World Health Organization

Eastern Mediterranean Region

Health and well-being profile of the Eastern Mediterranean Region

An overview of the health situation in the Region and its countries in

2023

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Contents

Foreword ix

Acknowledgements x

Acronyms and abbreviations xi

Executive summary xiv

1 Introduction 1

1.1 Global context 1

1.2 Regional context 2

1.3 Overview of the regional health profile 3

2 Promoting health and well-being 5

2.1 Health and well-being 5

2.2 Health literacy 5

2.3 Community engagement and inclusion 6

2.4 Health-in-All-Policies 6

2.5 Healthy Cities, a multisectoral platform to promote health and well-being 7

2.6 Global Health for Peace initiative 8

3 Social and environmental determinants of health and inequalities 9

3.1 Social determinants of health that drive health inequalities 9

3.2 Gender and health 10

3.3 Environmental risk factors 12

3.3.1 Air pollution 12

3.3.2 Water and sanitation 14

3.3.3 Chemical safety and unintentional poisoning 15

3.4 Food safety 16

4 Double burden of malnutrition 18

4.1 Stunting, wasting and overweight in children 18

4.2 Breastfeeding 20

4.3 Overweight and obesity 21

4.4 Anaemia among women of reproductive age 22

4.5 Multisectoral action to address malnutrition in all its forms 23

5 The burden and risk factors of NCDs 24

5.1 The burden of NCDs 24

5.2 Tobacco 26

5.3 Physical activity 28

5.4 Dietary intake 29

5.5 Alcohol 30

5.6 Surveillance and evaluation of NCDs and their risk factors 31

6 Management and control of priority NCDs 32

6.1 Diabetes 32

6.2 Cardiovascular diseases (CVDs) and hypertension 33

6.3 Cancer care and services 35

6.4 Asthma and chronic respiratory diseases 36
6.5 Oral health 36

7 Mental health and substance use disorders 38
7.1 Mental disorders 38
7.1.1 Strategic approaches: Regional framework for scaling up mental health in countries of the Region 39
7.1.2 Addressing the treatment gap 39
7.2 Substance use disorders 40

8 Accidental and violent injuries and disability 42
8.1 Burden of injuries and violence 42
8.2 Road traffic injuries 42
8.3 Gender-based violence 43
8.4 Violence against children 44
8.5 Disability 45
8.5.1 People living with disabilities 45
8.5.2 Sensory functions 46
8.5.3 Addressing disabilities in the Region 47

9 Migration and refugees 49
9.1 Policy and legislative response to health issues of migrants and refugees 49
9.2 Inclusive health information systems for migrants and refugees 50
9.3 UHC and financial protection for migrants and refugees 51
9.4 Protecting the health and well-being of migrants and refugees, with a focus on women, children and adolescents 52
9.5 Addressing NCDs and mental health among migrants and refugees, with focus on community-based initiatives 52

10 The COVID-19 pandemic – achievements, challenges and lessons learned 54

11 Health emergencies 58
11.1 Regional situation 58
11.2 Prevention and mitigation 59
11.2.1 Epidemic prevention campaigns 60
11.2.2 Public health laboratories 60
11.3 Preparedness 61
11.3.1 International Health Regulations 61
11.3.2 PHEOCs 62
11.3.3 One Health 62
11.3.4 Risk communication and community engagement 63
11.4 Detection and monitoring of public health events 63
11.5 Response to and early recovery from emergencies 64
11.5.1 Supporting and rebuilding health systems in countries affected by conflicts 64
11.5.2 Mental health and psychological support in emergencies 65

12 Elimination and eradication of vaccine-preventable diseases 67
12.1 Cross-cutting messages on disease burden across communicable diseases 67
12.2 Enhancing vaccination coverage 67
12.3 Re-emergence of vaccine-preventable diseases – the case of measles 70
12.4 Polio eradication and the transition agenda 71
12.5 Lessons learned from COVID-19 response in the rapid expansion of vaccination and impact on expanded programmes of immunization 72
12.6 Status and response to cholera epidemics 72

13 Priority communicable diseases 74
13.1 Tuberculosis 74
13.2 HIV 76
13.3 Hepatitis 78
13.4 Sexually transmitted infections 79
13.5 Mpox 80
13.6 Neglected tropical diseases 80
13.7 Influenza and respiratory tract infections 82
14 Zoonotic and vector-borne diseases 84
14.1 Avian influenza 84
14.2 MERS-CoV 85
14.3 Rabies, brucellosis, Ebola and Rift Valley fever 85
14.4 Malaria 86
14.5 Dengue 87
14.6 Chikungunya, yellow fever, West Nile virus disease, CCHF and leishmaniases 88
15 Antimicrobial resistance 89
15.1 Development of national action plans on AMR 90
15.2 Surveillance of AMR, use and consumption 90
15.3 IPC programmes 91
15.4 Antimicrobial stewardship 91
15.5 Education and awareness 92
16 Promoting health across the life course 93
16.1 Sexual and reproductive health and rights 93
16.1.1 Fertility and infertility 93
16.1.2 Maternal and perinatal mortality 94
16.1.3 Pregnancy, delivery and postnatal services 95
16.1.4 Female genital mutilation (FGM) 96
16.1.5 Improving sexual and reproductive health and rights 96
16.2 The health of newborns and children under 5 97
16.3 Adolescent health, fertility and development 127
16.4 Healthy ageing and health for older people 129
17 Health system governance 106
17.1 Reshaping the role of ministries of health in UHC and health security 106
17.2 Essential public health functions promotion and protection 107
18 Service delivery, quality and organization of care 109
18.1 Primary health care and family practice 109
18.2 Hospital care management 110
18.3 Model of care, integrated service delivery and referral systems 111
18.4 Health care quality and patient safety 111
18.5 Private sector role and regulation 112
18.6 Rehabilitation services 113
18.7 Emergency and trauma care services 114
18.8 Palliative care and services 115
18.9 COVID-19 response and lessons learned for service delivery 115
19 Health financing and financial protection 117
19.1 Progress and challenges in health financing and financial protection 117
19.2 Financial protection for achieving UHC 119
19.3 Expansion of health insurance in the countries of the Region 120

20 Health workforce 121
20.1 Regional and global density of physicians, nurses and midwives 121
20.2 Policy and regulatory frameworks on health workforce development 122
20.3 Health workforce information 123
20.4 Quality of health workforce training and the role of academia 123
20.5 Protecting and safeguarding health workforce in emergencies and at all times 124
21 Access to medicines, vaccines and health products 125
21.1 Enhancing regulatory status of national authorities for medicines and vaccines 126
21.2 Production capacity of vaccines in response to COVID-19 127
21.3 Policy and evidence-based selection of medicines 127
21.4 Use of health technology assessments 128
21.5 Access to assistive technology 128
21.6 Medical devices 129
21.7 Blood and other products of human origin 129
22 Digital health 131
22.1 Role of digital health in future of health systems 131
22.2 Lessons learned from the expansion of digital health in response to the COVID-19 pandemic 133
22.3 Digital health as a tool for achieving UHC and SDGs 134
23 Health data and health information systems 137
23.1 Health information system as the backbone of a functioning health system 137
23.2 Initiatives for establishing and strengthening effective health information systems 137
23.2.1 Civil registration and vital statistics 137
23.2.2 Routine HIS 139
23.2.3 PHC and integrated disease surveillance 139
23.2.4 Hospital information systems 140
23.2.5 Interoperability and linkages between information systems 141
23.3 National household and facility surveys 142
23.4 Comprehensive HIS assessment as tool for strategic planning for national progress 142
24 Research capacity and governance for health 144
24.1 Research governance 144
24.2 Funding and capacity for health research 145
24.3 Research ethics 146
24.4 Research impact and its role in policy-making 146
25 Institutionalizing evidence-informed policy-making 148
25.1 Multiconcept approach for institutionalizing evidence-informed policy-making at the national level 148
25.2 The Network of Institutions for Evidence and Data to Policy 148
25.3 Use of data and evidence for policy 149
25.4 Enhancing technical capacity and partnership for evidence-informed policy-making 150
25.5 Lessons learned from country experiences in use of evidence in decision-making in response to the COVID-19 pandemic 150
26 Coordination and collaboration among United Nations agencies and other partners 152
27 Conclusion 155
References 157

List of figures

Fig. 1. WHO's five priorities aligned with the triple billion targets and strategic functions 1
Fig. 2. UHC service coverage index, 2019 3
Fig. 3. Gender Inequality Index indicators for countries of the Eastern Mediterranean Region, 2021 11
Fig. 4. Age-standardized mortality rate attributed to household or ambient air pollution per 100 000 population, 2019 13
Fig. 5. Prevalence of stunting (% height-for-age <–2SD), wasting (% weight-for-height <–2SD) latest estimates and overweight (% weight-for-height >+SD), among children under 5 in the Region, 2020 19
Fig. 6. Prevalence of exclusive and early initiation of breastfeeding in the Region, latest estimates 20
Fig. 7. Age-standardized prevalence (%) of overweight and obesity among adults (18 years and above) in the Region, 2016–2020 21
Fig. 8. Prevalence of anaemia among women of reproductive age (15–49 years) (%), 2019 22
Fig. 9. Age-standardized mortality rates of communicable diseases and NCDs, 2019 24
Fig. 10. Probability of dying from any cardiovascular disease, cancer, diabetes or chronic respiratory disease aged between 30 and 70 (inclusive) (%), by sex, 2019 25
Fig. 11. Age-standardized prevalence (%) of tobacco use among persons aged 15 years and older, 2019 26
Fig. 12. Tobacco use among adolescents (13–15 years) (%), 2016–2019 27
Fig. 13. Insufficient physical activity (%) among adults (18 years and above) in selected countries, 2016–2021 29
Fig. 14. Age-standardized prevalence of raised blood glucose among adults (18 years and above), 2016–2021 32
Fig. 15. Proportion of NCDs contribution to mortality in the Region, 2019 33
Fig. 16. Age-standardized prevalence of raised blood pressure among adults (18 years and above), 2016–2021 34
Fig. 17. Incidence of cancer, 2020 35
Fig. 18. Global prevalence of mental disorders, 2022 38
Fig. 19. Percentage of children experiencing violent discipline in selected countries of the Region 44
Fig. 20. Dubai Logistics Hub request status, 2015–2022 57
Fig. 21. Measles incidence per 1 000 000 population, 2021 68
Fig. 22. Coverage of DTP3 and measles (MCV1 and MCV2) vaccination (%), 2021 69
Fig. 23. Measles incidence per million population, 2013–2022 70
Fig. 24. TB incidence per 100 000 population, 2021 74
Fig. 25. TB treatment success rate of new and relapse TB cases notified (%), 2020 75
Fig. 26. Percentage change in estimated new HIV infections by WHO region, 2012–2022 76
Fig. 27. HIV cases by status of care in the Region, 2021 77
Fig. 28. HBV cascade of care in the Region, 2020 79
Fig. 29. Women of reproductive age (15–49 years) who have their need for family planning satisfied with modern methods (%), 2021 93
Fig. 30. Maternal mortality in the Region, 2000 and 2020 95
Fig. 31. Neonatal and under-5 mortality rates (deaths per 1000 live births), 2021 98
Fig. 32. Children under 5 (%) with diarrhoea treated with oral rehydration therapy, 2016–2021 100
Fig. 33. Exclusive breastfeeding (%) 0–5 months of age, 2017–2021 101
Fig. 34. Adolescent fertility rate per 1000 girls aged 15–19 years, 2016–2021 103
Fig. 35. Domestic general government health expenditure (GGHE-D) as percentage of general government expenditure (GGE), 2016–2021 118
Fig. 36. Out-of-pocket spending as a share of the current health expenditure in the Region, 2017–2020 119
Fig. 37. Density of physicians, nurses and midwives, 2018–2021 121
Fig. 38. Availability of essential medicines (%) in public and private health facilities in selected countries, 2019–2021 126

Fig. 39. Reported number of countries that have adopted digital health applications 132
Fig. 40. Birth, death and completeness of cause of death registration (%), 2017–2021 138
Fig. 41. Implementation of comprehensive HIS assessment for strategic planning in the countries of the Region, 2016–2022 143
Fig. 42. Integrated multiconcept approach for evidence-informed policy-making for health 148

List of tables

Table 1. Regional and global DTP, measles and pneumococcal conjugate vaccination coverage, 2021 68
Table 2. Digital health service provision in the Region during the COVID-19 pandemic 134
Table 3. Summary of strategic objectives and proposed activities in the regional strategy 137

Foreword

Improving the health and well-being of people in our Region is a vision shared by WHO and its Member States. Countries of the Region vary greatly in terms of level of development, income and health status, from among the world's wealthiest to some of the least developed. Some countries are struggling to control the threat of infectious diseases, and all are battling against the surge in noncommunicable diseases. Conflict, natural disasters and political instability place tremendous challenges on under-resourced health systems in the Region. We have a shared responsibility to uphold the dignity and right to health of all people, irrespective of background or borders. Our vision also aims to address health emergencies and promote the transition to health, to foster peace and to promote healthier populations through multisectoral action, leaving no one behind.

The first *Health and well-being profile of the Eastern Mediterranean Region, 2020,* was published during the first year of the COVID-19 pandemic, which tested health care systems regionally and globally. The first profile provided an opportunity to review the health situation in the Region and assess opportunities and challenges. The pandemic highlighted the importance of health within the overall context of socioeconomic development. All countries took a whole-of-government and whole-of-society approach to minimize the impact of the pandemic and embraced opportunities to build stronger, more resilient health systems.

This second *Health and well-being profile of the Eastern Mediterranean Region, 2023,* presents the progress made in achieving WHO's regional vision and strategy during the period in question. It provides a more in-depth analysis of the health situation in the countries of the Region. While overall progress towards universal health coverage is not on target, the report shows how countries are drawing on important lessons learned from the pandemic in strengthening their health systems. It also includes new topics such as digital health, evidence-informed policy-making and zoonotic and vector-borne diseases.

In the report *Advancing health for all by all*, WHO provided a status update on many different programmes and initiatives. We also released *Progress on the health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2023,* which documented a marked slowdown across many of the health-related targets and indicators.

This report presents the current health situation in the Region which I hope will help countries, WHO and our partners to strengthen investments in building health systems that deliver essential health services accessible to all and resilient to future emergencies. It will also act, together with the other reports, as a baseline to guide action on the three regional flagship initiatives: expanding access to medical products; investing in a resilient health workforce; and accelerating public health action on substance use.

Dr Hanan Balkhy
WHO Regional Director for the Eastern Mediterranean

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Acronyms and abbreviations

AA-HA!	Accelerated Action for the Health of Adolescents
AFP	acute flaccid paralysis
AMR	antimicrobial resistance
ATACH	Alliance on Transformative Action on Climate Change and Health
CFR	case-fatality rate
CCHF	Crimean-Congo haemorrhagic fever
COPD	chronic obstructive pulmonary disease
COVAX	COVID-19 Vaccines Global Access initiative
CVD	cardiovascular disease
cVDPV	circulating vaccine-derived poliovirus
DALY	disability-adjusted life year
DTP	diphtheria-tetanus-pertussis
EPHFs	essential public health functions
FAO	Food and Agriculture Organization of the United Nations
FGM	female genital mutilation
FCTC	Framework Convention on Tobacco Control
GATS	Global Adult Tobacco Survey
GBV	gender-based violence
GCC	Gulf Cooperation Council
GLASS	Global Antimicrobial Resistance Surveillance System
GSHS	Global School-based Student Health Survey
GYTS	Global Youth Tobacco Survey
HBV	hepatitis B virus
HCV	hepatitis C virus
HIS	health information systems
HIV	human immunodeficiency virus
HPS	health-promoting schools
HPV	human papillomavirus
ICOPE	Integrated Care for Older People
ICD	International Classification of Diseases
ICU	intensive care unit
IDP	internally displaced persons
IHR (2005)	International Health Regulations (2005)
IMST	Incident Management Support Team

IOM	International Organization for Migration
IPC	infection prevention and control
ITU	International Telecommunication Union
JEE	joint external evaluation
LMICs	low- and middle-income countries
MCV	measles-containing vaccine
MERS-CoV	Middle Eastern respiratory syndrome coronavirus
mhGAP	Mental Health Gap Action Programme
MRSA	Methicillin-resistant *Staphylococcus aureus*
NCDs	noncommunicable diseases
NO_2	nitrogen dioxide
PCR	polymerase chain reaction
PM	Particulate matter
PHC	primary health care
PHEOCs	Public Health Emergency Operations Centres
PHSM	public health social measures
RCCE	risk communication and community engagement
RSV	respiratory syncytial virus
SDG	Sustainable Development Goal
SHINE	School Health Implementation Network
STEPS	WHO STEPwise approach to Surveillance
STI	sexually transmitted infections
TAPS	tobacco advertising, promotion and sponsorship
TB	tuberculosis
UHC	universal health coverage
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UN Women	United Nations Entity for Gender Equality and the Empowerment of Women

VDPV	vaccine-derived poliovirus
WASH	water, sanitation and hygiene
WFP	World Food Programme
WHO	World Health Organization
WHO FCTC	World Health Organization Framework Convention on Tobacco Control
WOAH	World Organisation for Animal Health

Executive summary

In 2015, the 2030 Agenda for Sustainable Development was adopted by all Member States of the United Nations. Rapid progress on health indicators, which had gained momentum in 2000, has stalled since 2015 with rising rates of maternal and child mortality, premature mortality from NCDs and road traffic mortality. The 767 million people of the Eastern Mediterranean Region represent almost 10% of the global population. The Region includes many countries facing high rates of material and financial deprivation exacerbated by the COVID-19 pandemic, socioeconomic challenges, including access to education and health care, gender and geographical inequity concerns, environmental risk factors, natural disasters and conflicts and protracted humanitarian crises in several countries of the Region. The documented slowdown across many health-related indicators of the Sustainable Development Goals (SDG) calls for a more strategic approach to reverse regional trends and address upstream issues such as risks and determinants of health.

Protecting and promoting health

Member States in the Region are committed to building effective partnerships and planning coordinated collective actions to facilitate whole-of-government and whole-of-society approaches to promote health. Several countries have developed Health-in-All-Policies strategies to advance towards universal health coverage. Countries in the Region are committed to enhancing community engagement; 13 have a form of community health worker programme and 109 cities are part of the Healthy Cities network. Regional evidence indicators show a low level of health literacy among adults and young populations; improving health literacy is a critical approach to empowering individuals to take an active role in improving their own health.

Evidence demonstrates marked health inequities in the Region across the whole social gradient that are evident in maternal and child health outcomes, in lifestyle and behaviours which cause noncommunicable disease (NCDs) and ill health, including undernutrition, in rates of obesity and smoking and in coverage of health services. Like other regions, gender-assigned roles and behaviours are associated with different risks and exposures to risk for women and men and for girls and boys. Primary health care (PHC) can contribute to increasing the coverage of maternal and child health interventions and reducing gaps between the richest and poorest in many countries of the Region. Gender mainstreaming can ensure equal access to resources for women and men and for girls and boys. Improving the availability of disaggregated data will provide the critical evidence needed to examine geographical, income- and gender-related inequality to reduce inequities and inform policy action.

The Region is facing a wide range of environmental challenges, such as water scarcity, depletion of arable land, air pollution, inadequate waste management and climate change. Air pollution in urban areas is higher than the global rate, causing about 390 000 premature annual deaths and other health burdens that disproportionately affect the poor, women, children and older people. Projections suggest that the Region will be that second-most affected by climate change. The health impacts of climate change include excess heat-related morbidity and mortality, increased incidence of heat exhaustion and heat stroke, and increased prevalence of NCDs. There are some signs of progress in starting to address climate change and health, with some countries making commitments and setting targets.

The Region faces a double burden of malnutrition – encompassing undernutrition, overweight, obesity and diet-related NCDs. In 2020, one in four children in the Region were stunted. Out of 13 countries in the Region for which data were available, nine may not meet the global target of reducing childhood wasting to less than 5% by 2025. In the Region as a whole, as many as one in five children under the age of five is overweight. The prevalence of overweight is also increasing in adults, from 38.5% in 2000 to 49% in 2016.

Preventing and managing noncommunicable diseases and mental health

NCDs are the main cause of death in nearly all countries of the Region and were responsible for 2.8 million deaths in 2019. Countries are scaling up efforts in implementing measures to address the key risk factors. For example, four countries tax tobacco to the recommended levels and 11 countries have implemented taxes on sugar-sweetened drinks; two countries require plain packaging on all cigarette packages while another 12 have adopted graphic warnings; almost all countries have a national physical activity policy and 13 countries have a policy to reduce salt/sodium consumption. Countries are also at different stages of preventing and controlling NCDs. Many have a national intersectoral mechanism for addressing NCDs and have conducted surveys among adults and adolescents. Half the countries of the Region have an operational policy, strategy or plan of action for diabetes and eight countries have one on cancer control. Many countries are implementing WHO tools and frameworks to strengthen NCD management in primary care. However, improving implementation of the 19 strategic interventions of the regional framework for action on NCDs is needed if countries are going to successfully reduce premature deaths due to NCDs by one third by 2030.

In 2019, 13.53 million disability-adjusted life years (DALYs) were lost in the Region due to mental disorders, 26.4% more than that estimated in 2015. Few countries in the Region are meeting the nine targets of the *WHO Comprehensive Mental Health Action Plan, 2013–2030*. Although most countries report having updated policies and mental health laws and plans and have guidelines for the integration of mental health into PHC, rates of psychosocial and pharmacological interventions remain limited, the median number of mental health workers (8.0 per 100 000 population) is much lower than the global median (13.6 per 100 000 population) and there are low levels of public expenditure on mental health. The COVID-19 pandemic brought increased attention to mental health and psychosocial support. The available evidence indicates that substance use varies and is prevalent in between 1% and 6% of the adult population in countries of the Region, with only one in 13 people receiving treatment, partly due to the limited number of trained personnel.

Addressing violence, injuries and disabilities

Contrary to global trends, total deaths due to violence and injury are rising and reached over 400 000 in 2019. The estimated number of direct deaths from major conflicts in the Region is about 10 times higher than the global rate (Region: 24.1 versus world: 2.5 per 100 000 population). The Region has the third highest mortality rate due to road traffic accidents among WHO regions (18 deaths per 100 000 population in 2016); the victims are mostly men, and younger and economically active populations are hardest hit. Almost all countries have road safety laws addressing key road safety behavioural risk factors but they usually lack best practice criteria, and the level of enforcement is weak in a third of the countries in the Region.

The Region has the third highest prevalence (31%) worldwide of physical and/or sexual intimate partner violence and more than 80% of children aged 1–4 experience violent discipline in several countries in the Region. In response, several countries have mainstreamed the prevention of gender-based violence in national sexual and reproductive health strategies and/or developed policies and programmes to respond to the needs of survivors of such violence, and most countries have laws and a national action plan to prevent violence against children. Expanding and scaling up these efforts through stronger policies, better implementation and strengthening national capacity in detecting and responding to such violence are key to ending gender-based violence and violence against children.

The estimated prevalence of disabilities in the Region is about 15% and is increasing, but there is widespread underreporting. Rising population numbers, ageing populations and chronic health conditions are global reasons for the increasing prevalence of disability; the protracted and widespread violent conflicts, wars, emergencies and variable safety standards in the Region are additional risks. The findings of a regional assessment of disability inclusion in health responses to COVID-19 revealed that disability inclusive health services promote better health and greater equity for persons with disabilities.

Migrants and refugees

The Region is host to the largest number of refugees of all the WHO regions. The limited available evidence indicates that they are at risk, as are host populations, of acquiring infectious diseases and developing longer term conditions, such as NCDs and mental health disorders. They also may be suffering from conditions requiring ongoing treatment. Migrants travelling for work are usually men of working age, while refugees are predominantly children, young people and women of reproductive age; thus, their health needs may vary. Most countries in the Region offer some level of health care; some countries have a national policy offering free access to PHC for refugees and migrants while others require that employers cover the health care of migrant workers. Several countries in the Region have taken high-level policy measures to promote refugee- and migrant-sensitive health policies providing legal and social protection and interventions, but implementation presents significant gaps in some countries.

COVID-19 pandemic and health emergencies

By the end of 2022, almost 23 million cases of COVID-19 and about 350 000 associated deaths had been reported in the Region. Over the three years of the pandemic, countries in the Region made significant progress in implementing priority activities under their preparedness and response plans. One of the key achievements in the Region was the rapid scale-up of laboratory capacities to test for COVID-19, from less than 30 to over 2500, and sequencing capacity increased from only 10 countries at the onset of COVID-19 to 21 countries by the end of 2022. Additionally, the WHO logistics hub became a major asset for the Region and the world, delivering shipments of life-saving supplies to 127 countries across all six WHO regions.

The Region is confronted with multiple emergencies from all hazards – natural, biological, societal (including armed conflict) and technological – resulting in a high burden of morbidity and mortality. Worsening insecurity and displacement, the COVID-19 pandemic and severe economic decline have contributed to an enormous level of need and vulnerability. The public health catastrophe in the occupied Palestinian territory (including East Jerusalem) has serious

implications on peace and security in the Region. Attacks on health care are a concerning feature of conflicts across the Region. Despite the most challenging operating environments in multiple conflict zones, the collective response by ministries of health, WHO and partners regularly met international humanitarian and public health standards.

The Region faces serious threats from emerging and re-emerging infectious diseases. Climate change, conflict, forced displacement and antimicrobial resistance are increasing the risk of outbreaks. Progress is being made in implementing the regional framework for their prevention, including the establishment of rapid response teams in all countries and the creation of the Early Warning Alert and Response Network in eight fragile conflict-affected countries.

The annual self-assessment of International Health Regulations (IHR 2005) core capacities has remained relatively unchanged in the last few years. Nevertheless, most countries are beginning to review their national action plans for health security based on lessons learned from the COVID-19 pandemic; these are of particular importance as the Region is home to some of the world's largest mass gatherings. Progress is also being made in identifying priority health threats as the basis for developing One Health national operational plans.

Eliminating and eradicating high-impact communicable diseases

As in other parts of the world, COVID-19 has negatively impacted immunization coverage; more than 2 million children missed first doses of the diphtheria, pertussis and tetanus vaccine, and more than 3 million had missed the second dose of measles vaccines by 2021 resulting in outbreaks of vaccine-preventable diseases in several countries of the Region. Nevertheless, expanding immunization coverage including supplementary immunization campaigns and mass vaccination campaigns have been conducted. In addition, countries are introducing new vaccines including *haemophilus influenzae* type B, pneumococcal conjugate and rotavirus vaccines.

Wild poliovirus transmission is at its lowest levels and is limited to a few zones in Afghanistan and Pakistan. Countries with endemic status and those considered at risk have taken measures to contain the problem, including supplementary immunization activities with focus on high-risk and hard-to-reach areas. Eight countries are the priority for post-eradication transition planning, which includes using polio assets to improve routine immunization that is crucial to sustain gains in polio eradication.

Some progress is being made on the priority communicable diseases: tuberculosis (TB), HIV, hepatitis, neglected tropical diseases, influenza and respiratory tract infections. Between 2015 and 2020 in the Region, declines of estimated TB incidence (4.9%) and TB deaths (6.2%) fell short of the End TB Strategy 2020 milestones of 20% and 35% reductions, respectively. The Region is experiencing the fastest-growing HIV epidemic of all WHO regions, with a doubling in the number of people living with HIV since 2012 compared with only a 24% increase globally. Only 41% of people living with HIV have been diagnosed, 27% are on treatment and 24% are virally suppressed. Oman became the first country in the Region to have eliminated mother-to-child transmission of HIV and syphilis; however, the Region as a whole has seen slow progress, with only 1500 of pregnant 6700 women living with HIV receiving the needed treatment.

The Region faces a high risk of emergence of zoonotic and vector-borne diseases due to its topography, complicated geopolitical situation, large religious and sporting mass gathering

events and other socioeconomical factors. Over the last few decades, at least 11 countries have reported major outbreaks and epidemics of zoonotic and vector-borne diseases with the potential to spread globally, including avian influenza A (H5N1), Middle East respiratory syndrome (MERS), malaria and dengue.

Misuse and overuse of antimicrobial medicines in humans and animals and in food production and inadequate infection prevention and control programmes are among the main factors contributing to the growth of antimicrobial resistance (AMR) globally. These risks are exacerbated by political instability, vulnerability to natural disasters, fragmented and/or destroyed health care infrastructure, inadequate infrastructure to regulate the use of antibiotics; limited local data and evidence, and inadequate awareness across all levels among other reasons. All 22 countries/territories of the Region have developed national action plans on AMR; the challenge now is implementation.

Promoting reproductive, maternal, child and adolescent health

The maternal mortality ratio, under-5 mortality rate and neonatal mortality rates have dropped significantly in the past 20 years. Nevertheless, a quarter of the countries in the Region are at risk of achieving the 2030 global targets. Many countries are adapting WHO guidelines to improve sexual and reproductive health and rights. Most countries are adopting the WHO-recommended eight-contact model into their routine practice and five countries have adopted the Robson classification system to monitor and optimize the use of caesarean section. Countries are committed to implementing a regional framework that follows an integrated multisectoral approach to implement interventions addressing reproductive, maternal, infant and child health both within the health sector as well as outside it in areas such as education, water and sanitation.

Child and adolescent mortality rates in the Region are the second highest among WHO regions. Collective violence and legal interventions and road traffic injuries are the leading causes of death. The leading causes of DALYs among adolescents in the Region are mental illnesses, substance use and nutritional deficiencies (particularly iron deficiency). Unhealthy lifestyle and risky behaviours are highly prevalent in the Region: the prevalence of tobacco use among school children aged 13–15 years is 43% among boys and 35% among girls in the countries reporting the highest levels.

Building health systems

Effective governance is critical to achieving universal health coverage (UHC), demanding that ministries of health not only manage health services and institutions but also lead multisectoral approaches to promote health and well-being and predict, and be prepared to respond to, future challenges. Both UHC and health security are essential for a health system to serve the needs of all people at all times. The COVID-19 pandemic renewed commitment to building public health capacities focusing on essential public health functions. However, the Region is a low investor in financing health care, accounting for about 2% of the global health expenditure for close to 10% of the world's population. Low public spending has led to a high share of private spending, with the average out-of-pocket expenditure on health around 40%. Prepayment mechanisms and using public funds are ways countries in the Region have tried to improve financial risk protection.

Despite the Region's strong commitment to PHC, coverage of essential health services is under 70% in many countries following disruptions to essential health services during the COVID-19 pandemic. The rapid expansion of the private health sector, ensuring financial protection, changing demography and health technologies, and protracted complex emergencies are key challenges to implementing PHC in countries of the Region.

The density of the health workforce in the Region is less than the global average, especially for nurses and midwives, but varies between countries despite improvements in the past few decades. Governance capacities remain limited to address health workforce challenges such as imbalances in skill mix and geographical distribution, insufficient workforce to deliver primary care and essential public health functions, and limited production and employment capacity.

Many low- and middle-income countries suffer from a shortage of essential medicines in both public and private facilities. Most countries have a national regulatory authority but many lack capacities to assess and regulate biological products. Nevertheless, good achievements are being made. Most countries have a national medicines policy and a recently updated national essential medicines list. Many countries have legal provisions prohibiting dispensing prescription medicines without a prescription.

Data and science for health

Digital technologies are increasingly being recognized and used as a key tool to expand access to services in the Region. The majority of countries of the Region have some relevant policies, strategies and/or legislation in place; however, a minority of countries fully realized the potential of digital health applications during the COVID-19 pandemic. Accurate, timely and comparable health-related statistics are indispensable for understanding population health trends. However, in many countries of the Region the routine health information systems do not perform efficiently and surveys are used as stopgaps rather than in a preplanned and systematic manner, resulting in data gaps for many key health-related indicators. In the past 10 years, there has been notable improvements in health information systems including in the registration of births and deaths and the adoption of the 11th revision of the International Classification of Diseases (ICD-11) and the Integrated Disease Surveillance system by many countries. However, challenges remain in achieving the interoperability of health information systems and implementing long-term plans for national household and facility surveys. The recent assessments of health information systems conducted in several countries of the Region have paved the way to developing strategies and costed national plans to improve the quality and availability of data for decision-making.

Establishing a national strategy for health research, ensuring research addresses the health priorities, increasing investment in research funding and strengthening research ethics and governance capacities are critical steps to building evidence to guide strengthening health systems and improving public health.

Ongoing efforts are being made to build the capacity of researchers and policy-makers and to institutionalize evidence-informed policy-making in countries of the Region. Despite an increasing trend in biomedical and health research in the Region, it often is not well-aligned to national health research priorities. Most countries of the Region lack national health technology assessment programmes. Even when these exist, they are not necessarily effectively employed

in the decision-making processes. The COVID-19 pandemic revealed the necessity of sufficient processes and capacities to ensure countries can use the best available evidence in national policy-making to effectively respond to the emergency.

Partnering for health

WHO has made extensive effort to strengthen action in all areas of health system and care delivery, addressing the risk factors and promoting health, and in preventing, preparing for and responding to the emergencies. Partnership and collaboration in line with the regional Vision health for all by all have been the cornerstone of the WHO approach. In 2020, WHO launched the Regional Health Alliance, to harmonize action between regional partners to support progress on the health-related SDGs and implement the *Global Action Plan for Healthy Lives and Well-being for All*.

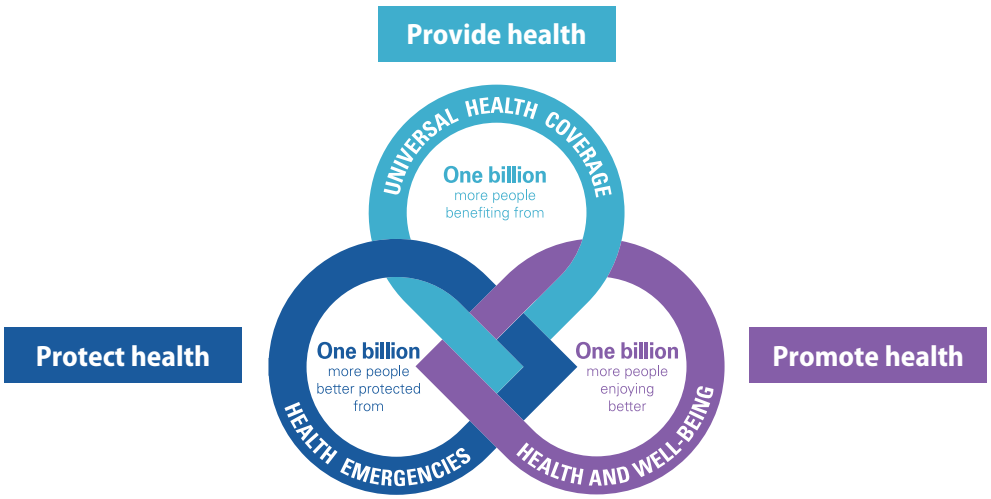
1 Introduction

1.1 Global context

Health and well-being are central concepts in the UN Agenda for Sustainable Development. The rapid progress on health indicators that gained momentum at the turn of the century has stalled since 2015, with falling rates of reduction in maternal and child mortality, premature mortality from noncommunicable diseases (NCDs) and road traffic mortality globally *(1)*. Despite high-level political commitment to the Sustainable Development Goals (SDGs), the second report on the *Progress on the health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region 2023* documented a slowdown across many of the health-related indicators in spite of some successes at country level *(2)*.

WHO's five-year plan and its triple billion targets set out an ambitious vision to recover from the impact of multiple crises and deliver measurable impact in countries to achieve the SDGs. This plan includes five focus areas to accelerate progress sustainably and equitably (Fig. 1). These five priorities mark a paradigm shift towards promoting health and well-being and preventing disease by addressing root causes so as to accelerate progress on achieving the SDGs *(3)*.

Fig. 1. WHO's five priorities aligned with the triple billion targets and strategic functions



Power health		
Data, digital, and delivery for impact	Innovation in health products, services and finance	Partnership with multilaternal agencies, civil society and others
Perform for health		
Transform WHO to maximize impact at the country level		

Source: WHO, 2022 (3)

1.2 Regional context

The WHO Eastern Mediterranean Region comprises 22 countries/territories: Afghanistan, Bahrain, Djibouti, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, occupied Palestinian territory (including East Jerusalem), Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates and Yemen. With an estimated population of 767 million *(4)*, the Eastern Mediterranean is the least populated of the six WHO regions, representing almost 10% of the world's population. Seven out of 10 people in the Region live in cities and the average life expectancy at birth ranges from 56.5 years in Somalia to 81.0 years in Kuwait. In Arab countries, high rates of material deprivation and increasing financial pressures have been related to the socioeconomic impact of COVID-19 and the war in Ukraine, with rural households most affected *(5)*. Income inequity is much higher in the Middle East and North Africa compared with other parts of the world, and these areas lag behind in implementing pro-poor social and economic policies *(5, 6)*.

A prominent characteristic of the Region is its heterogeneity with respect to historical background, geopolitical and social context, ethnicity and languages spoken, gross domestic product, sociodemographic profiles, health indicators and health system capacities and coverage. The marked inequities between and within countries are associated with marked differences in mortality and morbidity between the highest and lowest wealth quintiles *(7)*. Even prior to the COVID-19 pandemic, income inequality was very high and several countries in the Region experienced declines in national income per person *(6)*. Many countries in the Region show gender disparities greater than the global average *(8)*. Although the average life expectancy in the countries of the Region increased to 69.7 years by 2019, it varies by country from under 60 years to over 80 years. While several countries have a maternal mortality ratio under 20 per 100 000 live births and many have reached an under-5 mortality rate of 25 deaths per 1000 live births, other countries of the Region have the highest maternal and child mortality rates globally. Vast differences are also observed in communicable diseases. While TB incidence is less than 10 per 100 000 population in several countries of the Region, rates above 100 per 100 000 population were reported in three countries *(7)*.

The protracted humanitarian crises in several countries in the Region have made the situation even more complicated. While the Region represents just under 10% of the world's population, it is home to around a third of the overall humanitarian burden globally, and is the source of more than half (55%)[1] of the world's refugees. During 2023, the Region continued to be affected by several emergencies including the hostilities in the occupied Palestinian territory, complex emergencies in Afghanistan, Somalia, Syrian Arab Republic and Yemen, earthquakes in Afghanistan and Morocco, floods in Libya and Somalia and droughts leading to a food security crisis in the Horn of Africa, which includes Djibouti, Somalia and Sudan.

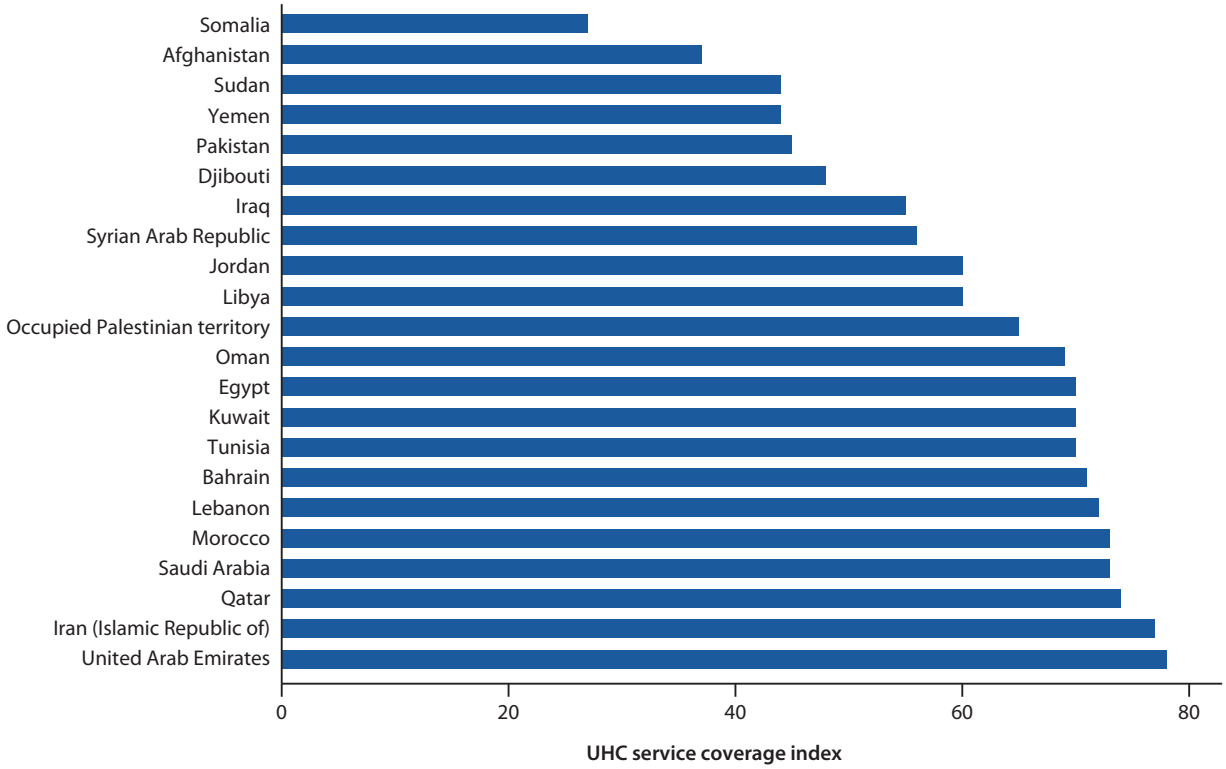
Underlying a large proportion of health issues in the Region are human interventions affecting the environment and people's health. Dam building, deforestation, poor water and land management have led to water scarcity, land degradation, desertification and sandstorms. Climate-change-induced extreme weather events have caused severe droughts and floods. Urbanization, lack of enforced regulations on industrial and vehicle emission standards, and unregulated use of fertilizers and pesticides in several countries in the Region are major drivers of air, water and soil pollution. These are some of the reasons why the Region has the highest annual mean

[1] This includes Palestinian refugees under the mandate of UNRWA who remain outside UNHCR's mandate

values of particulate matter among all WHO regions. Such high levels of particulate matter are associated with unsustainable development, urbanization and industrialization and infrastructure development. In terms of health impact, it is estimated that every year more than 854 000 people die prematurely due to living and/or working in unhealthy environments *(9)*. Ambient and household air pollution cause nearly 500 000 premature deaths annually as well as other health issues and disproportionately affect the poor, women, children and older people *(10)*.

Countries have demonstrated strong commitment for UHC by signing the UHC2030 Global Compact and endorsing the Salalah Declaration in 2018 *(11)*. However, progress on UHC has been slow; the Vision 2023 target of ensuring that 100 million more people are covered by 2023 was missed. The UHC service coverage index measures the coverage of essential health services based on 14 tracer interventions related to reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access *(12)*. Before the COVID-19 pandemic, the UHC service coverage index for the Region improved from 48 to 57 between 2010 and 2019, lower than the global average of 67. Although the index increased by 10 or more points in Egypt, Islamic Republic of Iran and Qatar, it stands at around 60 or less for 10 countries in the Region (Fig. 2). Evidence indicates that countries are making efforts to catch-up on service backlogs disrupted by the COVID-19 pandemic, recover services and respond to emerging needs *(13)*. However, very low levels of public spending on health, widespread poverty and shortages of trained health personnel in some countries of the Region are hampering efforts to make quality health services universally available and affordable.

Fig. 2. UHC service coverage index, 2019



Source: WHO (2021) (12)

1.3 Overview of the regional health profile

The first Health and well-being profile of the Eastern Mediterranean Region was published as the COVID-19 pandemic was beginning and documented countries' initial efforts to minimize the impact of the pandemic. Countries embraced opportunities to build a stronger, more resilient health system during its initial year *(14)*. The period included in this report and the data now available allow an in-depth analysis of the health situation in the countries of the Region. It complements the 2023 five-year WHO report, Advancing health for all by all, which provided the status of WHO work across the various public health programmes to achieve Vision 2023 *(15)*, and the 2023 SDGs progress report *(16)*. The 2023 regional health profile presents the latest evidence on the health status of the population in the Region and shares examples of national and regional efforts to address health challenges and strengthen health systems including important lessons learned from the pandemic.

The profile uses WHO publications, peer-reviewed literature and reports by other partners as main sources of information. It also uses data drawn from multiple sources including figures provided by WHO Member States (published on the Regional Health Observatory), the latest World Health Statistics publications, the WHO Global Health Observatory and estimates developed by United Nations agencies including WHO. Most data are from 2013 to 2022; however, a few indicators rely on data from 2007 to 2015.

2 Promoting health and well-being

2.1 Health and well-being

Ensuring healthy lives and promoting well-being for all at all ages is a key global commitment of the 2030 Agenda for Sustainable Development. Governments have a responsibility for the health of their people that can be fulfilled through a whole-of-society approach, multisectoral action and transformative approaches. Healthy societies are underpinned by a positive vision of health integrating physical, mental and social well-being, principles of human rights, inter-generational equity and peace, a focus on community empowerment, inclusivity and equity, and meaningful engagement and participation *(17)*.

The COVID-19 pandemic highlighted the need for promoting health and well-being to respond to ecological, political, commercial, digital and social determinants of health challenges. Following the World Health Assembly resolution on health and well-being proposed by United Arab Emirates in 2022, the Regional Committee affirmed their commitment to health and well-being as a key component for achieving UHC *(18)*. The WHO global framework on well-being describes key strategic directions for attaining healthy societies emphasizing the importance of building effective partnerships and coordinated collective actions to facilitate whole-of-government and whole-of-society approaches to promote the health of the population and the planet *(16)*.

2.2 Health literacy

Health literacy requires a level of knowledge, personal skills and confidence to improve personal and community health by changing personal lifestyles and living conditions *(19)*. Personal knowledge and competencies can be supported by organizational structures and access to information and services, to promote and maintain good health for themselves and people around them *(20)*. Increasing health literacy empowers individuals to take an active role in improving their own health; it is a critical component for realizing the SDGs.

A growing body of research in the Region indicates a low level of health literacy among adults and young populations, especially among women *(20–22)*. As in other parts of the world, health literacy is predicted by demographic and socioeconomic factors and has an impact on health behaviour. A case study conducted in a small Egyptian fishing community as part of the WHO National Health Literacy Demonstration Projects identified two sustainability outcomes: capacity-building of female nurses serving the community to distribute information as part of routine practice, and ongoing health education sessions in the community to raise awareness of health with provision of accessible educational materials (e.g. brochures, booklets) containing take-home messages for families *(20)*. Through community dialogue, the project also identified health literacy actions for the Government, NGOs, fishing syndicates, fishers and their families appropriate to the local context *(23)*. Sharing experience of local and national efforts to increase health literacy utilizing available toolkits would help pave the way to increasing health literacy in the Region *(24)*.

2.3 Community engagement and inclusion

The COVID-19 pandemic revealed the importance of enhancing community engagement to promote equity, build trust and sustain action. Engaging communities was key to successful protective interventions such as social distancing, mask wearing and COVID-19 vaccination. Community engagement has been key to understanding and supporting the needs of refugees and internally displaced persons (IDPs) *(24)*. A health equity and social inclusion project in Morocco and the occupied Palestinian territory (including East Jerusalem) through WHO support is an example of national interventions to increase community engagement *(24)*.

Community health workers are often advocates for community engagement and education in health. Community health worker programmes are especially important in the Region because of its high illiteracy rates, poor infrastructure in some areas and tight-knit communities that in some cases may lead to a lack trust in other government and nongovernmental structures. Strengthening community health worker programmes can be specifically important for improving health in areas such as maternal and child health, mental health and reducing the infectious disease burden. In the Region, 13 countries (Afghanistan, Egypt, Islamic Republic of Iran, Jordan, Kuwait, Morocco, Oman, Pakistan, occupied Palestinian territory (including East Jerusalem), Sudan, Syrian Arab Republic, Tunisia and Yemen) have a form of community health worker programme, some of which have been particularly successful *(25)*.

WHO is trying to enhance the capacity of community-based interventions by developing evidence-based tools and guidelines. For example, the Regional Office has developed a training package on promoting the health and development of neonates, infants and children up to five years of age at home for community health promoters *(26)*.

2.4 Health-in-All-Policies

The concept of multisectorality was raised at the time of the Alma-Ata Declaration of 1978, under "intersectoral coordination". It has grown to include the Health-in-All-Policies approach, which is key to achieving many health-related SDGs and targets. This systems approach to improve health and well-being embraces whole-of-government and whole-of-society mechanisms and platforms, which are key to address the challenges faced by the countries of the Region *(24)*. The Health-in-All-Policies approach supports generating and sharing collective knowledge for effective planning and implementation. This approach ensures that there are coherent, supportive policies within all sectors to promote health, including in emergencies and for critical subpopulations such as refugees and migrants.

A whole-of-society, whole of-government approach was key for countries in the Region to control and manage the COVID-19 pandemic *(27)*. Some countries, including Islamic Republic of Iran, Pakistan and Sudan, have developed Health-in-All-Policies strategies and are developing health systems governance institutional transformation plans to support their operationalization and advance towards UHC. Qatar is reorienting its health system by establishing well-being clinics that provide health promotion and well-being services. The city of Tunis is implementing a multisectoral urban governance project for health and well-being. The United Arab Emirates has adopted a National Strategy for Well-being *(24)*. Applying Health-in-All-Policies principles across sectors can ensure that basic needs to safeguard health and well-being are met *(18)*.

2.5 Healthy Cities, a multisectoral platform to promote health and well-being

The Region has two decades of experience in successful community-based initiatives that strengthen community involvement, ownership and leadership in sustainable community development and health improvement. Community-based initiatives include healthy settings such as: healthy villages; healthy cities; health-promoting schools and universities; healthy markets; healthy workplaces; and age-friendly cities. The common goal of these approaches is to create multisectoral platforms for political, physical, social and economic policies and multisectoral action for all relevant stakeholders and different segments of the community under a common vision for having a positive impact on the overall environment and quality of life. These community-based initiatives and healthy settings have been piloted and implemented in various forms in most countries of the Region. Despite successful implementation in some countries, the main challenge has been ensuring sustainability and commitment in order to scale up and expand implementation to other countries including countries experiencing emergencies.

Cities in the Region are facing several challenges such as environmental and transportation pollution, communicable diseases, NCDs, drug use, unemployment, inadequate access to clean water and sanitation, violence, sedentary lifestyles, mental illness, refugees and overcrowding. These challenges are aggravated by conflicts and political unrest. Urban health and healthy cities are the two main frameworks for developing health initiatives at city level. Healthy cities and health villages in the Region are based on multisectoral and community-based interventions under a common vision for health and well-being.

In response, the Region established the Healthy Cities programme, first initiated in the Islamic Republic of Iran. In 2012, the WHO Regional Office established the Regional Health Cities Network. Currently 109 cities have joined, from Afghanistan, Bahrain, Egypt, the Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Sudan, Tunisia and United Arab Emirates. The member cities are guided by the WHO Regional Office 80 indicators for implementing the Health Cities Programme under nine domains related to the social determinants of health and SDGs *(28)*. The Network has a dynamic website, and any city with the political commitment to take actions towards a healthy city can apply to join. The programme supports community engagement and organization, health development, access to safe water supply and sanitation, reduction of pollution, promotion of healthy lifestyles, income generation, education improvement and addressing women's issues and children's needs *(29)*.

During the past few years, the healthy cities and villages programme has been revitalized, mainly in Gulf Cooperation Council (GCC) countries and the Islamic Republic of Iran *(30)*. In Jordan, the Jordan Noncommunicable Disease Alliance has also begun work on creating healthy cities with a successful implementation in Amman in collaboration with Bloomberg Healthy Cities Network. To create more sustainable healthy cities in the Region, local communities must be involved in assessing needs, identifying priorities, designing, implementing and evaluating related plans and programmes to build local ownership and enhance sustainability *(31)*. In 2020, the Healthy Cities Department, Ministry of Health, Saudi Arabia was designated a WHO Collaborating Centre for Healthy Cities, the first one for the Region.

2.6 Global Health for Peace initiative

Conflict is a key determinant of health in the Region *(6)*. Guided by a strong partnership with the Ministry of Health of Oman, the Regional Office launched the regional Health for Peace Initiative

in 2019 to integrate conflict sensitivity and strengthen communities to address the impacts of insecurity and conflict in countries across the Region. In 2021, this regional work expanded into the Global Health for Peace Initiative aiming to strengthen the contribution of the health sector and WHO to community resilience and social cohesion through health programmes in conflict-affected and fragile settings by mainstreaming conflict sensitivity in its health programming. In Somalia, for example, psychosocial support and mental health care was integrated into primary health care (PHC) services to address the mental health needs of conflict-affected youth.

A draft roadmap for the Global Health for Peace Initiative developed in consultation with Member States, observers and other agencies of the UN system was approved at the 76th World Health Assembly in May 2023 *(32)*. It aims to promote and design health programmes that are sensitive to peace and conflict dynamics and, where appropriate, that seek to contribute to improving the prospects for peace – in collaboration with national and international stakeholders and under the leadership of national health authorities.

3 Social and environmental determinants of health and inequalities

3.1 Social determinants of health that drive health inequalities

Despite the efforts described in Sections 1 and 2, there has been limited progress in addressing the social determinants of health in the Region. Vision 2023 advocates for action in non-health sectors and addressing the social determinants of health as a priority. Regional mapping, assessment tools and a regional framework on the social determinants of health are needed to provide more robust support to countries *(33, 34)*. WHO has responded to the challenge by establishing a Commission on Social Determinants of Health in the Eastern Mediterranean Region. The Commission was jointly convened by the Regional Office for the Eastern Mediterranean, the Alliance for Health Policy and Systems Research and the Institute of Health Equity at University College London. The Commission worked to establish in the Region a comprehensive evidence base of health inequities and factors that drive such inequities, and to assess practical ways of addressing these within the context of countries in the Region, including those facing conflicts and emergencies.

The Commission started its work in late 2019 and concluded it in 2021. As it was convened before the start of the COVID-19 pandemic, the Commission's original year-long timeline was extended to be able to track some of the impacts of the pandemic on health inequities and social determinants of health in the Region. The final report of the Commission, entitled Build back fairer: achieving health equity in the Eastern Mediterranean Region: report of the Commission on Social Determinants of Health in the Eastern Mediterranean Region, provided invaluable information on the status of health inequities both within and between countries. The conceptual framework guiding the work focused on both individual and structural determinants of health ranging from employment, maternal health and education to climate change, economic, commercial and cultural factors. This regional report is the first to include conflict as a macrodeterminant of health and discussed the direct and indirect impact of conflict on countries in the Region *(6)*.

The Commission reported marked differences across the whole social gradient, with the difference in mortalities and morbidities between the highest wealth quintile and lowest wealth quintile in countries being exacerbated by the onset of the COVID-19 pandemic. The impact of this social gradient is evident in maternal and child health outcomes, in lifestyle and behaviours that cause noncommunicable disease (NCDs) and ill health including undernutrition, obesity and smoking, and in the coverage of health services *(6, 35)*. For example, maternal education, residential area and household wealth show significant associations with childhood stunting and overweight in countries of the Region *(6, 36, 37)*. The Commission also highlighted inequitable access of health services, particularly by area of residence (urban and periurban versus rural), wealth and household income, and education *(6)*. Although PHC is contributing to increasing coverage to maternal and child health interventions in many countries of the Region and reducing the gaps between the richest and poorest *(35)*, geographical disparities in health facilities and workforce within countries still contribute to inequitable access and utilization of health services *(38, 39)*.

A major challenge in the monitoring and assessment of the status of health inequities in the Region is the lack of relevant disaggregated data to assess and monitor inequities at national and subnational levels in many countries. At the same time, despite many countries having conducted household surveys using standard methodologies (e.g. Demographic and Health Survey and the Multiple Indicator Cluster Survey), in-depth analysis examining health disparities remains minimal. The limited availability of disaggregated data to examine geographical, income- and gender-related inequalities inhibits countries' abilities to reduce inequities and address populations more likely to be left behind and exposed to higher levels of risk, lower levels of access and worse outcomes; reducing such inequities and reaching these populations is the vision of the SDGs and WHO. Improving the availability of disaggregated data will provide the critical evidence needed to inform policy and ensure that health equity is central to decision-making to create the conditions supportive of health and well-being for all action *(2, 6)*.

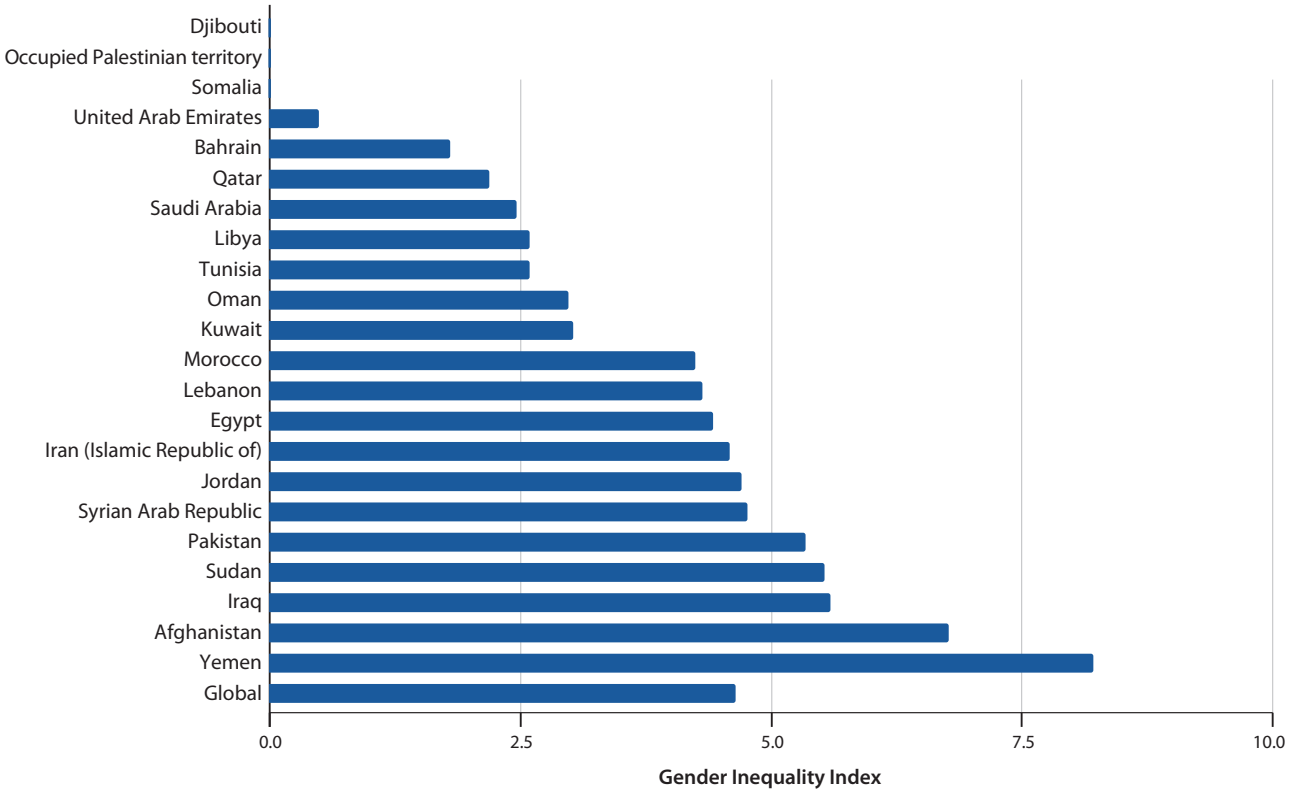
In May 2021, WHO launched the Special Initiative for Action on the Social Determinants of Health for Advancing Health Equity, which will operationalize the many lessons provided by reports and research since the 2008 Commission on Social Determinants of Health. The Initiative builds strong partnerships with global academia, regional offices and national partners to created models of action to address the social determinants of health. Two countries in the Region, Morocco and the occupied Palestinian territory (including East Jerusalem), were selected as pathfinder countries for the Initiative. Both have developed strong partnerships with counterparts in their respective ministries of health and the social determinants of health agenda has been strongly prioritized by health authorities. Additionally, a toolkit is being finalized to assist in the collation of the available resources to systematize action and integrate action to improve health equity into programming in a sustainable and sustained manner.

3.2 Gender and health

The recently launched regional situational analysis on gender and health found that the Region faces challenges in ensuring equal access to resources and achieving gender equity in health for women and men and girls and boys. Gender, a term that describes the socially and culturally constructed ideas of roles, responsibilities, attitudes and behaviours expected from men and women, and boys and girls, influences all aspects of a person's life including their access to and use and experience of health care and resultant health outcomes *(40)*. The average Human Development Index for the Arab States[2] is lower for females (0.645) than for males (0.741) *(8)*. The Gender Inequality Index, a composite measure to quantify the loss of achievements within a country due to gender inequality, scores countries between 0 and 1, with scores closer to one indicating greater gender disparities. Eight of the 19 countries in the Region with available data showed greater gender disparities than the global average (0.465), with scores ranging between 0.049 in United Arab Emirates and 0.820 in Yemen (Fig. 3) *(8)*.

[2] The Arab States exclude Afghanistan, Islamic Republic of Iran and Pakistan, but include the other countries of the Region and the following states that are not part of the Region: Algeria, Comoros and Mauritania.

Fig. 3. Gender Inequality Index indicators for countries of the Eastern Mediterranean Region, 2021



Source: United Nations Development Programme (UNDP), 2022 (8)

Gender-assigned roles and behaviours are associated with different risks and exposures to risk for men and women. For example, the social limitations and restriction of movement that women often experience result in their limited physical mobility and activity; physical inactivity is a risk factor for NCDs including diabetes and cardiovascular diseases and also increases the risk of breast and bowel cancer. Across the Region, 53% of women and 45% of men are obese and women are significantly more likely to be overweight and obese than men. In addition, the likelihood of suffering from a double burden of obesity and malnutrition are 16 times higher in women than men.

Stereotyped perceptions of masculinity increase men's exposure to smoking and road traffic injuries. These gendered social factors affect demand for health care, the provision of care and health outcomes. In terms of exposure to gender-based violence (GBV), the Region has the third highest worldwide prevalence (31%) with most of its survivors being female and enduring severe physical, mental and sexual and reproductive health-related consequences. To tackle gender inequality, a situational analysis of gender and health in the Eastern Mediterranean Region recommends promoting intersectoral collaboration to address structural determinants, integrating gender equity in health planning and policy-making, investing in gender-sensitizing medical and health professional education, and scaling up gender-sensitive evidence for policy-making *(40)*.

Technical support has continued to foster regional and country efforts to strengthen the health sector's integration of gender, through regional capacity-building initiatives such as a virtual intercountry capacity-building workshop on the use of WHO tools for integrating gender, equity

and rights in health systems response and recovery in the context of the COVID-19 pandemic and beyond and country level initiatives including particularly in the occupied Palestinian territory, Pakistan and Sudan. This includes country-based gender analysis, regional adaptation, piloting and implementation of WHO's global frameworks to support the integration of gender, equity and human rights in national health policies and planning. Furthermore, the programme to strengthen the health system response to GBV, currently implemented in 11 countries of the Region, is one of the most successful good practices and contributions to the advancement of the overall gender and health outcomes in the Region. The Regional Office actively participates in gender and GBV-prevention-related UN collective efforts and interagency initiatives, including through the Regional Health Alliance and with United Nations Population Fund (UNFPA), UN Women and the League of Arab States. A WHO gender, equity and human rights roadmap is currently being finalized and will provide a framework for addressing these key determinants of health moving forward.

3.3 Environmental risk factors

The Region is facing a wide range of environmental challenges such as water scarcity, depletion of arable land, air pollution, inadequate waste management, loss of biodiversity, declining marine resources and degradation of coastal ecosystems. Desertification, changes in rainfall patterns and the risk of higher sea levels in coastal areas are exposing the Region to environmental risks, particularly drought, dust and floods, which lead to health impacts. Climate change, population increases and urban growth add to these challenges with implications for regional food and water security and conflicts and humanitarian emergencies. Sustainable development requires addressing the interconnected risks and vulnerabilities to reduce the impact of climate change and natural hazards (e.g. drought, dust storms and flash floods) and ensure good environmental health *(41, 42)*.

Environmental risk factors such as air, water and soil pollution, lack of sanitation and inadequate hygiene, chemical exposures, climate change and chemical biological and radiation events contribute to more than 100 diseases and injuries. The burden is particularly high among children: it is estimated that 26% of childhood deaths and 25% of the total disease burden in children under 5 could be prevented through the reduction of environmental risk factors. In the Eastern Mediterranean Region, the top five causes of environment-related deaths are heart disease, stroke, unintentional injuries, respiratory infections and diarrhoeal diseases, which affect the most vulnerable people, namely children and older people *(43)*. Managing these risks by adopting an integrated ecological approach that recognizes the interactions between biological, behavioural, environmental and social factors could minimize their impact on health *(9)*.

3.3.1 Air pollution

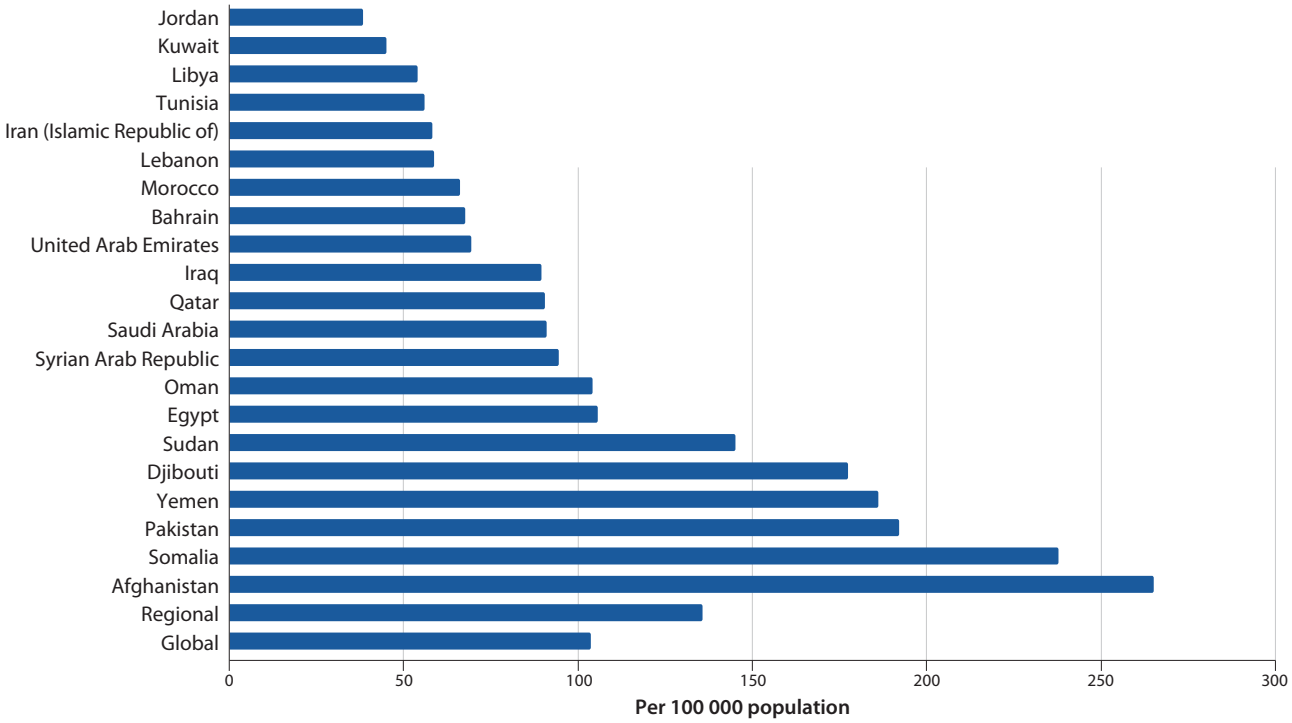
Air pollution is one of the greatest environmental risks to health affecting almost everyone in the world. In 2019, 99% of the world's population did not breathe clean air, and more than half of the urban population were exposed to outdoor air pollution levels at least 2.5 times above the safety standard set by WHO. It has been estimated that indoor and outdoor air pollution together caused an estimated 6.7 million deaths in 2019, roughly one in eight of all deaths globally, of which 4.2 million were premature deaths due to outdoor air pollution. Air pollution alone is responsible for about 100 premature deaths in children per 100 000 population *(33)*. Inadequate access to clean fuel and clean cooking technology is the main source of indoor air pollution. Nearly 2.5 billion people are not using clean fuel and non-polluting stoves, which in 2022 led to an estimated 3.2 million deaths from NCDs (including heart disease, stroke and cancer), including over 237 000 deaths of children under the age of five *(44)*.

Over 98% of the urban population in the Region live in places with unsafe air with regular exposure to high loads of pollutants (in some cases even 12 times higher than WHO-recommended safe levels). The annual mean concentration of fine particulate matter in urban areas in the Region is higher than the global rate and is the second highest among all WHO regions. This causes about 389 000 premature annual deaths and other health burdens that disproportionately affect the poor, women, children and older people. The age-standardized mortality rate attributed to household or ambient air pollution is higher in the Region than the global rate and is the third highest among WHO regions, as shown in Fig. 4 *(9, 43, 45)*.

The Region had the highest annual means of particulate matter (PM10) and nitrogen dioxide (NO_2) among all WHO regions between 2010 and 2019 *(46)*. The annual mean concentrations of PM2.5 and NO_2 in some countries of the Region exceeded WHO air quality standard values twelve- and tenfold, respectively. The underlying reasons for high PM2.5 levels across the Region are infrastructure development, including the construction of dams, urbanization, expansion of the industrial and transportation sectors; deforestation has led to increased sand and dust which contribute up to 50% of the recorded PM2.5 levels. transportation, industry and energy production *(47)*.

Inadequate access to clean fuel and clean cooking technology is the main source of indoor air pollution. Globally, it is estimated that approximately two thirds (69.3%) of the global population were primarily using clean fuels and technologies for cooking in 2020, up from one half (49.5%) in 2000. In the Region, around 73.18% of the population were reliant on clean fuels and technologies for cooking in 2020 *(7)*. Around 3.2 million premature deaths from NCDs (including ischaemic

Fig. 4. **Age-standardized mortality rate attributed to household or ambient air pollution per 100 000 population, 2019**



Source: WHO, 2023 (7)

heart disease, stroke, chronic obstructive pulmonary disease (COPD) and lung cancer) and acute lower respiratory infections were attributable to household air pollution in 2020 *(44)*. Women and children, typically responsible for household chores such as cooking and collecting firewood, bear the greatest health burden from the use of polluting fuels and technologies in homes. It is essential to expand the use of clean fuels and technologies to reduce household air pollution and protect health. These include the use of solar, electricity, biogas, liquefied petroleum gas, natural gas, alcohol fuels and well as biomass stoves that meet the emission targets in the WHO guidelines.

The implementation of the *Regional plan of action for an enhanced global response to the adverse health effects of air pollution (2017–2021)* has shown some success. Air quality monitoring and reporting has increased. The number of cities in the Region reporting ambient air quality monitoring data through the WHO Global Urban Ambient Air Pollution Database has increased by 25% since 2016; 158 cities in 16 countries of the Region now report air quality data through the WHO burden of disease database *(33)*. It is critical that countries develop and implement national and subnational plans of action on air quality management for health protection including an update of national air quality standards, response to local issues (e.g. dust storms and conflict- and war-related pressures) and exposure management, and assure efficient communication and coordination between all the relevant sectors *(48)*. Addressing the major sources of air pollution involves enhancing relevant mitigation interventions based on the best available evidence, rapidly phasing out subsidies for fossil fuels and polluting industries and redirecting investments to health-promoting alternatives, adopting and enforcing emissions standards and ensuring access to clean energy sources *(49)*.

3.3.2 Water and sanitation

More than half of the world's population is exposed to unsafe water, sanitation and hygiene (WASH) services that cause 800 000 deaths each year *(50)*. In the Region, the WASH-related mortality rate is lower than the global rate and is the third lowest among WHO regions *(7)*. The mortality rate due to unsafe WASH is more than 10 per 100 000 population in Afghanistan, Djibouti, Pakistan and Sudan, as high as 86.6 per 100 000 population in Somalia and zero in all GCC countries. Increasing access to clean drinking-water and sanitation services is the key intervention for controlling cholera and waterborne diseases. In the Region, low-income countries in particular (such as Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen) are suffering from limited access to safe drinking-water and sanitation services. Of the Region's population, 78% have access to at least basic sanitation services while 159 million people lack such access; 56% have access to safely managed drinking-water while 77 million people lack access to basic drinking-water services.

Status reports on water supply and sanitation, including in-depth monitoring of SDG 6 targets, have also commenced in five Member States. By 2019, most countries of the Region had updated drinking-water quality standards; however, only half had adopted water safety plans and wastewater reuse standards *(51)*. Investing in water and sanitation is a priority to address those in most need of these services. Implementing integrated drinking-water and sanitation management systems includes regulation, operational procedures and efficient monitoring and surveillance of service quality using a multisectoral approach; innovative technologies are critical to address climate change and water scarcity challenges. Joint sector reviews can facilitate strategic decisions on resource allocation to extend coverage to those who are unserved and upgrade existing services.

3.3.3 Chemical safety and unintentional poisoning

Another environmental factor causing health burdens is unintentional exposure to toxic substances such as pharmaceuticals, industrial chemicals, pesticides, chemical products and natural toxins. In 2017, the chemical industry was the second largest manufacturing industry in the world and was predicted to continue to grow – chemicals sales are projected to almost double from 2017 to 2030. The UN Environment Programme (UNEP) estimates the global chemical trade ranges between €3.5 trillion in 2017 to €6.6 trillion by 2030. The rate of increase in production of chemicals in the Middle East was 8.5%, the second-highest worldwide increase after China *(52)*.

Poisoning due to medication, household or industrial chemicals, plants and animal bite or sting is an under-recognized and underreported major public health concern. Poisoning could occur under various circumstances (e.g. it could be work-related, arise from substance use, be iatrogenic or be caused by self-harm or criminal acts); here the focus is on unintentional poisoning *(53)*. In 2019, unintentional poisoning with selected number of chemicals caused more than 84 000 deaths globally, of which 7500 were in the Region; this equates to 1.1 deaths per 100 000 population worldwide *(7)*. The Region has the second-highest mortality due to unintentional poisoning among all WHO regions. Globally, men are more exposed to unintentional poisoning; however, this is not the case in the Eastern Mediterranean Region, where the male to female ratio for unintentional poisoning is 0.7 *(54)*. There is strong evidence that this number is underreported due to poor syndromic surveillance system in the Region; limited number of well-developed poison control centres (47% of countries have at least one poison control centre); lack of regional and national networking; and poor data synchronization and harmonization.

Two systematic reviews conducted on specific causes of pesticides and carbon-monoxide poisoning provide more details information about the regional situation. Pesticide usage increased by 80% between 1990 and 2017, subjecting farm workers and others to occupational exposure to unintentional acute pesticide poisoning. Annually, about 11 000 acute pesticide poisoning fatalities and possibly significantly more than the WHO estimate of 1 million non-fatal cases occur around the world *(55)*. Deaths due to carbon-monoxide poisoning result from fires but also from stoves, portable heaters and automobile exhausts. Among studies conducted in seven countries of the Region, two thirds of non-fatal cases were in women while two thirds of fatal cases were in men, with gas heaters being the most common source. In the Islamic Republic of Iran, the overall incidence was nearly 39 per 100 000 population *(56)*.

A large majority of unintentional poisonings globally could be prevented. The health sector has an important role in sound chemical management through multisectoral cooperation in four interlinked areas: risk reduction, knowledge and evidence, institutional capacity and leadership and coordination *(57)*. Poisoning is an emergency in which poison control centres play an important role in providing guidance to health specialists on appropriate treatment and diagnosis *(58)*. Over 60 centres cover 10 countries in the Region; the majority *(44)* are based in the Islamic Republic of Iran. Poison centres also support the implementing the International Health Regulations (IHR 2005) through surveillance, detection and response to public health events caused by chemicals. A majority of countries perform poorly in implementing the chemical portion of the IHR (2005); only four countries (Egypt, Lebanon, Saudi Arabia and United Arab Emirates) scored 80 or higher *(7)*. Every country should have access to poison information centres that are not integrated with public health or emergency services *(58)*.

The WHO Chemicals roadmap, which was approved in the 70th World Health Assembly, aims to enhance health sector engagement in achieving the goal of Strategic Approach to International Chemical Management. This road map identifies concrete actions where the health sector has either a lead or important supporting role to play in the sound management of chemicals, recognizing the need for multisectoral cooperation. So far, six countries of the Region (Egypt, Iraq, Jordan, Oman, Saudi Arabia and Tunisia) have developed a national plan of action to implement the roadmap.

3.4 Food safety

Access to safe, nutritious and healthy food is a basic human right. Food safety is a responsibility shared by numerous stakeholders. The *WHO global food safety strategy, 2022–2030*, addresses current and emerging challenges to strengthen food safety as an essential element of public health. It calls on countries to develop food safety policies using the best available evidence, to recognize consumer interest and integrate food safety into national and regional policies on health, agriculture, trade, environment and development *(59, 60)*.

The Region has the highest incidence of foodborne diarrhoeal disease compared with other WHO regions *(61)*. At the same time, pesticide poisoning is a concern, with evidence indicating that consumers are exposed to foods contaminated by pesticides, some of which are banned internationally, above international limits, suggesting an acute need for stricter enforcement of regulations and international agreements *(62)*. Only half the countries in the Region score 80 or more in implementing the food safety part of the IHR (2005) *(7)*. Envisaging stronger action towards building food safety systems that are forward-looking, evidence-based, people-centred and cost–effective, a regional roadmap for implementing a global strategy for food safety is under development.

3.5 Climate change and impact on health

Climate change has both direct and indirect effects on human health. There is clear evidence that extreme temperatures are associated with increased human mortality and morbidity and that heavy rainfall may lead to emergence of waterborne or vector-borne diseases in places where they were not previously endemic. Indirect health effects related to the deterioration of air, soil and water quality may include increased exposure to allergens, air pollution and infectious diseases, which all significantly contribute to the increased frequency of respiratory diseases. Additionally, other activities related to industry, transportation and urbanization can interact with and exacerbate the harmful effects of climate change, especially those related to air quality. These changes will most likely impact agriculture and the food supply and may eventually lead to a change in diet and malnutrition in the Region.

Projections suggest that WHO's Eastern Mediterranean Region will be the region second-most affected by climate change. The effects will include a shortage in renewable water supply that is estimated to be 50% by 2050. Projected health-related deaths in the Region could reach 123.4 per 100 000 population by 2010 *(63)*. The synergy of natural disasters, rapid urbanization, water scarcity and climate change is a serious challenge for policy and planning. Recent wars and conflicts in the Region have led to an increasing number of refugees residing in overcrowded settlements with poor hygiene which, together with weakening of sanitation infrastructures, might generate favourable conditions for cholera and other waterborne disease outbreaks.

Flushing caused by heavy rains may transport waste to large rivers or coastal lagoons, and eventually to human populations. Failing sewage infrastructure, alongside such changes, can increase waterborne infectious diseases *(64)*.

The projected impacts of increased frequency of intensity of heat waves and the increased risk of fires in low rainfall countries include excess heat-related morbidity and mortality along with increased incidence of heat exhaustion and heatstroke, and increased prevalence of NCDs such as cardiovascular and respiratory diseases. The changing and variable precipitation, higher sea surface and freshwater temperatures could impact WASH infrastructure, accelerate microbial growth, shift the geographical and seasonal distribution of waterborne pathogens and decrease food production. As with other health determinants, climate change has greater impacts on poor populations such as outdoor labourers, displaced populations and those living in poor, unventilated crowded housing. Thus, urgent action is needed for countries to meet targets in the Paris Agreement *(42)* that can limit its effects.

Some progress has been made in countries of the Region in addressing climate change and health. Thirteen countries announced their commitment to build climate change resilient and sustainable low carbon health systems, with Jordan, Morocco and Yemen setting a target of 2050 to reach a net-zero emissions health system. Five Member States in the Region have updated their national health and climate profiles. Egypt and United Arab Emirates, are co-leading the Alliance on Transformative Action on Climate Change and Health (ATACH), launched in 2022 with WHO as the Secretariat, to follow the implementation of countries' climate commitments made at the 26th UN Climate Change Conference (COP26), the first that included health in the global climate discussions *(65)*. All committed countries in the Region as well as a few others and other institutions are actively participating in ATACH activities, meetings and working groups. An agreement on a loss and damage fund made at the 27th Climate Conferences (COP27) in Egypt was a key milestone; however, significant work is needed for the fund to become operational *(66)*.

Six countries in the Region are currently undertaking climate change and health vulnerability and adaptation assessments, which will be used to build their national health adaptation plans. The assessments aim to identify the risks and impacts of climate change on human health and communities and recommend actions and programmes to address these risks, minimize the negative impacts on different population groups and health service delivery, and build the capacity and resilience of the health systems. Efforts are also being made, in collaboration with WHO, to assess the level of climate resilience and environmental sustainability of health care facilities and estimate the carbon emissions of health care facilities across the Region to guide public action that would ensure that these facilities will be able to continue providing high-quality health services to the local communities under any expected or sudden climate crises. Emissions will be reduced, with the goal of net-zero health facilities and operations. These efforts lay the groundwork to implementing the new framework of action on climate change and health endorsed during the 70th session of the Eastern Mediterranean Regional Committee held in October 2023 *(67)*.

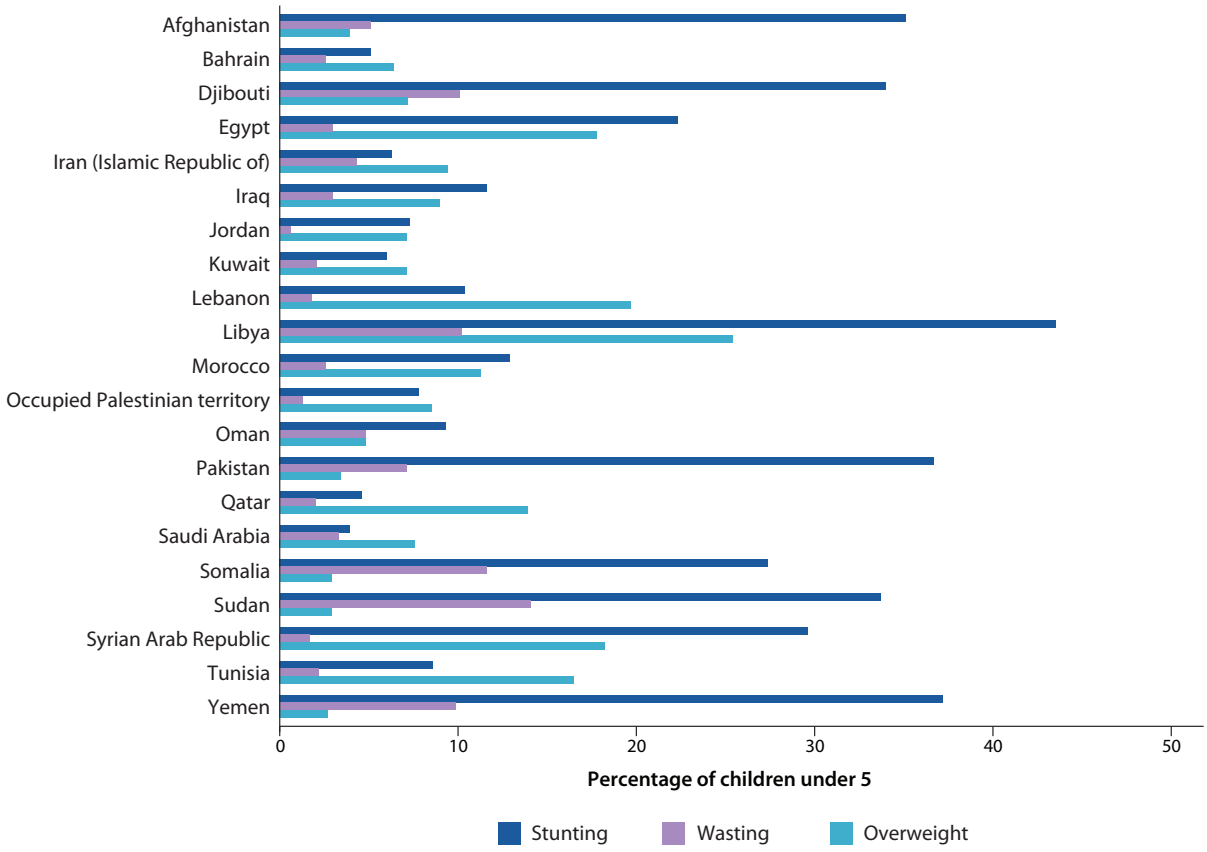
4 Double burden of malnutrition

A double burden of malnutrition – the presence of undernutrition along with overweight and obesity, or diet-related NCDs – characterizes the nutrition problem in the Eastern Mediterranean Region. The expected outcome of the problem is having simultaneously large numbers of stunted and underweight children as well as of obese and overweight children and adults both within countries and across the Region. Malnutrition and food insecurity in the Region pose significant challenges to the optimal growth of children; at the same time the nutrition transition contributes to the high rates of overweight and obesity. This transition is prominent in infant feeding, with fewer infants being breastfed.

4.1 Stunting, wasting and overweight in children

In 2020, the total number of stunted children aged under 5 in the Region was estimated to be 22.4 million (representing 26.2% of this age group). On average, one in four children in the Region is stunted, which is higher than the global average (22%) and the third highest among WHO regions; however, the prevalence in the Region has decreased from 33.9% to 26.2% over the past two decades. The prevalence of wasting among children in the Region is 7.4 % which is higher than the global average (6.7%) and the second highest among WHO regions *(7)*. The prevalence of wasting in children under 5 in the Region has decreased from 8.1% in 2012 to 7.4% in 2020; however, out of 13 countries in the Region with data available for 2020, nine countries may not meet the global target for 2025 of reducing childhood wasting to less than 5% (Fig. 5) *(7, 68–72)*. The average prevalence of overweight in children aged under-5 years in the Region is more than the global rate and the third highest among WHO regions. Although the prevalence of overweight in children under 5 in the Region increased from 7.2% to 7.8% between the years 2000 and 2010, the trend has been relatively steady since then *(7)*. On the other hand, as many as one in five children under the age of five are overweight (Fig. 5). Malnutrition in all its forms takes a heavy toll on the health and well-being of young children in the Region. All countries of the Region, in response, have developed an infant and young child feedback action plan and a child growth monitoring programme.

Fig. 5. **Prevalence of stunting (% height-for-age <–2SD), wasting (% weight-for-height <–2SD) latest estimates and overweight (% weight-for-height >+SD), among children under 5 in the Region, 2020**



Source: WHO (2023) (7, 68–72)

Low-income countries, including Afghanistan, Somalia, Syrian Arab Republic, Sudan and Yemen, have been facing acute and continued high levels of food insecurity, undernutrition and micronutrient deficiencies. Additional countries such as Djibouti, Iraq, Lebanon and Pakistan are also experiencing food insecurity due to economic shocks, weather extremes, the COVID-19 pandemic and the war in Ukraine. Of the estimated 22.4 million children under-5 years of age in the Region whose growth has been stunted, 18.2 million are in countries facing emergencies *(7)*. In Sudan, UNICEF, WHO Sudan and partners supported the treatment of about 290 000 children suffering from severe acute malnutrition in 2021 and 137 000 children in 2022, including counselling services for mothers and caregivers, resulting in a 92% cure rate for the community management of acute malnutrition *(73)*. In Afghanistan, WHO supported 127 inpatient department severe acute malnutrition centres that admitted 46 396 malnourished children with a recovery rate of 85%, a default rate of 9.6% and a death rate of 4.4% *(74)*.

In June 2022, WHO, the Food and Agriculture Organization of the United Nations (FAO), UNICEF and the World Food Programme (WFP) convened a high-level meeting to accelerate action on maternal and child undernutrition in the Middle East and North Africa, Eastern Mediterranean and Arab Regions, with a focus on Afghanistan, Djibouti, Lebanon, Pakistan, Somalia, Sudan, Syrian Arab Republic and Yemen. To protect, promote and fulfil populations' rights, it is critical to implement the approaches and actions described in the joint United Nations Global Action Plan

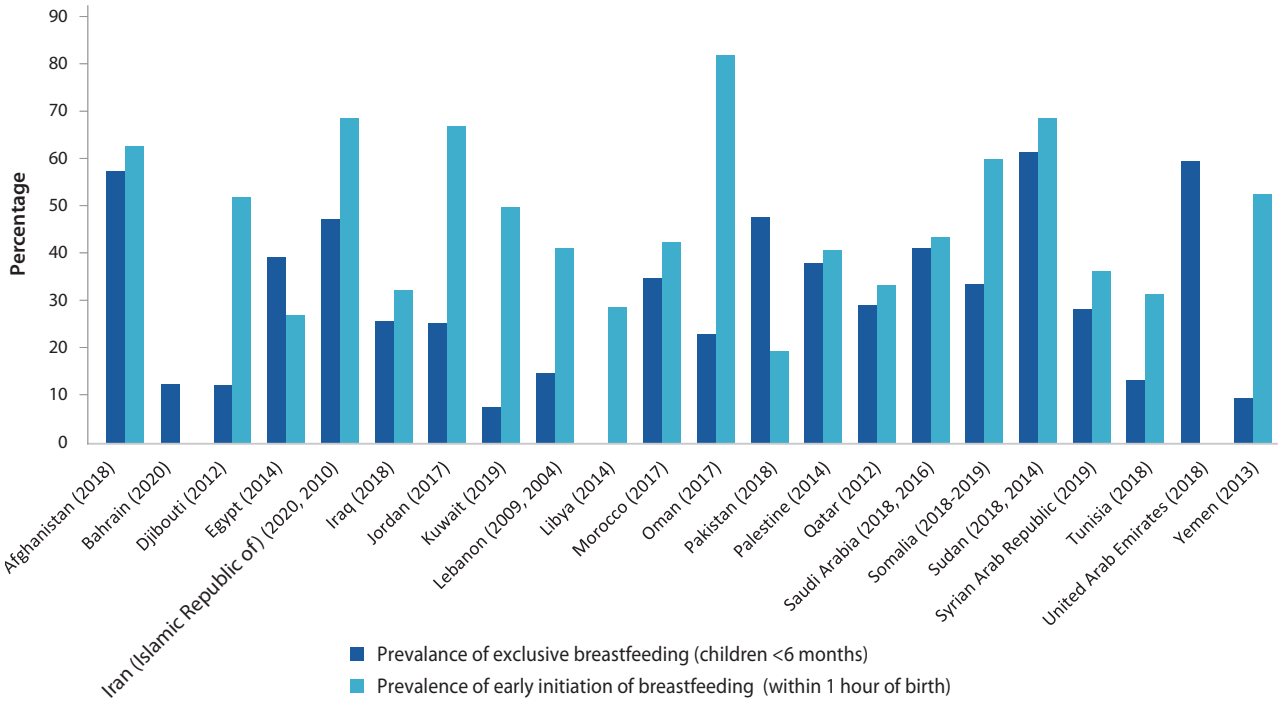
on Child Wasting, the United Nations Global Action Plan on Child Wasting, the *UNICEF Nutrition Strategy 2020–2030: Nutrition, for Every Child* and the *Strategic Framework for Zero Hunger in the Arab Region*. Given the urgent need to prevent, detect in a timely manner and treat maternal and child undernutrition given the continued impact of the COVID-19 pandemic, ongoing crises in the Region and serious threat to food security, an interagency call to action was published in 2022 highlighting priority areas to address the undernutrition in the Region *(75)*.

4.2 Breastfeeding

Breastfeeding is one of the best ways to improve child health and development. The global target for 2025 is to increase the rate of exclusive breastfeeding in the first six months of life to at least 50%. The latest available data for the Region indicate that only Afghanistan, Sudan and United Arab Emirates had exclusive breastfeeding rates over 50% by the end of 2018 (Fig. 6). Comparison of the latest country-specific estimates shows no correlation between the income level and the prevalence of early initiation of breastfeeding or exclusive breastfeeding. The highest estimate for the early initiation of breastfeeding was recorded in Oman (82.0% in 2017) while the highest estimate for exclusive breastfeeding was recorded in Sudan (61.5% in 2018).

To accelerate reaching the global target, supportive measures are needed to support mothers to establish and maintain appropriate breastfeeding practices. Seventeen countries have national legislations supporting the implementation of the International Code of Marketing of Breast-milk Substitutes *(77)*. A good portion of the countries in the Region are successfully implementing the Baby Friendly Hospital Initiative, an initiative that emphasizes Code implementation and is one way to promote optimal breastfeeding practices *(78)*. The Regional Office supported the WHO

Fig. 6. **Prevalence of exclusive and early initiation of breastfeeding in the Region, latest estimates**



Source: UNICEF (76)

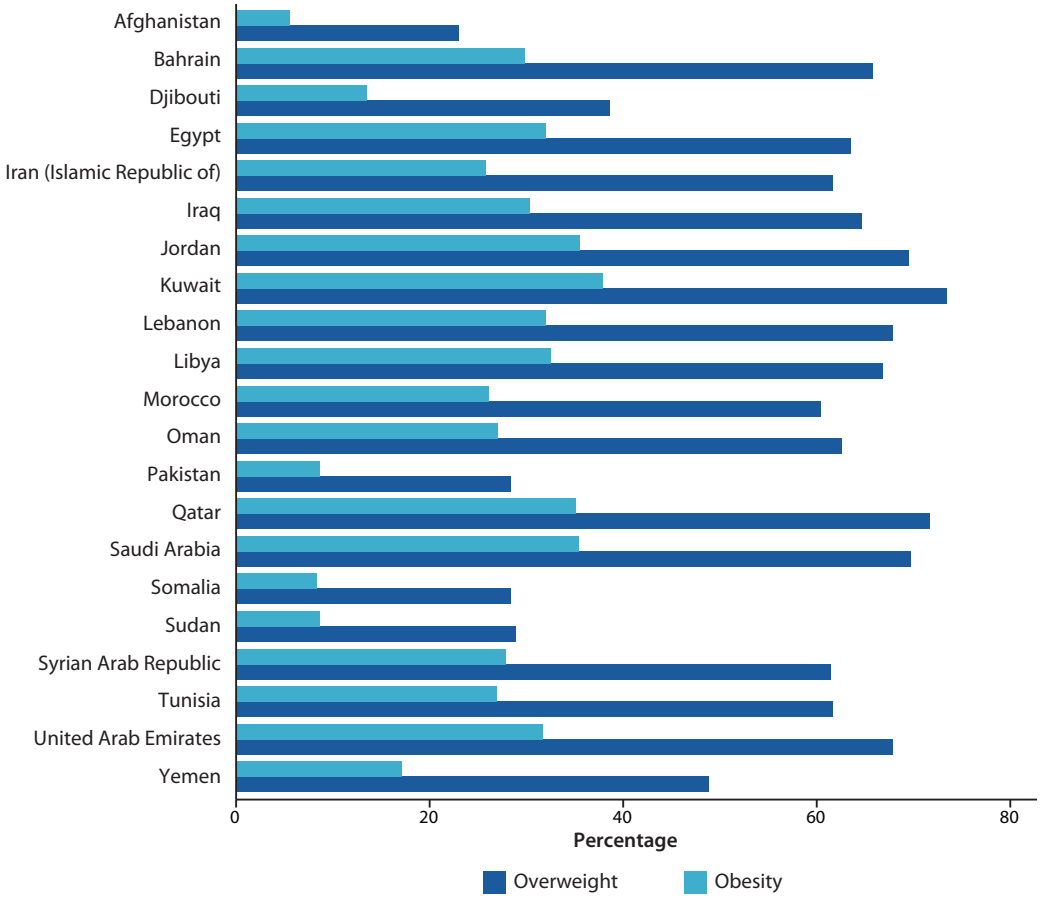
Country Office in Yemen in organizing a 10-day training on growth monitoring, infant and young child feeding and the Baby Friendly Hospital Initiative in Cairo in 2022. Representatives from the Ministry of Health of Yemen and from the UNICEF Yemen Country Office attended.

4.3 Overweight and obesity

The prevalence of overweight among children and adolescents aged 5–19 years has risen dramatically worldwide, from just 4% in 1975 to over 18.4% in 2016. In the Region, throughout the period (2000–2016), the prevalence of overweight and obesity among children and adolescents aged 5–19 years increased from 12.5% to 20.5% and was directly associated with country income level, with overweight and obesity being most prevalent in the high-income group. During this time period, the prevalence of obese children increased from 3.9% to 8.2%. By 2016, the prevalence of overweight (18.4%) and obesity (6.8%) in 17 countries of the Region was above the global prevalence rate *(7)*.

As among children and adolescents, there is an increasing prevalence of overweight (BMI ≥ 25) among adults in the Region's countries; the regional prevalence of overweight rose from 38.5% in 2000 to 49% in 2016 and ranged from 73.4% in Kuwait to 23% in Afghanistan. A similar rise is seen in the prevalence of obesity (BMI ≥ 30); from 13.3% in 2000 to 20.8% in 2016 in the Region as a whole and ranging from 37.9% in Kuwait (37.9%) to 5.5% in Afghanistan (5.5%) *(1)* (Fig. 7).

Fig. 7. **Age-standardized prevalence (%) of overweight and obesity among adults (18 years and above) in the Region, 2016–2020**



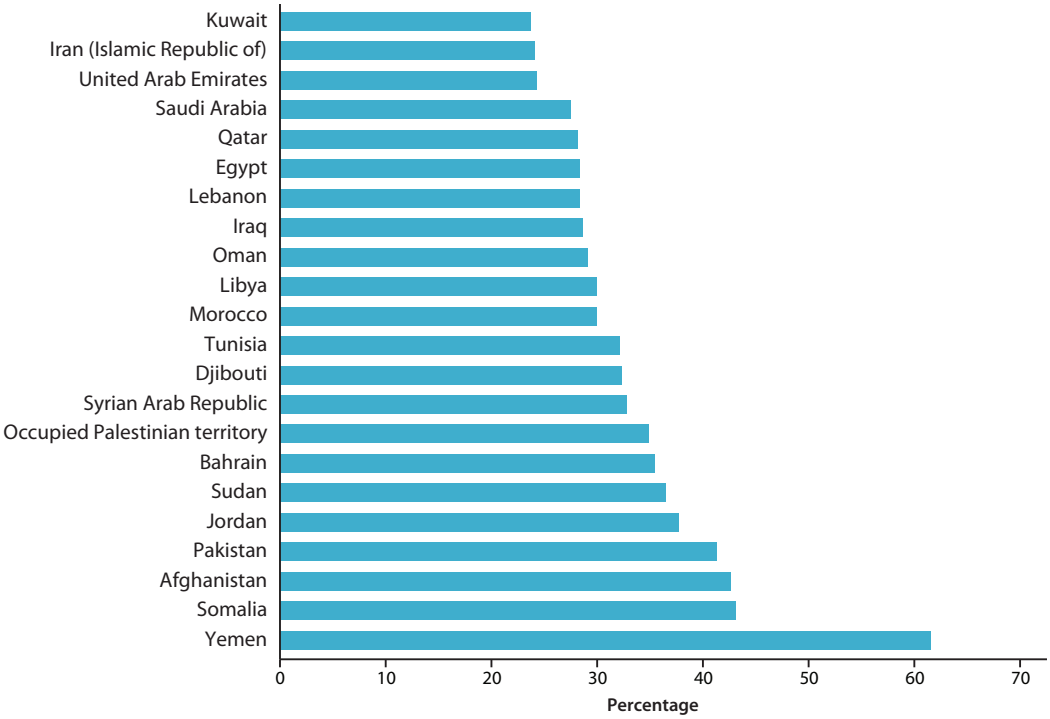
Source: WHO (2023) (7)

nutrition throughout the life course by 2030. By August 2022, all countries of the Region except Libya had developed a national nutrition strategy or action plan, and all countries of the Region By endorsing the WHO Strategy on Nutrition for the Eastern Mediterranean Region (2020–2030) in October 2019, the countries of the Region committed to strengthening action on improving except Afghanistan, Djibouti, Iraq, Pakistan and Somalia had a plan for obesity prevention. These strategies aim to enhance nutritional status by reframing nutrition as a core component of their development agenda. Twelve countries in the Region have developed a policy to reduce the impact of marketing of food to children. Furthermore, 14 countries in the Region have developed food-based dietary guidelines that offer dietary recommendations for the general population for healthy nutrition and daily lifestyles associated with a reduced risk of diseases. A regional virtual meeting on childhood obesity was held in 2021 to support countries in their efforts. In 2022, a regional workshop on obesity prevention in 2022 resulted in the development of an acceleration plan with five countries selected as target countries (Bahrain, Egypt, Islamic Republic of Iran, Jordan and Kuwait).

4.4 Anaemia among women of reproductive age

The prevalence of anaemia among women of reproductive age in the Region decreased from 37.0% in 2000 to 34.5% in 2014, after which the trend reversed. The most recent prevalence estimate from 2019 (34.9%) is the same as the estimate in 2010. Throughout the past two decades (2000–2019), anaemia in women of reproductive age has been inversely associated with country income level, being most prevalent in the low-income group, followed by the lower- and upper-middle-income groups, while the high-income group had the lowest prevalence. The anaemia situation was particularly alarming in the low-income group where the prevalence was over 40% – and therefore could be considered a severe public health problem – throughout the measuring period (2000–2019) (Fig. 8) *(7)*.

Fig. 8. **Prevalence of anaemia among women of reproductive age (15–49 years) (%), 2019**



Source: WHO (2023) (7)

Flour fortification has been applied through voluntary and mandatory regulations in all countries in the Region, except in Libya, Somalia and Tunisia. The most common nutrients that have been used to fortify wheat flour in the Region are iron and folic acid (used in 15 and 19 countries, respectively) in addition to B vitamins (used in nine countries). Currently, fortification with vitamin A and/or zinc (used in six countries) and vitamin D (used in two countries) is uncommon in the Region.

In 1991, the WHO urged all countries to scale up salt iodization. Salt iodization has been implemented in all countries in the Region through voluntary and mandatory regulations; subsequently, only three out of the 22 countries/territories in the Region (Iraq, Lebanon and Libya)have suffered from insufficient iodine intake. In the same context, national guidelines on vitamin D were developed in Lebanon in 2022 by the WHO Collaborating Centre the American University of Beirut, and WHO representatives contributed to the launching event.

4.5 Multisectoral action to address malnutrition in all its forms

Global targets on maternal, infant and young child nutrition, as well as global targets on NCDs, have been integrated into the 2030 Agenda for Sustainable Development. To accelerate progress towards these global targets, the United Nations declared a Decade of Action on Nutrition between 2016 and 2025. In October 2019, the Regional Committee endorsed the Strategy on Nutrition for the Eastern Mediterranean Region, 2020–2030. It provides a framework for action on nutrition, diet-related NCDs and sustainable development, as well as guidance on the implementation of the remainder of the UN Decade of Action on Nutrition (2016–2025) in the Region *(79)*. The strategy focuses on six areas of action: 1) sustainable, resilient food systems for healthy diets; 2) aligned health systems providing universal coverage of essential nutrition actions; 3) social protection and nutrition education; 4) trade and investment for improved nutrition; 5) safe and supportive environments for nutrition at all ages; and 6) strengthened nutrition governance and accountability. Comprehensive action across areas requires action across numerous sectors including but not limited to agriculture, commerce, economy, education, environment, health and many others.

Several countries of the Region have taken multisectoral action to address malnutrition. Pakistan has developed a national multisectoral nutrition strategy for 2018–2025 and the Saudi Food and Drug Administration has launched a Healthy Food Strategy to address the high prevalence of NCDs. A multisectoral coordination committee in Jordan is overseeing the implementation of the national framework of action on obesity prevention, 2018–2023 and its objectives focus on amending regulations to eliminate trans-fats and reduce saturated fats, sugars and salt, along with the promotion of physical activity, mandatory nutrition labelling and restrictions on marketing of foods high in fats, sugars, salt and breast-milk substitutes. In Kuwait, a multisectoral committee was established to develop food-based dietary guidelines. In Bahrain, a multisectoral higher level committee has released a healthy meal menu guideline based on WHO standards, which includes healthy preparation methods, lowering salt, sugar and trans-fat levels and a list of foods to avoid serving in school canteens.

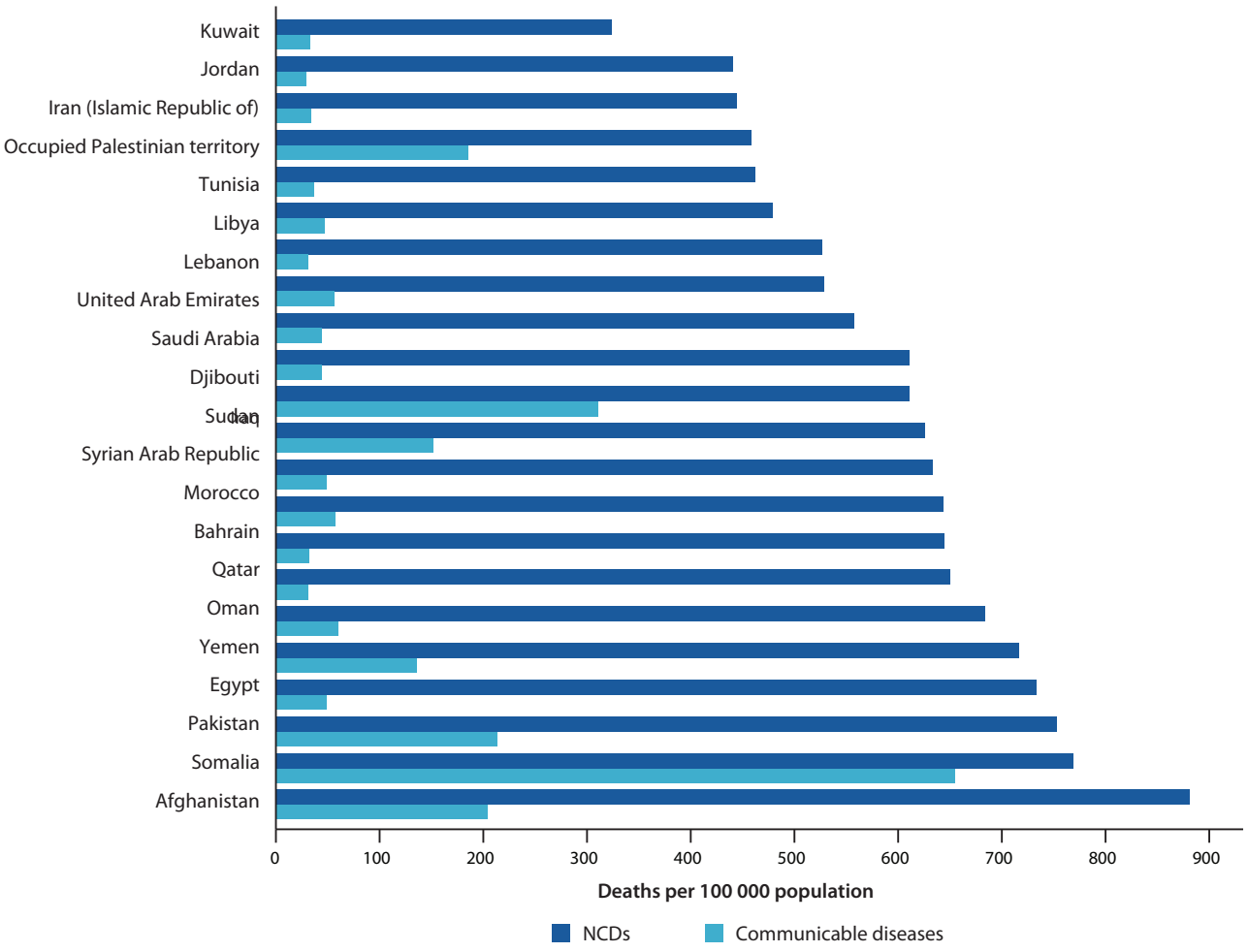
5 The burden and risk factors of NCDs

5.1 The burden of NCDs

NCDs were responsible for 2.8 million deaths in the Eastern Mediterranean Region in 2019, a figure expected to increase to 3.8 million by 2030. NCDs are the main cause of death in all countries of the Region. In Somalia communicable diseases are also the main cause of death (Fig. 9).

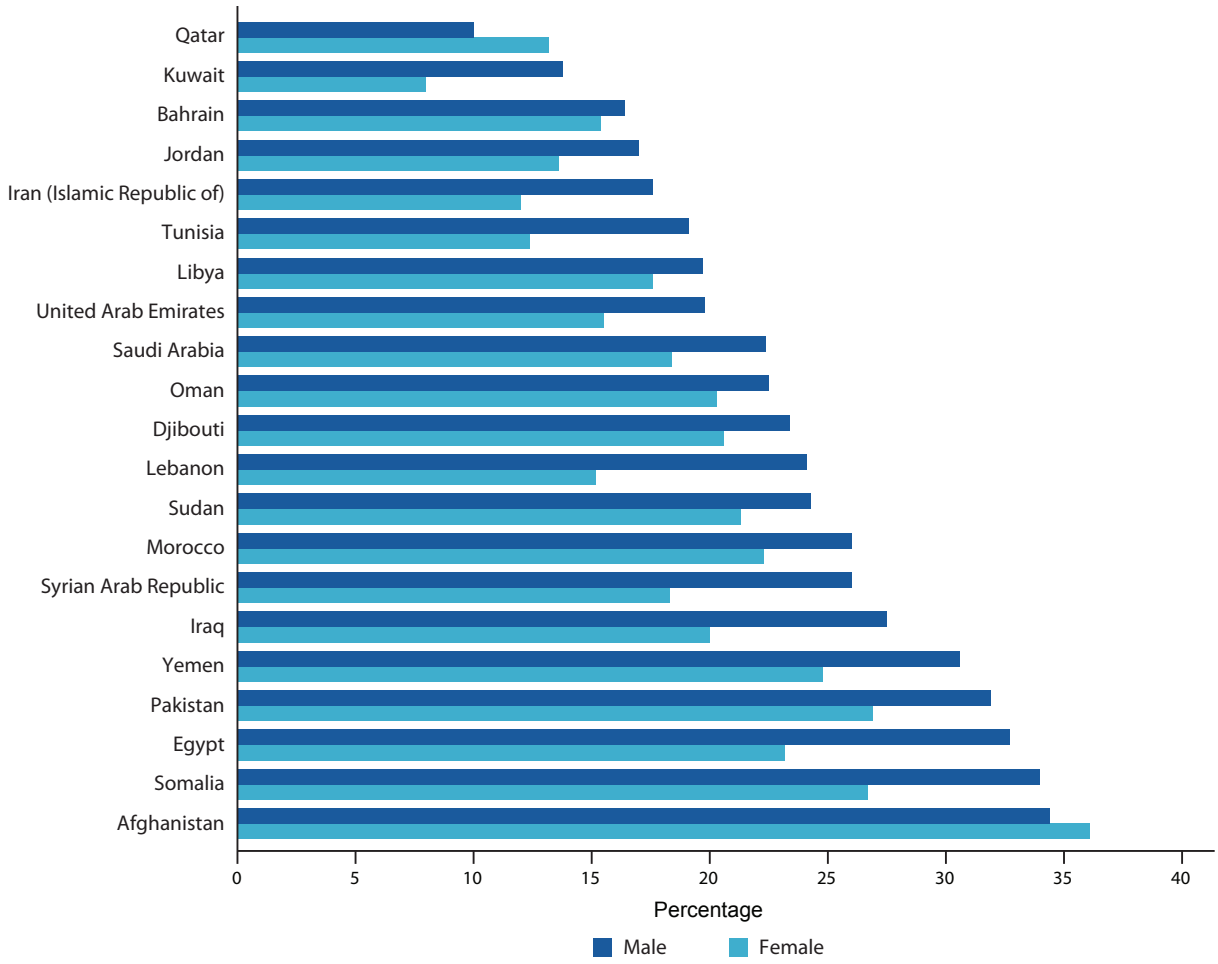
The probability of dying aged between 30 and 70 (inclusive) from major NCDs (cardiovascular disease, cancer, diabetes, chronic respiratory disease) is higher among men compared with women in the Region, except in Afghanistan and Qatar (Fig. 10). The highest probability is 35.3% in Afghanistan (34.4% for men and 36.1% for women). The lowest is for men in Qatar (10.0%) and women in Kuwait (8.0%). The probability for this indicator stands at 25% in the Region, which is higher than the global rate (17.8%) and the highest among WHO regions.

Fig. 9. Age-standardized mortality rates of communicable diseases and NCDs, 2019



Source: WHO (2022) (80)

Fig. 10. **Probability of dying from any cardiovascular disease, cancer, diabetes or chronic respiratory disease aged between 30 and 70 (inclusive) (%), by sex, 2019**



Source: WHO (2022) (80)

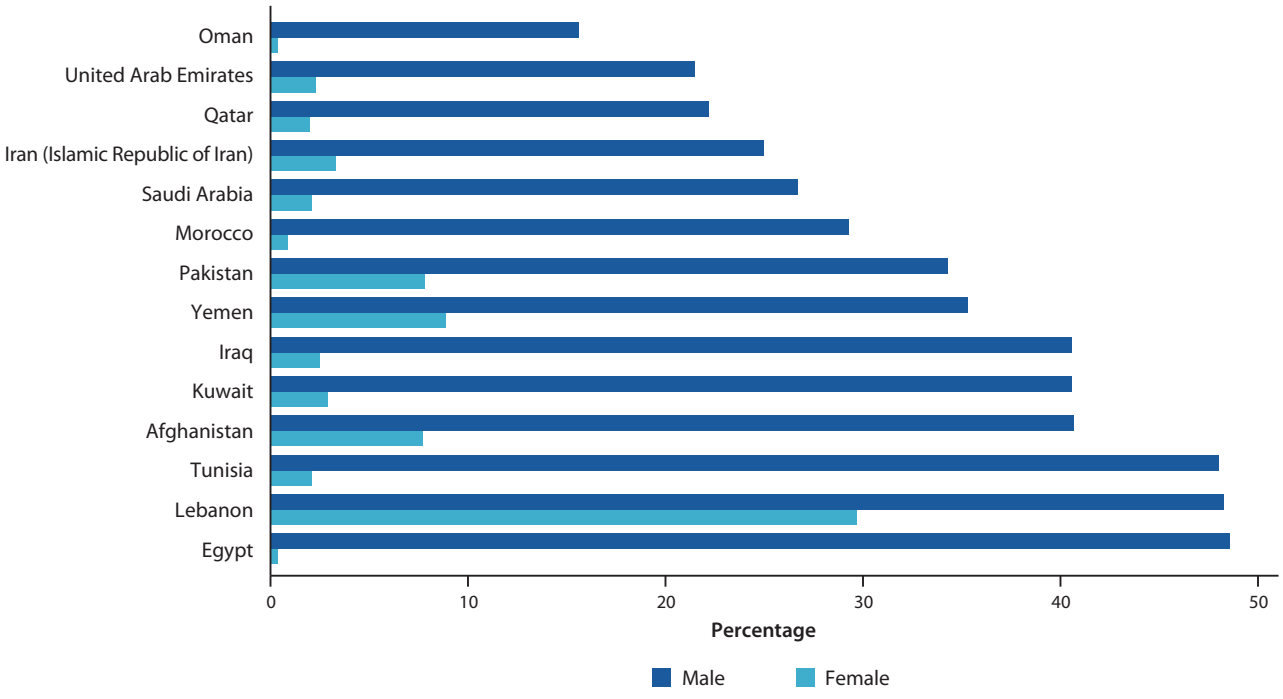
The regional framework for action on NCDs, endorsed by the Regional Committee in 2012 and updated in 2019, is a road map for countries to implement the United Nations Political Declaration on Prevention and Control of Noncommunicable Diseases *(81)*. The framework includes 19 strategic interventions and 15 monitoring indicators covering the areas of NCD governance, prevention, surveillance and health care. WHO monitors implementation of the framework and reports to countries on the progress made and pace of implementation. By 2019, only eight countries in the Region were fully achieving six or more of the sub-indicators and the remaining 14 countries were achieving less than one third of sub-indicators. Half the countries of the Region have an operational multisectoral national strategy or plan that integrate the major NCDs and their shared risk factors, and more than 40% of countries have established evidence-based national guidelines, protocols or standards for the management of major NCDs through a PHC approach *(82)*.

To achieve SDG target 3.4 to reduce premature deaths due to NCDs by one third by 2030, countries need to prioritize NCD prevention and treatment strategies in their national health policies alongside implementing required legislative and regulatory measures, safeguarding sustained financial resources and promoting capacity-building initiatives. The health sector cannot address NCDs alone, although it has a major role in mobilizing existing resources to promote multisectoral, multistakeholder, Health-in-All-Policies, whole-of-government and whole-of-society approaches *(45)*. WHO, in collaboration with the United Nations Development Programme (UNDP), supported the development of six NCD investment cases for countries of the GCC (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) to provide countries with an economic analysis and advocacy tool to support the comprehensive implementation of their national strategies and plans. The preliminary results of a costing exercise requested by countries found that current expenditures for NCD-related services are insufficient to address the NCD burden *(82)*.

5.2 Tobacco

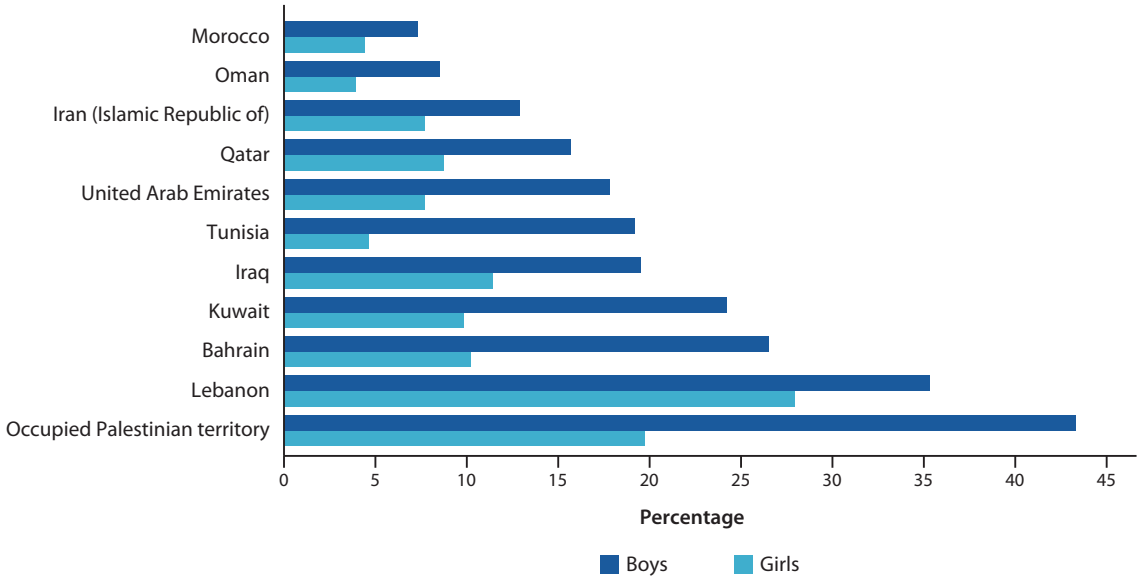
The age-standardized prevalence of tobacco use among adults (defined as people aged 15 years and older) was 19.3% in the Eastern Mediterranean Region in 2018, which is below the global average and the third lowest among all WHO regions *(83)*. The prevalence of tobacco smoking among men in all reporting countries is above 10%; in six countries more than 40% of the male population smoke tobacco (Afghanistan, Egypt, Iraq, Kuwait, Lebanon and Tunisia). The prevalence of tobacco use among women is below 1% in many countries of the Region. Although this indicates a generally low prevalence of female tobacco use in the Region, notably, the rates are very high in Lebanon (29%) *(84)*; (see Fig. 11). In 2016–2019, tobacco use among male

Fig. 11. Age-standardized prevalence (%) of tobacco use among persons aged 15 years and older, 2019



WHO (2021) (84)

Fig. 12. Tobacco use among adolescents (13–15 years) (%), 2016–2019



Source: WHO (2021) (84)

adolescents (aged 13–15 years) ranged from 7.3% in Morocco to 43.3% in occupied Palestinian territory (including East Jerusalem). Among female adolescents, tobacco use ranged from 3.9% in Oman to 27.9% in Lebanon (Fig. 12) *(84)*.

The overall prevalence of tobacco use in the Region is projected to decrease considerably from an estimated 23% in 2010 to 17% in 2025, a relative reduction. Although significant, this means that the Region is still projected to miss the global voluntary NCD target of a 30% relative reduction in tobacco use by 2025 (from 2010, as the baseline year). Tobacco use in the Region is projected to decrease; however, this achievement can be endangered by an increase in prevalence in any country. The absolute number of tobacco smokers is projected to reach 94 million by 2025 *(83)*.

In 2003, the 56th World Health Assembly adopted the WHO Framework Convention on Tobacco Control (WHO FCTC). All countries of the Region, except Morocco and Somalia, are Parties to the WHO FCTC. Seven countries (Egypt, Islamic Republic of Iran, Iraq, Kuwait, Pakistan, Qatar and Saudi Arabia) are also Parties to the Protocol to Eliminate Illicit Trade in Tobacco Products. Efforts are ongoing to scale up the implementation of both the WHO FCTC and the Protocol in the Eastern Mediterranean Region *(33)*.

In 2008, WHO introduced the MPOWER policy package, a set of evidence-based interventions shown to be effective at reducing the demand for tobacco *(6, 84)*. Fourteen countries ran at least one substantial anti-tobacco mass media campaign; however, mass media campaigns often do not have the required preparation and characteristics to be effective in reducing tobacco use *(85)*. Although 12 countries have completely banned tobacco advertising, promotion and sponsorship (TAPS), violations related to new nicotine and tobacco products have been seen in many countries of the Region. Eight countries have banned tobacco use in public places. Four countries tax tobacco to the recommended levels, namely at least 75% of the retail price (Egypt, Jordan Morocco, and occupied Palestinian territory), but this covers only 16% of the population

of the Region. Tobacco taxation ranges from 4.1% in Afghanistan to 92.8% in occupied Palestinian territory (including East Jerusalem). In half the countries of the Region, the share of total taxes in the retail price of the most widely sold brand of cigarettes is more than 50%. In 12 countries of the Region, cigarettes have become less affordable since 2010 *(84)*. Two countries require plain packaging on all tobacco packaging while another 12 have adopted graphic warnings. Finally, only five countries implement the full package of cessation services by providing cost-covered nicotine replacement therapy and cessation support as well as a national toll-free quitline.

In general, despite high coverage for certain interventions in the WHO FCTC and MPOWER policy package, few countries in the Region have comprehensively and fully implemented most of the key control measures to reduce tobacco use; at the same time, some achievements have deteriorated for various reasons, which undermines both the sustainability of achievements and also the level of population protection.

5.3 Physical activity

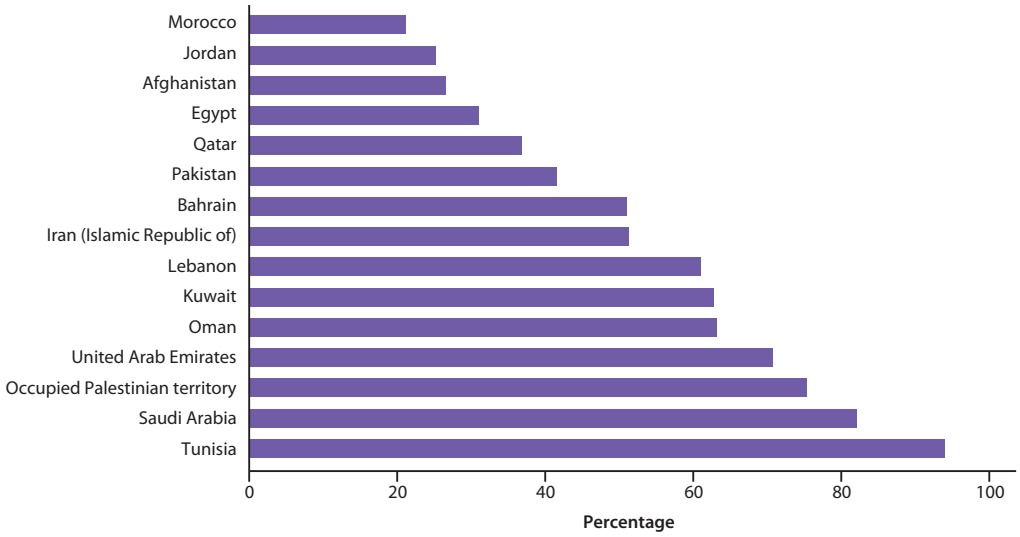
Regular physical activity promotes mental and physical health and well-being. The COVID-19 pandemic exposed the critical importance of physical activity but also the inequities to access and opportunities for people to be physically active. Globally, one in four adults and more than 80% of adolescents do not meet WHO's recommended levels of physical activity for health. Physical inactivity is one of the top risk factors for NCD morbidity and mortality; it is a major economic burden on national health systems and the economy as a whole *(86)*.

The prevalence of physical inactivity is 44.5% in the Eastern Mediterranean Region (Fig. 13). Globally and in the Region, physical inactivity is more prevalent among women than men and the gender gap is much wider in the Region compared with other WHO regions *(54)*. Data collected as part of the Global School-based Student Health Survey (GSHS) show that physical inactivity is also a major problem among adolescents in the Region. On average, only 16% of adolescents meet the global recommendation of at least 60 minutes of physical activity per day on five or more days of the week.

There have been efforts at both policy and planning level to address physical inactivity in the Region, although the response is inadequate. Almost all countries have a national physical activity policy, have a national intersectoral mechanism for addressing NCDs and have conducted surveys among adults and adolescents. However, only nine countries (Bahrain, Islamic Republic of Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Tunisia and United Arab Emirates) have implemented at least one national public awareness campaign recently. Fewer than half the countries in the Region provide opportunities and programmes for physical activity, such as promoting physical activity in PHC, childcare, and workplace settings and through community-based and sports initiatives *(86)*.

In 2018, WHO launched the Global action plan on physical activity and health, which outlines 20 policy actions around four strategic objectives, namely, creating active societies, active environments, active people and active systems *(87)*. Through a consultative process, the Global Plan was adapted to the contextual needs of the Region taking into consideration the emergency situation, cultural factors and climate *(88)*. The regional adaptation also identified key opportunities for effective, whole-of-society interventions in the form of five regional access points (youth bulge, active settings, community-based lifestyle interventions, converting stress into positive energy and sports).

Fig. 13. **Insufficient physical activity (%) among adults (18 years and above) in selected countries, 2016–2021**



Source: WHO (2022) (80)

The November 2022 FIFA World Cup, hosted for the first time in the Region, by Qatar, provided an opportunity to promote a healthy tournament and nurture physical activity and healthy lifestyles. A memorandum of understanding signed by Qatar, the host country, FIFA and WHO established the Sports and Health Initiative in the run up to the World Cup.

5.4 Dietary intake

Dietary patterns in the Region are becoming high in salt, sugar and saturated or trans-fats, resulting in rapidly growing rates of overweight and obesity and NCDs in the Region *(79)*. Data from the Food and Agriculture Organization of the United Nations (FAO) food balance sheets and from food consumption surveys between 1969–1971 and 2011 highlight a shift towards an increasingly energy-dense diet and high intakes of fat and sugar, coupled with a parallel decrease in the consumption of carbohydrates *(89)*. Salt intake above the WHO recommendations (<5 g per person per day, equivalent to <2 g per day of sodium) is linked to increased risk of hypertension (raised blood pressure), which in turn leads to stroke and heart disease *(90)* and stands at more than 10 g per person per day in the Region *(91)*. Free sugar intake exceeds the recommended limit of 10% of energy intake in the Region; high sugar consumption, particularly free and added sugar, is associated with obesity and NCDs *(92)*. Accordingly, there is an urgent need for government-led reformulating programmes to reduce the intake of fat, salt and sugar from foods and beverages *(93, 94)*.

Key objectives of the regional nutrition strategy launched in 2020 are to halt the rise in diabetes and obesity, reduce the mean population intake of salt by 30% and virtually eliminate industrially-produced trans-fats from the food supply *(79)*. The strategy outlines key actions to transform food systems to improve the production of and access to foods that make up healthy diets, including regulatory measures that could support a shift in dietary patterns from energy-dense foods, unhealthy fats, sugar and salt from food and drinks.

Most of the Region's countries have developed policies to support a healthy diet and to reduce nutrition-related risk factors of NCDs. Thirteen countries, including all high-income countries and two upper-middle-income countries (Iraq and Jordan) and five lower middle-income countries (Egypt, Islamic Republic of Iran, Morocco, occupied Palestinian territory (including East Jerusalem) and Tunisia) have a policy to reduce salt/sodium consumption. Neither Lebanon nor Libya nor any low-income country have developed such policies yet *(74, 95, 96)*. Taxes on sugar-sweetened drinks have been implemented in 11 countries, namely all six high-income countries and five lower middle-income countries (Egypt, Islamic Republic of Iran, Morocco, occupied Palestinian territory (including East Jerusalem) and Tunisia), *(7, 97–99)*. A 50% tax on soft drinks and 100% tax on energy drinks were adopted in GCC countries in 2016 *(98)* and by 2022, Bahrain, Oman, Qatar, Saudi Arabia and United Arab Emirates had started implementation of these taxes. However, none of the low-income countries have developed such policies. Fifteen countries in the Region have some policy to limit trans-fatty acid intake, including all high-income countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates), and all upper and lower middle-income countries except Djibouti and Libya *(7, 8, 10, 13, 74, 96, 99–101)*.

5.5 Alcohol

Alcohol consumption among the adult population (aged 15 years and above) in the Region is 0.6 litres per capita, which is one tenth of the global rate and much lower than in other WHO regions. The Region's share of global alcohol consumption is only 0.7%; however, 70.5% of alcohol consumption in the Region is unrecorded (i.e. not accounted for in national statistics on alcohol taxation or sales as it is produced and sold outside the official channels). The trend of alcohol consumption has remained stable in the Region since 2000, and the prevalence of heavy episodic drinking has deceased.

The Eastern Mediterranean Region has the highest level of sobriety compared with other WHO regions, with 97.1% of the population having abstained from alcohol in the past 12 months. The prevalence rate of current drinking among young people (aged 15–19 years) is only 1.2%, which constitutes up to 700 000 young people in the Region. The sex ratios for current drinking and heavy episodic drinking are the highest among all WHO regions, suggesting that alcohol use is mostly a masculine behaviour in the Region.

The Region has the highest per capita consumption (24.3 litres) of alcohol among current drinkers, which is attributable to the proportion of the population who engage in heavy episodic drinking. This is alarming for the health sector as it suggests that, despite the very low prevalence of alcohol consumption in the Region, those who do drink are more vulnerable to the harmful effects of alcohol, such as diabetes mellitus.

Compared with other WHO regions, the Eastern Mediterranean has the lowest age-standardized burden of disease and injury attributable to alcohol consumption, at seven deaths and 322 DALYs per 100 000 population. Alcohol use disorders, including harmful use of alcohol and alcohol dependence, among persons aged 15 years and above in the Region are estimated to be 0.8%, which is the lowest rate globally. Information about treatment coverage in the Region is very limited, and most countries do not have specialized treatment services for alcohol use disorders and dependence *(102)*.

Policy and legislation to control alcohol production, sale and marketing is quite strict in the Region. Nearly 55% of countries have restrictions on alcohol advertising and promotion, 50% of countries

restrict the physical availability of retailed alcohol and more than 40% of countries have increased the excise tax on alcoholic beverages *(45)*.

5.6 Surveillance and evaluation of NCDs and their risk factors

The countries of the Region continue to strengthen NCD risk factor surveillance systems. For example, most countries have conducted the GSHS. Many countries have conducted surveys using the WHO STEPwise Approach to NCD Risk Factor Surveillance (STEPS), most recently Libya and the occupied Palestinian territory (including East Jerusalem) in 2021 and Libya and Qatar in 2023. Other important surveys are under way, including the Global Adult Tobacco Survey (GATS) currently being repeated in Pakistan and the Global Youth Tobacco Survey (GYTS) soon to be conducted in four countries. NCD risk factor surveillance helps monitor and evaluate emerging patterns and trends and can guide priority-setting and targeting interventions to better address the NCD epidemic.

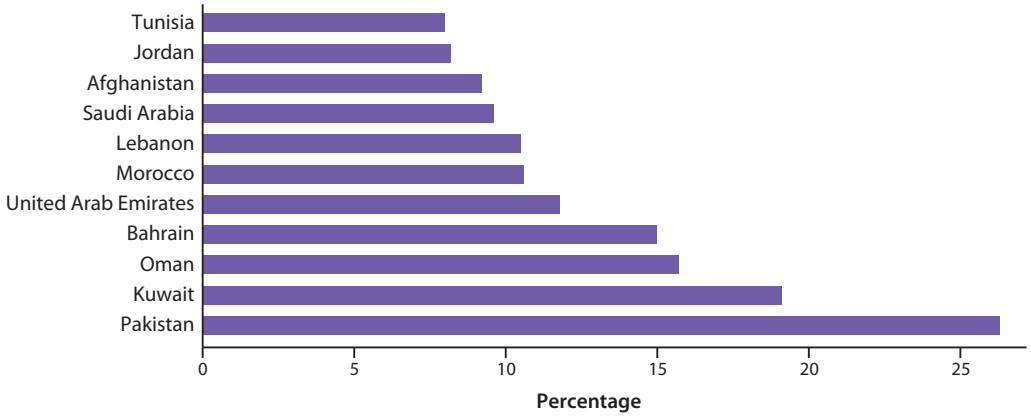
6 Management and control of priority NCDs

6.1 Diabetes

More than 41 million people in the Eastern Mediterranean Region are living with diabetes. The Region has the highest age-standardized rate of DALYs due to diabetes among WHO regions. and these increased threefold in the Region in 1990–2015. Analysis of the Global Burden of Disease 2015 study and results of other studies show this trend is increasing beyond estimates, and that epidemics of obesity and physical inactivity are the main risk factors for type 2 diabetes *(103)*. Among the countries of the Eastern Mediterranean Region, raised blood glucose among the adult population affects the lowest proportion of people in Somalia and the highest in Kuwait (Fig. 14).

Countries in the Region are at different stages in the prevention and control of diabetes. All GCC countries except Bahrain, and some middle-income countries including Egypt, Jordan, Lebanon, occupied Palestinian territory, Libya and Syrian Arab Republic, have an operational policy, strategy or plan of action for diabetes. However, about half of the countries of the Region, including all the low-income countries, lack the required policy and programmes at national level to tackle the increasing burden of diabetes *(103)*. Member States adopted the Regional Framework on Diabetes Prevention and Control during the 68th Regional Committee meeting in October 2021. The framework outlines a set of interventions to be considered by all governments to step up their efforts and take concerted action to control the disease in the Region. The framework guides strategic interventions and clearly defines indicators on investment across the four domains of action (governance, prevention, management, and surveillance and research) *(104)*.

Fig. 14. **Age-standardized prevalence of raised blood glucose among adults (18 years and above), 2016–2021**



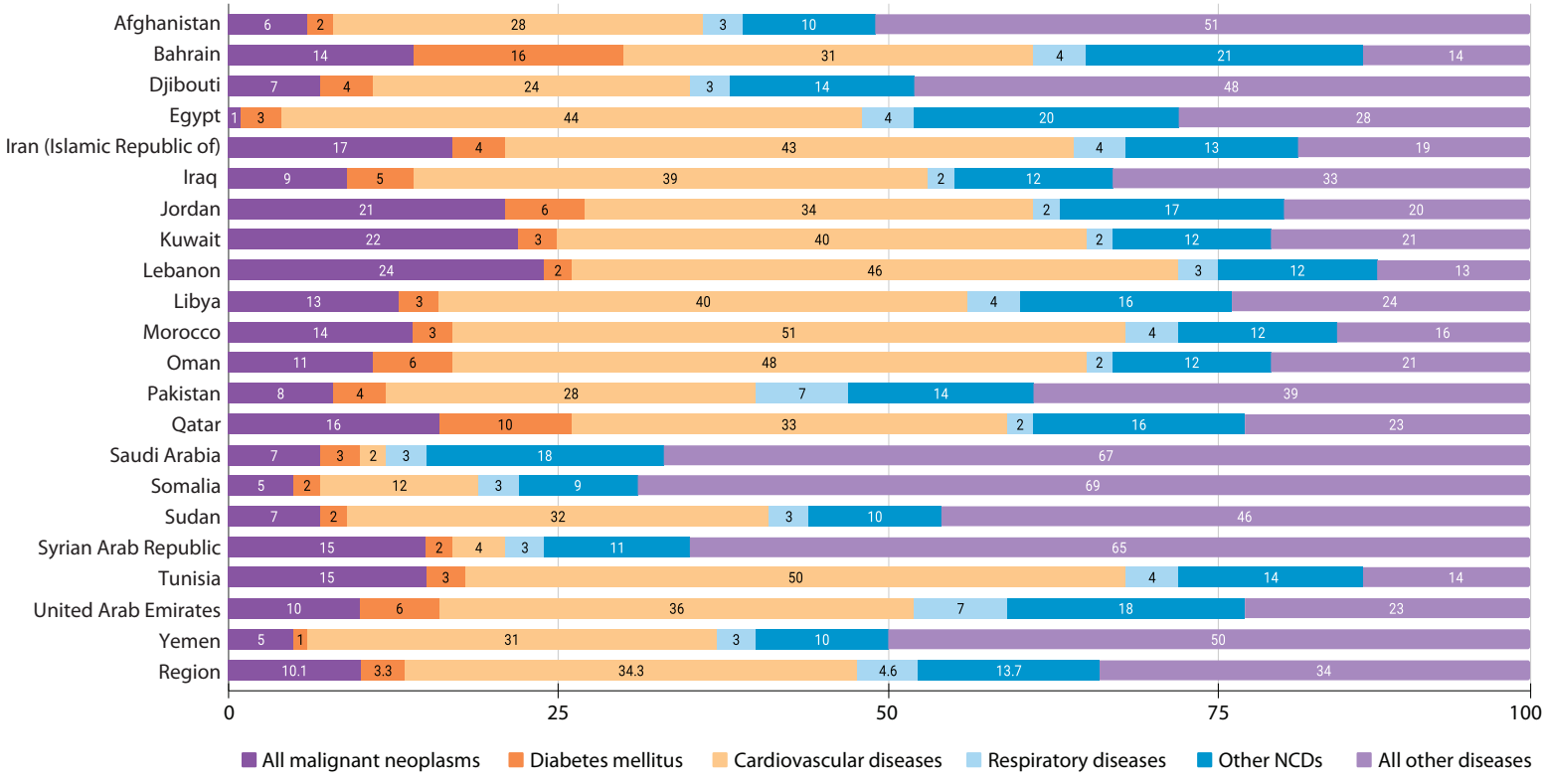
Source: WHO (2022) (80)

6.2 Cardiovascular diseases (CVDs) and hypertension

The death toll attributed to NCDs in the Region is high and is rising. Of the 4266 million deaths in the Region in 2019, 2826 were attributed to NCDs, accounting for 66% of the deaths in 2019, an increase of 3% compared with those reported in 2016. Of the 66% of deaths due to NCDs in 2019, cardiovascular diseases alone accounted for almost half (34%), while cancer, diabetes and chronic respiratory diseases were responsible for 10%, 3% and 5% of all deaths, respectively. Cardiovascular diseases are the major contributor to the proportionate mortality from NCDs in the different countries of the Region (Fig. 15).

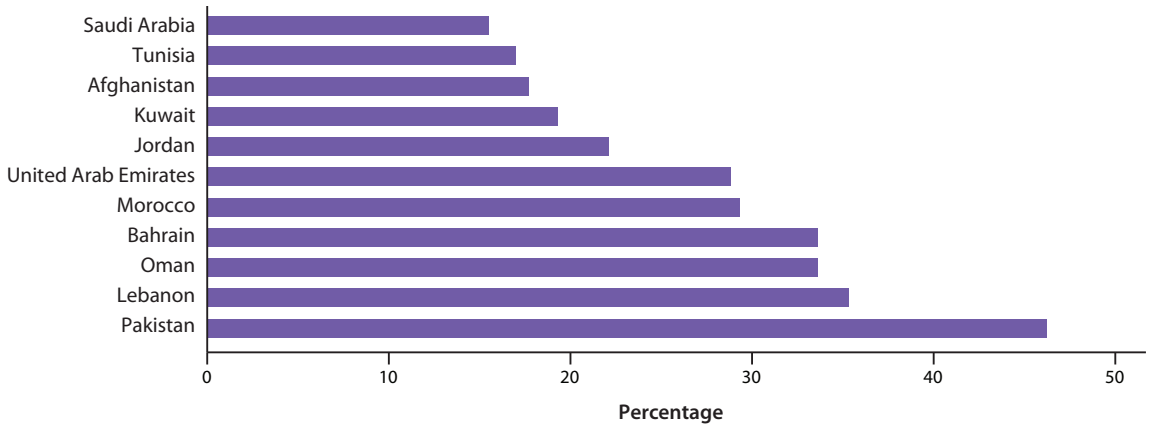
Sedentary lifestyles and risk factors such as hypertension, diabetes (ranging from 4% in Islamic Republic of Iran to 19% in Sudan) and hypercholesterolemia (ranging from 14% in Lebanon to 52% in Islamic Republic of Iran) contribute to the high burden of CVDs in the Region *(105)*. On average, one in four adults in the Region has raised blood pressure (Fig. 16).

Fig. 15. Proportion of NCDs contribution to mortality in the Region, 2019



Source: WHO (2022) (80)

Fig. 16. Age-standardized prevalence of raised blood pressure among adults (18 years and above), 2016–2021



Source: WHO (2022) (80)

WHO tools and frameworks, such as the *WHO package of essential noncommunicable (PEN) disease interventions for primary health care* and the HEARTS technical package for cardiovascular disease management, have been well received across the Region to strengthen NCD management in PHC *(106, 107)*. In addition to community-based actions such as the implementation of the Global Hearts Initiative in Bahrain, Oman and occupied Palestinian territory (including East Jerusalem) and the implementation of the WHO PEN protocol in Islamic Republic of Iran as IraPEN by community health workers, several countries have implemented the HEARTS package, including Jordan, Morocco and Sudan; additional countries (Iraq, occupied Palestinian territory (including East Jerusalem), Pakistan and Yemen) have expressed interest in its implementation.

Moving forward, countries in the Region need to focus on three domains of action. The first is CVD prevention and reduction of risk factors by implementing the evidence-based NCD best-buys for tackling tobacco use, alcohol abuse, unhealthy dietary intake (excessive salt, trans-fatty acids, sugar intake) and physical inactivity *(108)*. The second is CVD management and health care that fully implement the HEARTS technical package with a focus on PHC through implementing WHO PEN. The third is CVD surveillance, monitoring and evaluation by building national capacity to conduct country surveys such as the WHO STEPwise survey to generate more reliable cause-specific mortality data, and to agree on key performance indicators at the facility level using the Global Hearts Initiative monitoring and evaluation module *(109)*.

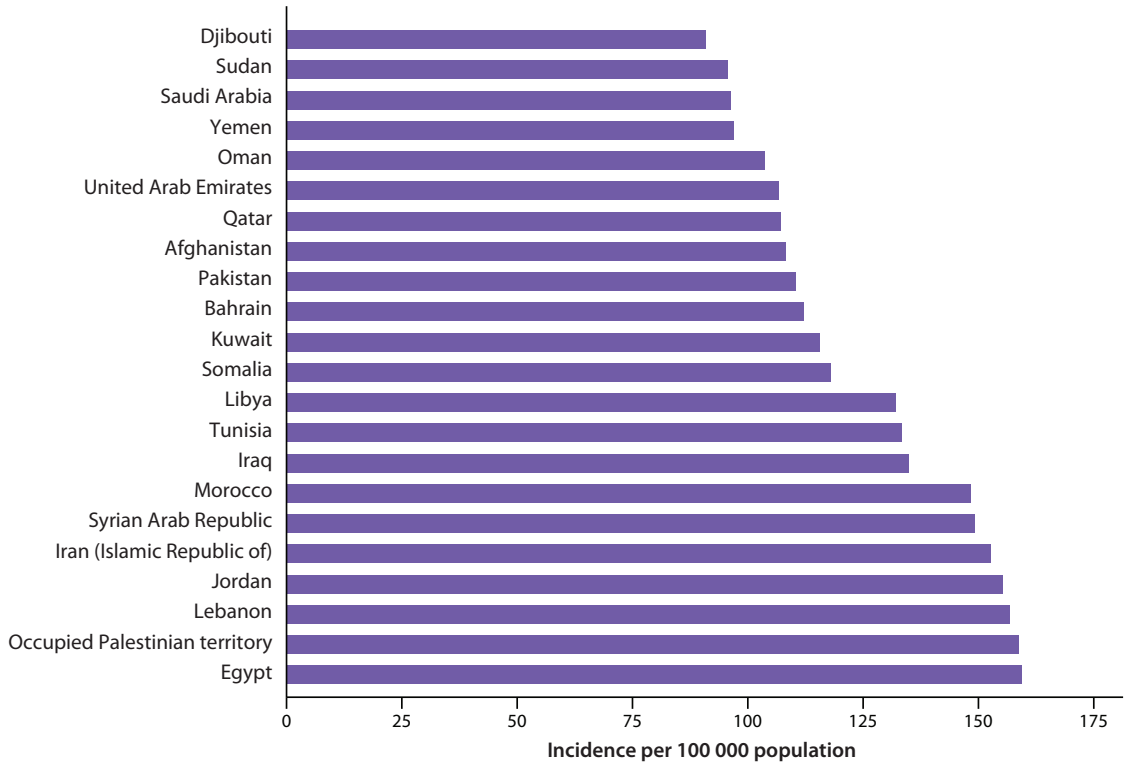
6.3 Cancer care and services

Population growth, an ageing population and progressively unhealthy lifestyles (including smoking, poor diet and inactivity) contribute to the increasing burden of cancer, as they do to the burden of other NCDs. Cancer is one of the major killers in the Region and results in nearly 400 000 deaths annually. The incidence of all types of cancer in the Eastern Mediterranean Region ranges from 91 per 100 000 people in Djibouti to 159 per 100 000 people in Egypt (Fig. 17). Over 700 000 people were diagnosed with cancer in the Region in 2020 and about 500 000 lost their lives to it; these figures are predicted to double by 2040 *(111)*. The five most common cancers identified as amenable for early detection in the Region are breast, colorectal, cervical, prostate and oral

cancers. Breast cancer is the most common cancer among women and its incidence is increasing in all countries of the Region; the incidence of colorectal and prostate cancers is also increasing. Cost–effective public health interventions including full implementation of the FCTC, increasing coverage of human papillomavirus vaccination and strengthening industrial standards to reduce exposure to occupational carcinogens could prevent many of these common cancers *(112)*.

Progress in cancer control has been generally slow in the Region. Although a majority of countries (73%) have a population-based cancer registry in place that covers either a Region in the country (e.g. Karachi in Pakistan and Gharbiah in Egypt) or the whole country (e.g. Kuwait) *(113)*, only eight countries in the Region have an operational policy or strategy on cancer control and only five countries have a functional multisectoral committee for cancer control. Early detection strategies often focus on screening rather than early diagnosis; however, there are good examples of breast cancer early diagnosis initiatives in the Islamic Republic of Iran, Jordan and Morocco *(113)*. In terms of cancer management, only half of the countries in the Region (mostly GCC countries and upper middle-income countries) have approved guidelines for cancer management, and a few countries, such as Jordan and Oman, have service models incorporating multidisciplinary teams with different specialties (e.g. pathology, radiology and surgical, medical and radiation oncology). Palliative care is available in the public health system in only three countries of the Region *(113)*. WHO has developed numerous tools and guidance to promote a comprehensive approach for cancer control, including the *Framework for action on cancer prevention and control in the WHO Eastern Mediterranean (112)* with its six areas of action: governance, prevention, early detection, management, palliative care and surveillance and research *(114)*.

Fig. 17. Incidence of cancer in the Eastern Mediterranean Region, 2020



Source: WHO (2022) (110)

Moving forward, the Region will focus on the wider implementation of the WHO global initiative on cancer within Member States of the Region; that is, expanding implementation of the Global Childhood Cancer initiative within and beyond the seven implementing countries in collaboration with St Jude's Children's Hospital in the United States of America (a WHO collaborating centre); rolling out the WHO breast cancer initiative, and implementing the recently launched regional cervical cancer elimination strategy. To date, five Member States (Libya, Morocco, Kuwait, Saudi Arabia and United Arab Emirates) have started human papillomavirus (HPV) vaccination.

6.4 Asthma and chronic respiratory diseases

Asthma affected an estimated 22 million people in 2019 and caused 455 000 deaths *(113)*. Asthma is generally prevalent among children and recent reports show that the prevalence of asthma symptoms in young adults and through middle age is gradually increasing worldwide *(116)*. Asthma is mostly underdiagnosed and undertreated, particularly in children *(117)*. The environmental risks are greater in low- and middle-income countries and among the lower socioeconomic sections of society. Exposure to indoor smoke caused by heating and cooking can lead to COPD and lung cancer and, in children, to pneumonia and asthma. About 50% of all households worldwide and 90% of rural households use fuels that reduce indoor air quality, exposing over 2 billion people to noxious smoke, especially in low-income households.

Data on the prevalence of asthma and chronic respiratory diseases in the Region are inadequate. A literature review showed that prevalence of asthma is higher in GCC countries. Less information is available on COPD, but studies indicate that COPD is far more prevalent in low- and middle-income countries. The pooled prevalence of asthma and COPD in the Region is estimated to be 9.4% (95% confidence interval (CI: 9.2–9.6) and 5.4 (CI: 5.12–5.6), respectively *(118)*. The key element in reducing and controlling COPD is addressing risk factors, including indoor smoke exposure and tobacco use, through political, social and public health initiatives, as well as developing cost–effective management protocols for COPD, especially in low-income settings *(119)*.

6.5 Oral health

Oral health is integral to health and well-being. It enables people to perform essential functions such as eating, breathing and speaking but is also linked to psychosocial well-being such as self-confidence and ability to socialize and work without pain, discomfort and embarrassment. According to the WHO oral health status report, the major oral diseases and conditions are estimated to affect close to 3.5 billion people globally, an estimated global prevalence of 45%, higher than the prevalence of any other NCD *(120)*. In May 2021, the World Health Assembly adopted a resolution on oral health requesting that oral health be embedded within the NCD and UHC agenda since oral diseases and conditions share common risk factors with the leading NCDs. A draft strategy on tackling oral diseases was developed in 2022 and is being translated into an action plan and a monitoring framework.

The WHO estimated regional prevalence of dental caries in deciduous teeth is 45% and 32% in permanent teeth; these rates are higher than the global average of 43% and 29%, respectively *(120)*. Regional evidence shows higher and increasing prevalence rates *(121, 122)*. Key risk factors for dental caries in children include increased age, sociodemographic factors such as having a low income and mother's limited education, high sugar intake and poor oral hygiene *(122)*. Oral health interventions addressing dental caries, such as using fluoridated toothpaste in Syrian

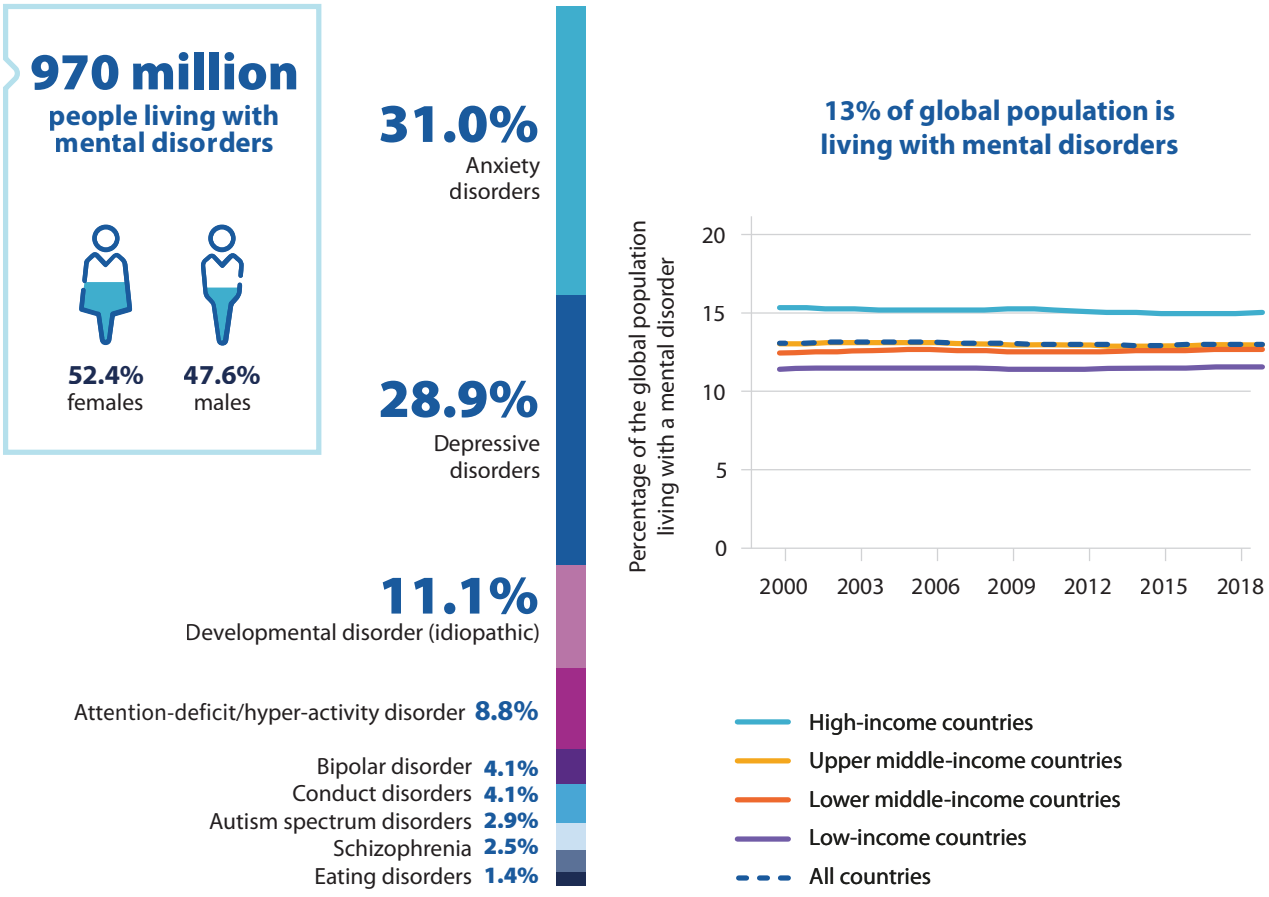
Arab Republic, preventive treatment and fluoridated chewing gum in Saudi Arabia, oral health education in the Islamic Republic of Iran and the integration of mother and child oral health promotion into vaccination programmes in Islamic Republic of Iran and Syrian Arab Republic were effective in reducing early caries in children *(123)*. The regional prevalences of other major oral health diseases and conditions, such as periodontitis, tooth loss and oral cancers are lower than in most other WHO regions *(120)*. Addressing oral health is a priority given that these diseases are largely preventable and require simple interventions if diagnosed and addressed early. Aligning national strategies with the global strategy, which stresses a promotive and preventive approach to oral health including embedding oral health in PHC, would be key to address the burden of oral diseases in the Region *(120)*. WHO tools are available to support building national capacity in oral health. A regional oral health promotion toolkit based on one produced by the WHO Regional Office for Africa *(22)* was developed in consultation with focal persons from countries of the Region. The first ever online course on oral health for the OpenWHO.org platform entitled Promoting oral health in PHC settings was launched in February 2021; by the end of 2023, over 14 000 people total had enrolled in the English and Arabic versions.

7 Mental health and substance use disorders

7.1 Mental disorders

In 2019, prior to the COVID-19 pandemic, an estimated 970 million people globally were living with a mental disorder, 82% of whom were in low- and middle-income countries (LMICs) (Fig. 18). According to various estimates, in the Region in 2016, 283 million people had alcohol use disorders *(102)*; in 2019, 38 million people had drug use disorders *(125)*; in the same year, 55 million people had dementia *(126)*; and in 2015, 50 million people had epilepsy *(127)*. By 2019, an estimated 25% more people than in 2000 were living with mental disorders *(128)*. For people living in conflict-affected settings in the preceding 10 years, it is estimated that one in five have a mental disorder *(129)*. In 2019, in the Eastern Mediterranean Region, 13.53 million DALYs were due to mental disorders, with a 26.4% increase from the estimates in 2015. This accounted for 5.5% of the total DALYs, with depressive disorders being the ninth leading cause of disease burden in the Region. Females have also showed higher rates of DALYs caused by mental disorders than males *(130)*.

Fig. 18. Global prevalence of mental disorders, 2022



Source: WHO, 2022 (124)

Suicide accounts for more than one in every 100 deaths globally *(131)*. In 2019, suicide was the third leading cause of death in females aged 15–29 years and the fourth leading cause of death for males *(132)*. For every death by suicide more than 20 suicide attempts are made *(133)*. Worldwide, about 60% of suicide deaths can be attributed to mental and substance use disorders. Globally, the mortality rate following a suicide attempt is twofold higher among men than women; however, the attempt itself is 2–4 times more common among women. Differences in age-standardized suicide rates can be seen across WHO regions. The lowest suicide rate was in the Eastern Mediterranean Region (6.4 per 100 000) *(132)*.

7.1.1 Strategic approaches: Regional framework for scaling up mental health in countries of the Region

Mental health systems globally are failing to meet the needs of their populations. The gaps in treatment vary across countries and from one mental health condition to another. For example, while 70% of people with psychosis are reported to be treated in high-income countries, only 12% of people with psychosis receive mental health care in low-income countries *(14)*. For depression, only 1 in 5 people living with major depressive disorder in high-income countries and 1 in 27 in lower middle-income countries, received minimally adequate treatment *(14)*.

In 2019, the 72nd World Health Assembly endorsed extending the implementation of the comprehensive *Mental Health Action Plan 2013–2020* to 2030. This plan includes nine possible targets with few countries currently meeting them; Bahrain and Islamic Republic of Iran have met six targets, for example. The regional framework which operationalizes the objectives of the Global Plan identified high-impact, cost–effective, affordable and feasible strategic actions supported by a set of indicators to monitor the implementation of the plan *(17)*.

Most countries in the Region (81%) have reported having updated policies or plans for mental health and mental health laws (71%). While guidelines for the integration of mental health into PHC have been adopted in most countries of the Region, with ongoing activities for training and supervision, rates of pharmacological and psychosocial intervention for mental health conditions remain limited. Regionally, the median number of mental health workers was 8.0 per 100 000 population, compared with the median of 13.6 per 100 000 population in the rest of the world. Although a good portion of countries in the Region (62%) have reported compiling mental health data as part of general health statistics, only 24% reported the regular compilation of data specific to mental health covering at least the public sector, with some countries reporting that no mental health data had been compiled nor reported in the past two years (14%). Finally, the limited allocation of financial resources for the implementation of mental health policies and plans (43% of countries in the Region reported having allocated resources for the implementation of such plans) and low levels of public expenditure on mental health (1.8% of health expenditure compounded by misplaced priorities) indicate that mental health remains a severely unfunded area of care. Significant efforts are therefore needed to move forward in implementing the most high-impact, cost–effective strategies to address the mental health burden in countries of the Region.

7.1.2 Addressing the treatment gap

To address the treatment gap, countries need to increase resources for mental health care by utilizing available human and material resources efficiently and making the paradigm shift from institutional to an integrated community-based model of mental health care *(134)*. WHO's Mental Health Gap Action Programme (mhGAP) *(135)*, which can be used to facilitate this paradigm shift,

is being implemented in almost all countries in the Region to enhance access to mental health services through the PHC system. Furthermore, the Regional Office has developed a guidance package to support countries in the integration of mental health in PHC and launched an online course based on the package in 2022 *(136, 137)*.

Efforts are under way to increase mental health services and beds in general hospitals and scale down stand-alone mental institutions, especially in Afghanistan, Iraq, Jordan, Lebanon, occupied Palestinian territory (including East Jerusalem) and Syrian Arab Republic. Community-based services, such as community mental health centres and day treatment facilities, can also play a major role in increasing access to affordable mental health services; however, these are underdeveloped in the Region *(138)*. Available evidence suggests that virtual or face-to-face interaction with persons with mental disorders is one of the best-evidenced mental health interventions for addressing stigma and discrimination. This intervention is being implemented in some countries of the Region (Lebanon, Pakistan, Saudi Arabia and Tunisia) *(139)*. In 2022, a regional initiative addressing stigma and discrimination was launched with plans to set up a regional alliance of civil society and organizations of people with lived experience and their families.

While the COVID-19 pandemic has slowed down the implementation of a range of strategic activities, it has also brought increased attention to mental health and psychosocial support. It has provided the opportunity to scale up services and overcome stigma. A regional mental health and psychosocial support platform was launched in 2020 at the start of the COVID-19 pandemic and an online course for health and social care professionals based on a basic psychosocial skills package was developed by the Inter-Agency Standing Committee Reference Group on Mental Health and Psychosocial Support in Emergency Settings in 2022 *(140)*. Additionally, the School Health Implementation Network (SHINE) promotes mental health through a manualized school-based intervention in countries of the Region (Egypt, Islamic Republic of Iran, Jordan, Lebanon and Pakistan) and this is also being adopted by other regions. Although challenges persist in implementing suicide prevention programmes, Afghanistan, Islamic Republic of Iran, Jordan, Lebanon, occupied Palestinian territory and Tunisia are developing and implementing national suicide prevention programmes based on WHO guidance and support *(33)*.

7.2 Substance use disorders

Substance use disorders were responsible for an estimated 1 836 778 million DALYs in the Region during 2019, of which 1 217 868 were due to drug use disorders and 618 909 to alcohol use disorders *(129)*. According to the World drug report 2021, around 275 million people worldwide are estimated to have used an illicit drug at least once during the preceding year, and some 36.3 million people who use drugs suffer from drug use disorders *(141)*. Globally, about 0.5 million deaths and 30.9 million DALYs are attributed to drug use (with 66% of the DALYs being attributed to men and 34% to women).

Available evidence indicates that substance use varies between 1% and 6% of the adult population in different countries in the Region. Cannabis is the most commonly used drug; however, opioids are the main contributor to mortality and morbidity and the main reason for seeking treatment. The estimated prevalence of opioid dependence in the Region (0.29%) is 1.3 times higher than the global prevalence. Emerging regional trends indicate the use of tramadol and amfetamine-type substances, such as captagon, as well as newer psychotropic substances, particularly synthetic cannabinoids *(142)*.

Despite the scale of the problem, one in eight people with a drug use disorder worldwide receive evidence-based treatment *(141)*, while in countries of the Region, only one in 13 receive treatment *(142)*. Treatment contact coverage (defined as the proportion of people with substance use disorders who are in contact with treatment services) is generally very limited (1–10%) or limited (11–20%) in the Region for people with opioid, cannabis and amfetamine use dependence but is generally higher for men than for women *(143)*. One key reason for the low coverage is the limited number of trained personnel. The number of health workers available for the treatment of substance use disorders per 100 000 adult population in the Region was generally less than one across all professional groups. Across countries, the median number of professionals available per 100 000 adult population was lowest for addiction medicine specialists/narcologists (0.12) and highest for nurses not specialized in psychiatry (0.58).

In the light of the massive treatment gap for substance use disorders in the Region, the Regional Committee in 2019 endorsed the *Regional framework for action to strengthen the public health response to substance use* (resolution EM/RC66/R.7) *(144)*. The framework outlines strategic interventions in the domains of governance, health sector response, promotion and prevention, monitoring and surveillance and international cooperation. Some progress is being made on implementing the framework across all areas of work, including availability of specialized treatment facilities for people with a substance use disorder, established prevention programmes, updated policies and/or plan to address substance use and prevention and treatment guidelines. However, treatment coverage remains limited for opioid, cannabis and amfetamine-type-stimulant dependence. Thus, significantly more work is needed to implement the regional framework.

8 Accidental and violent injuries and disability

8.1 Burden of injuries and violence

Unintentional, intentional and violent injuries continue to be a growing public health problem in the Eastern Mediterranean Region. Deaths as a result of violence and injury total over 406 000 per year in the Region, representing 9% of all such deaths globally; contrary to global trends, the rates of such deaths in the Region are on the rise. The Eastern Mediterranean Region has the second highest rate of deaths from injury (relative to deaths from all causes) of all WHO regions except the African Region. More than a third of deaths from injury are due to road traffic crashes and another third to intentional injuries (13% being due to collective violence, 10% to self-harm and 9% to interpersonal violence) *(7)*. The rate of injuries as cause of death per 100 000 population was 100 or above in four countries in 2019, which represents a drop from seven countries in 2016. Younger age groups have the highest overall burden of deaths from injury, and males account for two thirds of all deaths from injury.

The humanitarian crises and sociopolitical and economic instability in the Region further compound gender inequalities, compromise women's agency in their lives and increase the risk of violence against women and children. Deaths from injuries are only the tip of the iceberg. Each source of injury that can cause death will also lead to a number of hospital admissions, emergency department or general practitioner treatments, or treatment delivered outside formal medical care, that will be larger than the number of deaths it causes. Within overall multisectoral efforts, the health sector has a central role in injury prevention, not only in terms of providing post-injury care and support but also in applying unique public health models to address the problem.

8.2 Road traffic injuries

Road traffic crashes leading to death and injury are a growing, although preventable, public health problem. Every day, 3700 people worldwide lose their lives on the roads, and the number of people who are seriously injured or acquire a lifelong disability reaches the tens of millions every year. Road traffic injury continues to be a serious public health problem in the Region, which hosts almost 9% of global road traffic deaths. The Region has the third highest mortality rate (18 deaths per 100 000 population in 2016) due to road traffic crashes among WHO regions, after the African and South-East Asia regions. The victims of road traffic crashes in the Region are mostly men, and younger and economically active populations are hardest hit. The majority (80%) of road traffic deaths occur in middle-income countries. However, what distinguishes the Eastern Mediterranean Region from other regions is that the death rate due to road traffic accidents does not decrease in line with an increase in country income. The overall road traffic fatality rate of high-income countries in the Region is three times the average rate of similar countries worldwide *(145)*.

Countries of the Region are taking measures to address this major public health problem. The majority of countries have an agency to lead national road safety efforts; however, these agencies

are rarely fully functional and funded. Almost all countries have road safety laws in place on key road safety behavioural risk factors such as speed, drink–driving and non-use of motorcycle helmets, seatbelts and child restraints, but they usually lack best practice criteria. Additionally, the effectiveness of the legislation seems undesirable as the level of enforcement of existing road safety laws is rated "good" in less than one third of countries in the Region. There are hardly any data on indicators that measure road user behaviour and law enforcement, such as seat belt or helmet wearing. The absence of a safe system road safety approach, combined with insufficient multisectoral coordination and significant gaps in emergency and trauma care and rehabilitative services, are additional challenges to overcome to make roads safer in the Region *(33)*.

Despite these challenges, there has been progress in the Region in developing policies for sustainable transport and measures for the safety of roads. The Decade of Action for Road Safety and the SDGs, alongside consecutive World Health Assembly resolutions and Regional Committee resolution EM/RC56/R.7, provide great opportunities for countries of the Region to enhance their existing endeavours towards increasing road safety *(146)*. In 2022, a Regional Approach to the Decade of Action for Road Safety was discussed during the 69th Regional Committee; it calls for adopting a systemic approach to promoting road safety. In response, a regional strategic framework for establishing a road safety system has been drafted and already used by Islamic Republic of Iran, Morocco, occupied Palestinian territory (including East Jerusalem), Saudi Arabia and Tunisia in their national efforts for strategic planning for road safety.

8.3 Gender-based violence

The Region has the third highest prevalence (31%) worldwide of lifetime and past 12 months' physical and/or sexual intimate partner violence among ever-married/partnered women aged 15–49 *(147)*. Despite this alarming data, there has been remarkable progress in some countries of the Region to promote gender equality and women's empowerment while combating violence against women and girls. In Pakistan, Somalia and Sudan, GBV has been mainstreamed in the national sexual and reproductive health strategies. In Iraq, in 2022, the Ministry of Public Health, together with WHO, launched the first ever GBV strategy for the health sector, which provides a strategic vision and operational directions for better implementation and coordination of sustainable interventions related to the health system response to GBV to reduce its short and long-term health consequences *(148)*. One of the key follow-up actions for the implementation of the strategy has been the development of a technical referral guideline for GBV survivors in Iraq, in collaboration with relevant line-ministries, organizations and other partners *(149)*. In Egypt, Libya and occupied Palestinian territory, efforts by the Ministry of Health and Population, WHO, UNFPA and other partners led to a draft national health policy and manual to respond to the needs of GBV survivors.

A major WHO initiative started in 2018 is the inclusion of essential response and prevention services for survivors/victims of GBV in countries in crisis or with cross-border response and hosting refugees in WHO preparedness, response and recovery plans. Following piloting in Afghanistan, Iraq and Syrian Arab Republic, 10 emergency countries have now incorporated essential GBV services in emergency preparedness and response plans, namely Afghanistan, Iraq, Egypt, Libya, occupied Palestinian territory (including East Jerusalem), Pakistan, Somalia, Sudan, Syrian Arab Republic and Yemen. Furthermore, health clusters in these countries are now integrating GBV into their humanitarian needs overview and response plans *(150)*. A good practice to highlight is the presence of a stand-alone GBV indicator (women, men, girls and boys reached by GBV awareness or empowerment activities) in the key performance indicators for the Syrian Arab Republic *(151)*.

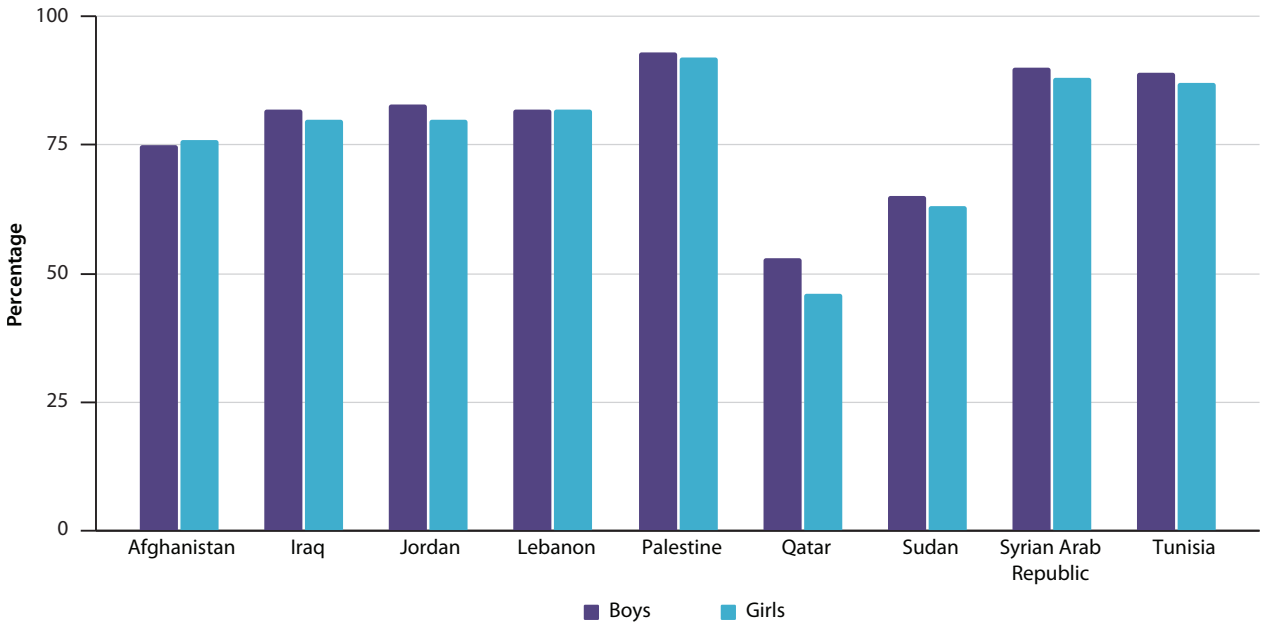
8.4 Violence against children

Violence against children is preventable. The SDGs contain a clear call for its elimination. Violence against children includes child maltreatment, bullying and other types of youth violence. Beyond deaths, violence against children has acute and long-term health and educational consequences; children experiencing violence are also at increased risk of interpersonal and self-directed violence. Globally, half of all children suffer from some form of violence each year; nearly three quarters of children aged 2–4 years regularly suffer physical and/or psychological violence from their parents or caregivers. An estimated 10% of the global child homicides occurred in the Eastern Mediterranean Region; it is the Region with the third highest estimated child homicide rates in the world (1.5 per 100 000 children), with rates higher in boys than in girls in most countries of the Region. Available data indicate that more than 80% of children aged 1–14 years experience violent discipline in several countries in the Region (Fig. 19) *(152)*.

The COVID-19 pandemic had grave implications for the exposure of women and children to violence. It led to isolation, restricted movement and stay-at-home measures to contain the spread of the virus with disruption of health services globally, including in the Region. The likelihood of children's exposure to violence increased drastically during the pandemic *(152)*. A review of media reporting of violence against children was conducted by WHO and partners and showed a notable increase in unverified media reports of such violence during the first half of 2020 in comparison with the same period in 2019.

A set of seven evidence-based strategies to eliminate violence against children called INSPIRE was launched in 2016 and serves as a technical package for preventing and responding to violence against children. Each letter of INSPIRE represents a strategy: implementation and enforcement; norms and values, safe environments, parent and caregiver support, income and economic strengthening, response and support services, and education and life skills *(152)*.

Fig. 19. **Percentage of children experiencing violent discipline in selected countries of the Region**



Source: WHO, 2022 (152)

A regional workshop on the seven INSPIRE strategies to end violence against children was organized during the fifth Arab Regional Conference on the Prevention of Child Abuse and Neglect *(34)*. Generally, in the Region, both prevention and response to violence against children need further strengthening. Over 80% of countries in the Region have a national action plan to prevent violence against children but only one third of them have measurable targets to monitor progress. Laws for preventing violence against children exist in the majority of countries in the Region but their enforcement remains inadequate.

In the coming years, WHO aims to employ most of the INSPIRE strategies. Plans are under way to assess national health system policies, guidelines and protocols addressing violence against children and to build the capacity of health care providers to detect and respond to such violence. A training package for health professionals to responding to child maltreatment is being developed based on global guidelines and was piloted in 2023 in a regional training of trainers with selected countries of the Region *(153)*. In addition, the first Parents Support Conference for the Eastern Mediterranean Region is also being organized, in collaboration with UNICEF, WHO, the Global Partnership to End Violence Against Children, the Early Childhood Development Action Network and Parenting for Lifelong Health.

8.5 Disability

8.5.1 People living with disabilities

The 2022 *Global report on health equity for persons with disabilities* estimated that 16% of the global population were experiencing disability in 2021 *(154)*. About 80% of the total population of people with disabilities live in LMICs. The estimated prevalence of disabilities varies across WHO regions and is 14.7% in the Eastern Mediterranean Region. However, the reported disability prevalence in countries ranges between 0.4% and 5.1% *(155)*. This wide variation is an indication of data limitations including lack of uniform definition and standardized methodology. Moreover, these figures are likely underestimated, particularly when compared with the global percentage of 16% of the total population *(154)*.

Findings from a global burden of disease study and other studies pointing to specific disabilities and disorders complement the WHO figures. For example, musculoskeletal disorders including back pain, neck pain, osteoarthritis, rheumatoid arthritis and gout are a leading cause of disability in the Region *(156, 157)*. In 2013, the point prevalence was particularly high for lower back pain and neck pain, ranging between 32.45 per 1000 in Kuwait and 159.23 in Egypt for back pain and between 34.31 per 1000 in Pakistan and > 55 per 1000 in Somalia and Djibouti *(157)*. In 2017, the prevalence of musculoskeletal disorders was 35 034 per 100 000 population, contributing to 6.2% of the disease burden in the Region, and was higher in women compared with men *(156)*. Estimates for diabetes-related lower extremity complications – namely foot ulcers and amputations – also indicate that these could be a large and growing contributor to the disability burden globally, increasing by 15–31% since 1990 with the highest rates estimated to be in the Middle East and North Africa. They disproportionately affect men and middle-to-older populations *(158)*.

Multiple sclerosis is one of the most common neurological disorders that begins in early adulthood with a variable clinical course, including episodic acute periods of relapses, gradual progressive decline in neurological function or a combination of the two. A systematic review of 52 epidemiological studies conducted in the Middle East and North Africa estimated an overall prevalence of 51.5 per 100 000 population, ranging from 14.8 in Kuwait to 85.8 in Islamic Republic

of Iran per 1000 population *(159)*. These examples, among others, have implications for the prevalence of disability in the Region.

Looking specifically at children, UNICEF reported that 13% of children aged 2 to 17 years in the Middle East and North Africa have one or more functional disabilities, based on surveys conducted in Algeria, Iraq, occupied Palestinian territory and Tunisia. A significantly higher number of boys than girls and children from the poorest households have functional difficulties *(160)*. A global systematic review estimated that 11.2% of children and adolescents have one of four disabilities studied as sequelae of specific health issues and impairments: hearing loss (4.0%), low vision (3.1%), intellectual disability (3.2%) and childhood epilepsy (0.9%); these rates were much higher than a 2004 estimate and increased from infancy to adolescence *(161)*. Another review estimated that 8.4% of children under 5 have developmental disabilities, including epilepsy, intellectual disability, hearing loss, vision loss, autism spectrum disorder and attention deficit hyperactivity disorder *(162)*.

In addition to global reasons for the increasing prevalence of disability in the past decade, including rising population numbers, ageing populations and chronic health conditions, protracted and widespread violent conflicts, wars and emergencies in the Region are also contributing to increasing numbers of disabilities (see Section 18.6 on Rehabilitation services).

A rapid regional assessment of disability inclusion in health responses to the COVID-19 pandemic undertaken by 18 countries in the Region underlined the inadequate and lack of explicit consideration of disability in the planning and implementation of national health responses to COVID-19 in the Region. While focusing on disability inclusion in COVID-19 response plans, this assessment had the potential to stimulate further reflections on disability inclusion in health systems in general and act as a basis for further assessment to feed into action towards improving the situation in this regard. The assessment explicitly indicated that disability inclusive health services are not only crucial to control pandemics such as the COVID-19 pandemic but also to promote better health and greater equity for persons with disabilities. Drawing on this assessment and on the Global report on health equity for persons with disabilities, WHO has embarked on developing a situation analysis of disability inclusion in the health systems in the Region to inform stronger action in this area at the national and regional levels.

8.5.2 Sensory functions

Based on WHO calculations, about 86 million people in the Region are estimated to be in need of glasses and low-vision aids *(163)*. The most common cause of blindness and low vision in 2015 were refraction and accommodation disorders, with a prevalence of 10.8% in males and 14.8% in females and with the highest prevalence in Afghanistan. This cause was followed by cataracts with a prevalence of 1.3% in males and 1.7% in females and with the highest prevalence in Pakistan *(164)*. The prevalence of vision loss due to diabetic retinopathy was significantly higher in the Middle East and North Africa for both men and women (men: 261.5, women: 249.8 per 100 000) compared with the global figures (59 per 100 000 population) *(165)*. Among children under-5 years of age, refraction and accommodation disorders were the leading causes of vision loss, with Afghanistan and Egypt among the top 10 countries globally with the highest number of cases per 100 000 population for vision loss *(9)*.

Trachoma is responsible for the blindness or visual impairment of about 1.9 million people globally. In the Region, five countries required ongoing interventions for the elimination of trachoma

as a public health problem (Afghanistan, Egypt, Pakistan, Sudan and Yemen), two may require interventions in suspected trachoma-endemic areas (Libya and Somalia) and three countries are waiting to be validated as having eliminated it as a public health problem (Iraq, Saudi Arabia and Tunisia). WHO validated Islamic Republic of Iran (2018), Morocco (2016) and Oman (2012) for having eliminated trachoma as a public health problem. Safe water supply, hygiene measures and improved sanitation can prevent trachoma as well as other diseases *(166)*.

Common causes of blindness such as cataracts, glaucoma and age-related macular degeneration are preventable and can be treated simply with timely and cost–effective interventions. The proportion of ageing population (60 years and older) of the regional population is estimated to increase from about 6.6% in 2015 to almost 15.0% in 2050. The number of people with visual impairment is thus expected to increase, given that a substantial proportion of people with visual impairment are above 50 years of age. This has substantial implications for the demand of related health services, which should include targeted screening and appropriate clinical services. Practical guidance to pursue integrated people-centred eye care, including preventable vision impairment and blindness, is therefore much needed in the Region *(167)*. To date, over half the countries of the Region have developed and revised their five-year national action plans on eye health in line with WHO's *Universal Eye health: A global action plan 2014–2019 (168)*. WHO continues its collaboration with key global and regional partners to support countries in the Region in strengthening integrated people-centred care in health systems in alignment with global recommendations including reaching the 2030 targets: A 40 percentage point coverage increase for refractive error and a 30 percentage point coverage increase for cataract surgery *(169–171)*.

Globally, over 5% of the world's population – or 430 million people – require rehabilitation to address their disabling hearing loss *(172)*. In the Eastern Mediterranean Region in 2020, 78 million people were living with hearing loss, with this number projected to reach 194 million by 2050. It is estimated that the overwhelming majority of people with hearing loss reside in LMICs, with most of them lacking access to the required interventions *(173)*. A global burden of disease study estimates much higher rates: 14.9%, with the greatest percentage increase projected in the Eastern Mediterranean and African Regions *(174)*. For children under 5 years, hearing loss is largely due to otitis media and congenital anomalies; Yemen and Pakistan were among the top 10 countries globally for the number of cases per 100 000 children under the age of five *(162)*. Countries should consider the WHO package of interventions on hearing loss to identify those best suited for their country priorities for achieving UHC *(172)*.

8.5.3 Addressing disabilities in the Region

Member States have made efforts to address several objectives outlined in the *WHO Global Disability Action Plan, 2014–2021*. Egypt, Morocco, Oman, Pakistan, Sudan and Syrian Arab Republic drafted national disability action plans based on the Global Plan with support from WHO. Ten countries have included disability in their national censuses *(175)*. In 2021, Member States adopted resolution WHA74.8 on the highest attainable standards of health for persons with disabilities *(176)*. Welcoming progress on mainstreaming disability, the resolution called for incorporating a disability- and gender-sensitive approach in designing programmes, identifying and eliminating barriers to access to services and ensuring comprehensive, accessible and affordable access to health systems and care for all persons with disabilities *(176)*. WHO is currently conducting a regional situation analysis of disability inclusive health systems, drawing on the action areas indicated in the *Global report on health equity for persons with disabilities*:

governance and leadership; health financing; engagement of stakeholders and the private sector providers; models of care; health and care workforce; physical infrastructure; digital technologies for health; quality of care; and monitoring and evaluation. This situation analysis will inform the development of a strategic action framework to guide country action towards health equity for persons with disabilities based on available WHO normative guidance and the specific context of the Region.

9 Migration and refugees

The Region is home to all types of migrant populations, including IDPs, asylum seekers, refugees, regular and irregular migrants, and returnees *(177)*. It is host to the largest number of people forcibly displaced globally *(178)*. More than half the population of the Region live in nine countries with graded emergencies (Afghanistan, Iraq, Libya, occupied Palestinian territory (including East Jerusalem), Pakistan, Somalia, Sudan, Syrian Arab Republic and Yemen). These countries experience high levels of IDPs, with many crossing international borders and becoming refugees. Many of the neighbouring countries and areas have been home to displaced populations who have crossed their borders. Some of these displaced populations are registered as refugees but others simply remain migrants and even irregular migrants *(177)*. In 2022, the world saw the largest displacement of populations since 1980, according to the United Nations High Commissioner for Refugees (UNHCR). Pakistan and Sudan each host more than 1 million refugees; by population size, one in six people in Lebanon and one in 16 people in Jordan are refugees *(179)*.

Evidence on the health status of migrants and refugees in the Eastern Mediterranean Region is limited. Nevertheless, migrants, IDPs and refugees are at risk, as are host populations, of acquiring infectious diseases and developing longer term conditions such as NCDs and mental disorders. In addition, IDPs and refugees may already be suffering from conditions that require ongoing treatment, and as a result of conflict they are more susceptible to psychological problems. Labour migrants tend to be healthy, but depending on their employment status, where they have transited and their destination, they may acquire occupational injuries and/or infectious diseases. Working in low-paid jobs or on insecure, temporary or illegal contracts can lead to migrants' social exclusion, limited access to health services and vulnerability to high levels of stress (and eventually depression), as well as early onset of NCDs such as CVDs. Such consequences can be attributed to the absence of proper national laws to protect migrants' rights.

9.1 Policy and legislative response to health issues of migrants and refugees

Migrants travelling for work are usually men of working age; while refugees are predominantly children, young people and women of reproductive age; thus, their health needs may vary. Health systems, therefore, need to be able to offer continuity of care services specific to their health needs across life-stages *(180)*. Most of the countries in the Region offer basic services to refugees and migrants, with some level of health care, including emergency and life-threatening care. Countries of the GCC host most of the migrant workers in the Region; their health care is covered by their employers. Other countries in the Region provide a haven for refugees displaced by war. In Egypt, Iraq, Jordan, Lebanon and Tunisia, based on national legislation, refugees and migrants can access health care for free at the PHC level. For Palestinian refugees, UNWRA provides coverage for PHC services and selective secondary and tertiary care, and in Yemen, health care services are provided by the international community to the more than four million IDPs *(1)*.

The presence of refugees and migrants provides opportunities for countries to improve their health system. Several countries in the Region have taken legislative and high-level measures to promote refugee- and migrant-sensitive health policies in order to provide legal and social protection and interventions to ensure the fundamental rights of refugees and IDPs; these adaptations can be seen as efforts to improve the overall health system. In Djibouti, the National Refugee

Law adopted by Parliament in 2016 was promulgated in 2017 to ensure refugees' fundamental rights including access to health services. The Jordan Response Plan 2018–2020 has adopted a resilience-based approach to maintain the continuity of care by responding to the short-term needs of refugees alongside those of vulnerable Jordanians, and by guaranteeing mid- to long-term response through strengthening of institutional capacities. In Pakistan, the Government, in collaboration with UNHCR. developed a five-year health strategy for 2014–2018. The strategy mainstreamed the most vulnerable refugees into the national health system to allow their easy access to communicable disease and NCD services provided through PHC *(181)*. The huge influx of Syrian refugees in Lebanon provided the opportunity to reform the mental health system and introduce a policy for a mandatory second opinion approach for caesarean section, the latter resulting in a flattening in the increase of caesarean section *(182, 183)*.

In 2022, the Regional Committee endorsed the regional strategy to promote the health and well-being of refugees, migrants, IDPs and other displaced groups in the Eastern Mediterranean Region *(184)*. The regional strategy builds on resolution WHA70.15 on promoting the health of refugees and migrants, the Global Compact for Refugees, the Global Compact for Safe, Orderly and Regular Migration and WHO's Global Action Plan to promote the health of refugees and migrants *(177, 185)*. The regional strategy is of course tailored to the context of the Region, which is very different to other regions due to the high number of complex emergencies and because two thirds of all refugees and half of all IDPs are from this Region. The main goal of the strategy is to promote the implementation of appropriate interventions that improve, protect and preserve the health and well-being of all IDPs, refugees, returnees and migrants by including them in national health policies, strategies and plans, across the whole migration path, in countries of origin, transit and destination. The aim is to ensure that they are always included in national efforts to achieve UHC and that countries are supported to achieve this. The strategy also urges Member States to respond promptly and effectively to the needs of IDPs, refugees and migrants in emergencies; improving the social determinants that affect the health and well-being of IDPs, refugees, returnees, and migrants; and strengthening partnerships towards promoting the health of refugees and migrants.

9.2 Inclusive health information systems for migrants and refugees

Migrant workers fall into those who follow the laws of the country and enter the country with the correct papers and identification; those who outstay their visas or become unemployed and fall into irregular migration; and those who cross borders without papers and also fall into an area of irregular status. Regular migrants have varying types of access to a country's health care system, based on their employment contracts. In contrast, irregular migrants must pay out-of-pocket for health services, which can incur catastrophic expenditure. However, many irregular migrants are reluctant to access basic health services for fear of deportation. Refugees are usually able to access health services as they are given a status in the country and as such, what is offered for host communities is offered to the refugee population. However, as many of the countries in the Region have not ratified the treaties and conventions on refugees and migrants, a number of memoranda of understanding are usually signed with UNHCR on the onset of the displacement, which then remain in place.[3] Providing accurate information both to service providers and to refugees and migrants can facilitate access to health services. Available evidence suggests that reducing communication and language barriers and strong community engagement are the key

[3] As of 2023, nine out of 22 countries/territories in the Region are signatories to the Convention relating to the Status of Refugees (1951) and the subsequent Protocol relating to the Status of Refugees (1967). In addition, only four countries in the Region have signed the International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families (1990).

interventions to improve access to services for refugees and migrants. Countries also need to make health services available for refugee and migrant populations without stigma and discrimination and not allow the creation of parallel systems.

In order to develop informed policy and response, health systems need reliable surveillance and information systems must be robust to collect required data on refugees and migrants. Fourteen countries in the Region are collecting data disaggregated by nationality. However, data disaggregation depends on the strength of a country's health information system, and data collection must be followed by data analysis and dissemination. In addition, unclear definitions of refugees and migrants within national health information systems makes stratification challenging. There is also a need to collect data on internal displacement and, as such, new variables must be adopted.

There have been efforts in the Region to enhance health monitoring and information systems to collect reliable data on health status and service provision to refugees *(181)*. In Afghanistan, the Ministry of Public Health launched a monitoring and reporting system, in collaboration with WHO and the International Organization for Migration (IOM), to track mass population movements and register attacks on and closure of health facilities in order to facilitate access of displaced populations to existing health facilities in conflict-affected areas. This is also the case in Iraq, Libya and Sudan, where the displacement tracking matrix has been set up by the IOM. In Syrian Arab Republic, efforts have been made to strengthen and expand the disease surveillance and response system for the early detection and control of highly contagious childhood diseases, such as polio and measles; however, the system does not disaggregate data by residency.

9.3 UHC and financial protection for migrants and refugees

To achieve UHC, countries of the Region need to provide equitable access to quality affordable essential health services, medicines and vaccines alongside financial support and protection for refugees and migrants, similar to that provided to the host community. To ensure financial protection in Sudan, a high-level agreement was made to include urban refugees in the national insurance scheme. The refugees have been included in the UHC scheme and UNHCR is covering the cost, which is higher on average than for the host community. In Islamic Republic of Iran, the Government's universal public health insurance initiative offers all registered refugees the possibility to enrol and benefit from a comprehensive health insurance package similar to that available to Iranians. In Afghanistan, the basic package of health services ensures the access of the whole population to essential health services, including migrants, returnees and IDPs.

In Sudan, WHO supported the Federal Ministry of Health's response to acute watery diarrhoea in cholera treatment centres in states hosting refugees from South Sudan, treating over 13 000 cases. In addition, the Ministry, supported by WHO, UNHCR and health partners, conducted a preventive oral cholera vaccination campaign covering approximately 140 000 South Sudanese refugees. In Lebanon, the Ministry of Public Health, with the support of international nongovernmental organizations and relevant United Nations agencies, provides affordable PHC, mental health services and free vaccination for every person residing in Lebanon. Displaced Syrians can access PHC services through mobile medical units, which provide consultations, dispense medication free-of-charge and refer patients back to PHC centres. In Morocco in 2003, the Ministry of Public Health allowed migrants to receive free services for communicable disease control programmes and in 2008, this free access was expanded to all services provided at PHC centres. The same is

happening in Islamic Republic of Iran and Pakistan, where access to health care is free for Afghani refugees. However, in Jordan, Syrian refugees are considered the same as uninsured Jordanians and are required to cover 20% of their medical bills.

9.4 Protecting the health and well-being of migrants and refugees, with a focus on women, children and adolescents

Protecting and improving the health and well-being of women, children and adolescents remains a priority in planning health services for refugees and IDPs. In most countries in the Region, immunization for preventable childhood diseases is administered for free; a similar approach was particularly evident in the COVID-19 vaccination administered across the Region regardless of a person's nationality. In Jordan, the Government provides a free-of-charge essential service package to eligible refugees, including counselling, antenatal care, family planning and vaccinations; however, childbirth is not included. In Lebanon, the health sector supports the efforts of the Ministry of Education and Higher Education, the Ministry of Public Health and the WHO school health programme to improve adolescent and youth health. In Pakistan, UNHCR, in line with the Convention on the Rights of the Child, has put a focus on promoting gender equality and preventing GBV through community-based initiatives. The Refugee-Affected and Hosting Areas programme supports capacity-building for community midwives in Afghan refugee villages *(181)*.

9.5 Addressing NCDs and mental health among migrants and refugees, with focus on community-based initiatives

Providing humanitarian assistance and long-term public health interventions to reduce mortality and morbidity by addressing NCDs is another key measure to respond to refugees' health needs. However, costs can be significantly higher, as was shown in Jordan, where costs related to managing the chronic conditions of Syrian refugees was much higher than those for non-refugee populations, also associated with higher out-of-pocket expenditure. Delayed diagnosis, treatment interruptions and abandonment of cancer care are only some of the consequences of the limited care access for people on the move *(186)*.

A few countries in the Region have incorporated addressing NCDs among refugees and migrants. In 2017, the Afghan Red Cross, in collaboration with WHO, began to strengthen the response to NCDs among IDPs and returnees by supplying essential medicines and enhancing the capacity of frontline workers in the management of NCDs. In Lebanon, the Ministry of Public Health, with WHO support, has initiated the NCDs screening protocol to detect risk of CVDs and provide treatment when needed. In Somalia, the Federal Ministry of Health in collaboration with the IOM is deploying a mobile and rapid response team that is adaptable to all aspects of the development, humanitarian, transition and recovery phases among migrants, IDPs and populations on the move *(181)*. This has also been the case in Egypt for the 2023 influx of migrants from Sudan. WHO has set up clinics to support the prevention and control of NCDs for Sudanese migrants.

Promoting continuity of care for refugees and migrants through community-based initiatives is an efficient approach to reach a large number of refugees. In this context, there have been prominent examples in the Region, particularly in the field of mental health. In Egypt, a community-based psychosocial workers network in partnership with UNHCR provides culturally relevant psychosocial and mental health support to Syrian refugees. In Iraq, mental health is being integrated into the PHC services of refugee camps through building the capacity of non-specialized health staff and

community workers, with a focus on assessing and managing priority mental health conditions and establishing referral pathways between mental health and psychosocial support actors and PHC units in camps.

Local communities can play an active role in promoting the health and well-being of migrants and refugees. In the Syrian Arab Republic, mental health and psychosocial support in PHC has been integrated into PHC, specifically through training health care staff and community health workers on basic mental health interventions. Over 400 PHC and community centres throughout the Syrian Arab Republic are now offering integrated mental health and psychosocial support services. In the occupied Palestinian territory (including East Jerusalem), collaborative ongoing efforts between WHO and the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) support health service provision for Palestinian refugees, particularly the integration of mental health services into PHC within the framework of the family practice approach *(181)*. A regional community engagement framework developed in 2019 has been updated in light of lessons learned and good practices during COVID-19 with special focus on refugees and displaced population.

10 The COVID-19 pandemic – achievements, challenges and lessons learned

The COVID-19 pandemic has been the most demanding public health emergency globally and regionally in the past 100 years. The first case of COVID-19 in the Region was diagnosed in United Arab Emirates on 29 January 2020, and by the end of 2022, almost 23 million cases of COVID-19 had been reported by the countries of the Region. This figure includes more than 348 000 associated deaths, representing a case-fatality ratio of 1.5% *(187)*. The Region endured six peaks of COVID-19 cases during the pandemic, with the highest number of deaths occurring during the Delta subvariant surge in September 2021 and the highest number of cases during the Omicron surge in January and February 2022 *(188)*.

In the early phase of the pandemic, all 22 countries and territories of the Region activated multisectoral coordination mechanisms to oversee the national COVID-19 response, consistent with a whole-of-government and whole-of-society approach. High-level leadership in countries demonstrated decisive leadership in implementing effective public health and social measures to limit the spread and minimize the impact of the pandemic *(189)*. Such high-level commitment was particularly useful in adapting and incorporating WHO guidance for critical religious events and the reopening of borders, schools and workplaces *(190)*. Regional coordination and information sharing was also vital, with a Ministerial Working Group on COVID-19 convening virtually 23 times during the first two years of the pandemic. WHO also shared 375 direct communications with the group by WhatsApp on a range of epidemiological, technical and operational issues.

WHO established an Incident Management Support structure across the Organization. The regional Incident Management Support Team (IMST) served as the main regional coordination structure for COVID-19 response linking WHO headquarters-level IMST to WHO country offices *(191)*. In 2021 alone, the IMST mobilized US$ 250.3 million for the COVID-19 response; supported countries in receiving vaccine doses from the COVID-19 Vaccines Global Access (COVAX) initiative, medical oxygen and biomedical equipment and supplies; identified three regional laboratories for genome sequencing; and supported the training of over 50 000 health care workers in intensive care units (ICU) and critical care and of 2450 in infection prevention and control *(191)*. It was seen as an effective coordinating mechanism that balanced centralized leadership and priority-setting with information sharing and collective problem solving. This mechanism supported greater collaboration within the Regional Office, provided a platform for regular information sharing and problem solving and facilitated strategic decision-making to improve the COVID-19 response in Member States *(190)*.

In the first three years of the pandemic, Member States made significant progress in implementing priority activities under their strategic preparedness and response plans in coordination with WHO. Most Member States followed WHO recommendations on containment by prioritizing the establishment of national multisectoral coordination structures, expansion of testing, treatment and isolation of cases, infection prevention and control (IPC), and contact tracing and quarantining, although the scale of application of these measures varied substantially. By mid-2022, countries that had fragile, conflict-affected and vulnerable settings had lower

testing rates (30/1000 versus 715/1000) and vaccination coverage rates (19% versus 63%) than other countries; they also had much higher case-fatality ratios (4.3% versus 1.2%).

Member States also implemented a range of social measures to limit virus transmission, including but not limited to travel and movement restrictions (including domestic and international flight restrictions), closure of borders, schools and non-essential businesses, suspension of mass gatherings, curfews, partial-to-full lockdowns and intensive community engagement. By mid-March 2020, all countries had applied some form of public health social measures (PHSMs) *(192)* and the early implementation of such measures undoubtedly reduced virus transmission. However, these measures also resulted in significant economic and societal costs – especially in LMICs – and ultimately many countries lifted PHSMs after taking such costs into consideration. Socioeconomic pressure and community fatigue thus influenced public health decisions related to COVID-19, particularly in relation to the relaxation of social measures.

Many achievements were documented across the Region. Among the most impressive was the rapid scale-up of laboratory capacities to test for COVID-19, with strong support from WHO. Although accurate baseline data are not available, the number of public laboratories with polymerase chain reaction (PCR) capacities to test for COVID-19 is estimated to have increased by a factor of 100 over the course of the pandemic, from less than 30 to over 2500. Similarly, 21 countries had sequencing capacity by the end of 2022, compared with only 10 at the onset of COVID-19. With WHO support, by 2022 all 22 national reference laboratories and over 300 other laboratories passed external quality control reviews. By the end of 2022, three new regional reference laboratories for genomic sequencing had been established.

A key lesson learned was the importance of leveraging existing influence surveillance systems. At the beginning of the COVID-19 response, existing influence surveillance systems were repurposed to support it, including sentinel sites, national influenza centres and laboratories, reporting platforms and staff. Many countries integrated SARS-COV-2 surveillance and testing into existing influenza surveillance based on WHO interim guidance *(189)*. Many countries accelerated the adaptation of digital tools and techniques to improve detection and suppress community transmission *(189)*.

The COVID-19 pandemic placed an additional burden on the health system to meet the surge of needs of patients with severe and critical illnesses, particularly in resource limited and conflict-affected settings in the Region. The regional workforce study on ICU capacity highlighted a critical shortage across low-, middle- and high-income countries of the Region *(193)*. All countries have boosted their efforts to address this major gap in critical care management during the pandemic. More than 50 000 physicians and nurses from nine countries (Afghanistan, Iraq, Jordan, Libya, occupied Palestinian territory (including East Jerusalem), Pakistan, Somalia, Sudan and Yemen) participated in the in-person and virtual training on integrated respiratory infectious diseases critical care and intensive care conducted by WHO. Throughout COVID-19 and beyond, a series of webinars to scale up critical care and intensive care was conducted for all 22 countries/territories in the Region. In north and south Yemen, more than 50 national facilitators trained 138 selected health care workers in a nine-week nationally certified training programme for critical care, intensive care and case management in 2022, with support from WHO. This cadre of ICU care experts are now cascading the training within their respective regions *(194)*.

Medical oxygen is an essential treatment for life-threatening hypoxemic conditions and is commonly indicated for the clinical management of respiratory diseases and many leading

causes of mortality. It is included in the priority medical devices for the COVID-19 response *(195)*. Many countries in the Region lacked robust medical oxygen systems prior to the COVID-19 pandemic, particularly in remote and rural health facilities; this serious gap was due not only to the limited availability of facilities to produce medical oxygen and of medical facilities where oxygen could be administered but also to the lack of key human resources and other critical areas necessary to support increasing access to medical oxygen in the Region *(196)*. During the pandemic, many countries scaled up medical oxygen capacities through technical and financial support from WHO in both stable and fragile settings.

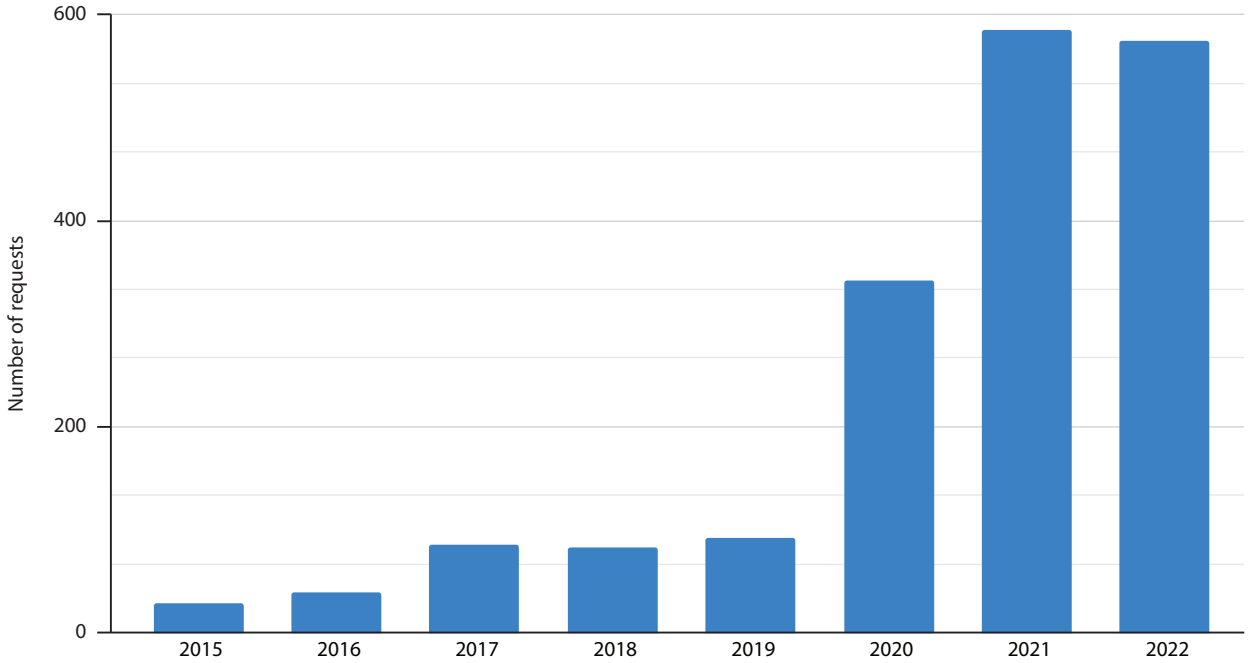
In November 2021, WHO launched a Live Oxygen Platform, a real-time baseline data platform aimed to facilitate identifying national oxygen production gaps and guide countries in scaling up medical oxygen planning and response. By mid-2023, 16 countries in the Region were participating in the platform, which is currently being expanded to include information about the maintenance and repair of oxygen-generating plants and equipment, a repository of global oxygen guidance and information, and a network/linkage to NGOs and partners for oxygen scale-up and maintenance. Currently, a regional roadmap for the oxygen scale-up is being finalized *(196)*, which will support the World Health Assembly resolution on increasing access to medical oxygen *(197)*.

Communication and engaging and empowering communities through community awareness campaigns has been key in minimizing risk exposure *(189)*. An assessment conducted during the early stage of the COVID-19 pandemic found that countries had specific plans for communication, had repurposed existed media capacity for COVID-19 and had shared regular updates and followed good practices for social mobilization by building trust with face-to-face communications. However, these risk communication and community engagement (RCCE) plans, strategies and actions were often not well integrated within the broader COVID-19 response and were not well grounded in real-time evidence, in part due to limited country capacity *(198)*. Accommodating social media in public communication strategies was critical in addressing misinformation and overall response *(190)*. By strengthening collaboration and partnerships and networks, WHO supported countries in designing and implementing interventions to address COVID-19 risks and needs, developed a regional guiding framework on RCCE and built the evidence to support targeted interventions, especially to increase access to and acceptance of COVID-19 vaccines *(189)*. In some Member States, community health workers were critical in broadening outreach and ensuring health coverage *(190)*. Institutionalizing RCCE programmes and building national capacity could strengthen national capacity in the prevention and preparedness for future emergencies *(190)*.

Generating new knowledge and timely awareness of emerging evidence was critical to ensure that the COVID-19 pandemic response was based on the best available evidence. Member States responded enthusiastically to WHO's calls for proposals for COVID-19-related national level research studies. In 2020, the Regional Office supported 17 of the 122 submitted proposals and in 2021, it supported 26 of 140 proposals. Additionally, 10 countries participated in the global solidarity trial to assess potential therapies for COVID-19, 13 countries implemented the population-based age-stratified seroepidemiological Unity Studies with WHO support and 300 COVID-19 randomized controlled trials were registered in countries of the Region *(199)*.

Given the major disruption of global supply chains, the WHO logistics hub became a major asset for the Region – and the world. Its support was especially important to LMICs. By the end of 2022, the hub had dispatched 723 shipments of life-saving COVID-19 supplies worth

Fig. 20. Dubai Logistics Hub request status, 2015–2022



over US$ 67 million to 127 countries across all six WHO regions (Fig. 20). Seven of the 10 main recipient countries were in the Region, which received 319 (44% of WHO total) shipments and US$ 42.4 million (63%) worth of supplies.

As effective COVID-19 vaccines became available, WHO collaborated with UNICEF and other partners to form a regional working group to support vaccine roll-out. Considering the intense global competition for vaccines, the partnership moved quickly to support countries through all steps of the COVAX Facility allocation processes. Nonetheless, as projected early in 2021, vaccines for COVAX Advanced Market Commitment countries were generally not available in significant volumes until the fourth quarter of the year. This was largely due to wealthier countries procuring the bulk of available vaccines in the early stages, raising major concerns regarding equity of access. As of the end of 2022, 47% of the population in the Region had been fully vaccinated (the numbers by country ranged from 2% to 98%). Due to a combination of factors, including insufficient resources, competing demands and vaccine hesitancy, only 12 countries met the WHO target of 40% fully vaccinated populations by the end of 2022, while five had vaccinated less than 20% of their populations. Most low-income countries of the Region had limited capacities for critical care and/or for the production of medical oxygen at the start of the outbreak. Innovative solutions were found, including the roll-out of critical care training that reached over 50 000 clinical staff. WHO has supported the recruitment of 10 biomedical engineers to support the ongoing production of oxygen in 10 LMICs.

An external review of WHO's response to the COVID-19 pandemic noted that many Member States had built internal capacities in several previously neglected areas that should be prioritized and sustained for the long term. In addition to the laboratory, critical care and oxygen-generating capacities referred to earlier, these include Public Health Emergency Operations Centres (PHEOCs) and institutionalized units on IPC and RCCE within ministries of health *(190)*.

11 Health emergencies

11.1 Regional situation

The Eastern Mediterranean Region continues to be confronted with multiple emergencies from all hazards – biological, societal (including armed conflict), natural and technological – resulting in a high burden of morbidity and mortality. Nine of the 22 countries/territories are categorized by the World Bank as fragile and conflict-affected *(200)*. By October 2023, 13 of the Region's 22 countries/territories were experiencing ongoing conflicts – many of which have become protracted crises – directly or indirectly, while other were coping with heavy refugee caseloads *(201)*. During 2023, WHO had recorded and responded to 73 disease outbreaks[4] (excluding COVID-19) by the end of November, up from 31 outbreaks for the whole of 2021 *(201)*. Since 2020, worsening insecurity and displacement, major natural disasters (e.g. floods in Pakistan affecting 33 million people, drought and food insecurity in Somalia leaving 4.9 million in need of assistance and the earthquake in the Syrian Arab Republic impacting 8.8 million people), technological disasters (e.g. port explosion in Beirut), the COVID-19 pandemic, and severe economic decline and poverty (e.g. in Afghanistan and Syrian Arab Republic) have contributed to an enormous level of need and vulnerability. These impacts have been most severe in the low- and lower middle-income countries of the Region, although all countries have experienced significant emergencies since 2017.

In 2022 alone, eight of the 13 Grade 3 emergencies globally impacted the Region – more than any other WHO Region – and included conflicts, natural disasters and disease outbreaks. The number of people needing humanitarian assistance in the Region doubled from 63 million in 2018 to 140 million by December 2023 *(201, 202)*. As of the end of 2023, the Region represented 10% of the world's population, was home to 37% of the overall humanitarian burden and was the source of more than half (55%)[5] of the world's refugees.

As of December 2023, WHO was responding to 18 graded emergencies in the Region, including the hostilities in Israel and the occupied Palestinian territory, complex emergencies in Afghanistan, Somalia, Syrian Arab Republic and Yemen, an earthquake affecting Syrian Arab Republic and Türkiye and the food security crisis in the Horn of Africa. Recent escalation of crises in the occupied Palestinian territory, Sudan and Syrian Arab Republic, earthquakes in Afghanistan and Morocco, and flooding in Libya and Somalia are severely testing response capacities *(203)*.

The public health catastrophe in the occupied Palestinian territory is rapidly evolving, with high levels of violent deaths and injuries, mass displacement, overcrowding, massive degradation of the health system, and damage to water and sanitation infrastructure in Gaza Strip. The attack in Israel on 7 October 2023 killed more than 1200 people and injured over 5400 people and by 31 December 2023, nearly 22 000 fatalities (70% women and children) and more than 50 600 injuries had been reported by the Ministry of Health *(204)*; these figures include more than 300 fatalities and 3900 injuries in the West Bank *(205)*.

[4] This counts mpox as a distinct outbreak in each country.
[5] This includes Palestinian refugees under the mandate of UNRWA.

As of 31 December 2023, 142 UNRWA personnel had been killed during the hostilities – the highest number of UN aid workers to be killed in such a short period of time. In 2023, WHO lost one of our own staff members, Dima Abdullatif Mohammed Alhaj, when she was killed along with over 50 members of her family.

As of 31 December 2023, about 1.9 million people, nearly 80% of the population in Gaza, were internally displaced; population displacement has also been seen in Israel (200 000), Lebanon (74 471) and the Syrian Arab Republic (1600) and the West Bank (2262).

The conflict has led to major infrastructure damage impacting access to water and sanitation services, fuel, electricity and food in Gaza. The massively overcrowded shelters and camps – which are operating at four times their capacity – pose a major risk of communicable disease outbreaks; a 20-fold increase in monthly reported diarrheal cases in children under-5 years compared with 2022 is but one example. Access to health services for people with chronic conditions, to reproductive, maternal and child health, also for the 50 000 pregnant women, and GBV prevention services is seriously hampered *(206, 207)*. The number of functioning hospitals dropped from 36 to 14 by 31 December 2023; those able to admit patients faced bed occupancy rates of 209% by 31 December 2023 *(207)*. Access to health services is obstructed due to closures at checkpoints, movement restrictions, insecurity and attacks on health *(207)*. On 10 December 2023, recognizing the severe risk of collapse of the humanitarian system, WHO's Executive Board adopted a resolution calling for immediate, sustained and unimpeded passage of humanitarian relief including for medical personnel *(208)*.

Attacks on health care are a deeply concerning feature of the conflicts across the Region, with nearly 3000 attacks and 1203 deaths recorded between 2018 and 2022 in eight countries or territories (Afghanistan, Lebanon, Libya, occupied Palestinian territory (including East Jerusalem), Somalia, Sudan, Syrian Arab Republic and Yemen) *(209)*. Between 7 October and 31 December 2023, the occupied Palestinian territory experienced 619 attacks on health care resulting in 613 people being killed and 819 injured; these included 326 attacks impacting health facilities and 497 affecting health personnel. During the same time period, Israel experienced 67 attacks resulting in 24 people being killed, 34 injuries and impacting 17 health facilities.

Sudan represents another evolving humanitarian catastrophe. The escalation in conflict in Sudan has resulted in 25 million people requiring humanitarian assistance, with 8 million people being newly displaced (6.1 million people displaced within Sudan and 1.8 million beyond its borders) since 15 April 2023. Between 1 April and 31 May 2023, at least 60% of health facilities located near conflict areas were out of service and 46 attacks on health care had been verified by WHO *(203)*. A rapidly spreading cholera outbreak is already affecting nine states; there are also ongoing outbreaks of dengue, measles and malaria.

The high levels of violence and insecurity continue to constrain the humanitarian response in Sudan. All international United Nations staff were relocated from Khartoum to Port Sudan in April 2023. Large areas of the country remain inaccessible, especially in the Darfur and Kordofan regions, limiting WHO's and partners' ability to deliver supplies and services, support disease surveillance and other public health activities, and control the ongoing disease outbreaks. Most assistance to Darfur is currently being delivered cross-border from Chad, with cross-border operations from South Sudan now also being considered.

11.2 Prevention and mitigation

In addition to grappling with COVID-19, the Eastern Mediterranean Region faces serious public health threats from other emerging and re-emerging infectious diseases, such as waterborne, vector-borne, respiratory and zoonotic diseases. Climate change, conflict, forced displacement, migration, environmental degradation, urbanization, antimicrobial resistance (AMR) and other factors are increasing the risk of disease outbreaks across the Region and globally. Over 70% of emerging diseases are zoonoses, highlighting the risks at the human–animal interface and demonstrating the need for a One Health approach.

Between 2018 and 2022, the 166 new disease outbreaks (including COVID-19) documented by WHO across the Region included chickenpox, chikungunya, cholera, Crimean-Congo haemorrhagic fever (CCHF), dengue, diphtheria, extensively drug-resistant typhoid fever, hepatitis A, hepatitis E, HIV, measles, Middle Eastern respiratory syndrome coronavirus (MERS-CoV), poliomyelitis, Rift Valley fever and SARS-CoV 2.

The WHO *Strategic Framework for the prevention and control of emerging and epidemic-prone infectious diseases in the Eastern Mediterranean Region 2020–2024*, developed through broad consultation with countries in the Region, focuses on strengthening capacity in disease prevention, surveillance, laboratory diagnosis, rapid investigation and response to public health events, and knowledge management and innovation *(210)*. Progress has been made in several areas. All 22 countries/territories in the Region have rapid response teams at national and subnational levels, who have contributed not only to the control of COVID-19 but also to the responses to CCHF (e.g. in Afghanistan and Iraq), cholera (e.g. in Lebanon, Somalia and Syrian Arab Republic), dengue (e.g. in Pakistan, Sudan and Somalia), and Rift Valley fever (e.g. in Sudan). The Early Warning Alert and Response Network for timely detection and response in eight fragile, conflict-affected and vulnerable countries shows a high percentage of completeness (e.g. 95 % in Yemen, 88% in Afghanistan) and alert verification within 48 hours for the majority of alerts (e.g. 95% in Afghanistan and 89% in Sudan), demonstrating successful implementation. Attention to early detection and improved case management meant that across the eight cholera outbreaks documented in 2022, case-fatality ratios were maintained within international standards for seven of them (median case-fatality ratio = 0.19%, range 0.001% to 1.67%).

11.2.1 Epidemic prevention campaigns

Few of the high-risk emerging and re-emerging diseases in the Region are preventable by vaccinations. A major exception is yellow fever, which can be associated with high rates of morbidity and mortality. Sudan is the only high-risk country in the Region for yellow fever. Between 2015 and 2019, Sudan's Ministry of Health, with support from WHO and partners, vaccinated over 30 million people against yellow fever through a nationwide campaign. Catch-up campaigns were conducted in various states of Sudan between 2020 and 2023, vaccinating an additional 5.5 million people. Since the completion of the campaigns, there have been no documented yellow fever cases or outbreaks in the country.

The oral cholera vaccine is an important tool for the control of outbreaks across the Region, complementing other public health and clinical interventions. In the last five years, over 20 million doses of oral cholera vaccine were provided to six countries in the Region and over 10 million people received cholera vaccination to protect them from cholera infection. High vaccination

coverage rates in Lebanon (80%), Pakistan (94%), and Syrian Arab Republic (98%) contributed to improved disease control during 2022.

11.2.2 Public health laboratories

In October 2016, the 63rd session of the WHO Regional Committee for the Eastern Mediterranean endorsed the *Strategic framework for strengthening health laboratory services, 2016–2020 (211)*, which was later extended to 2023 *(85)*. The overall goal of the strategic framework is to guide the strengthening of sustainable national health laboratory systems to improve clinical and public health services in a cross-cutting manner for better preparedness for, surveillance of and response to epidemic-prone diseases, health security issues and other potential emergencies of public health concern. Progress has been made in strengthening laboratory capacity in the Region; however, substantial challenges remain, including a lack of national policy and strategic planning for laboratory services, insufficient funding, inadequately trained laboratory staff, weak laboratory infrastructure, old and inadequately serviced equipment, lack of essential reagents and consumables, weak biorisk management and limited implementation of laboratory quality management systems.

WHO conducted an assessment on the progress made towards implementing the regional framework between November and December 2022. It found that half the countries in the Region had developed policies and national laboratory strategic plans and established functional tiered laboratory networks but required more support to ensure effective implementation and funding to achieve the set goals and the sustainability of the established networks. Despite significant improvement in the availability of quality laboratory workforce over time, only 20% of countries have national laboratory staffing plans addressing workload forecasting with all positions filled with domestic funding.

The Regional External Quality Assessment scheme to support the implementation of laboratory quality management reaches 70% of Member States and plans to extend to all countries. In 2020, the fourth edition of the *WHO Laboratory biosafety manual* was published, which promotes a risk-based approach to laboratory biosafety, leading to more locally relevant, economically feasible and sustainable management of biosafety risks. WHO delivered six iterations of a virtual course to key experts in the Region to become familiar with both the structure and contents of this manual, its associated monographs and the risk-based approach to laboratory biosafety.

Laboratory diagnostics in countries of the Region expanded significantly in response to the COVID-19 pandemic *(190)*. In January 2020, four countries had the capacity to test for COVID-19; by 2021, all countries had laboratories that could provide COVID-19 PCR testing and by late 2022, 21 countries could carry out COVID-19 genome sequencing domestically. Through WHO support, countries' diagnostic capacity for a broader range of pathogens expanded considerably (e.g. the introduction of arboviral testing in Afghanistan and Somalia; CCHF in Iraq; cholera in Lebanon and Syrian Arab Republic; and mpox in Egypt and Lebanon). By 2022, all 22 national reference laboratories and over 300 other laboratories had passed external quality control reviews. Three regional reference laboratories have been established for genomic sequencing.

11.3 Preparedness

11.3.1 IHR (2005)

Under the IHR (2005), minimum core public health capacities for surveillance, response and reporting of health emergency events with possible international concern are required for all States Parties. This capacity is assessed through annual self-assessment reports by Member States and voluntary joint external evaluations (JEEs). The average score for the annual State Party self-assessment annual reporting – the main measurement of IHR core capacities –remained essentially unchanged in the Region between 2018 and 2022, ranging between 63 and 66 out of 100. In 2022–2023, all 22 countries/territories had successfully completed the mandatory self-assessment annual reporting, and by 31 December 2023, 20 had completed the first round of JEEs and two countries had completed the second round. While 19 Member States have already completed national action plans for health security, financing remains generally low; nonetheless, many are beginning to revise them by drawing on the lessons learned from the COVID-19 pandemic. Updated national action plans for health security are also being informed by intra-action reviews, after-action reviews and simulation exercises supported by WHO. Simulation exercises were undertaken to test and adjust COVID-19 vaccine plans in all countries in the Region, while tabletop exercises were successfully used to strengthen public health preparedness ahead of the COP27 conference in Egypt and the FIFA World Cup in Qatar in 2022.

Controlling the international spread of disease requires stronger public health capacities at points of entry and risk-based guidance on travel measures. The Region is home to some of the world's largest mass gatherings, such as the annual Hajj in Saudi Arabia and Arba'een in Iraq, as well as one-time events such as the FIFA World Cup 2022 in Qatar and the 2022 COP27 in Egypt. Such large-scale events can be associated with significant public health risks, including disease outbreaks. Countries have made efforts to strengthen public health preparedness for these events with risk assessment and approaches informed by efforts to limit the spread of COVID-19. These efforts have borne fruit, as there have been no significant disease outbreaks associated with the Hajj for the past two decades since the meningitis outbreaks of 2001; similarly, the FIFA World Cup 2022, EXPO 2020 and COP27 were all hosted during the second half of the COVID-19 pandemic without any major reported public health events.

11.3.2 PHEOCs

PHEOCs are a cornerstone of effective emergency management. A WHO study early in the pandemic revealed that 12 of 22 countries/territories had PHEOCs with varying levels of functionality, but only 10 countries involved their centres in the COVID-19 response. A PHEOC Strategic Plan (2023–2027), developed by the WHO Regional Office for the Eastern Mediterranean, in collaboration with the WHO Regional Office of Africa and other partners, and reviewed by Member States, aims for at least one functional PHEOC in 90% of countries/territories by 2027. The plan identifies five strategic objectives across the PHEOC core components, including policies, plans and procedures, surge personnel capacity to support emergency management, information management capacity to facilitate efficient data management, and appropriate communications and IT technologies to facilitate effective communication, coordination and decision-making during health emergencies *(212)*. WHO has also developed and tested an innovative electronic Public Health Emergency Management software, which has been introduced in 10 countries in the Eastern Mediterranean Region and in the WHO African Region, with plans for wider dissemination.

11.3.3 One Health

Given the increasing health risks posed by endemic, emerging and re-emerging zoonoses, food safety risks, AMR and environmental threats, implementing the One Health approach is a priority for the Region *(213)*. The One Health operational framework for action for the Eastern Mediterranean Region endorsed by the 69th Session of the Regional Committee in 2022 recommends that countries regularly conduct a One Health risk assessment to identify priority threats, develop a national One Health plan informed by the risk assessment and aligned with the regional framework, and establish multisectoral mechanisms to oversee its implementation.

Seven countries (Afghanistan, Egypt, Jordan, Pakistan, Qatar, Sudan and United Arab Emirates) have conducted joint risk assessment of health threats, four countries (Jordan, Somalia, Sudan and United Arab Emirates) have prioritized health threats at the human–animal–environmental interface and eight countries (Bahrain, Egypt, Iraq, Jordan, Qatar, Sudan, Somalia and United Arab Emirates), have developed One Health national operational frameworks and plans. The recently formed One Health Quadripartite – comprised of the FAO, UNEP, the World Organisation for Animal Health (WOAH) and WHO – adopted a global One Health Joint Plan of Action (2022–2026), which has been operationalized at the regional level.

11.3.4 Risk communication and community engagement

All health emergencies begin and end in communities. The COVID-19 pandemic has incentivized countries in the Region to strengthen RCCE for preparedness and response. Throughout the pandemic, Member States of the Region undertook or participated in multiple RCCE activities, such as knowledge, attitudes and practices surveys and behavioural insights assessments, to guide the development of COVID-19-related messages and information, education and communication materials. Training sessions were conducted for the media and other stakeholders to boost the accuracy, timeliness and applicability of COVID-19-related messaging. Together with the International Federation of Red Cross and Red Crescent Societies and UNICEF, WHO established the Inter-Agency Working Group for Risk Communication and Community Engagement, which has since expanded its scope to address ongoing outbreaks and emergencies in the Region. This coordination mechanism has now been established at the national level in 12 countries in the Eastern Mediterranean Region.

11.4 Detection and monitoring of public health events

Timely detection of public health events – especially potential outbreaks – is vital to controlling them early and preventing both national and international spread. Between 2018 and 2022, a total of 166 new outbreaks were reported in the Region, including the COVID-19 outbreak[6]. The highest number of new outbreaks (n = 49) was reported in 2018 but the highest number of active outbreaks (n = 73) were recorded by November 2023. In 2022, more than 10 000 signals were captured, 25 new public health events detected and 21 rapid risk assessments conducted. Early verification of events and resulting risk assessments improved the timeliness of response to disease outbreaks and other events across the Region, as demonstrated by the rapid control of cholera in Sudan in 2019 and Lebanon in 2023. By 2023, event-based surveillance systems were operational in 12 countries (Afghanistan, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, Somalia, Sudan, Tunisia) where guidelines have also been developed and adapted

[6] This counts COVID-19 and mpox as distinct outbreaks in each country.

to national contexts. The Epidemic Intelligence from Open Source initiative is operational in 13 countries (Afghanistan, Bahrain, Egypt, Iraq, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic and Tunisia).

To improve the surveillance of communicable diseases at the country and regional level, an integrated disease surveillance strategy was developed and adopted during the 68th session of the Regional Committee for the Eastern Mediterranean in October 2021 *(214, 215)*. It aims to integrate public health data from disease-specific (e.g. cholera, measles) and programme-specific (e.g. influenza, malaria) systems to provide a more comprehensive and timelier overview of infectious disease threats, thereby informing evidence-based decision-making. Consolidating disease-specific systems into a single, effective system supported by a digital platform and connected with the public health laboratory network would require an annual investment of US$ 1–4 per capita in infrastructure, staff and operations *(214)*.

To date, eight countries have undertaken a comprehensive review of their surveillance systems as the first step towards improved integration, while in Lebanon, a review of the national surveillance unit was undertaken and a roadmap developed for integrated disease surveillance implementation. Further steps in implementing the regional strategy would overcome current data fragmentation and provide better evidence for decision-making.

11.5 Response to and early recovery from emergencies

11.5.1 Supporting and rebuilding health systems in countries affected by conflicts

In recent years, emergencies have become increasingly protracted and complex; they are affecting more people and demanding more resources than ever before. These emergencies impact health directly by causing injuries, illnesses, psychological trauma and deaths, and indirectly by increasing susceptibility to diseases and poor health through their impact on the determinants of health and health system functioning and its performance. In 2022, the Region reported a greater than 50% increase in the number of people in need of humanitarian assistance compared with 2021, recorded over 400 mass casualty incidents attributable to conflict, natural and human-made disasters and coordinated responses to new emergency events including the widespread flooding in Pakistan, cholera in Lebanon, Pakistan and the Syrian Arab Republic and CCHF in Iraq. By late 2023, additional crises emerged including the escalation of conflict in the occupied Palestinian territory (including East Jerusalem) and Sudan, earthquakes and flooding in Afghanistan, and flooding in Libya and Somalia. WHO response to these emergencies included the Regional Trauma Initiative supporting 40 hospitals with a comprehensive programme of training support in mass casualty management accredited by the WHO Academy. By October 2023, this initiative had helped over 800 000 injured patients by responding to more than 200 mass casualty incidents across five priority fragile and conflict-affected settings.

Despite the most challenging operating environments in multiple conflict zones, the collective response by ministries of health, WHO and partners regularly met international humanitarian and public health standards. Recent examples include:

- Averting cholera deaths: During eight cholera outbreaks across the Region in 2022, the case-fatality ratio for cholera cases was well within the accepted international standard of 1.0% in seven outbreaks. The median case-fatality rate (CFR) was 0.19% (range 0.01–1.67%).

- Helping children recover from severe acute malnutrition: In the WHO-supported stabilization centres for severe acute malnutrition in Afghanistan, Pakistan, Somalia, Sudan and Yemen, recovery rates have regularly exceeded 90%, well above the accepted standard of > 75%.
- Preventing excess mortality: In the volatile and frequently insecure Al Hol displaced persons camp in the Syrian Arab Republic, crude and under-5 mortality rates have consistently been well within international standards.
- WHO support to the crisis in the occupied Palestinian territory: In mid-November 2023, WHO in collaboration with the Palestine Red Crescent Society and other UN agencies coordinated the evacuation of 31 very sick premature infants, 73 severely ill or injured patients and 94 individuals comprising health care workers, staff and family members. As of 4 December 2023, 238 metric tonnes of WHO supplies (a value of US$ 3.2 million) entered the Gaza Strip as part of the interagency humanitarian convoys, including 230 000 Interagency Emergency Health Kits, 5 500 Trauma and Emergency Survey Kits, NCD kits, trauma bags, stretchers and tents.

Recent external reviews of WHO's emergency response have been very positive:

- COVID-19 (2020–2022): In an external review by Dalberg Advisors, 80% of external observers stated WHO's response exceeded or met their expectation. "WHO successfully provided an appropriately tailored response to each Member States' needs and that WHO support frequently strengthened Member State's own response efforts while contributing towards long-term capacity-building."
- Whole of Syria programme (2016–2022): WHO received an A rating from the Government of the United Kingdom and Northern Ireland in the Programme Completion Review for the five-year Whole of Syria programme. The report stated: "WHO played an essential role in the delivery and coordination of the humanitarian health response among international actors, particularly on COVID-19 preparedness and response, and have contributed to better coordination of health services across Syria."
- Yemen Emergency Health and Nutrition Programme (2017–2022). In partnership with UNICEF, the Programme received a rating of highly satisfactory from the World Bank – the highest score on a six-point scale. The report noted: "The project was carried out in a high-risk environment but achieved its Project Development Objective … by providing essential services to people in need and strengthening the national and local systems for improved and resilient service delivery."

11.5.2 Mental health and psychological support in emergencies

WHO estimates show that one in five people (22%) living in an area affected by conflict has some form of mental health disorder, which is more than double the figure for the general population. The rates of depression and anxiety in countries of the Region are among the highest in the world, largely explained by the multiple emergency situations *(129)*. The COVID-19 pandemic added to this already heavy burden; health care workers, in particular, faced increased psychological distress.

A rapid assessment conducted in the early stages of the pandemic found that 90% of community and outreach services for mental health, neurological and substance use disorders had been disrupted. WHO supported 19 countries to integrate mental health and psychosocial support into

their COVID-19 response; 17 countries set up hotlines and/or platforms for remote service delivery to ensure the continuity of services.

WHO has developed a range of practical guides to help establish and scale up mental health and psychosocial support in emergency settings, including psychological first aid guidance and the mhGAP humanitarian intervention guide through which general health workers are trained to recognize and provide first-line support for common mental health disorders *(216, 217)*. In response to the upheaval during the pandemic, WHO launched a mental health and psychosocial support online platform in Arabic, English and French, which has been accessed by more than 114 000 people. This platform guides users to assess their psychosocial well-being, offers advice on stress management and substance use and provides contact details if further assistance is needed.

COVID-19 has been a catalyst for scaling up quality mental health and psychosocial support services in many countries facing emergencies, including Afghanistan, Djibouti, Iraq, Lebanon, Libya, occupied Palestinian territory (including East Jerusalem), Somalia, Sudan, Syrian Arab Republic and Yemen. These examples highlight that mental health and psychosocial support interventions not only help people survive extreme distress and hardship, but also support peace, development and recovery. However, there are serious barriers to providing mental health services to immigrants originating from countries of the Region, as they often have limited knowledge about the host country's culture and language, and many are illiterate or have low literacy levels, which are a barrier to accessing mental health services.

12 Elimination and eradication of vaccine-preventable diseases

12.1 Cross-cutting messages on disease burden across communicable diseases

Significant improvement in vaccination coverage, especially in more recent years, has resulted in a decreased burden of vaccine-preventable diseases in the Region. Some variation exists between low-, middle- and high-income countries, with the latter having a particularly low burden. However, the COVID-19 pandemic led to significant disruption in immunization services, resulting in a backsliding in coverage of all antigens in most countries since 2020.

Globally, the priority given to COVID-19 vaccination has had a deleterious effect on the Expanded Programme on Immunization. Immunization coverage for third dose of diphtheria, tetanus toxoid and pertussis-containing vaccine (DTP3) and measles-containing-vaccine first-dose (MCV1) at the global and regional levels have declined to 2016 levels. Outbreaks of vaccine-preventable diseases such as measles and diphtheria have started to emerge in countries, especially those suffering from emergencies and conflict. In the Region, measles cases increased from 16 000 cases to almost 22 000 between 2021 and 2022, 5000 cases and 1300 cases in Afghanistan and Sudan, respectively, representing an 100% increase; more than 7000 cases were diagnosed in Pakistan and Yemen. Excluding Bahrain, Egypt, Islamic Republic of Iran and Oman, who have been verified for the elimination of measles and rubella, the incidence of measles reached 9.62 million in 2021, with a great variability between countries ranging from 0.08 million in Tunisia to 142.31 million in Yemen. Vaccination campaigns against measles and cholera have been conducted in Afghanistan, Pakistan, Syrian Arab Republic and Yemen. Since late 2022, efforts have been focused on vaccinating missed children and reducing the immunity gap to regain previous coverage levels and reduce the burden of measles and diphtheria outbreaks.

12.2 Enhancing vaccination coverage

The Region has made progress in eliminating vaccine-preventable diseases through maintaining the average immunization coverage at 80%. However, the progress has been uneven, with high coverage in some countries and serious challenges in countries suffering from protracted emergencies or in conflict and post-conflict situations.

In the Eastern Mediterranean Region, vaccination coverage for the third dose of the combined diphtheria, tetanus toxoid and pertussis (DTP3) vaccine for children has remained above 80% since 2015, reaching the highest level (85%) just before the pandemic (2019) and dropping to 82% in 2021 (82%) and to just above the global average (81%, Table 1). The 2021 WHO/UNICEF estimates indicate that 11 countries achieved at least 90% coverage of DTP3 nationally. However, more than 2 million children missed at least one dose of DPT3 in 2021, of whom around two thirds (63%) were in three countries (Afghanistan, Pakistan and Somalia) *(218)*.

Vaccination coverage with MCV1 in the Region reached 80% in 2015 and slightly increased by 2021 (82%). A second dose with measles-containing vaccine (MCV2) reached a level of only 77% by 2021. More than 3.3 million children missed measles vaccines in 2021, of which 61% were in the same

Table 1. Regional and global DTP, measles and pneumococcal conjugate vaccination coverage, 2021

	DTP3	MCV1	MCV2	PCV3
Regional coverage	82%	82%	77%	54%
Global coverage	81%	81%	71%	51%

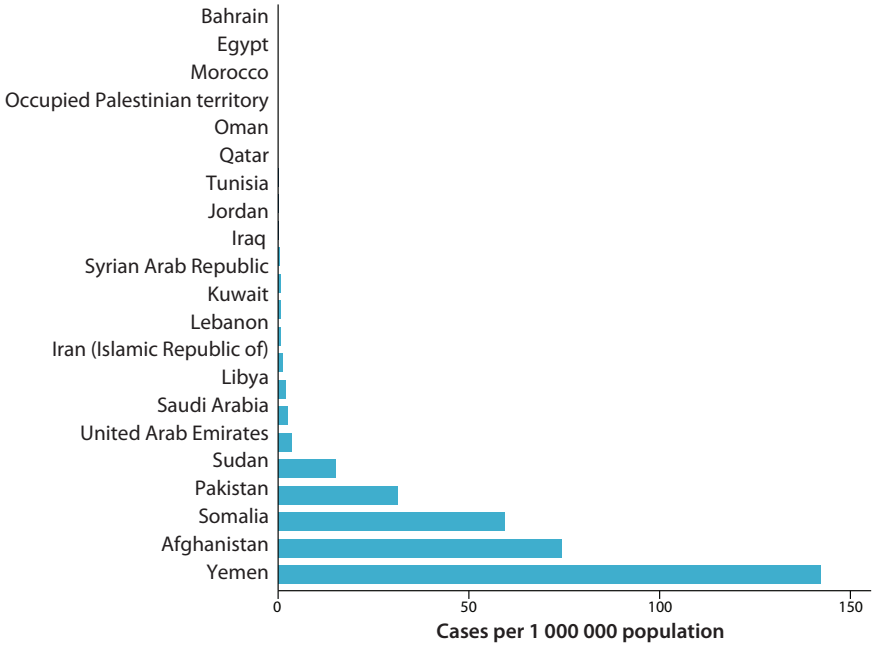
Source: WHO (2019) (218).

three countries (Afghanistan, Pakistan and Somalia). Low immunization coverage, disruptions of routine immunization services, overcrowding, migration, internal displacement, conflict and natural disaster severely compromised access to vaccination services in many countries, resulting in an accumulation of susceptible children and disease outbreaks *(218)*.

Maternal and neonatal tetanus elimination has been achieved in more than three quarters of countries in the Region, and only five countries (Afghanistan, Pakistan, Somalia, Sudan and Yemen), like seven others outside the Region, are yet to achieve this goal *(219)*. Strengthening the routine immunization of pregnant women with tetanus toxoid vaccine and conducting supplementary immunization activities in selected high-risk areas targeting women of reproductive age with three doses of the vaccine are key strategies to achieve elimination.

Measles case-based laboratory surveillance has been implemented in all countries of the Region except Somalia, where aggregate surveillance is carried out. Four countries (Bahrain, Egypt, Islamic Republic of Iran and Oman) are now verified to have achieved the elimination of measles and rubella by the Regional Verification Commission, and eight countries are close to achieving the elimination target for measles (an incidence of zero cases per million); however, measles outbreaks remain a concern (Fig. 21). More than half the countries in the Region (12 countries) continue to suffer from measles outbreaks because of insufficient levels of immunization coverage *(2)*. In 2021, the measles incidence rate was over 100 cases per million population in Yemen.

Fig. 21. Measles incidence per 1 000 000 population, 2021



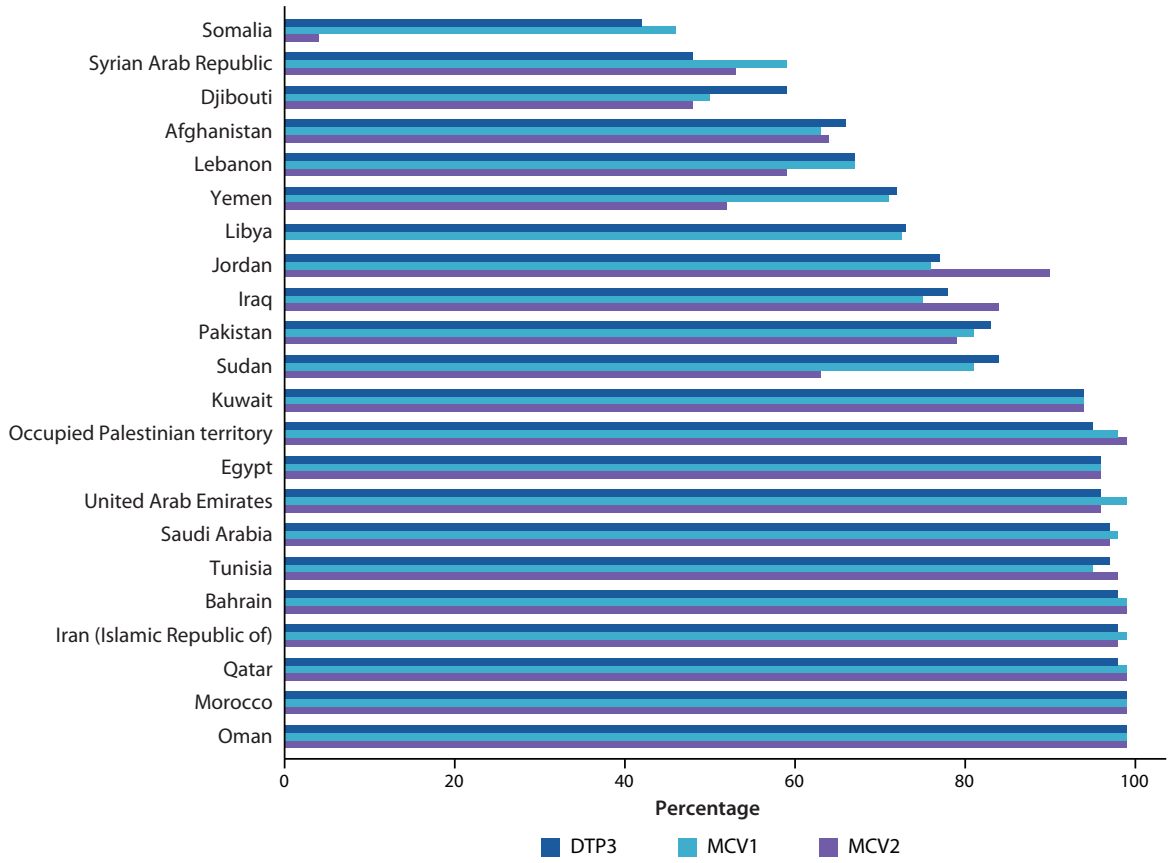
Source: WHO (2022) (80)

All countries of the Region provide two doses of measles-containing vaccine. From 2010 to 2021, the global coverage for MCV2 increased from 2% to 71%; however, this is still insufficient to prevent measles outbreaks and avoid preventable deaths *(3)*. Coverage of MCV2 was 77% in the Region in 2021 (Table 1), which is above the global rate, although lower than the European and Western Pacific regions. In 2021, the routine coverage of MCV1 was 95% or above in 10 countries, 90–94% in one country and under 90% (range 46–81%) in 11 countries (Fig. 22) *(218)*.

Regional efforts to expand immunization coverage include implementing the reaching every district strategy to achieve the goal of 80% coverage in all districts and 90% nationally in WHO Member States *(220, 221)*. Supplementary immunization activities and mass vaccination campaigns are also effective strategies for the vaccination of children missed by routine immunization services, such as hard-to-reach and underserved groups and communities, or to provide vaccination for older susceptible individuals who are not among the age groups targeted by the Expanded Programme on Immunization. Routine reports from countries to WHO shows that countries vaccinated 148 million children with measles vaccine through supplementary immunization activities in 2019–2021. Ninety-four per cent of these children were vaccinated in Pakistan, Egypt, Sudan and Yemen. An additional 9.5 million children were vaccinated through routine immunization during the same period.

In addition to strengthening vaccination programmes for high-impact vaccine-preventable diseases, there has been remarkable progress in introducing new life-saving vaccines. By the end of 2018, all countries of the Region had introduced *haemophilus influenzae* type B vaccine

Fig. 22. Coverage of DTP3 and measles (MCV1 and MCV2) vaccination (%), 2021



Source: WHO (2022) (80)

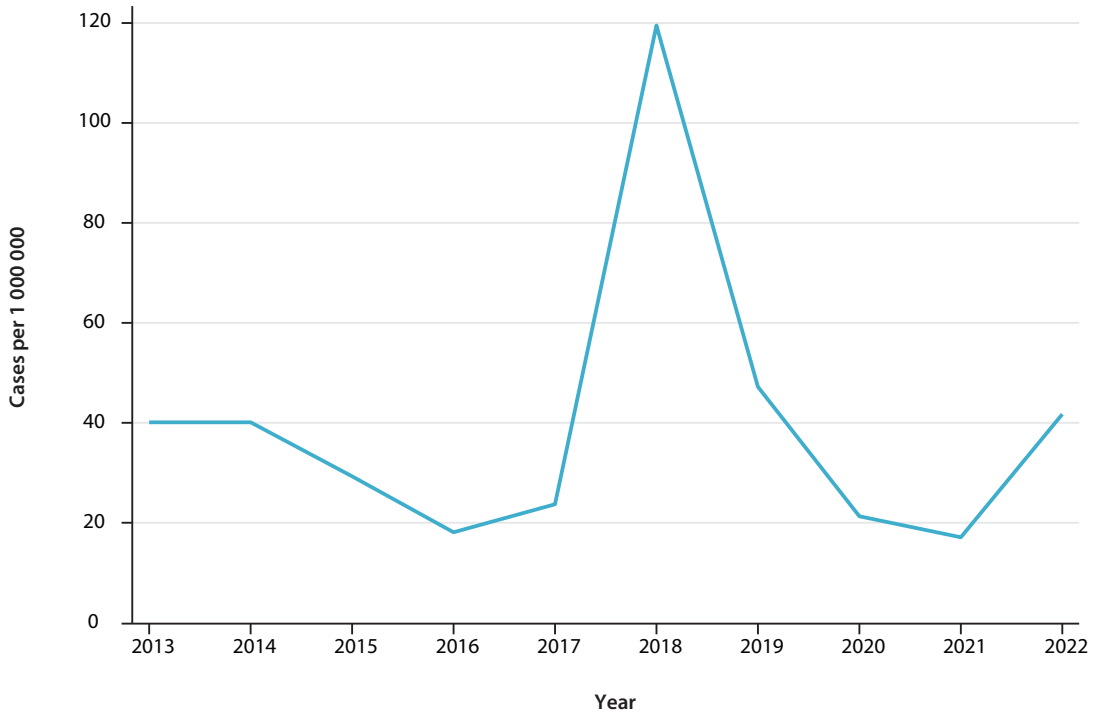
in their national immunization programmes, 17 countries had introduced pneumococcal conjugate vaccine and 16 countries had introduced rotavirus vaccine. At least one dose of inactivated poliovirus vaccine has been introduced in all countries of the Region *(219)*. The *Eastern Mediterranean Vaccine Action Plan 2016–2020* provides strategic guidance to support countries in reaching the goal of eliminating vaccine-preventable diseases *(222)*.

12.3 Re-emergence of vaccine-preventable diseases – the case of measles

The Eastern Mediterranean Region witnessed significant progress towards the interruption of measles virus transmission during the period 1998–2010 and reported a decrease in measles cases of 89%, from 89 478 cases in 1998 to 10 072 in 2010. However, since 2011, due to the geopolitical situation in several countries and the significant decrease in donor funding of measles supplemental immunization activities, regional progress slowed. The annual measles incidence increased from 39 per million population in 2013 to 119.5 in 2018, then decreased to 21.3 in 2019 (and further falsely decreased during the COVID-19 pandemic to reach 17.1 in 2021) before starting to significantly increase in 2022 to reach 41.73 per million population (Fig. 23).

Member States in the Region adopted a Measles Elimination Strategy in 1997 with the goal to eliminate measles in the Region by 2010. Its implementation by countries in the Region has had varying levels of success, with only Bahrain, Egypt, Islamic Republic of Iran and Oman achieving measles and rubella elimination between 2019 and 2022, as verified by the Regional Verification Commission for Measles and Rubella established in February 2018. Although some countries have a low annual incidence and have the potential to eliminate measles and rubella, many countries,

Fig. 23. Measles incidence per million population, 2013–2022



Source: Ministries of health, WHO Eastern Mediterranean Region, monthly national surveillance reports, 2013–2022

such as Afghanistan, Pakistan, Somalia, Sudan and Yemen, continue to experience large and persistent measles and rubella outbreaks. Due to routine immunization disruptions caused by the COVID-19 pandemic and ongoing conflict and the resulting destruction of health infrastructure, its estimated that in 2021, 3 357 096 children did not receive any measles-containing vaccine. WHO and partners strongly supported countries to control the situation, bridge the immunity gap, avoid the backslide on coverage resulting from the COVID-19 pandemic and boost immunity by implementing preventive supplementary immunization activities and intensifying routine services.

12.4 Polio eradication and the transition agenda

The Eastern Mediterranean Region is on the verge of eradicating poliomyelitis. Wild poliovirus transmission is at its lowest levels ever and is limited to a few zones in two countries – Afghanistan and Pakistan. In 2018, 33 cases of poliomyelitis were reported in Afghanistan and Pakistan, which increased significantly to 140 in 2020, during the COVID-19 pandemic. Although reported cases were much lower in 2021 (five cases), the higher number of cases compared with earlier years likely result from the internal displacement and prevailing security situation in both countries *(218, 223)*.

An outbreak of circulating vaccine-derived poliovirus (VDPV) type 2 (cVDPV2) started in the northeast Syrian Arab Republic in 2017, and officially ended in December 2018. Poliovirus type 2 is most likely to regain virulence and cause outbreaks in communities with low routine immunization coverage, particularly in inaccessible and conflict-affected areas. An outbreak of cVDPV2 and type 3 in Somalia in 2018 testifies to this vulnerability. For this reason, live virus vaccines containing type 2 poliovirus are now no longer being routinely used globally. Three countries in the Region are at very high risk for outbreaks, namely Somalia, Syrian Arab Republic and Yemen, and three are at high risk, namely Iraq, Libya and Sudan *(33)*.

Surveillance for acute flaccid paralysis (AFP) in the Region led to more than 20 000 reported cases per year in 2020–2022 among the 10 priority countries (Afghanistan, Pakistan, Somalia, Djibouti, Egypt, Iraq, Jordan, Libya, Sudan and Yemen). Nearly all countries achieved the national core surveillance indicator targets during the three-year period; Jordan did not achieve the non-polio AFP target rate for 2020 and 2021 and Djibouti did not achieve the stool adequacy benchmark in 2021 and 2022. Most countries performed well at the subnational level, with some gaps observed in Djibouti *(224)*. The Regional Laboratory Network, comprising 12 WHO-accredited laboratories, supports this surveillance activity. Environmental surveillance is another approach helping the polio programme to expand its reach by facilitating the early detection of VDPVs, especially in emergency-affected and hard-to-reach areas. Environmental surveillance is currently implemented in Afghanistan, Bahrain, Djibouti, Egypt, Islamic Republic of Iran, Iraq, Jordan, Kuwait, Lebanon, occupied Palestinian territory, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic and Yemen *(33, 225)*.

Countries with endemic status and those considered at risk have taken measures to contain the problem. In Afghanistan and Pakistan, the national programme and local authorities, supported by WHO, UNICEF and international partners, have carried out immunization response based on national emergency action plans for polio eradication to reach chronically missed children and those living in inaccessible areas, despite facing tremendous difficulties in conflict zones. To keep the rest of the countries in the Region free from poliomyelitis, supplementary immunization activities continue to be carried out in the two endemic countries in addition to event and outbreak

countries. Preventive campaigns have been implemented in selected areas in some countries where there is population movement from endemic countries. The Regional Commission for the Certification of Poliomyelitis Eradication, in their 2022 meeting, requested that countries conduct polio outbreak simulation exercises; Libya and Qatar were the first two countries to conduct such an exercise *(226)*.

Increasing coverage of the Expanded Programme on Immunization is crucial to sustain the gains made in polio eradication. Four countries (Afghanistan, Pakistan, Somalia and Sudan) are among the 16 countries in the Region identified globally as a priority for post-eradication transition planning. An additional four countries (Iraq, Libya, Syrian Arab Republic and Yemen) are considered regional priorities for developing a transition plan. These priority countries need to focus on using polio assets to improve routine immunization and find the best mechanisms to synergize and support priority countries in maintaining a polio-free status *(227)*. Somalia, Sudan and Syrian Arab Republic are implementing integrated public health teams as an interim strategy to implement polio transition, while in Yemen, the surveillance network originally established for polio is being used for broader vaccine-preventable disease surveillance. In Libya and Iraq, the focus is on the full transition of essential polio functions to the governments. However, the outbreak of cVDPV in Somalia and continued transmission of wild poliovirus type 1 in Afghanistan and Pakistan have affected the implementation of transition plans *(228)*.

12.5 Lessons learned from COVID-19 response in the rapid expansion of vaccination and impact on expanded programmes of immunization

The COVID-19 pandemic demonstrated the critical importance of maintaining equitable access to vaccines as a high priority during an emergency. The drop in vaccination coverage during the early part of the pandemic called for a rapid vaccination response that resulted in a higher coverage for all antigens that was usually reached annually. In addition to the high priority placed on equitable access to vaccines, lessons learned include the following:

- Working as one team in a coordinated manner resulted in maximum benefit of the resources. The prioritization of COVID-19 vaccine use was based on the risk as recommended by the Strategic Advisory Group of Experts on Immunization.
- The digitalization of vaccine supply, registration and monitoring facilitated vaccine roll-out.
- A variety of tools, equipment, manuals, and guidelines facilitated strengthening the vaccine management system including the cold chain management system.
- Developing a strong vaccination service delivery system within the overall health system is key to ensure equity.
- Integrating COVID-19 vaccination in the Expanded Programme on Immunization increased the uptake of all vaccines.

The pandemic also provided the opportunity to build capacity in RCCE as well as improve technology for vaccine production. Vaccination experience during the COVID-19 pandemic is now being used for expanding vaccinations to a life course approach, such as the inclusion of immunization for influenza and HPV and focusing on high priority population sub-groups.

12.6 Status and response to cholera epidemics

In 2022, eight countries from the Region (Afghanistan, Islamic Republic of Iran, Iraq, Lebanon, Pakistan, Somalia, Syrian Arab Republic and Yemen) reported an acute watery diarrhoea or cholera outbreak. A total of 667 008 suspected cases were reported, with 7494 confirmed cases and 304 deaths (CFR: 0.05%). In most of these countries, gaps and challenges include limited access to a safe water supply and proper sanitation, limited capacity in terms of staff, hospital space and beds to care for and treat cases, limited availability and prepositioning of basic life-saving health services due to severe funding gaps, and limited laboratory capacity. In addition, armed conflict and insecurities interrupt patient referral, health staff movement and transfer of supplies, severely impacting the functioning of cholera treatment centres. Cholera outbreak preparedness and response activities in the affected countries include, among other things, strengthening intersectoral coordination, training and deployment of rapid response teams, establishment and/or intensification of acute watery diarrhoea surveillance in high-risk areas, printing and distribution of surveillance tools, chlorination of drinking-water, strengthening of water and sanitation services, recruitment of surge staff, distribution of cholera case management guidelines and cholera kits to affected communities, and implementation of oral cholera vaccination campaigns.

13 Priority communicable diseases

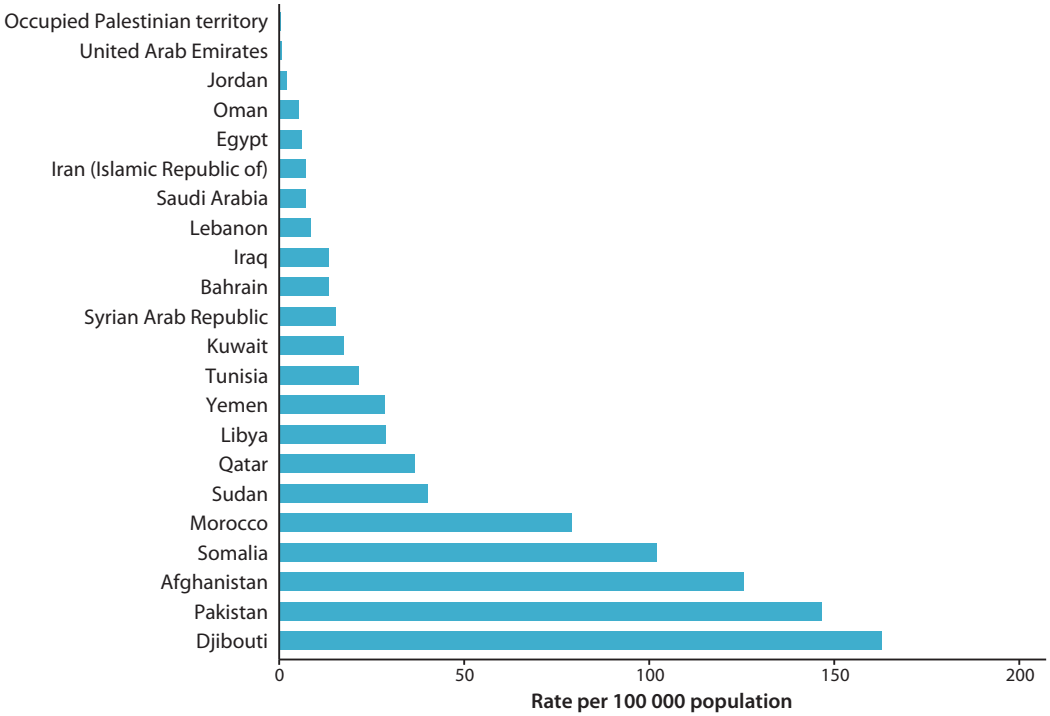
13.1 Tuberculosis

In 2021, the incidence of tuberculosis (TB) in the Eastern Mediterranean Region was 112 per 100 000 population, which was lower than the global estimated incidence of 134 per 100 000 population but the third highest among WHO regions. TB incidence varies greatly in the Region; from less than 10 per 100 000 population (six countries); to rates above 100 per 100 000 population (in Afghanistan, Djibouti, Pakistan and Somalia) *(80)* (Fig. 24).

The Region accounts for nearly 8% of global TB cases *(229)*. The Region experienced a marked drop in number of people diagnosed with TB between 2019 and 2020 as an impact of COVID-19-related disruptions to essential TB services. This was followed by an almost complete recovery in 2021, and a total of 498 000 people were diagnosed with TB. Two countries account for the highest proportions of the regional TB incidence: Pakistan with 70% and Afghanistan with 9%. Between 2015 and 2020, in the Region, declines in estimated TB incidence (4.9%) and TB deaths (6.2%) fell short of the End TB Strategy 2020 milestones of 20% and 35% reduction, respectively.

In the Region, 46 000 multidrug-resistant TB cases were estimated in 2021 and only 10% (4500) had started treatment (out of the total estimated) *(230)*. Closing the gap requires improvements in the overall detection of people with TB, improvements in the percentage of those diagnosed with TB who were bacteriologically confirmed and improvements in the coverage of testing for rifampicin-resistant TB.

Fig. 24. TB incidence per 100 000 population, 2021



Source: WHO (2022) (80)

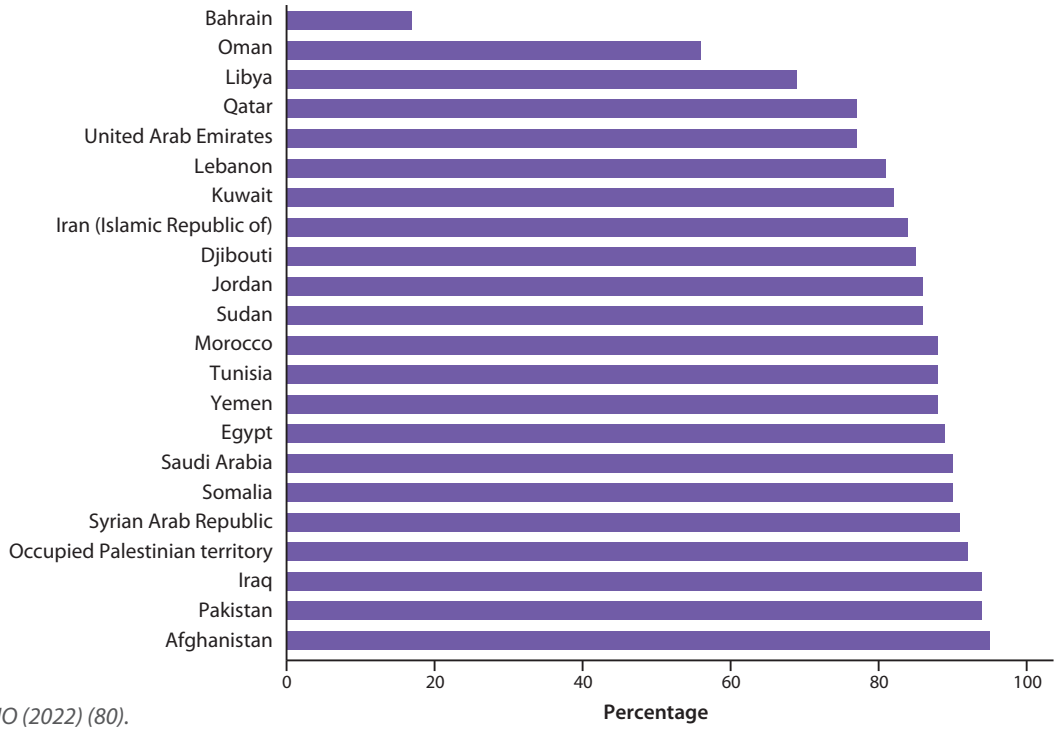
In 2021, TB treatment coverage was 58%, up from 52% in 2020, but lower than 60% in 2019. Approximately 350 000 people with TB were neither diagnosed nor treated. Coverage ranged from 41% in Somalia to 87% in Lebanon and member countries of the GGC (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates).

In the Region, the treatment success rates were the highest among all six WHO regions, at 92% for 2020 drug-susceptible TB and 72% for 2019 drug resistant TB cohort, exceeding the global averages of 86% and 60%, respectively. The treatment success rate ranged from 56% in Oman to 95% in Afghanistan for drug-susceptible TB (Fig. 25).

The countries of the Region have made progress in recent years with the introduction and expansion of the rapid molecular diagnostics recommended by WHO, which have improved the diagnosis of TB. The proportion of TB patients diagnosed with rapid diagnostics increased to 48% in 2021, up from 5% in 2017, and more than 80% of new and previously treated patients were tested for rifampicin-resistant TB in 2021.

Half of countries in the Region have either updated or are in the process of updating their national strategic plans in line with *WHO's End TB Strategy* and the *Tuberculosis action plan for the WHO Eastern Mediterranean Region, 2023–2030*, and to accommodate the 2018 Political Declaration of the United Nations General Assembly High-level Meeting on TB. Countries adopted the *Multisectoral Accountability Framework to Accelerate Progress to End Tuberculosis by 2030 (231)*. Countries in the Region with a low disease burden initiated the TB elimination process.

Fig. 25. **TB treatment success rate of new and relapse TB cases notified (%), 2020**



Source: WHO (2022) (80).

Compared with 2020, funding for TB increased in 2021, and approximately 50% of the countries' needs are met due to support from donors and partners. However, more and smarter investment

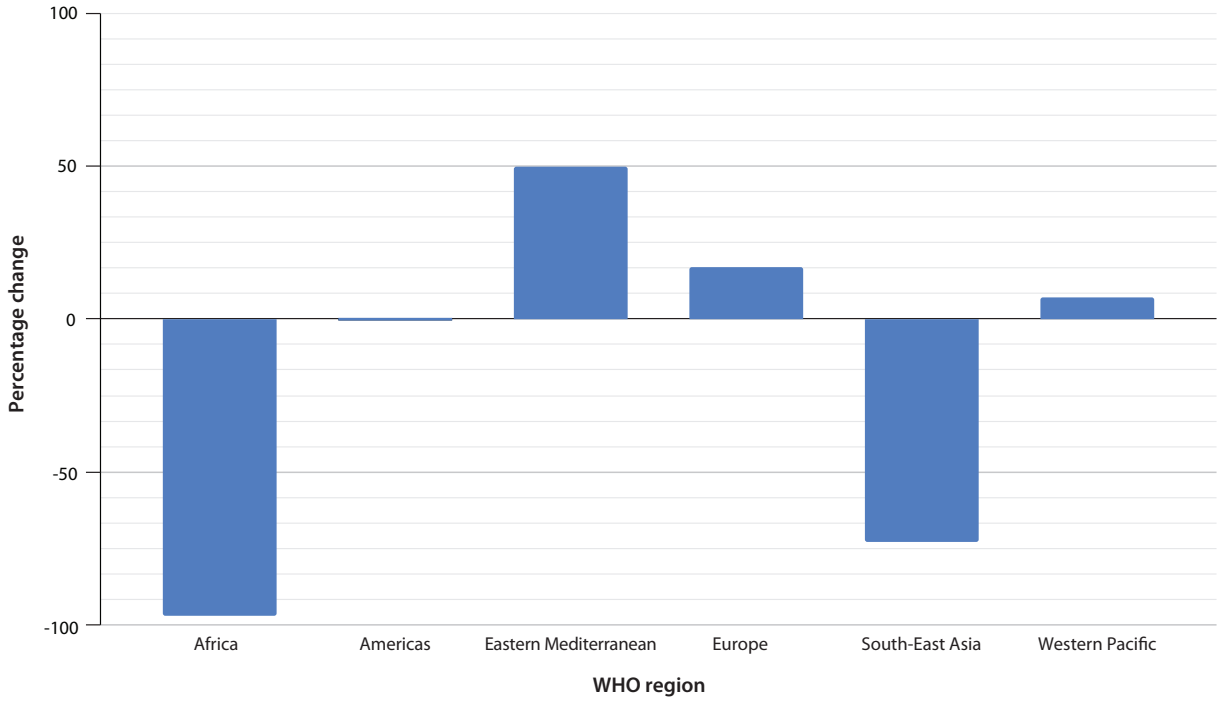
in TB is needed, especially from domestic resources. Investing more in TB will help to find missing people with TB, reduce TB transmission and mortality and improve productivity.

The health, social and economic impacts of TB are devastating, and investments in TB are needed across the whole of society to achieve UHC. Social and economic development and health-related risk factors such as undernutrition, HIV infection, diabetes and smoking are profoundly influencing the TB epidemic. Member States are strongly advised to invest more to address these determinants and achieve global and regional targets for reduction in the TB disease burden. Countries need to go beyond the health sector and collaborate per the *TB Multisectoral Accountability Framework*.

13.2 HIV

By the end of 2022, there were an estimated 490 000 people living with HIV in the Region, including 14 000 children, which represents 1% of the global HIV burden. Despite this low share of HIV cases, the Region is experiencing the fastest-growing epidemic of all WHO regions, with a doubling in the number of people living with HIV since 2012, compared with only 24% globally (Fig. 26). In 2022, the WHO and Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated there to be 56 000 new HIV infections and 20 000 deaths in the Region. Those figures are equivalent to a 100% and a 67% increase in estimated new HIV infections and AIDS-related deaths, respectively, compared with 2010, whereas these figures decreased by 38% and 51% globally *(232)*. The epidemic in the Region mostly affects people aged > 25 years (75% of total HIV cases), and data indicate a male predominance among HIV reported cases, with a male-to-female ratio of two to one (WHO, unpublished data, 2021).

Fig. 26. Percentage change in estimated new HIV infections by WHO region, 2012–2022



Source: UNAIDS (232)

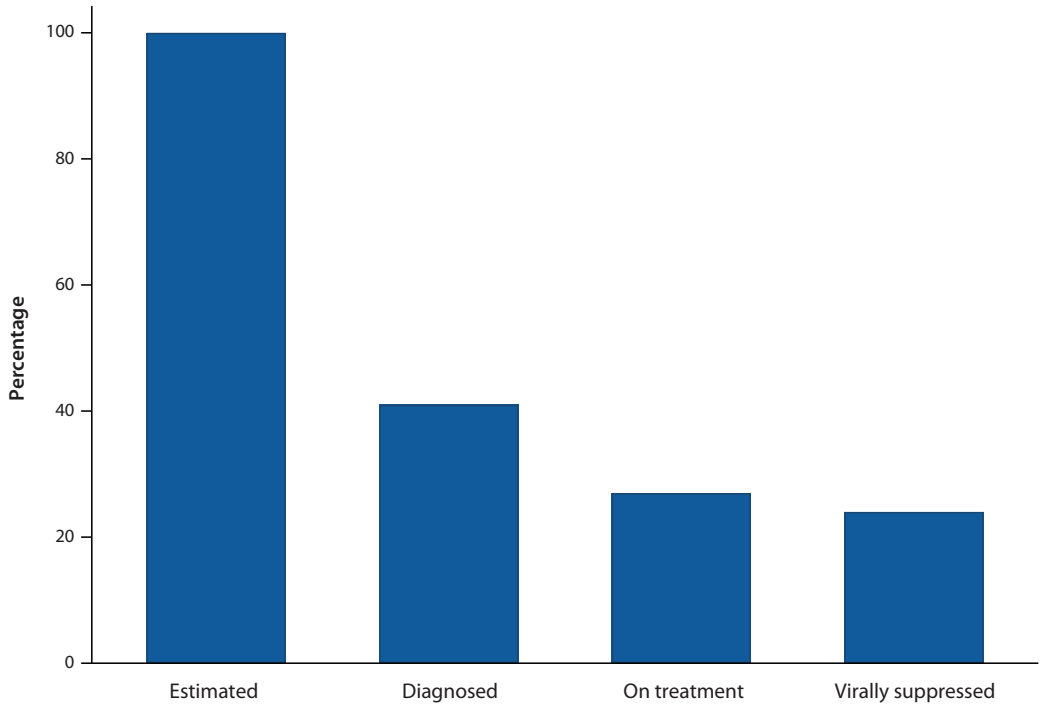
The Region's HIV epidemic is concentrated among key populations, including people who inject drugs, men who have sex with men, transgender people and female sex workers, who all have

a higher HIV prevalence compared with the general public. Integrated bio-behavioural surveys conducted among these groups reported a prevalence of up to 9.3% among sex workers in Djibouti, 9% prevalence among men who have sex with men in Tunisia, and 21% among people who inject drugs in Pakistan *(232)*. In 2020, among newly reported HIV cases, 31% were attributed to heterosexual transmission, 29% to injecting drug use, 10% to blood and blood products and 6% to transmission between men who have sex with men (WHO, unpublished data, 2021).

In contrast with global progress, the Region is still facing challenges in diagnosis and treatment and the Region reports the lowest performance worldwide. Only 41% of people living with HIV have been diagnosed, 27% are on treatment and 24% are virally suppressed (Fig. 27) *(232)*. Most of the countries in the Region missed the interim targets for 2020 to identify 90% of the total HIV population, treat 90% of those who are diagnosed and achieve 90% viral load suppression among those on treatment *(233)*.

There is a scarcity of data on prevention coverage, with most data being reported from a limited number of countries. In 2021, 11 countries in the Region reported adopting WHO recommendations on pre-exposure prophylaxis use; however, implementation remains limited to Morocco (625 users in 2021) and Lebanon (239 users in 2021). Other prevention measures such as condom use among men who have sex with men are reported by two countries; in 2021, condom use among this group was 52% in Lebanon and 57% in Morocco.

Fig. 27. HIV cases by status of care in the Region, 2021



Source: UNAIDS (232)

The WHO policy review in 2020 indicated that most countries in the Region had not adopted the WHO recommendations that emphasize targeted testing for key populations in countries with

concentrated epidemics. Analysis of HIV case reporting data between 2016 and 2021 indicated that only 13% of HIV tests annually are performed on members of high-risk groups. Most of the tests are conducted among low-risk groups such as migrants. Country programmes, such as those in Lebanon and Morocco, that adopted comprehensive key populations programming progressed towards the global fast-track targets (Lebanon: 83% diagnosis, 66% on treatment; Morocco: 83% diagnosis, 80% on treatment). In addition, innovative testing approaches such as HIV self-testing were only implemented or piloted in four countries, with 14 countries having no policy in place.

The Region's efforts towards the elimination of mother-to-child transmission of HIV remain slow except for in a few countries. In 2021, out of 6700 women living with HIV, only 1500 were receiving the needed treatment. In 2021, Oman became the only country in the Region to eliminate mother-to-child transmission of HIV and syphilis. This is a result of ensuring universal access to services for women living with HIV and their babies and establishment of successful maternal, perinatal and child health services within PHC services *(234)*.

In 2020 and 2021, COVID-19 challenged HIV services, leading to a shortage of supplies, depleted resources and disrupted services, including prevention, testing and referral to treatment. In 2020, the number of HIV tests conducted only reached 45% of those conducted in 2019 (3.7 million in 2020 versus 8.4 million in 2019). This further led to a decrease in HIV diagnoses (16 216 people living with HIV diagnosed in 2020 compared with 19 234 in 2019) *(235)*.

13.3 Hepatitis

In 2021, WHO estimated that 296 million people were living with chronic hepatitis B virus (HBV) infection globally, 58 million people were living with chronic hepatitis C virus (HCV) infection and 3 million people were newly infected with viral hepatitis (1.5 million new HBV infections and 1.5 million new HCV infections). Taken together, in 2021, the two diseases caused 1.11 million hepatitis-related deaths *(236)*.

Among WHO regions, the Eastern Mediterranean Region comes in third place for the prevalence of HBV with a 2.5% rate among the general population (18 million chronic infections); it follows the African Region (7.5%) and Western Pacific Region (5.9%). Among the countries of the Region, in 2021, 85% of the chronic HBV infections were in five countries: Egypt, Pakistan, Somalia, Sudan and Yemen. By the end of 2020, the prevalence of hepatitis B surface antigen (hBsAg) in children under-5 years (cumulative incidence of HBV) was 0.8% compared with 1.6% in 2016. WHO estimated in 2020 that 33 000 deaths could be attributed to HBV *(234)*.

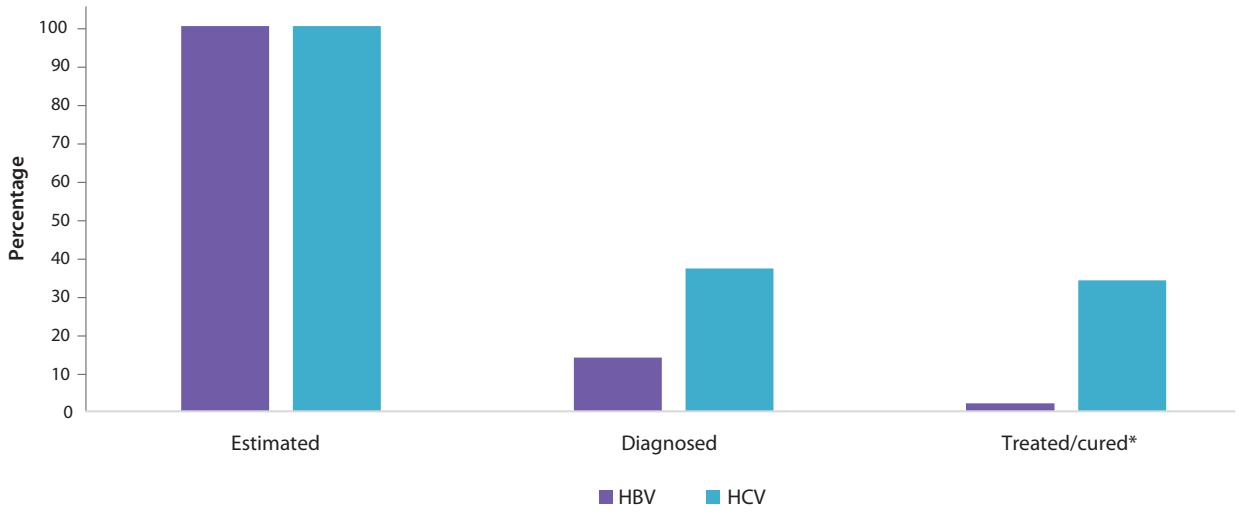
For HCV, the Region had the highest prevalence of infection (1.6%) in the general population among all WHO regions. The Region has the highest incidence of HCV infections. WHO estimated that 470 000 new HCV infections occurred in 2020, mainly driven by unsafe injections. Pakistan bears the highest burden of chronic HCV infections in the Region, accounting for 70–80% of the chronic HCV infections there *(236)*.

As of 2020, the regional coverage of the third dose of hepatitis B vaccine among infants reached 82% in 2021 compared with 80% in 2015. Only four countries (Afghanistan, Somalia, Syrian Arab Republic) did not achieve a coverage above 80%. Despite moderate progress, the regional coverage of timely hepatitis B vaccine birth dose remains very low, at 35% at the end of 2020. Harm reduction services remain very limited in the Region. The number of syringes per injecting

drug user per year increased from 25 to 27 only between 2015 and 2017, leaving a major gap to reach the 2020 target of 200 syringes per person per year. In 2020, only five countries in the Region had harm reduction programmes and services were mainly offered by civil society organizations and on a limited scale (Morocco achieved 109 syringes per person per year, Afghanistan, 52, Islamic Republic of Iran, 48, and Pakistan, 46, with no data available for Egypt and Lebanon). For blood safety, the 2017 WHO estimates indicated that 82% of blood donations in the Region were screened in a quality-assured manner compared with 81% in 2015. On the other hand, a review of the demographic and health surveys conducted in the Region indicated that 8% of injections performed were unsafe *(237)*.

In 2020, 14% of the estimated 18 million HBV infected persons were diagnosed and 2% were receiving treatment, compared with 2% diagnosed and less than 1% receiving treatment in 2015 (Fig. 28). There has been progress in HCV testing and treatment in the Region since 2016, however, it is still on an insufficient scale. The proportion of persons with HCV infection diagnosed was 35% in 2020, compared with 18% in 2015. The proportion of those diagnosed with HCV who had started treatment reached 33% in 2020, compared with 12% in 2015. The progress in HCV testing and treatment has mainly been driven by efforts in Egypt to eliminate HCV. Between 2016 and 2020, Egypt implemented a nationwide campaign, screening 60 million people and offering free treatment to 4 million HCV patients. Now Egypt is on its way to the validation of the elimination of HCV as a public health problem *(236)*.

Fig. 28. HBV cascade of care in the Region, 2020



*Treated for HBV or cured for HCV

Source: WHO (2021) (233)

13.4 Sexually transmitted infections

In 2020, WHO estimated that more than 1 million sexually transmitted infections (STIs)[7] were acquired every day worldwide, the majority of which were asymptomatic. In the same year, 374 million adults were newly infected with four curable STIs, namely, gonorrhoea, chlamydia, trichomoniasis and chlamydia. In the Region, 2020 pooled prevalence estimates of STIs in the general population were: 1) chlamydia, 3.9%; 2) trichomoniasis, 2.5%; 3) syphilis, 0.6%; and 4) gonorrhoea, 0.5%. According to WHO Regional estimates of disease burden in 2020, there were 2.4 million cases of syphilis, 1.8 million cases of gonorrhoea, 15 million cases of chlamydia and 9.5 million cases of trichomoniasis.

STI response remains largely neglected, with a limited number of countries having programmes. The response is predominantly focused on patient care, with limited higher-level programming and limited surveillance, testing and treatment. There is inadequate funding for STI programmes. Few countries in the Region are working actively to eliminate STIs or have STI surveillance programmes. In 2022, Oman validated the elimination of mother-to-child transmission of syphilis. In addition, Morocco and Qatar are working to eliminate mother-to-child transmission of syphilis. Despite this limited response, opportunities for integration of services exist, such as the use of multiplex technologies for testing and capitalizing the PHC platform for treatment, and these could be leveraged to improve programmes *(234)*.

13.5 Mpox

Mpox (monkeypox) is a viral zoonosis (a virus transmitted to humans from animals) with symptoms like those seen in the past in smallpox patients, although it is clinically less severe. In May 2022, multiple cases of mpox were identified in several non-endemic countries. By July 2023, nearly 90 000 cases had been confirmed, including 152 deaths in 113 countries reporting cases. Most of the cases were reported by countries in the Americas and European regions rather than in West or Central Africa where the mpox virus is endemic. Cumulatively in the Region, 80 laboratory confirmed mpox cases were reported from 10 Member States along with one mpox-associated death in Sudan. Cases were reported by Lebanon (24), Sudan (18), United Arab Emirates (16), Saudi Arabia (8), Qatar (5), Morocco (3) Egypt (3), Bahrain (1) Islamic Republic of Iran (1) and Jordan (1).

All countries of the Region developed outbreak response plans based on WHO guidance. WHO conducted several training sessions between June and October 2022 to enhance surveillance and support country adaptation of case management and worked closely with civil society organizations in the outbreak affected countries and with technical advisory groups to enhance preventive measures, case reporting and response in the outbreak-affected countries.

13.6 Neglected tropical diseases

Neglected tropical diseases are a group of diverse diseases that can be found in various geographical areas (not limited to tropical environments) and are strongly connected to poverty. The neglected tropical diseases currently prevalent in the Eastern Mediterranean Region are dengue, chikungunya, dracunculiasis (Guinea worm disease), echinococcosis,

[7] WHO focuses on four curable STIs: gonorrhoea, chlamydia, trichomoniasis and chlamydia.

foodborne trematodes, leishmaniasis, leprosy, lymphatic filariasis, mycetoma, onchocerciasis, rabies, scabies and other ectoparasites, schistosomiasis, soil-transmitted helminthiasis, snakebite envenoming, taeniasis/cysticercosis and trachoma. Some neglected tropical diseases that were previously controlled are re-emerging in a few countries (e.g. Djibouti, Iraq, Syrian Arab Republic and Yemen) due to prevailing complex emergency situations.

SDG target 3.3 includes ending epidemics of neglected tropical diseases by 2030. In 2021, the reported number of people in the Region requiring interventions against neglected tropical diseases was about 72 million *(238)*. The neglected tropical diseases that are at the focus in the Region for eradication or elimination by 2030 are dracunculiasis, onchocerciasis, schistosomiasis, lymphatic filariasis, trachoma, soil-transmitted helminthiases, visceral leishmaniasis and leprosy. Nine countries require preventive chemotherapy to eliminate onchocerciasis, schistosomiasis, lymphatic filariasis, trachoma and soil-transmitted helminthiasis *(239)*.

Sudan is the only country in the Region that is not certified as having eradicated dracunculiasis nor lymphatic filariasis as public health problems. Among countries in which trachoma is prevalent, for example, in Afghanistan, Egypt, Somalia, Sudan and Yemen, surgery, antibiotic treatment, facial cleanliness and environmental improvement (SAFE strategy) may be needed to eliminate the disease as a public health problem. Islamic Republic of Iran, Iraq, Morocco, Oman and Saudi Arabia have been validated as having eliminated trachoma as a public health problem *(240)*. Pakistan and Tunisia have initiated the validation process for elimination.

Leishmaniasis is a major public health problem in Afghanistan, Djibouti, Islamic Republic of Iran, Iraq, Libya, Morocco, Pakistan, Somalia, Sudan, Syrian Arab Republic, Tunisia and Yemen. The Region has the highest burden of both types of leishmaniasis (cutaneous and visceral) compared with other WHO regions. In 2021, the Region reported 174 920 cases of cutaneous leishmaniasis, accounting for 79% of the global burden, and 4660 cases of visceral leishmaniasis *(241)*. Sudan reported 3323 visceral leishmaniasis cases, the highest for any country worldwide. Treatment through the AmBisome donation programme is available for countries where visceral leishmaniasis is prevalent.

There is no medicine donation programme for cutaneous leishmaniasis, and the global production of medicines for the treatment of cutaneous leishmaniasis is inadequate. Most antileishmanial medicines are produced by only a single manufacturer, and there are problems related to quality, low production capacity and lack of an adequate forecast of needs (resulting in long lead times for orders) that regularly cause stock ruptures in endemic countries. Countries endemic for cutaneous leishmaniasis do not have widespread use of other treatment methods (e.g. cryotherapy and thermotherapy) causing significant challenges in the case management of cutaneous leishmaniasis.

Schistosomiasis is a public health problem in Egypt, Sudan, Somalia and Yemen, where mass drug administration is being conducted to eliminate the disease. Djibouti, Islamic Republic of Iran, Jordan, Lebanon, Morocco and Tunisia are in the process of either validating the interruption of transmission or validating the elimination of schistosomiasis as a public health problem. Only two countries in the Region (Sudan and Yemen) have reported onchocerciasis, and at the time of writing both were conducting mass drug administration to eliminate the disease.

Preventive chemotherapy for school-age children to control soil-transmitted helminthiasis has been implemented in Afghanistan, Iraq, Pakistan, Somalia, Syrian Arab Republic and Yemen, as

well as for refugee populations under UNRWA. In 2021, the total number of preschool and school-age children requiring preventive chemotherapy was 55 million in the Region, but only 11.5 million school-age children received treatment *(242)*.

Egypt, Somalia and Sudan are among the 23 global priority countries for leprosy control. During the last decade, trends in the detection of new leprosy cases in the Region are increasing, which can be attributed to enhanced active case detection in priority countries, especially in Somalia. Mycetoma is currently reported to be prevalent in some countries, but only Sudan reports the cases, and the country is tackling the disease through active case-finding, early diagnosis and treatment with currently available tools. Few countries in the Region report echinococcosis, foodborne trematodes and taeniasis/cysticercosis; these are mainly reported by Egypt, Islamic Republic of Iran, Iraq, Morocco and Syrian Arab Republic.

13.7 Influenza and respiratory tract infections

Acute respiratory disease outbreaks, including influenza, cause significant health burdens worldwide every year. During the winter months alone, seasonal influenza can infect up to 20% of the population and can cause up to 650 000 deaths each year. In 2015, lower respiratory infections were the third leading cause of death and the fourth leading contributor to the total disease burden, accounting for 29.5 deaths per 100 000 population in the Region. Despite the overall declining trend observed during the COVID-19 pandemic, including in the influenza season 2022–2023), influenza still causes a significant health burden in the Region. Since the beginning of the pandemic, more than 23 million cases, including 349 081 associated deaths, have been reported from all 22 countries/territories of the Region, revealing a CFR of 1.5%.

MERS-CoV remains an ongoing threat in the Region. Between April 2012 and March 2023, 2604 laboratory-confirmed MERS-CoV cases were reported globally, with 936 associated deaths at a CFR of 36%; most of these cases were reported from Saudi Arabia (2196 cases; 855 related deaths; CFR: 39%).

Non-influenza viruses such as respiratory syncytial virus (RSV) are a leading cause of hospitalization and deaths in infants below two years of age. Globally in 2019, there were an estimated 3.6 million RSV-associated acute respiratory infection hospital admissions, and 101 400 RSV-attributable deaths in children aged 0–60 months overall. One in every 50 deaths in children aged 0–60 months and one in every 28 deaths in children aged 28 days to 6 months are attributable to RSV. More alarmingly, over 97% of RSV-attributable deaths across all age groups were in LMICs in 2019, a group that includes more than half of the countries in the Region.

WHO supports Member States to establish functional sentinel systems for influenza-like illnesses and severe acute respiratory infections. It also supports them in strengthening capacities in epidemiological surveillance, laboratory, health system and health professionals, emergency response systems and risk communications. The influenza platforms and systems developed over the last 15 years proved to be of great support during the current COVID-19 pandemic and represent a critical foundation for any future respiratory epidemics and pandemics. Thus, WHO is supporting Member States to initiate the integration of SARS-Cov-2 testing within their sentinel influenza surveillance systems.

WHO is actively supporting Member States to ensure that all countries in the Region review and update their national influenza pandemic preparedness plan to fulfil their national obligations

under the IHR (2005). Promoting seasonal influenza vaccination is an important strategy for influenza prevention; in 2022, WHO finalized the regional roadmap to scale up the uptake and utilization of influenza vaccines in the Region. To enhance country capacity to estimate the influenza disease burden using the available epidemiological and virological surveillance data, WHO provides support for the timely assessment of the severity of pandemic influenza, which provides the information needed to determine the timing, scale, emphasis, intensity and urgency of pandemic response actions.

14 Zoonotic and vector-borne diseases

The risk of emergence of zoonotic and vector-borne diseases is high in the Region due to its topography, complicated geopolitical situation, large mass gathering religious and sporting event and other socioeconomical factors *(243–245)*. Four of the eight migratory bird flyways pass through various countries of the Region: Central Asia–India, East Atlantic, Mediterranean–Black Sea and West Asia–Africa *(246)*. These migratory wild birds are a reservoir for many avian influenza viruses, and may transfer viruses to domestic birds, poultry and subsequently to humans as well. Climate change and other environmental factors also affect the survival and distribution of high-risk pathogens and their vectors and hosts. Complected geopolitical situation and humanitarian emergencies have also resulted in spread of infections due to huge population displacement, interruption in the health services, poor living conditions, weak surveillance and disease detection capacities and the lack of disease control measures *(243)*.

Over the last few decades, at least 11 countries of the Region have reported major outbreaks and epidemics of zoonotic and vector-borne diseases *(247)*. Currently there are around 50 active outbreaks ongoing in the Region, with 70% of them being related to vector-borne and zoonotic diseases. Avian influenza A (H5N1) and MERS-CoV are considered two of the greatest threats to global health security and both viruses are endemic in the Region. Sporadic cases and outbreaks of Mpox, Sandfly fever, Alkhurma haemorrhagic fever *(248–250)* and plague are also occurring in a few countries, while there is limited information on other rare zoonotic diseases such as Q fever and tularaemia *(251)*. In addition to these outbreaks and epidemics, many zoonotic and vector-borne infections are endemic in the Region, including rabies, brucellosis, leishmaniases, Ebola, other foodborne zoonotic infections and malaria.

14.1 Avian influenza

Avian influenza A (H5N1) remains a major concern in the Region and according to a recent study, around 10 000 outbreaks due to various types of avian influenza were reported in birds and other species there in 2011–2021 *(252)*. The majority of these avian outbreaks were reported from the Egypt, Islamic Republic of Iran and Iraq, while most of the other countries in the Region reported no or very few outbreaks in avian species. As of March 2023, 868 cases and 457 deaths had been reported due to avian influenza H5N1 in humans, and of these 366 cases (42%) and 123 deaths (27%) were reported from the Region *(253)*. Most of these cases and deaths were reported from Egypt, while a few cases and deaths were also reported from Djibouti, Iraq and Pakistan *(254)*.

Egypt accounts for the largest number of avian influenza H5N1 cases globally and is the only country with a high number of H5N1 outbreaks among poultry and some cases among humans. Some serological studies showed that H5N1 cases in Egypt are underreported, and the actual number may be higher than this *(255–257)*. One study showed that around 2% of Egyptians exposed to poultry had been infected with H5N1 *(256)*. The virus has become enzootic in Egypt and a low level of transmission is reported throughout the year *(258)*. The upsurge in avian influenza H5N1 cases in Egypt has been attributed to uncontrolled poultry farming practices, lack of awareness, high-risk behaviour and inadequate personal protection while in contact with poultry *(259)*. The risk of a major outbreak of H5N1 in poultry is high in Egypt, owing to

the presence of more than 40 000 poultry farms with low biosecure production systems and a high prevalence of backyard farming *(260)*. An outbreak of an H5N1 subtype had already been reported in a backyard poultry farm in an eastern Region of Libya in 2014 *(261)*.

14.2 MERS-CoV

Most MERS-CoV cases worldwide are reported from countries in the Region – Saudi Arabia alone accounts for more than 84% of global cases of MERS-CoV *(262)*. Cases have also been reported from many other countries of the Region including Bahrain, Egypt, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Tunisia, Yemen and United Arab Emirates *(263)*. The number of cases in the Region has decreased since the start of the COVID-19 pandemic, likely due to a reduction in testing but also to adopting various control measures such as mask wearing, hand hygiene, improving ventilation and social distancing.

MERS-CoV is still a threat in the Region as cases are regularly being reported from Saudi Arabia and currently, there is no vaccine or MERS-specific treatment available. According to a WHO risk assessment, additional cases of MERS-CoV infection will continue to be reported from countries in the Middle East, particularly when routine surveillance activities are gradually resuming after the acute phase of COVID-19 *(264)*. The risk of MERS-CoV spreading to other countries is high due to travel in endemic areas and exposure to dromedaries, animal products or humans. Moreover, the transmission mechanism from animals to humans is still unclear. Though dromedary camels are considered a major reservoir for MERS-CoV, their role in MERS-CoV transmission is not fully understood. Limited, non-sustained human-to-human transmission of MERS-CoV has been reported, mainly in health care settings *(263)*. Although MERS-CoV surveillance and case detection have been improved in the Region, case management, compliance with infection control measures in hospitals and contact follow-up remain major challenges *(265)*.

14.3 Rabies, brucellosis, Ebola and Rift Valley fever

Rabies has been controlled in most countries of the Americas and Western Europe; however it is still a public health challenge in the Region, where only three countries (Bahrain, Kuwait and United Arab Emirates) are rabies free *(266)*. Rabies is endemic in at least 14 countries of the Region, including Egypt, Islamic Republic of Iran, Iraq, Jordan, Lebanon, Morocco, Oman, occupied Palestinian territory (including East Jerusalem), Pakistan, Tunisia, Syrian Arab Republic, Saudi Arabia, Sudan and Yemen *(251, 266)*. During 2017 only, 239 578 cases of dog-bites in humans were reported from 11 countries and 52 cases of human rabies from nine countries, although both numbers are considerably underreported *(267)*. Most cases of rabies in the Region are dog-mediated (268); however, high positivity rates have been reported in foxes in Oman and wolves in Syrian Arab Republic *(269)*. The risk of rabies is reported to be higher in children, people from low socioeconomic backgrounds and those living in rural areas *(270)*. Very little information is available on the rabies situation in conflict-affected countries such as the occupied Palestinian territory (including East Jerusalem) and Syrian Arab Republic *(266)* and rabies cases have recently increased in some of their neighbouring countries as well *(271)*.

Brucellosis is also a major public health problem in the Region and *Brucella spp*. is widespread in many countries. Human cases have been reported from Egypt, Islamic Republic of Iran, Jordan, Saudi Arabia and Yemen; however, accurate estimates of human cases of brucellosis are lacking, largely because of underreporting and misdiagnosis *(272)*. Risk factors for human brucellosis in

the Region are the consumption of unpasteurized milk, direct contact with infected animals and occupational exposure.

Although Ebola is currently not circulating in the Region and no cases have been reported in the Region during the recent outbreaks in West Africa, the risk is very high. Ebola outbreaks have occurred in Sudan in 1976, 1979 and 2004, resulting in 284, 34 and 17 cases, respectively *(273, 274)*.

Finally, outbreaks of Rift Valley fever have been reported from Saudi Arabia, Sudan and Yemen *(275–277)*.

14.4 Malaria

A total of 346 million people are at risk of contracting malaria in the Region. In 2018, the Region reported 4.8 million presumed malaria cases, of which nearly 2 million were confirmed *(33)*. The estimated number of malaria-related deaths in 2021 was 13 400, of which 1725 were reported as confirmed cases, showing an increase compared with 2015 (1016 confirmed deaths) *(219)*. Six countries (Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen) account for more than 99% of estimated cases in the Region, with Sudan (54%), Pakistan (18%) and Yemen (16%) having the highest numbers of cases. *Plasmodium falciparum* is the most prevalent malaria parasite in the Region (74%), followed by *Plasmodium vivax* (26%) *(278)*.

The estimated incidence of malaria in the Region was 11.6 per 1000 population at risk in 2021, which was lower than the global rate (59.2), but higher than in other regions except for that of the African Region (229.4). The estimated malaria incidence in the Region declined between 2010 and 2015 but increased significantly in 2016 and then remained stable for the next five years, translating into a 38% increase between 2010 and 2021. The number of estimated malaria deaths shows a similar trend – in this case, an increase of 55% between 2010 and 2021. In terms of receiving global investment in malaria programmes, the Region stands last alongside the South-East Asia Region, receiving less than 5% of global investment in 2021 *(279)*.

The Region has made substantial progress towards malaria elimination and there are now 14 countries free of malaria in the Region. Morocco and United Arab Emirates were certified as malaria-free in 2007 and 2010, respectively, and Egypt and Oman are eligible for certification of malaria-free status with zero local reported cases for three years.

Islamic Republic of Iran and Saudi Arabia are close to eliminating malaria. The Islamic Republic of Iran reported zero indigenous cases between 2018 and 2021; however, in 2022, the country witnessed a significant increase in reported cases and local transmission. Saudi Arabia reported zero indigenous cases in 2021. The other endemic countries (Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen) are at the burden reduction stage *(33)*.

The two primary vector control methods are long-lasting insecticidal nets and the use of indoor residual spraying. In the Region, the operational coverage of long-lasting insecticidal nets has increased from 41 million protected people in 2015 to more than 69 million in 2019. In the Region, 6 million people were protected by indoor residual spraying in 2021, which shows an increase compared with 2015. The proportion of reported malaria cases confirmed either by microscopy or rapid diagnostic test was more than 49.7% in 2021, which represented a significant increase from the 18% confirmation rate reported in 2015; however, it is still far from the target of 90% confirmation of reported suspected malaria cases.

Preventing the reintroduction of malaria must be the focus of efforts in the malaria-free countries of the Region; however, there are barriers to maintaining this status in some countries, including existing conflicts that lead to massive population movement increasing the risk of the reintroduction of malaria, as happened in the Islamic Republic of Iran in 2022. Malaria-endemic countries also face challenges, including: weakening health systems; outbreaks of other vector-borne diseases (chikungunya and dengue), which puts further strain on limited human and financial resources; insufficient investment in malaria control programmes; the consequences of climate change, which have resulted in changes in malaria eco-epidemiology with an introduction of invasive vectors; and increasing levels and distribution of insecticide resistance and spread of deletion of histidine-rich protein genes (pfhrp2/3) in *Plasmodium falciparum* in the Horn of Africa countries, inducing some countries of the Region, that lead *Plasmodium falciparum* cases to be undetectable by HRP2-based malaria rapid diagnostic tests *(279)*. A prominent example in this context is the increasing number of malaria cases in Djibouti, which reached alarming levels in 2018–2019 due to the influx of immigrants from neighbouring countries, the presence of invasive *Anopheles stephensi*, pfhrp2/3 gene deletion and an inefficient control programme *(219)*.

The *Regional malaria action plan 2016–2020* was endorsed by the 62nd Regional Committee for the Eastern Mediterranean in 2015 and updated for 2022–2030. The Regional Office has also developed a regional plan of action (2019–2023) for the implementation of *WHO's Global Vector Control Response 2017–2030* to strengthen vector control through increased capacity, improved surveillance, better coordination and integrated action across sectors and diseases. All endemic countries have updated their national treatment policies and are providing antimalarials free-of-charge in public health facilities. The quality and coverage of the malaria surveillance system has increased in Afghanistan, Djibouti, Pakistan, Somalia and Sudan, following the adoption of the software platform DHIS2 for data collection, reporting, analysis and dissemination, and WHO continues to support malaria endemic countries to integrate the standard WHO malaria module into DHIS2 *(219, 280)*.

14.5 Dengue

Dengue is one of the fastest-growing mosquito-borne viral disease in the Region and it is endemic in at least eight of its countries. Large outbreaks of dengue have been reported from Afghanistan, Egypt, Pakistan, Sudan and Yemen *(45, 46)*. The outbreak also spread to some neighbouring countries, including Kuwait and Syrian Arab Republic. In recent years, outbreaks of suspected and confirmed dengue were recorded in Afghanistan (2019–2023), Djibouti (2011–2012), Egypt (2015, 2017), Oman (2014, 2018, 2022), Pakistan (2004–2005, 2008, 2010–2013, 2017–2023), Saudi Arabia (2004–2006, 2008–2009, 2023), Sudan (2005, 2010, 2013–2017, 2019–2022) and Yemen (2012, 2016–2019).

Pakistan may carry the highest burden of dengue in the Region. Since 2006, dengue epidemics have occurred every year across most cities in Pakistan and the disease has become a major health burden in the country. Understanding the epidemiology, timely detection and response to outbreaks and estimating the burden of dengue virus in the Region is an ongoing challenge because of inadequate human and vector surveillance, non-reporting of illness syndromes and poor capacity for laboratory detection of the virus in many countries *(281)*.

14.6 Chikungunya, yellow fever, West Nile virus disease, CCHF and leishmaniases

Apart from malaria and dengue, the Region is home to several arthropod-borne viruses (arboviruses), and mosquito-borne diseases are particularly expanding their range and emerging in new areas. Chikungunya outbreaks have been reported from Pakistan, Somalia, Sudan and Yemen *(247, 282)*. Like dengue, chikungunya is also spreading into new areas and the first ever outbreak in Sudan was reported in 2018 and resulted in more than 20 000 cases *(282)*.

In the Region, yellow fever outbreaks have only been reported from Sudan *(283)*; however, serological studies have shown evidence of the circulation of yellow fever in Djibouti and Somalia as well *(247, 284)*. According to a systematic review of 35 seroprevalence studies in the Region, specific antibodies for West Nile virus were detected in the human population of 11 countries: Djibouti, Egypt, Islamic Republic of Iran, Iraq, Jordan, Lebanon, Libya, Morocco, Pakistan, Sudan and Tunisia. West Nile virus RNA was also detected among patients in Islamic Republic of Iran, Pakistan and Tunisia *(285)*.

In addition to mosquitos, there are other vectors spreading diseases in the Region. The incidence of CCHF has increased in many countries of the Region, with sporadic human cases and outbreaks of CCHF being reported in the past decades from 10 out of 22 countries/territories in the Region *(286–288)*. CCHF is endemic in Afghanistan, Islamic Republic of Iran, Iraq and Pakistan and several outbreaks have occurred during the last few years, particularly in the border areas of these countries, due to a number of factors including population movement and animal trade. Despite regular reporting of CCHF cases and outbreaks, the true disease burden in the Region remains unclear due to limited awareness and reporting of suspected cases, and the different surveillance systems used for CCHF in the different countries of the Region. Other major challenges are delay in diagnosis and a lack of awareness among health care providers.

Leishmaniases are also widespread in the Region due to poor awareness and reporting, difficult case management and lack of effective control measures *(289)*. Most cases of leishmaniases are reported in disadvantaged communities in the Region *(290)*.

15 Antimicrobial resistance

AMR – the development of resistance to antimicrobials in microorganisms (bacteria, viruses, fungi and parasites) – has emerged as a major global issue with serious health and economic impacts. The first comprehensive global burden of AMR revealed that, in 2019, nearly 5 million deaths were associated with bacterial AMR and 1.25 million were directly attributable to it *(291)*. It is estimated that AMR could increase health care expenditure by up to US$ 1 trillion globally if its growth is not slowed immediately.

Misuse and overuse of antimicrobial medicines in human and animal health and in food production and inadequate IPC programmes are among the main factors contributing to the growth of AMR globally. An analysis by the Organisation for Economic Co-operation and Development has projected that between 2010 and 2030, antimicrobial consumption in food animal production will climb by 67% *(292)*. Many countries in the Region are intensifying livestock and fishery production, with associated increases in antibiotic use. While global attention to AMR has mainly focused on the human and animal health and agriculture sectors, there is now growing understanding and evidence that the environment also plays a crucial role in the development, transmission and spread of AMR *(293)*. Adopting a One Health approach will therefore be essential to address the alarming rise of AMR.

The risks associated with AMR in the Region are exacerbated by political instability, vulnerability to natural disasters, fragmented and/or destroyed health care infrastructure, an inadequate infrastructure to regulate the prescription and use of antibiotics; limited local data and evidence on the magnitude of the problem, inadequate awareness and understanding about the problem at all levels, absence of national surveillance systems to track AMR, poor IPC measures and a lack of access to WASH.

At policy level, the response to AMR in the Region dates to 2002, when the Regional Committee passed resolution EM/RC49/R.10 urging Member States to establish a national intersectoral task force, under Ministry of Health leadership, to contain AMR. The growing problem of AMR and the necessity of developing surveillance systems and ensuring the rational use of antimicrobials were also highlighted in resolution EM/RC60/R.1 in 2013. However, planning for concrete interventions is still required to provide a tangible response to the problem in the Region *(294)*.

In October 2017, the 64th session of the Regional Committee adopted resolution EM/RC64/R.5 on AMR in the Eastern Mediterranean Region. The resolution urged Member States to: a) develop and endorse national action plans for AMR and allocate adequate resources for their implementation; b) establish a multisectoral high-level coordinating mechanism; c) develop and enforce policies and regulations to prevent the purchase of antimicrobials without prescription; d) establish AMR surveillance at the national level and join the Global AMR Surveillance System (GLASS) to establish national IPC programmes in line with resolution EM/RC57/R.6; and f) establish antimicrobial stewardship programmes in the human and animal sectors.

In November 2022, the third High-Level Ministerial Conference on AMR was held in Muscat, Oman, and for the first time countries committed to three concrete targets to address AMR through what was called the Muscat Manifesto:

1. reduce the total amount of antimicrobials used in the agri-food system by at least 30–50% from the current level by 2030;
2. zero use of critically important antimicrobials in animal health; and
3. at least 60% of total antibiotic consumption in human health being categorized as ACCESS group antibiotics (based on the AWaRe classification).

In the Region, 17 countries (Bahrain, Egypt, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, occupied Palestinian territory (including East Jerusalem), Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates and Yemen) have endorsed the Muscat Manifesto. Increasing political commitment in the Region to tackle AMR is evident and Saudi Arabia hosted the next Ministerial Conference in 2024.

This political commitment and increasing awareness of AMR as a One Health priority issue parallels the growing interest and awareness of the need for One Health approaches across a range of threats and for the development of coordinated One Health and health security plans.

15.1 Development of national action plans on AMR

Much progress has been made in the Region since May 2015 when the World Health Assembly adopted the Global Action Plan on AMR and the Regional Committee adopted its resolution. All 22 countries/territories of the Region have developed national action plans on AMR. All national plans were developed in alignment with the Global Plan and reflect the political commitment of the countries. Most countries developed their national action plans in collaboration with all sectors (health, animal and environment) to reflect a One Health approach to AMR.

The level of implementation of these plans varies greatly among countries. A lack of funding, human resources and technical capacity as well as the challenges of coordinating and scaling up action across fragmented health sectors are among the key challenges in turning plans into action. Most national plans on AMR were developed between 2016 and 2019 and have expired or are about to expire. Countries are now looking into thoroughly reviewing their plans, identifying best practices and challenges in order to update them through an evidence-based, multisectoral process. This should lead to more focused and prioritized plans that are better embedded within health system plans and budgets and hence more likely to be implemented.

15.2 Surveillance of AMR, use and consumption

WHO launched GLASS in 2015 as the first worldwide platform for data sharing on AMR. GLASS enables countries to collect, analyse and share standardized and validated data on AMR. The system combines patient, laboratory and epidemiological data to illustrate the situation of AMR at the national level. In the Region, 19 countries reported AMR data and 10 countries submitted antimicrobial consumption data to GLASS in 2022. Several countries (Bahrain, Egypt, Islamic Republic of Iran, Iraq, Jordan, Oman, Pakistan, Saudi Arabia, Sudan and Tunisia) have established national coordinating centres and nominated a national reference laboratory for AMR surveillance.

Regional data reported to GLASS in 2021–2022 show an extremely high resistance profile of urgent threat pathogens. The proportion of bloodstream infections due to extended-spectrum beta-lactamases (ESBL) *E. coli* increased from 58.4% in 2017 to 66% in 2021. The proportion of

bloodstream infections due to methicillin-resistant *Staphylococcus aureus* (MRSA) likewise increased from 33.6% in 2017 to 53.3% in 2021. Alarmingly, these types of resistant organisms and infections are also resistant to the last resort drugs (e.g. vancomycin for MRSA infections and carbapenems for ESBL *E. coli*), which limits the options for the treatment of patients infected with these organisms.

Challenges identified for the implementation of national AMR surveillance include: lack of or limited microbiology laboratory infrastructure and capacities for detecting resistance at national and/or facility level; lack of qualified laboratory staff; lack of or limited external quality assurance programmes; and lack of necessary laboratory supplies. In countries affected by conflicts and crises, laboratory capacities are further weakened.

15.3 IPC programmes

Preventing infections is an essential component of limiting the development and spread of drug-resistant infections. The presence of the critical infrastructure to support prevention (WASH, immunization programmes) varies greatly across the Region. The COVID-19 pandemic demonstrated the urgent need to strengthen systems for IPC and catalysed major improvements in many countries. In addition to COVID-19, several countries in the Region have been facing different infectious disease outbreaks (mpox, Ebola and acute respiratory infections) and are putting measures in place to strengthen their emergency IPC preparedness and response.

Around 75% of countries in the Region have now developed national IPC guidelines, as well as established national IPC governance structures at the national and facility level. WHO is providing extensive capacity-building of health care workers in the Region through: 1) regional virtual IPC webinars; 2) a series of IPC training courses to address basic IPC standard measures and IPC in special high-risk wards in health care settings; 3) a newly developed regional IPC training package prototype; and 4) a training package focusing on IPC standard precautions, IPC practices in special areas of care, outbreak response, communication and leadership skills.

15.4 Antimicrobial stewardship

Levels of inappropriate antimicrobial use across the Region is high, with over-the-counter sales of all medication being widespread (regardless of whether legislation to restrict it is in place or not). Some countries, such as Saudi Arabia, have started to actively enforce a ban on over-the-counter sales of antimicrobials in community pharmacies. There is also widespread use of antibiotics categorized as WATCH in WHO's AWaRe classification across the Region. This is particularly concerning as they have higher resistance potential and most of them are classified as the highest priority agents among the critically important antimicrobials for human medicine.

Many challenges exist in the Region that hinder the successful implementation of such antimicrobial stewardship programmes, including a lack of or limited numbers of the infectious disease consultants and/or clinical pharmacists essential for managing programmes; lack of technical capacities at the national (health ministry) level to coordinate programmes; and lack of information technology capacity to monitor the impact of activities.

Hospitals in many countries of the Region are developing antimicrobial stewardship programmes that encourage more appropriate and evidence-based use of medicines but more needs to be done in primary and secondary care. WHO recently launched its AWaRe antibiotic book and

associated application on the syndromic management of common infectious diseases in adults and children *(295)*. Rolling out and implementing its application over the upcoming years will be a priority for countries in the Region.

15.5 Education and awareness

Efforts are being made to increase awareness of AMR and appropriate use of antimicrobials in the Region through World AMR Awareness Week. The global event is celebrated annually from 18 to 24 November and aims to raise awareness of AMR and encourage best practices among the general public, health care workers and policy-makers to avoid the further emergence and spread of drug-resistant infections. WHO usually carries out a regional World AMR Awareness Week campaign and many countries in the Region have very active programmes of community and professional engagement around the event. Activities during the Week include social media messages, press conferences, media briefings, in-person events and outreach to schools, universities and health care facilities, Professional education is also vital, and WHO is working in countries, such as Egypt and Sudan, to strengthen the training and education of health professionals.

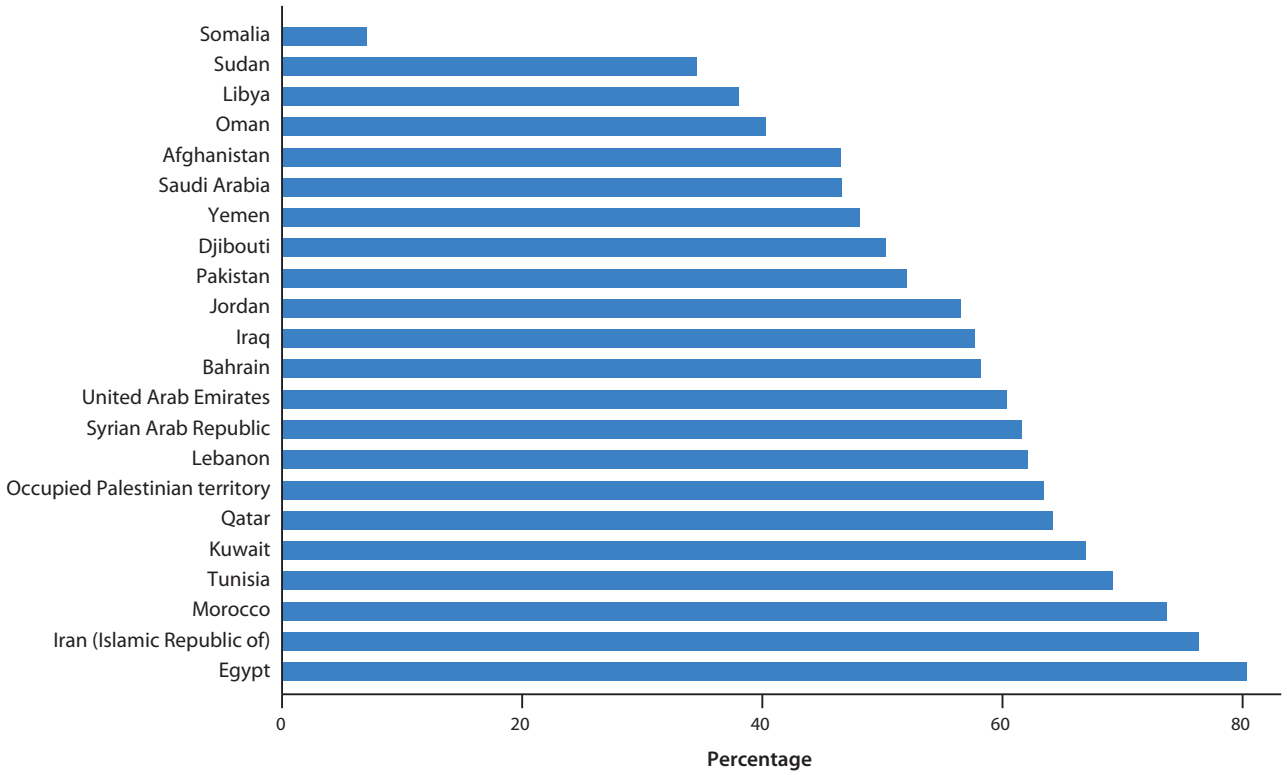
16 Promoting health across the life course

16.1 Sexual and reproductive health and rights

16.1.1 Fertility and infertility

Family planning, safe pregnancy, childbirth, postpartum care and prevention and control of STIs, including HIV/AIDS, are among the basic sexual and reproductive health rights. The total fertility rate per woman varies between countries, with the highest value of 6.4 children found in Somalia and the lowest of 1.5 in Kuwait (Fig. 29). The four countries in the Region with the lowest replacement rate are Qatar (1.6), Lebanon (1.8), Saudi Arabia (1.9) and Bahrain (2.0). In the Eastern Mediterranean Region, the proportion of women of reproductive age (15–49 years) who have their need for family planning satisfied with modern methods ranges from 33.3% in Sudan to 81% in Egypt (Fig. 29). The average rate for this indicator is lower for the Region than the global average, and is the second lowest among all WHO regions.

Fig. 29. **Women of reproductive age (15–49 years) who have their need for family planning satisfied with modern methods (%), 2021**



Source: WHO (2022) (80)

The World Health Organization defines infertility as a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse. Infertility may occur due to male factors, female factors, a combination of male and female factors, or may be unexplained. For both women and men, however, lifestyle factors such as smoking, excessive alcohol intake and obesity have been associated with higher chances of infertility. The WHO report on infertility prevalence estimates launched in April 2023 showed that approximately one in six people have experienced infertility at some stage in their lives. Globally, the lifetime prevalence of infertility is estimated to be 17.5% and the period prevalence of infertility is estimated to be 12.6%; these estimates for the WHO Eastern Mediterranean Region (10.7% and 10.0, respectively), are lower than global estimates and are the lowest compared with other WHO regions *(296)*.

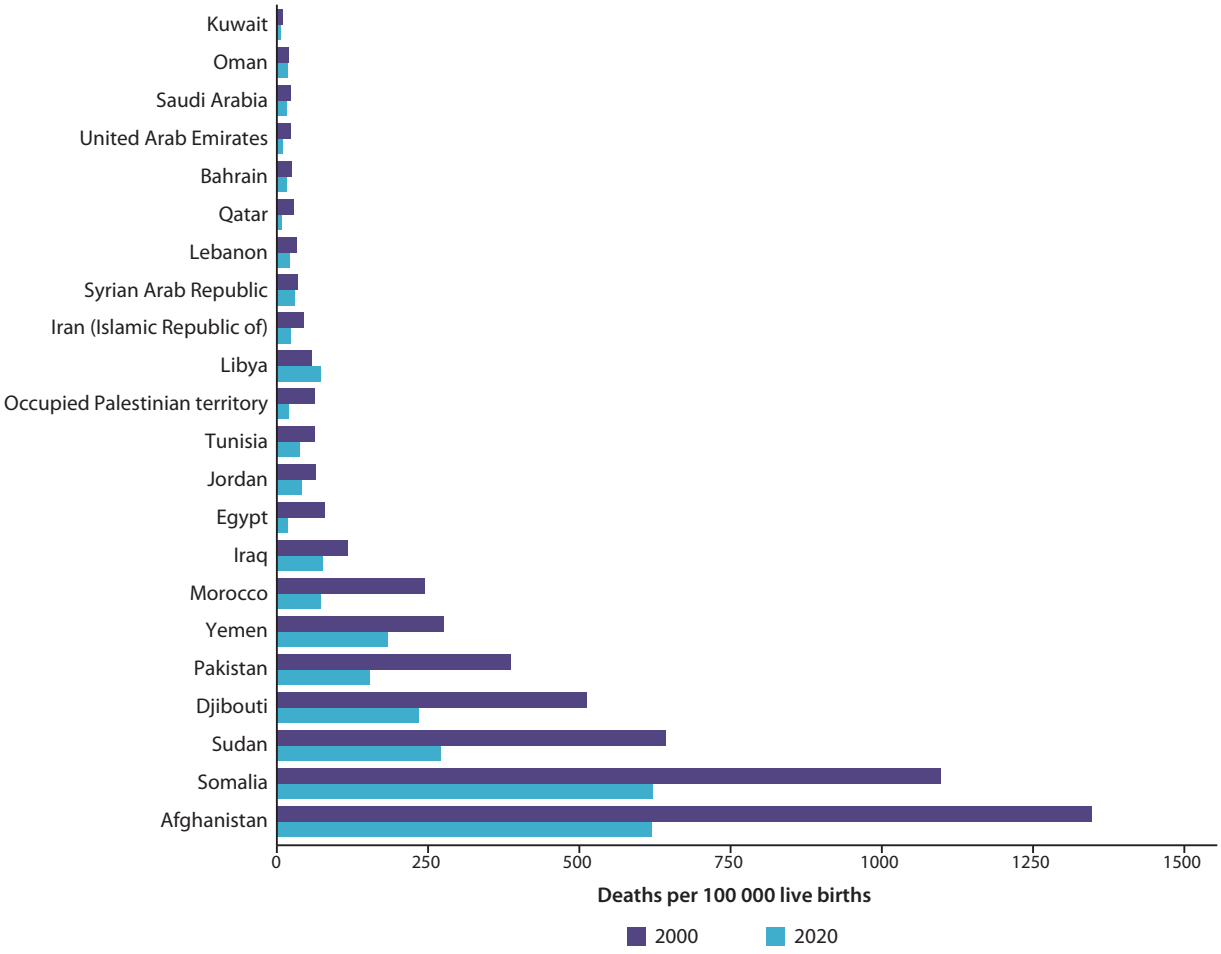
Addressing infertility is an important component of sexual and reproductive health and rights and central to achieving the health and gender equality targets of the 2030 SDGs. It requires addressing the challenges observed in relation to the availability, accessibility and quality of interventions to prevent, diagnose and treat infertility. Governments are encouraged to develop evidence-based policies and practices, as part of their efforts to strengthen health systems to help people fulfil their fertility intentions and achieve their desired family size. WHO provides support to countries to adopt policies and legislation on assisted reproductive technologies to manage infertility care at the country level. Five countries in the Region (Iraq, Lebanon, Morocco, Oman and United Arab Emirates) have developed national policies and regulation to manage infertility *(297)*.

16.1.2 Maternal and perinatal mortality

The maternal mortality ratio was 178 deaths per 100 000 live births in the Region in 2020. The regional maternal mortality ratio is less than the global ratio of 223, although it is the second highest among WHO regions. Somalia and Afghanistan have the highest maternal mortality ratio in the Region at 621 and 620, respectively. The maternal mortality ratio is under 20 in all GCC countries and Islamic Republic of Iran. Maternal haemorrhage, eclampsia, sepsis and obstructed labour have been the leading cause of maternal mortality since 1990, both globally and regionally.

Between 2000 and 2020, the maternal mortality ratio declined by 50.3% in the Region and progress in some countries has been remarkable (Fig. 30) *(298, 299)*. Egypt is ranked among the 10 top countries globally for reduction in maternal mortality since 2000 (79%), from 79 to 17 maternal deaths per 100 000 live births. However, at the end of 2020, six out of 22 countries/territories in the Region had a maternal mortality ratio greater than the global target for 2030, 70 per 100 000 live births *(298)*. As more than half the countries in the Region achieved this target by 2010, ending preventable maternal mortality requires achieving equity in maternal mortality for vulnerable populations at the subnational level. Ending preventable maternal mortality requires improving metrics, measurement and data quality to ensure that all maternal and newborn deaths are counted by allocating adequate resources to address the objectives of the global strategy framework.

Fig. 30. Maternal mortality in the Region, 2000 and 2020



Source: WHO (2023) (2)

Implementing specific sexual and reproductive and health interventions using the WHO updated recommendations and guidelines for family planning, antenatal care for positive pregnancy experiences, skilled birth attendance, emergency obstetric care, maternal and newborn care including rational use of caesarean section, and postnatal and postabortion care have contributed to reducing negative pregnancy outcomes in these countries. In the Region, 21 countries/territories out of 22 have shown a reduction maternal mortality estimates from 2000 to 2020, including nine countries that have reduced maternal mortality by more than 50%. One country, Libya, has recorded an increase in maternal mortality, from 57 maternal deaths per 100 000 live births in 2000 to 72 maternal deaths in 2020 *(298)*.

WHO envisions a world where every pregnant woman and newborn receives quality care throughout pregnancy, childbirth and the postnatal period. Within the continuum of reproductive health care, antenatal care provides a platform for important health care functions, including health promotion, screening and diagnosis and disease prevention. By implementing timely and appropriate evidence-based practices, antenatal care can save lives. Crucially, antenatal care also provides the opportunity to communicate with and support women, families and communities at a critical time in the course of a woman's life.

WHO defines a positive pregnancy experience as maintaining physical and sociocultural normality, maintaining a healthy pregnancy for mother and baby (including preventing or treating risks, illness and death), having an effective transition to positive labour and birth, and achieving positive motherhood (including maternal self-esteem, competence and autonomy). WHO recommends an antenatal care model with a minimum of eight contacts to reduce perinatal mortality and improve women's experience of care; while antenatal care coverage (1+ visits) varies across the Region, between 100% in Bahrain and United Arab Emirates and 63.8% in Afghanistan. Antenatal care coverage (4+ visits) ranges between 99.1% in Bahrain and 20.9% in Afghanistan. Most countries in the Region are in the process of adopting the eight contacts model into their routine practice. In the Region, coverage of births attended by skilled health personnel in 2017–2021 is above 99% in 10 countries and above 90% in another two. However, it is less than 60% in three countries (Afghanistan, Somalia and Yemen) *(80)*.

Caesarean section is a surgical procedure that can effectively prevent maternal and newborn mortality when used for medically indicated reasons. In 1985, WHO aimed at decreasing disparity among nations in the number of caesarean sections and set an optimal rate of 10–15% to optimize maternal and child health. The average rate of caesarean section in the Eastern Mediterranean Region is 21% (range: 2% in Somalia to 52% in Egypt). Fourteen countries (Bahrain, Egypt, Iraq, Islamic Republic of Iran, Jordan, Lebanon, Libya, Morocco, Oman, occupied Palestinian territory (including East Jerusalem), Syrian Arab Republic, Saudi Arabia, Tunisia and United Arab Emirates) have caesarean section rates above the WHO-recommended rate of 10–15% *(296)*.

WHO has adopted the Robson classification system as a standard for assessing, monitoring and comparing caesarean rates within and between health care facilities *(300)*. It serves as a useful facility-based standard and reliable tool that can help identify and analyse groups of women who contribute the most and least to overall caesarean section rates, compare practices and consider changes to optimize the use of caesarean section. Five countries in the Region (Egypt, Islamic Republic of Iran, Lebanon, Morocco and Pakistan) have adopted this 10-group classification system at the programmatic and health facility level and have started compiling data for comparative analysis.

16.1.4 Female genital mutilation

Female genital mutilation (FGM) is unacceptable from both a human rights and a health perspective. Short-term health consequences for women and girls who have suffered FGM include severe bleeding and urination problems, while long-term problems can include cysts, infections, complications in childbirth and increased risk of newborn death. Mental health problems are another major issue for young girls experiencing FGM *(301)*. FGM is still practised in some countries in the Region (Djibouti, Egypt, Somalia, Sudan and Yemen and in the Kurdistan region of Iraq (76, 302). The practice is near universal among married women of reproductive age in Egypt (92.0%) and Sudan (86.6%); in Sudan, 76% of those subjected to it had the procedure performed by a health care worker. Despite laws prohibiting the procedures, evidence indicates it remains common; 99% of women aged 15–29 in Somalia and 31% of girls aged 0–14 in Sudan have experienced FGM.

A WHO online FGM resource kit for the health sector is available to support the health sector in both preventing FGM and treating its complications *(303)*. WHO recommends the integration of FGM response into existing sexual and reproductive health and rights programmes to ensure sustainability, integration and institutionalization. The main achievements at the regional level include strengthening governance (e.g. establishing a national law against FGM and designating a FGM focal point in the Ministry of Health and Population in Egypt), integrating prevention of FGM

in pre-service training (in Somalia and Yemen), building national capacity (e.g. conducting training of trainers using a national training package on FGM prevention based on national guidelines in Egypt, strengthening capacities of the health professional association including developing an accountability framework in Sudan) and raising community awareness (e.g. in Somalia and Yemen).

16.1.5 Improving sexual and reproductive health and rights

WHO tools and standards are available for improving the quality of care for sexual and reproductive health in the Region, including recommendations on antenatal care for a positive pregnancy experience, a labour care guide, 10-group classification system for caesarean section, the standards for improving quality of maternal and newborn care in health facilities, the medical eligibility criteria wheel for contraceptive use and self-care interventions for sexual and reproductive health *(300, 304–307)*. Many countries of the Region are working on the adaptation and adoption of WHO updated guidelines to their local context, similar to efforts in Islamic Republic of Iran *(33)*. WHO provides technical support and guidance to strengthen sexual and reproductive health policies, programmes and practice for better girls', women's and couples' health in Afghanistan, Djibouti, Egypt, Islamic Republic of Iran, Iraq, Morocco, occupied Palestinian territory, Pakistan, Somalia, Sudan, Tunisia and Yemen. The main objective is to integrate evidence-based guidance on comprehensive sexual and reproductive health and rights into national policies, programmes and practices to accelerate the reduction of maternal mortality and morbidity due to preventable causes and unwanted pregnancies and ensure quality sexual and reproductive health services towards achieving the 2030 SDG targets *(308)*. A project has also been initiated to improve family planning practices in emergency situations in refugee camps in Lebanon, based on WHO practice recommendations on safe and effective contraceptive use *(34)*.

The main challenges to improving sexual and reproductive health and rights in the Region are: lack of national policies supporting the provision of sexual and reproductive health care; fragmented service delivery mechanisms; poor accessibility to care services among the population groups who need them most; poor quality of care; social and cultural barriers; lack of national policies fulfilling women's and girls' rights to achieving positive sexual and reproductive health outcomes; and instabilities and conflicts that have made the already inadequate infrastructure for sexual and reproductive health more fragile *(309)*.

16.2 The health of newborns and children under 5

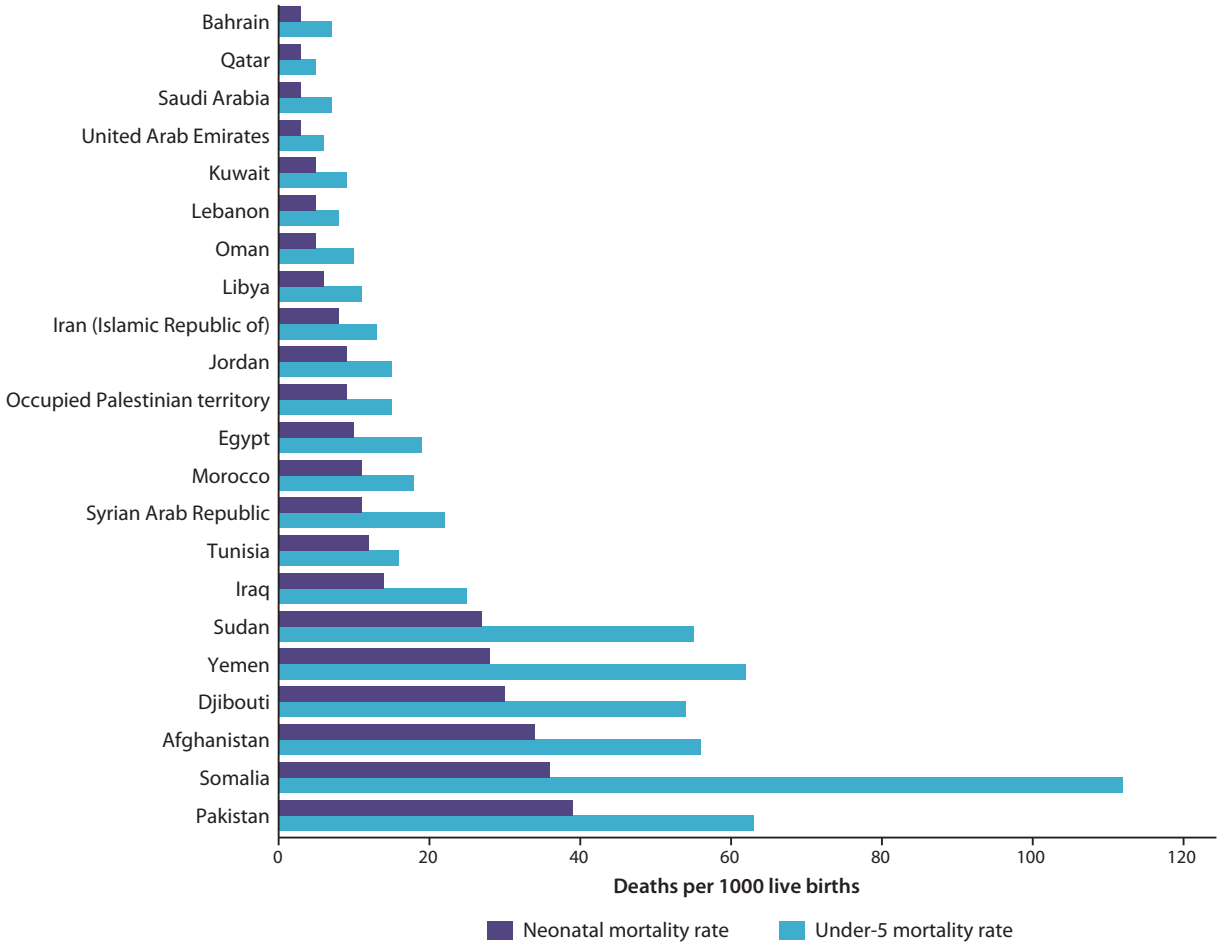
Children aged under-5 years old represent 12% of the total population of the Eastern Mediterranean Region. High newborn and young child mortality rates in the Region indicate that the coverage of health services for this age group is inadequate. In 2021, an estimated 831 000 children in the Region died before reaching their fifth birthday. The mortality rate among children aged under 5 years is higher in the Region than the global rate, and is the second highest among WHO regions after the African Region. In 2021, more than 469 000 newborns died in the Region, accounting for more than 53% of all deaths in children under 5 years. The neonatal mortality rate in the Region is higher than the global rate and higher than in other WHO regions except for the African Region. Improvements in child mortality rates vary substantially between countries; however, only limited information is available regarding subnational variations, which would be critical information for public health action to save the most lives *(310)*.

About 97% of all under-5 mortality in the Region occurs in only nine countries. In 2021, the highest under-5 mortality rate was in Somalia (112 deaths per 1000 live births) and the lowest in Qatar

(5 deaths per 1000 live births) (Fig. 31). The overall under-5 mortality rate fell by 56% in the Region between 1990 and 2021. During the same period, the neonatal mortality rate declined by 43% in the Region. In 2021, the highest neonatal mortality rate was in Pakistan (39 deaths per 1000 live births), followed by Somalia (36 per 1000 live births), Afghanistan (34 per 1000 live births), Djibouti (30 per 1000 live births), Yemen (28 per 1000 live births), Sudan (27 per 1000 live births) and Iraq (14 per 1000 live births). The lowest were in Bahrain, Qatar, Saudi Arabia and United Arab Emirates (3 deaths per 1000 live births) (Fig. 31). Infant mortality rates were highest in Somalia (71 deaths per 1000 live births) and lowest in Qatar and United Arab Emirates (6 deaths per 1000 live births).

In terms of SDG targets, by the end of 2021, six out of 22 countries/territories in the Region still had an under-5 mortality rate higher than the global target (25 deaths per 1000 live births) for 2030, while seven countries had a neonatal mortality rate higher than the global target (12 deaths per 1000 live births) for 2030. A key challenge to lowering the neonatal mortality rate is the high prevalence of home deliveries; based on available data, the proportion of births attended by skilled health personnel is particularly low in Afghanistan, Somalia and Sudan *(80)*. At the same time, even when babies are born in hospital, services are not always based on evidence-based standards and health care workers are often not skilled enough to provide the quality services needed.

Fig. 31. Neonatal and under-5 mortality rates (deaths per 1000 live births), 2021



Source: IGME (2022)(311)

In countries of the Region with low under-5 mortality rates, the main causes of death are prematurity and congenital anomalies; in countries with high under-5 mortality, pneumonia, diarrhoea and birth asphyxia are still the main causes *(26)*. Prematurity is the leading cause of neonatal mortality in the Region, with one in five deaths among children aged under-5 years due to preterm labour (21%). Congenital abnormalities (birth defects) are of increasing importance in the care of newborns. This is especially relevant in the Region, where the high rate of consanguineous marriages constitutes a major risk factor for congenital abnormalities. Results of a situational analysis of the whole Region suggest fewer than half of countries conduct surveillance on birth defects, which leads to inadequate data required for prevention, service planning and family support for the management of birth defects *(312)*.

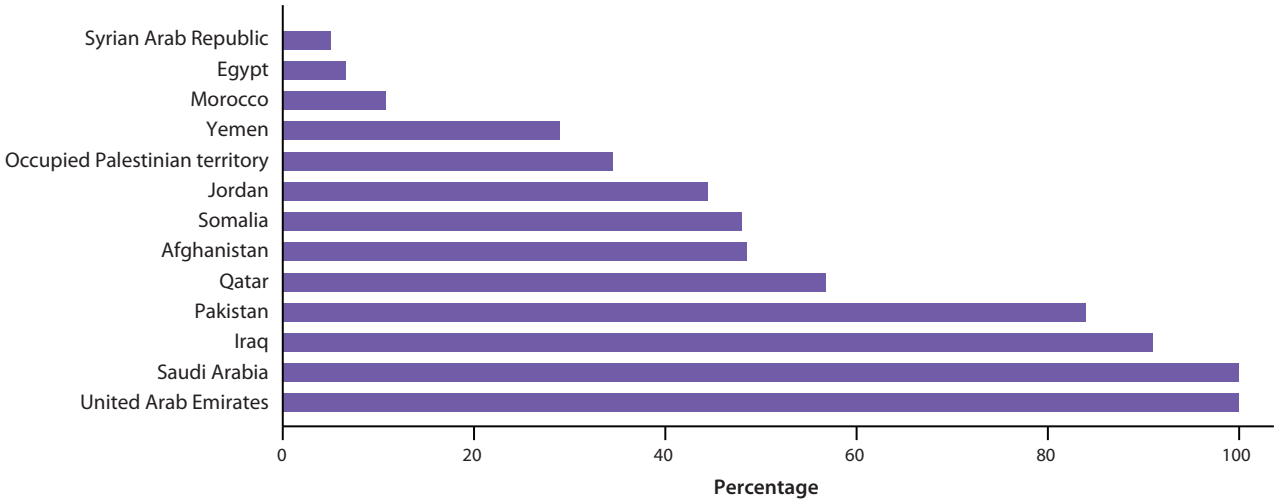
Low birth weight is associated with short-term health problems and consequences for health and well-being later in life, including an increased risk of chronic diseases. In the Region, the prevalence of low birth weight is similar in high- and middle-income countries, and highest in Pakistan. Countries are off-track to meet the global targets of a 30% reduction in the prevalence of low birth weight babies between 2012 and 2030 *(313)*. WHO-recommended quality antenatal care includes interventions to reduce the incidence of low birth weight. Implementation of cost–effective antenatal interventions such as micronutrient supplements, prevention of malaria in pregnancy and delayed cord clamping, among others, could help reduce the prevalence of low birthweight and achieve the SDG target for neonatal mortality *(314)*.

Despite high rates of under-5 and neonatal mortality in some countries of the Region, more than 60% of countries have been successful in their efforts to reduce these rates in line with the global targets for 2030. Evidence-based strategies that have contributed to these achievements in countries include: appropriate home care and timely treatment of complications for newborns; integrated management of childhood illness for all children under-5 years of age; implementation of the Expanded Programme on Immunization; and promotion of infant and young child feeding. Integrated management of childhood illness is the main strategy for child health in PHC settings in 16 countries, with large variations in coverage ranging from 29% to 100% *(26)*. Additionally, measles vaccination saved more than 2.5 million lives between 2000 and 2017. However, as reflected above, the Region is still behind most other WHO regions, with subnational disparities within countries at different levels of socioeconomic development *(26)*.

Nevertheless, a key factor contributing to high neonatal and child mortality rates in the Region is the low coverage of essential interventions, such as attendance of skilled health professionals during delivery, which puts a large number of newborns at risk of early neonatal death. Coverage of evidence-based interventions for the prevention and treatment of infectious diseases, such as pneumonia and diarrhoea, varies across countries of the Region. Access to water and sanitation services is low in many countries of the Region, which increases the risk of diarrhoea and other waterborne diseases. Care seeking for pneumonia varies from 21% in Somalia to 71% in Pakistan, while coverage of antibiotic treatment for pneumonia varies from 14% to 86.9% *(315)*. About two thirds of children are born in countries (mostly middle-income) that do not offer pneumococcal conjugate or rotavirus vaccines. The coverage of oral rehydration therapy for children suffering from diarrhoea is less than 60% in a majority of reporting countries (Fig. 32). WHO and partners need to increase awareness of families and communities on oral rehydration therapy. Furthermore, accessibility and affordability of oral rehydration therapy should be enhanced with good quality of care provided by trained health workers.

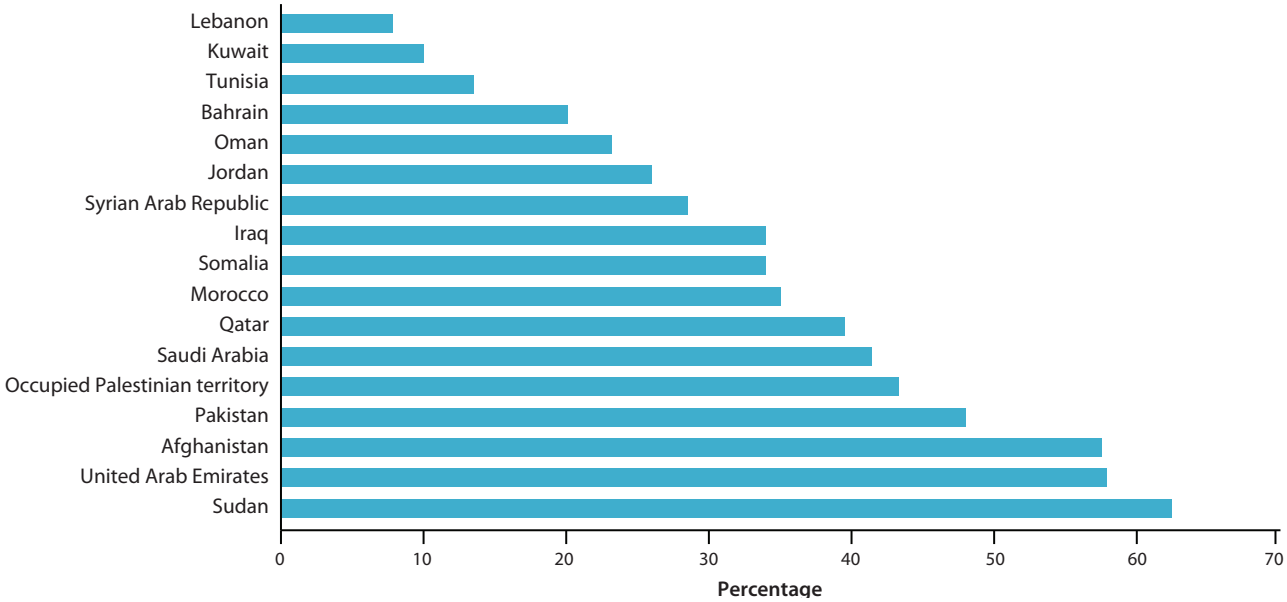
Globally, suboptimal breastfeeding contributes to 11.6% of mortality in children under 5. The average rate of exclusive breastfeeding (0–5 months) is 37.8% in the Region, which is approaching the global rate of 38% *(316)*. Four countries of the Region (Afghanistan, Libya, Sudan and United Arab Emirates) have reached the global target for 2025 of at least 50% for exclusive breastfeeding in the first 6 months of life, and two countries (Islamic Republic of Iran and Pakistan) are very close to achieving the target (Fig. 33). This means that more than 75% of countries in the Region, regardless of their income level, are not meeting the target and need to enhance their efforts towards an evidence-informed policy and programme response.

Fig. 32. Children under 5 (%) with diarrhoea treated with oral rehydration therapy, 2016–2021



Source: WHO (2022) (80)

Fig. 33. Exclusive breastfeeding (%) 0–5 months of age, 2017–2021



Source: WHO (2022) (80)

To address the high levels of child and maternal mortality, a regional initiative on saving the lives of mothers and children was announced in the 2013 Dubai Declaration to accelerate progress towards achieving Millennium Development Goals 4 and 5 *(317)*. Following this initiative, maternal and child health acceleration plans were developed and implemented in countries with a high burden of maternal and child deaths. During the same year, the Regional Office actively contributed to the development of the *Global Action plan for prevention and control of pneumonia and diarrhoea*, to reduce the death toll from these two conditions, which account for about a quarter of child deaths globally *(318)*.

The *Newborn, child and adolescent health implementation framework for the Eastern Mediterranean Region, 2019–2023*, is the road map developed by the Regional Office to guide the development or update of countries' national strategic plans for newborn, child and adolescent health and development, in line with WHO's five-year plan and Vision 2023. The framework was endorsed by the 66th session of the Regional Committee in 2019 (resolution EM/RC66/R.2). The framework aims at an integrated and multisectoral approach, considering the fact that almost half of deaths among children aged under-5 years are preventable through interventions outside the health sector, such as education and water and sanitation *(26)*.

16.3 Adolescent health, fertility and development

The child and adolescent mortality rates in the Region are the second highest among WHO regions, after the African Region. In general, the health needs of children aged from 5 to 9 years have been overlooked. For the Region as a whole, the mortality rate in children aged from 5–9 years was 3.37 deaths per 1000 children aged five in 2021 compared with 5.59 deaths per 1000 children aged five in 2000. The Region has the slowest rate of reduction in mortality in this age group between 2000 and 2021 at only 40%, compared with 2% in the African Region, 77% in the South-East Asia Region and 65% in the European Region. The leading causes of death among children aged between 5 and 9 years are collective violence and legal intervention, followed by road traffic injuries *(7)*.

Adolescents (10–19 years) represent 20% of the Region's population. Adolescence is a key developmental stage for ensuring health across the life course. As one fifth of the population of the Region is an adolescent, their specific health and development needs should be addressed in health policy-making and health system planning. For young adolescents (10–14 years), the mortality rate in the Region decreased between 2000 and 2020, from 3.86 deaths per 1000 children aged 10 in 2000 to 2.81 deaths per children aged 10 in 2020. The probability of dying among children aged 5–14 years in the Region is 6 per 1000 children aged five in 2021, which is the second highest rate after the African Region *(7)*. Collective violence and legal interventions are the leading causes of mortality among adolescents in any age group. The leading causes of years lived with disability among adolescents in the Region are mental illnesses, substance use and nutritional deficiencies (particularly iron deficiency). In 2017, half of the people in need of humanitarian assistance in emergency settings were children and adolescents aged under 18 years *(26)*.

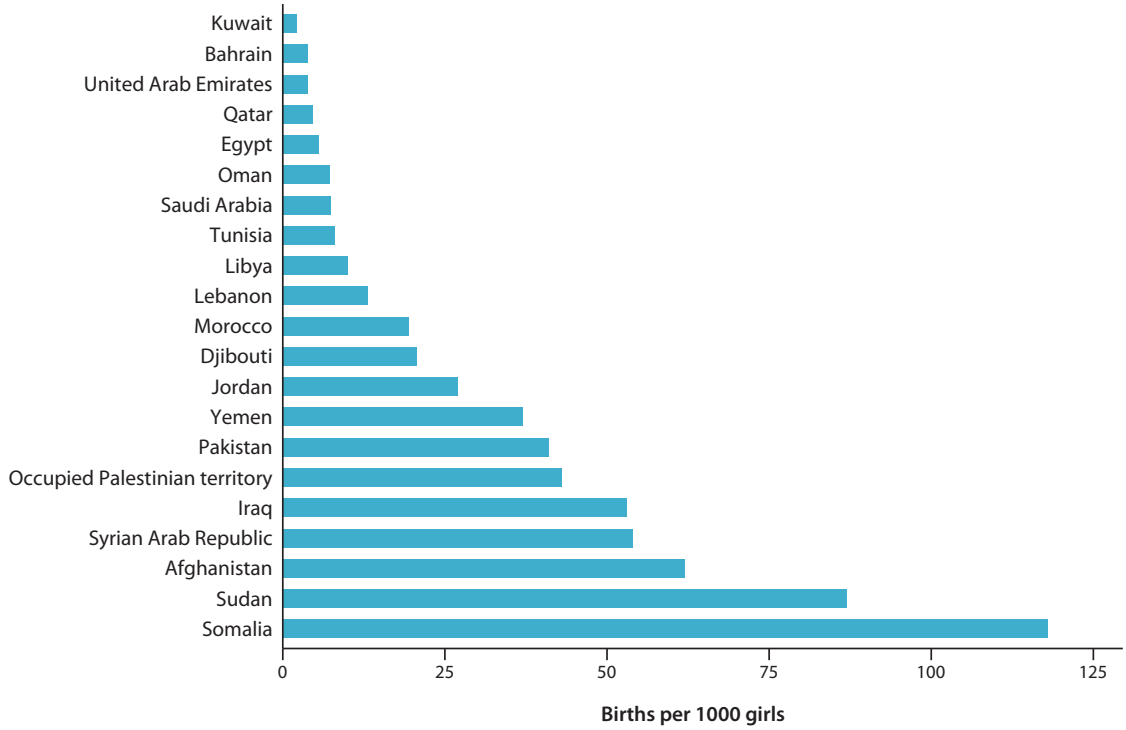
In addition to general health risks in this phase of development, young people in many countries of the Region are exposed to additional health hazards because of conflicts and civil unrest. The impact of these instabilities on young people includes the direct physical effects of violence and increasing rates of mortality and injuries, as well as longer term effects such as damage to mental health and sexual and reproductive health. Other health risks among young people include their

vulnerability to substance use, overweight and physical inactivity. Addressing these NCD risk factors would improve the health and social function of adolescents both at present and during the life course.

Adolescent pregnancies have serious health, social and economic consequences. The adolescent fertility rate (births per 1000 girls aged 15–19 years) ranges from zero in Kuwait to 87 in Sudan (Fig. 34). The average adolescent fertility rate for the Region is 44.5, which is higher than the global average and the third highest among WHO regions. Huge variations are also seen within countries based on key determinants of health including place of residence (urban–rural), level of education and wealth; in Somalia and Sudan, the fertility rate is nearly four times higher among women with only primary education compared with those with secondary and above *(39)*. Child marriage, limited autonomy in decision-making about delaying childbearing and contraceptive use, and child sexual abuse are among several factors that contribute to adolescent pregnancies globally. Thus, strategies should focus not only on preventing adolescent pregnancy but also on improving access to and quality of maternal care for pregnant and parenting adolescents *(319)*.

Unhealthy lifestyles and risky behaviours are significantly prevalent in the Region. The reported prevalence of tobacco use among school children aged 13–15 in countries of the Region varies significantly; however, in the highest reporting countries, the prevalence is more than 43% among boys and 35% among girls. Physical inactivity is a key determinant of future health among school children and adolescents. Yet, adolescents in the Region are extremely inactive with the majority of countries reporting more than 80% insufficient physical activity among adolescents aged 13–18 years.

Fig. 34. Adolescent fertility rate per 1000 girls aged 15–19 years, 2016–2021



Source: WHO (2022) (80)

Several global and regional strategies, as well as operational guides, have been developed to support countries in their efforts for planning, monitoring and evaluating child and adolescent health. The *Global Strategy for Women's, Children's and Adolescents' Health (2016–2030)* sets targets based on the SDGs to address all communities, including those affected by emergencies, with the aim of leaving no one behind *(320)*. In 2017, WHO, in collaboration with six other UN and international agencies, developed the *Global Accelerated Action for the Health of Adolescents (AA-HA!)* guidance to support country implementation, based on the *Global Strategy for Women's, Children's and Adolescents' Health (319)*. In 2017, the Regional Committee adopted resolution EM/RC64/R.4 to operationalize the adolescent health component of the Global Strategy. The resolution urged countries to develop and/or update national adolescent health action plans using the AA-HA! implementation guidance *(321)*. Sudan was the first country globally to apply AA-HA! in developing a country strategic plan for adolescent health and development; additional countries developed their national strategic plans for adolescent health or incorporated an adolescent health component in their reproductive, maternal, newborn, child and adolescent health strategic plans.

Healthy children and adolescents have a better chance to learn and advance in the education system. Evidence has shown that education and health are inseparable. Nutrition status, acute infections and chronic illnesses affect cognitive performance and school results. Health conditions may result in absence from and eventually dropping out of school. Physical environment and structures are extremely important to facilitate the learning process and to promote the health of students. Water and sanitation facilities at school are of utmost importance, particularly for girls. Children need safe schools where they have no need to fear violence, maltreatment or neglect. Moreover, children who complete more years of schooling are in a better position to enjoy better health and have access to more opportunities in life.

In 2018, WHO and the United Nations Educational, Scientific and Cultural Organization (UNESCO) announced an initiative to Make Every School a Health Promoting School, through developing global standards and indicators for health-promoting schools (HPS) and supporting their implementation. The Global Standards for HPS and systems, launched in 2021, provide a resource for education systems to foster health and well-being through stronger governance. As part of the HPS package, WHO published a comprehensive guide on school health services. In 2022, ministries of education and ministries of health from 17 countries in the Eastern Mediterranean Region committed to move forward with the agenda of HPS, including strengthening school health services.

16.4 Healthy ageing and health for older people

The average life expectancy in countries of the Region has increased to 69.7 years in 2019 *(7)*, compared with 69.1 years in 2016 *(54)*. However, life expectancy varies considerably across the Region. Similarly to the rest of the world, the population of older people (60 years and older) is increasing in the Region. In the year 2000, older people comprised 5.8% of the population in the Region, while in 2017, the proportion of older people reached nearly 7% of the total population. It is projected that older people will make up nearly 15% of the population in 2050 *(322)* and that 80% of them will be living in low- and middle-income countries *(323)*.

In 2015, WHO published the first world report on ageing and health, which reflected a new conceptual model of healthy ageing that focuses on functional ability for older people to live

independently rather than only in the absence of disease *(324)*. In 2020, the UN General Assembly adopted a resolution for the UN Decade of Healthy Ageing, 2021–2030. It calls for participation, engagement and collaboration, to achieve measurable improvements in older people's lives each year for the next 10 years, with WHO serving as the Secretariat and leading its implementation in collaboration with other UN organizations.

The Decade of Healthy Ageing 2021–2030 aims to address four action areas: age-friendly environments, combating ageism, integrated care and long-term care. Action needs to be informed by evidence and aligned with older persons' expectations and with priorities that are negotiated with stakeholders and resourced by decision-makers. The WHO baseline report for this decade of action provides guidance on needed actions and policy changes for healthy ageing and promoting health for older people using multisectoral approaches. Recognizing that what is measured is addressed, the report also calls on UN partners to produce status reports to support WHO's mandate to track progress *(325)*.

Creating age-friendly environments, cities and communities that promote health and support for people experiencing loss of capacity requires intersectoral collaboration and coordination. The age-friendly cities initiative being implemented in Sharjah, United Arab Emirates, and Isfahan, in the Islamic Republic of Iran, offer successful models in creating an age-friendly environment for a city's senior citizens. Joint efforts, networking and coordination with key partners is vital to overcome the limited available resources to support healthy ageing programmes in countries of the Region, especially those in emergency situations *(33)*.

The WHO guidelines for integrated care for older people (ICOPE) provide guidance for person-centred assessment and pathways in primary care *(326)*. ICOPE assists with setting person-centred goals, screening for loss in a range of domains of intrinsic capacity and assessing health and social care needs to develop a personalized care plan. The care plan may include multiple interventions to manage declines in intrinsic capacity, provide social care and support, support self-management and support caregivers. The domains of intrinsic capacity include cognitive decline, limited mobility, malnutrition, visual impairment, hearing loss and depressive symptoms. These guidelines have been used in the Region to conduct numerous training-the-trainer courses to build core teams at the national level and supporting community health and care workers to put the recommendations outlined in the ICOPE guidelines into practice. Recently, Hammad Corporation, Qatar, was designated a WHO Collaborating Centre for Healthy Ageing and Dementia.

In the Eastern Mediterranean Region, older adults are highly respected within families and family members are discouraged from institutionalizing them; consequently, care facilities for older adults are not well developed. Providing long-term care for severely disabled older family members can put considerable mental and economic strain on families. With the increase in life expectancy and the increased population of older people, dementia has become one of the most prevalent public health issues among this age group. Diagnosis of dementia in the Region faces major challenges due to language barriers in using assessment tools (which mostly come from western countries), lack of verified translations of assessment instruments and use of assessment tools that are culturally inappropriate. These barriers, together with inadequate numbers of skilled professionals in the field of geriatrics and lack of care facilities specialized for older people, can delay the diagnosis of dementia in the Region. Additionally, as care is usually provided within the family system, the family carer's own knowledge and skills about dementia play a major role in providing services to older people.

The estimated prevalence of dementia in people aged 60 years and older and 65 and older is 4.17% and 5.9%, respectively, in the Region; in other words about 2.3 million people are living with dementia. This is expected to rise to 4.4 million by 2030 *(323)*. The costs of dementia per annum in countries of the Region were estimated to be US$ 31.2 billion in 2019, and costs per capita were US$ 13 428, 91.8% being informal care costs borne by families rather than formal medical or social care costs *(323)*. Given the rising health, economic and social costs of dementia, it is imperative to scale up action on dementia through the development and implementation of national plans for dementia based on the seven domains of the global action plan *(126)*.

17 Health system governance

Health system governance covers a wide range of stewardship and regulatory functions to achieve national health policy objectives *(327)*. A clear vision, strong governance structures, effective public health functions and functional partnerships are all critical to enhance health system performance. Governance is the most important enabling function among the four overlapping core health system functions – the others being resource generation, financing and service delivery *(328)*. The COVID-19 pandemic highlighted the urgent need to build and sustain mechanisms that foster trust, transparency and accountability for health system governance in the Region. Effective governance is critical to achieving UHC and this demands that ministries of health not only manage health services and institutions but also lead multisectoral approaches to promote health and well-being and predict and be prepared to respond to future challenges *(329, 330)*.

17.1 Reshaping the role of ministries of health in UHC and health security

The COVID-19 pandemic demonstrated that UHC and health security are two sides of the same coin. Health security focuses on the prevention of, detection of and response to health threats, and relies on the IHR (2005) as the main instrument for identifying resources and building national core capacities. UHC aims to improve the accessibility and quality of health services for all people by ensuring that all levels of care (primary, secondary, tertiary and palliative) are well resourced to cater to people's need with a governance mechanism that allows systematic and well-functioning referral and back referral *(331, 332)*. Both UHC and health security are essential for a health system to serve the needs of all people at all times; addressing one component over the other places a country at risk of reduced health service coverage or inadequate response to outbreaks *(333)*. Health systems for health security work towards strengthening resources and capacities required for implementing the IHR (2005) components of the health system and those of other sectors for both effective management of health emergencies and maintaining continuity of essential health services *(332)*.

Advancing towards UHC and health security requires investing in resilient equitable and efficient health systems *(330)*. Health system resilience is the ability to absorb, adapt and transform when exposed to a shock such as a pandemic, natural disaster or armed conflict. A resilient health system should not only be able to retain its core functions during a crisis but also bounce back to a more efficient and stronger state. Recognizing a crisis when it is approaching and absorbing, adapting and learning from it requires that all elements of a health system (e.g. human resources, funds and levels of care) are responsive to change and that sufficient funds are available and can easily be reallocated when needed *(334–337)*. Establishing resilient health systems means that health authorities should take stock of those issues and others, ensure continuous monitoring, researching and understanding the barriers to health care accessibility, and address those in a timely and well governed manner.

The COVID-19 pandemic provided the opportunity to implement innovations to support the emergency response in the Region. But it also revealed major gaps due to underinvestment in health, IHR (2005) and health systems. The disruption of essential health services was particularly pronounced and extended for a longer period in countries with weaker health systems prior to

the pandemic. Suboptimal leadership, underutilization of emergency operation centres, shortage of health workers, limited capacity for high-end hospital care, inadequate clinical and logistic systems, limited quality, high price and shortages of medical products and fragmented health information systems were just some of the regional challenges.

The Regional Agenda for Building Back Better by Building Resilient Health Systems Towards UHC and Health Security, approved by the Regional Committee in 2022, identifies seven priorities: 1) strengthening health emergency and disaster risk management in line with the Plan of action for ending the COVID-19 pandemic and preventing and controlling future health emergencies in the Eastern Mediterranean Region; 2) optimizing ministries of health and building institutions for public health; 3) establishing PHC-oriented models of care; 4) enhancing and scaling up a fit-for-purpose, fit-to-practise health workforce; 5) promoting equity and enhancing financial protection; 6) improving access to medicines, vaccines and health products; and 7) fostering an integrated approach in policy, planning and investments for long-term health system resilience *(330)*. Moving forward on this agenda requires countries to invest in resilient health systems as a foundation for development *(338)*. Priority actions also include but are not limited to aligning and integrating national action plans for health security with or into the national health policy, strategy and plan, clarifying and reinforcing national emergency management arrangements, including functional linkages between ministries of health and national disaster management authorities, and adapting context-relevant models of care for the effective delivery of quality pre-defined essential health services packages *(330)*. The WHO health systems resilience toolkit provides a package of technical resources that can be adapted to promote an integrated, whole-of-system approach to strengthening health systems for resilience considering the wider determinants of health, equity and quality *(339)*.

17.2 Essential public health functions promotion and protection

The COVID-19 pandemic led to a renewed commitment to building public health capacities focusing on essential public health functions (EPHFs) at the global and regional levels *(340, 341)*. In 2021, Member States of the Region endorsed seven regional priorities for building resilient health systems towards UHC and health security and committed to strengthening EPHFs *(330)*. Through a deliberate consultative process, WHO revised the 2017 regional EPHF framework *(342)*, taking into account the lessons learned from the COVID-19 pandemic and global and regional priorities. The revised version places governance as foundational to all other EPHFs; removes the distinction between core and enabling functions since all EPHFs are cross-cutting and inter-dependent; repackages functions, sub-functions and operational definitions; and adds a new public health services function (e.g. access to vaccination, screening and links to PHC). It includes nine interconnected functions (governance, health protection, health promotion, emergency preparedness and response, surveillance, public health services, research, communication and health workforce) emphasizing public and preventive health services *(341, 343)*. Each function includes sub-functions. Governance, for example, includes four areas: financing, agenda-setting, legislation and institutional arrangements, which clearly describes national health authorities' institutional arrangements and their oversight and coordination role across public health sectors and providers. It is envisioned that this framework will guide countries in transforming their public health system to effectively respond to future health challenges and emergencies *(341)*.

A Master's degree in public health and similar programmes can provide a broad-based professional multidisciplinary training to ensure graduates are able to address the EPHFs for the Region.

Wide opportunities are available through schools and faculties of public health and medicine in the Region *(343–347)*. Combining such programmes with other health professional degrees, offering modular training, providing short courses and executive Master's are examples of how some institutions are responding to public health human resource needs in their countries *(344)*. Harmonizing curriculum standards in graduate public health education based on the regional EPHF competency framework currently being developed would be a key step to strengthening the cadre of public health professionals in the Region *(343)*. A regional collaborative network of academic institutions and programmes could serve as a platform to share experiences in teaching, practice and research and develop public health educational standards based on global guidance and sensitivity to regional needs and priorities *(344–346, 348)*.

18 Service delivery, quality and organization of care

18.1 PHC and family practice

The Region has always been committed to the core principles and values of PHC, as reaffirmed in the 2008 Qatar Declaration on Primary Health Care signed by the ministers of health of all its countries *(349)*. Resolution EM/RC60/R.2 on UHC, adopted by the 60th session of the Regional Committee for the Eastern Mediterranean in 2013, urged Member States to expand the provision of integrated health services based on PHC *(350)*. In 2018, the Global Conference on Primary Health Care in Astana, Kazakhstan, prioritized strengthening the delivery of health services through the PHC system to achieve UHC. However, coverage of essential health services is under 70% in many countries of the Region, including in some high-income countries; therefore, investment in the reorientation of health services towards PHC will be required for achieving UHC.

Examples of best practices for strengthening and expanding PHC in the Region include the *welayat* (district) health systems in Oman, and the *shabakey behdashti* (PHC network) and *behvarz* (community health worker) initiatives in the Islamic Republic of Iran. Pakistan established a Lady Health Workers Programme in 1994, which had over 100 000 workers by 2019; and Afghanistan has contracted out PHC services to nongovernmental organizations with successful results. These success stories can guide the promotion of service delivery through PHC in other countries of the Region and the world *(351)*.

PHC is facing several challenges in the Region including: rapid expansion of the private health sector; governments' increasing interest in partnering with the private sector; changing demography of the population and related ageing health issues; changes in health technology; ensuring the financial protection of households when accessing health services; and rising expectations of a more informed population. Additionally, protracted complex humanitarian emergencies and conflicts are affecting the Region, causing the forced displacement of more than 30 million people in 2023, many of whom belong to vulnerable population groups, including women and children *(351)*.

To realize the commitments of the Astana Declaration, the Regional Director for the Eastern Mediterranean launched the Primary Health Care Measurement and Improvement initiative in 2019. The initiative builds on global goods such as the Primary Health Care Performance Initiative, the PHC operational framework, the family practice approach, the PHC quality indicators and the WHO Regional Office's health system profiles. The approach aims to build national capacity for the assessment-based improvement of PHC.

The term family practice refers to health care services provided by a family physician and his or her multidisciplinary team that are characterized by comprehensive, continuous, coordinated, collaborative, personal, family and community-oriented services. The countries of the Region are committed to scaling up family practice and have prioritized strengthening human resource capacity, a key barrier to moving forward on this commitment *(352, 353)*. Initial findings of a mapping and situation analysis of family medicine training in the Region conducted in collaboration

with the American University in Beirut in 2022 showed that 60% of the countries of the Region found that fewer than 50 family medicine physicians graduate each year. Training programmes vary widely. While many countries require a residency as part of the formal postgraduate training (i.e. Bahrain, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia and United Arab Emirates) other countries recognize a Master's degree in family medicine (i.e. Egypt, Islamic Republic of Iran and Sudan) and/or family medicine fellowships (i.e. Egypt).

To reach the target of three family physicians per 10 000 population by 2030, WHO, in collaboration with UNICEF, American University in Beirut and the World Organization of Family Doctors, developed the Regional Professional Diploma in Family Medicine as a bridging programme, which offers a transitional period when a general practitioner will be introduced to family medicine and gain improved knowledge and skills in service delivery. The programme, recognized by the Arab Board of Health Specialization, was officially launched in February 2022 and the first cohort started the programme in October of the same year. On 14 December 2022, 14 Member States and eight international organizations signed a declaration entitled Implementing the Regional Professional Diploma in Family Medicine in the Eastern Mediterranean Region – a call for action demonstrating their support to secure a favourable environment and a wider professional acceptance for the diploma programme at a national level.

18.2 Hospital care management

Hospitals are costly components of any health system and depend on a wide range of resources to function effectively. In the Eastern Mediterranean Region, the total number of hospital beds is estimated to be 740 000, and most of those beds (80%) are in the public sector; however, the private sector is growing rapidly. Many hospitals in the Region, especially in the public sector, have failed to evolve in terms of operational processes and infrastructure, and standards of care and efficiency are declining in some.

Hospitals are essential actors in achieving UHC and contribute to implementing the vision for PHC. However, in most countries, hospitals are not well-aligned to the PHC system and the referral networks between PHC and hospitals need to be better defined and to function properly. This is due to rapidly evolving hospital demands, the major impact of health sector shortcomings on the capacity of hospitals to deliver high-quality people-centred services systematically and efficiently, and internal hospital deficiencies. A renewed focus on hospital roles, functions and operations through an integrated and people-centred lens is critical *(354)*. To meet this transformational goal, WHO developed a regional framework for action for the hospital sector, endorsed by the Member States at the 66th Regional Conference in 2019. The regional framework proposes two sets of interrelated interventions at the system (policy) and the facility levels. The regional framework for action serves as guidance to Member States to develop or update and implement a national strategic plan for the hospital sector, aligned with or embedded within overarching national health policies, strategies and plans, and considering country-specific challenges, priorities and capacities. Eight countries (Egypt, Morocco, occupied Palestinian territory (including East Jerusalem), Pakistan, Sudan, Syrian Arab Republic, Tunisa and Yemen) are using the framework to develop and implement their national strategies for the hospital sector.

The COVID-19 pandemic exposed the overwhelming pressures an emergency can put on hospitals. It highlighted the timely necessity to strengthen hospitals' resilience to all types of disasters while maintaining essential services, which aligns with WHO's mission and the Region's Vision

2023. In response, the WHO Office for the Eastern Mediterranean developed a hospital resilience conceptual framework accompanied by practical operational guidance embedded with specific tools to guide hospital managers on strengthening the resilience of their hospitals. In 2023, this operational guide was being piloted in six countries of the Region (Egypt, Oman, Morocco, Pakistan, Syrian Arab Republic and Yemen).

Strengthening the leadership and management capacity of hospital managers is essential. Existing evidence shows that a significant proportion of hospital managers in the Region have inadequate formal and/or informal training on hospital/health care management, and a lack of plans to promote the continuity of professional development. The WHO Office for the Eastern Mediterranean has developed a comprehensive curriculum to build the managerial capacity of hospital managers and move towards the professionalization of health (hospital) care management; more than 3000 hospital managers were trained between 2017 and 2023.

18.3 Model of care, integrated service delivery and referral systems

Achieving UHC through a PHC-based health system often requires countries to re-orient their model of care to the PHC approach. Through WHO support, the occupied Palestinian territory (including East Jerusalem), Pakistan and Sudan have reviewed their existing models of care and a pilot has been launched testing key components of this approach. However, a large part of the effort in the Region for the expansion of services is to develop and implement UHC priority benefits packages in countries *(355)*. Such a package is a set of evidence-informed prioritized interventions, including health services and programmes, intersectoral actions and fiscal policies, that accounts for economic realities and social preferences and is developed through a consultative process. A UHC priority benefits package should be available for all, in good quality, at the appropriate service delivery level, through the relevant service delivery platform, using an integrated people-centred approach and covered by adequate financial protection arrangement(s).

The Salalah Declaration on UHC, endorsed in September 2018, calls for health policy-makers to define a context-specific essential health services package *(11)*. The UHC priority benefits package is also highlighted as one of 10 key initiatives of the regional Vision 2023 *(356)*. During 2021, WHO finalized two regional reference packages as guidance for countries that wish to develop their national UHC priority benefits packages *(357)*.

These two regional reference packages are integrated into the Service Package Delivery and Implementation Tool developed by WHO and are being used by several countries to map their current packages (e.g. Jordan) and guide the development of new national packages (e.g. in Jordan and the occupied Palestinian territory (including East Jerusalem)). At least 11 countries of the Region were working on developing and implementing a priority benefits package as of 2023; additional countries (Lebanon, Libya and United Arab Emirates) have plans to develop national packages of services in the near future.

18.4 Health care quality and patient safety

Patient safety is a global health priority in pursuit of UHC and was emphasized in the Global Action on Patient Safety *(358)*. Despite such commitments, unsafe health care is still among the 10 leading causes of death and disability worldwide. Globally, approximately two thirds of adverse events, DALYs and premature deaths are consequences of unsafe health care practices. Estimates show that up to 40% of patients suffer unnecessary harm in primary and ambulatory care settings.

In LMICs, it is reported that about 134 million adverse events are encountered annually, leading to nearly 2.6 million deaths *(359)*.

In the Region, a study showed that 8–18% of hospital admissions might lead to adverse events, of which 80% were deemed preventable. This is consistent with other estimates that show less than 50% compliance with basic critical elements of patient safety practices across the Region. The prevalence of health-care-associated infections, an indicator of patient safety and quality of care in hospitals, varies from 12% to 18% in different countries of the Region *(350)*.

In response, WHO has been working to overcome challenges and to advocate for quality and safety to be at the heart of resilient health systems within the Region. The Patient Safety Friendly Hospital Framework was launched in the Region in 2007 to encourage safe health practices in hospitals through the integration of all patient safety activities in health care facilities using the framework as a reference. Implementation of the programme is a joint effort between participating health care facilities and WHO, which guides the process and certifies the facilities on meeting a set of evidence-based patient safety standards. The Patient Safety Friendly Hospital Framework was running in more than 400 health care facilities across the Region in 2023 and the number will continue to grow. The Framework is now considered the flagship for goal two of the GCC policy (the objective for Implementing Quality Improvement and Patient Safety Programmes in GCC states) to ensure quality and safer health care delivery.

WHO has developed a set of 34 quality indicators to address quality and safety at the PHC level along with a framework for quality improvement at the PHC level. Technical support is being provided to Member States on how to foster an indicator-based approach to identify and address quality gaps *(360)*. In addition, technical support is being offered on the development of national quality policy and strategies to catalyse and better sustain system-wide efforts to support UHC and national health-related SDG agendas.

The large number of graded emergencies in the Region has exposed health system fragility and lack of resilience in many countries of the Region. In addition, the COVID-19 pandemic accentuated the risks of avoidable health care-related harm to patients, health workers and the public and revealed gaps in safety in local and national health systems. An action framework for addressing quality and safety in fragile conflict-affected and vulnerable settings has been developed that is being used to see how best to ensure safe and quality health care services in such settings. In addition, a set of 22 key performance indicators for health workers' safety was developed by WHO and were field tested in four countries of the Region (Islamic Republic of Iran, Jordan, occupied Palestinian territory (including East Jerusalem) and Saudi Arabia). The next steps will aim at providing support on the adoption of this tool for reporting, monitoring, benchmarking and improving health workers' safety across the Region and beyond.

18.5 Private sector role and regulation

Utilizing the strengths of the private health sector is a key strategy for achieving UHC. The private health sector (formal, for-profit and/or not-for-profit health service providers) plays a considerable role in providing health services at different levels, from PHC to ambulatory and hospital services in many countries of the Region. About 20% of the total number of hospital beds in the Region (740 000) are in private hospitals. On average, more than 60% of pharmacies in the Region, particularly in middle-income countries, are in the private health sector. In Islamic Republic of Iran, Pakistan, Saudi Arabia and Sudan more than 50% of diagnostic facilities are in

the private health sector. A higher proportion of physicians work in the public sector (60–90%) in GCC countries; in Jordan close to half of physicians and nurses work in the private sector while in Lebanon the private hospital sector is the main employer of the health workforce *(361)*. Based on available data from the ministries of health in the middle- and low-income countries of the Region, the private health sector provides between 33% and 86% of outpatient or ambulatory services. It also provides between 11% and 81% of the health services used by the poorest quintile in those countries *(362)*. A high proportion of Syrian refugees in Egypt and Jordan seek care in the private health sector, according to UNHCR *(361)*.

The range of services provided by the private sector is variable; standards are questionable, regulation is insufficient and the level of financial burden to the users is unclear. Limited regulation or control of the private pharmaceutical sector has resulted in the over-the-counter sale of prescription-only medicines, including antibiotics, unethical drug promotion and induced demand for medicines and costly health technologies. In addition to causing high out-of-pocket expenditure, these unacceptable practices contribute to increasing technical misuse and medical errors associated with health technologies and growing AMR in the Region *(361)*.

Nevertheless, the private health care sector has the potential to fill service provision gaps. It can offer technologically advanced and specialized services that the public sector cannot provide. The smaller caseloads allow patients to receive more personalized care. Flexible resource deployment and working hours compared with the public sector could promote greater efficiency, innovation and performance-based management and increase patient perspectives of the same. Experience in Afghanistan, Iraq, Libya, Somalia, Syrian Arab Republic and Yemen has shown that the private health sector can adopt a dynamic approach to addressing the evolving health needs of a population when public health systems are weakened or non-existent.

In low-income countries, such as Afghanistan, Somalia and Yemen, policies and regulatory mechanisms for the private health sector are weak or non-existent. Countries that have longer experience of engaging with the private health sector, such as Lebanon, the Islamic Republic of Iran and Tunisia, have better developed policies and procedures. Some countries have recently developed regulatory policies and have started contracting out the delivery of health services to the private sector. Pakistan has established a Ministry of National Health Services, Regulations and Coordination, which focuses on improving the regulatory capacity of services in the health sector. Islamic Republic of Iran has established an urban PHC programme that relies heavily on contracting out services to the private sector, including general practitioners. Although some progress has been made in promoting more effective engagement with the private health sector in the regional drive for UHC, greater efforts are needed in strengthening country capacity to develop and implement a national framework in line with the regional one for effective engagement with the private health sector to move towards UHC *(361, 362)*.

18.6 Rehabilitation services

In the Eastern Mediterranean Region, an estimated 180 million people (based on 2019 data) could benefit from rehabilitation (approximately 1 in 4 people) as a result of having different health conditions. For example, about 41 million people were affected low back pain. It is also important to note that there has been a 114.8% increase in years lived with disability between 1990 and 2019, with substantial implications for rehabilitation needs in the Region *(363)*. Similar to the global trends, rehabilitation health care needs in the Region are projected to further increase based on

demographic and health changes as people live longer and with the increase in chronic conditions and injuries, without considering the many prevailing emergency situations. Rehabilitative care is an increasingly important area of health care that requires attention *(364)*.

Integrating rehabilitation across all levels of the health system is part of UHC; its integration at PHC level brings services closer to the community, improving equity, access and timeliness of service delivery *(365)*. The WHO Rehabilitation 2030 Call for Action describes 10 key activities, including improving the integration of rehabilitation into the health sector, strengthening intersectoral linkages, incorporating rehabilitation into UHC and building comprehensive rehabilitation service delivery models *(365)*. Efforts have been made by some countries in the Region to strengthen rehabilitation in health systems. Jordan developed its National Strategic Rehabilitation Plan using the WHO Guide for Action *(365)*; similar efforts are ongoing in Pakistan. The DHIS2 rehabilitation module is being applied in Jordan and occupied Palestinian territory (including East Jerusalem).

18.7 Emergency and trauma care services

Emergency care, an essential part of the health system, provides timely recognition of urgent conditions, resuscitation and referral for severely ill patients, and definitive care for acute illnesses and injury. Emergency care covers a range of time-sensitive health care services for acute medical, surgical and obstetric conditions, from injuries and infections to asthma, heart attacks and complications of pregnancy. The emergency care system delivers these services at the scene of illness onset or injury, during transport and emergency unit care, to early operative and critical care *(366)*. Emergency care services are critical for a Region where more than half the countries are experiencing complex emergencies, religious mass gatherings draw millions of pilgrims annually and parts are prone to natural disasters.

In 2022, across the Eastern Mediterranean Region, WHO recorded over 400 mass casualty incidents; the real number is likely to be at least twice as high. Between 60 and 80% of all trauma deaths in low- and middle-income countries across the Region occur before reaching the hospital. Approximately one quarter of these fatalities could be avoidable with basic control of haemorrhage at the time of injury *(367)*. Yet, trauma care services remain rudimentary in fragile conflict-affected and vulnerable settings, increasing the risks of death and disability. In poorly resource settings, prehospital services are rudimentary and laypersons are required to stabilize and even transport injured patients. Inadequate funding, lack of leadership, lack of legislation setting standards and expertise and lack or fragmented emergency care systems are some of the key challenges *(366)*. During the Great March of Return in the Gaza Strip in 2018–2019, the Ministry of Health and Palestinian Red Crescent, with support from WHO, established an innovative trauma referral pathway. WHO estimates between 435 and 1227 lives were saved over 12 months from the pathway and capacity-building, which have contributed to improvements in emergency services that were sustained until October 2023.

In 2016, Member States committed to scaling up emergency care *(368)*. Emergency care systems assessments were conducted in 10 countries to guide them in developing emergency care systems *(369)*. During the COVID-19 pandemic, countries made various efforts to strengthen key components of an emergency care system to limit mortality and avoid secondary mortality, such as establishing a national emergency care access number, setting up COVID-19 hotlines for the public to access information and introducing measures to control patient flow, including directing suspected COVID-19 patients to dedicated facilities *(369)*. Developing national plans for a more

systematic approach to emergency care services based on lessons learned from the pandemic and other emergencies is the key way forward, and has been done in Djibouti, Egypt, Islamic Republic of Iran, Iraq, Jordan, Libya, Pakistan, Qatar, Sudan, Tunisia and Yemen. Numerous capacity-building efforts on trauma services and mass casualty management have been conducted across the Region with support from WHO.

18.8 Palliative care and services

WHO defines palliative care as an approach that aims to improve the quality of life of patients and their families when facing problems associated with life-threatening illnesses. Often associated with cancer and end-of-life care, palliative care is explicitly recognized under the right to health. Palliative care is required for a wide range of other chronic diseases beyond cancer; not only does it improve the quality of life for patients but it also reduces unnecessary hospitalizations and use of health care services. The Region is projected to have the fastest-growing need for palliative care over the next four decades, compared with the other WHO regions, based on serious health-related suffering. The estimated number of people dying globally with serious health-related suffering in 2016 was 1.6 million; by 2060 it is estimated to increase by 170% to 4.4 million *(370)*.

The World Health Assembly adopted resolution WHA67.19 in 2014, calling upon WHO and Member States to improve access to palliative care as a core component of the achievement of UHC. Palliative care is part of the comprehensive NCD package of services as reflected in the *Global Action Plan for the Prevention and Control of NCDs 2013–2030*. In 2019, WHO established a regional palliative care network to guide the regional agenda. The network, which includes representatives from different countries of the Region, is an important platform for regional collaboration and has supported the development of a regional road map for palliative care. The road map includes a set of strategic objectives and concrete deliverables across the domains of policy, human resources and service delivery that inform health policies and support capacity-building in countries of the Region.

18.9 COVID-19 response and lessons learned for service delivery

A critical lesson learned from the COVID-19 pandemic response is the importance of ensuring the continuity of essential health services while responding to the evolving challenges of a pandemic. The health system response to COVID-19, especially during the first waves, tended to emphasize hospital care with disruptions to essential health services persisting at least until January 2023 *(371)*. Based on the fourth round of the WHO pulse survey on the continuity of essential health services during the pandemic, nine of the 15 responding countries of the Region reported some disruptions in at least one essential health service up to the fourth quarter of 2022, a marked reduction compared with earlier phases of the pandemic. The 15 countries responding to the survey reported disruptions to 22% of tracer essential health services compared with a year earlier. Service disruptions were seen across service delivery settings and particularly in the continued disruption of emergency, critical and operative care and appointments with specialists. Major areas of persisting disruptions included care for older people, neglected tropical diseases, communicable diseases, NCDs, nutrition and sexual, reproductive, maternal, newborn, child and adolescent health.

Nevertheless, health systems are responding to overcome service disruptions. At least 40% of countries reported increased backlogs across all tracer essential health services in 2022 compared

with 2021. Some countries reported increased service volumes compared with pre-pandemic levels in such services as traditional and complementary medicine, mental health and NCD services. These increases are possibly tied to country efforts to catch-up on service backlogs, recover services and respond to emerging needs.

The COVID-19 pandemic drove a push for adaptation and innovation in health service delivery and incentivized governments to find effective and efficient ways to meet the needs of their populations – whether those were related to COVID-19 or not. Innovations included structural and organizational changes that affected access to many PHC centres in the Region. In fact, most countries reported at least one successful action to mitigate the consequences of the pandemic and promote service recovery. A good portion of countries have integrated successful mitigation strategies into their routine health system, including integrating approaches to scale up community communications and mitigate health workforce issues. Some of the most commonly reported interventions in the fourth round of the pulse survey included training health workforce in quality improvement, improved patient flow, proactive communication strategies to reach vulnerable groups, rapid training and job aids for new tasks and roles.

Countries usually engage the private health sector in the response phase of an emergency rather than in the planning phase; this was reflected during the pandemic where few countries included private sector representatives in the national response committee. Nevertheless, the private sector played a major role in supporting countries, particularly in the distribution of COVID-19-related supplies and the provision of some key essential health services, often through remote consultations, during the first peak of COVID-19 cases, when many health services were scaled down or suspended.

19 Health financing and financial protection

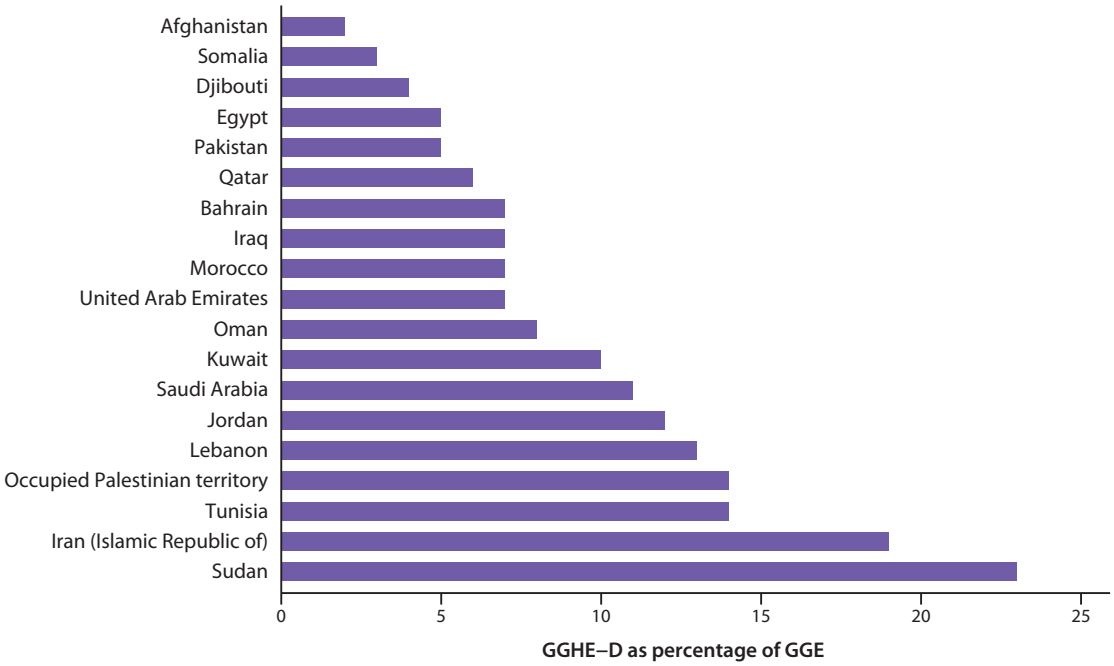
19.1 Progress and challenges in health financing and financial protection

Health financing is a core function of health systems that can accelerate the achievement of UHC by improving effective service coverage and financial protection. Globally, millions of people do not access health services due to financial barriers. Many others receive poor quality services even when they pay out-of-pocket. The COVID-19 pandemic aggravated the situation even more, as many countries faced challenges in sustaining health care for their citizens because of the additional cost of combating COVID-19, whether these challenges were related to treatment, vaccination or the additional costs of protective measures within the health system. Additionally, the economic slowdown in many countries contributed to the lack of resources allocated to health during the pandemic *(372, 373)*.

Carefully designed and implemented health financing policies can re-enforce the timely provision of resources and flow of funds and promote equal access to health services at all times. For example, contracting and payment arrangements can incentivize care coordination and improve quality of care; sufficient and timely disbursement of funds to providers can help to ensure adequate staffing and medicines to treat patients *(374)*.

The Eastern Mediterranean Region is a low investor in health, accounting for about 2% of global health expenditure for close to 10% of the world's population in 2020 *(375)*. The average share of health expenditure in total government expenditure was 8.3% in 2018, 8.1% in 2019 and 9.1% in 2020. There are huge disparities in public health spending between governments in the Region, ranging from 2.3% in Afghanistan to 22.9% in Islamic Republic of Iran. As shown in Fig. 35, the share of health expenditure is not necessarily related to the income level of a country, as many high-income countries have lower shares of health expenditure compared with middle-income countries. The average total expenditure on health per capita in the Region in 2023 was US$ 656, which is less than the global average (US$ 1204); within the Region, expenditure varies widely, from less than US$ 100 per capita in Afghanistan, Djibouti, Pakistan and Sudan to over US$ 1000 in Kuwait, Qatar, Saudi Arabia and United Arab Emirates. This low public spending on health in the Region – even in high-income countries – is primarily due to the low priority of health on national government agendas, highlighting again the crucial role of governance and the need for evidence-informed strategic planning *(376)*.

Fig. 35. Domestic general government health expenditure (GGHE-D) as percentage of general government expenditure (GGE), 2016–2021



Note: Recent data not available for Libya, Syrian Arab Republic and Yemen.

Source: WHO (2022) (80)

The Region faces numerous challenges in health financing to achieve UHC. The global economic crisis has resulted in increased rates of unemployment, challenged the purchasing power of individuals and potentially reduced the fiscal space for health spending by governments. The fluctuations in oil and gas prices put a strain on the economies of oil-producing countries and increased costs for medical supply production and transport. The lower share of public health funding compared with other regions indicates that health financing is not considered a national priority or a human capital and economic investment and thus, in turn, faces the threat of being further reduced when countries face economic challenges.

Public health funding is targeted towards secondary and tertiary care with fewer resources targeted to PHC, reducing the cost–effectiveness of the national budget allocated to health. Within the health sector, most countries do not have a clear package of services and products or their packages are designed without considering the financial and resource implications; such ad hoc decision-making may therefore not align with population needs. Finally, improving efficiencies is difficult with weak clinical governance where wastage is difficult to measure and assess.

Nevertheless, there is an increased awareness of and drive to improve the cost efficiency of health service provision among policy-makers in the Region, which paves the way for WHO support in designing and supporting health financing policies for the Region. For example, WHO tools can be used to support the development of country-specific, evidence-informed benefit packages for UHC. Additionally, the technological advances and innovation that were observed during the COVID-19 pandemic could be capitalized on to improve cost efficiency. At the same time, there is an increased momentum towards health security and local production of health and medical supplies; countries

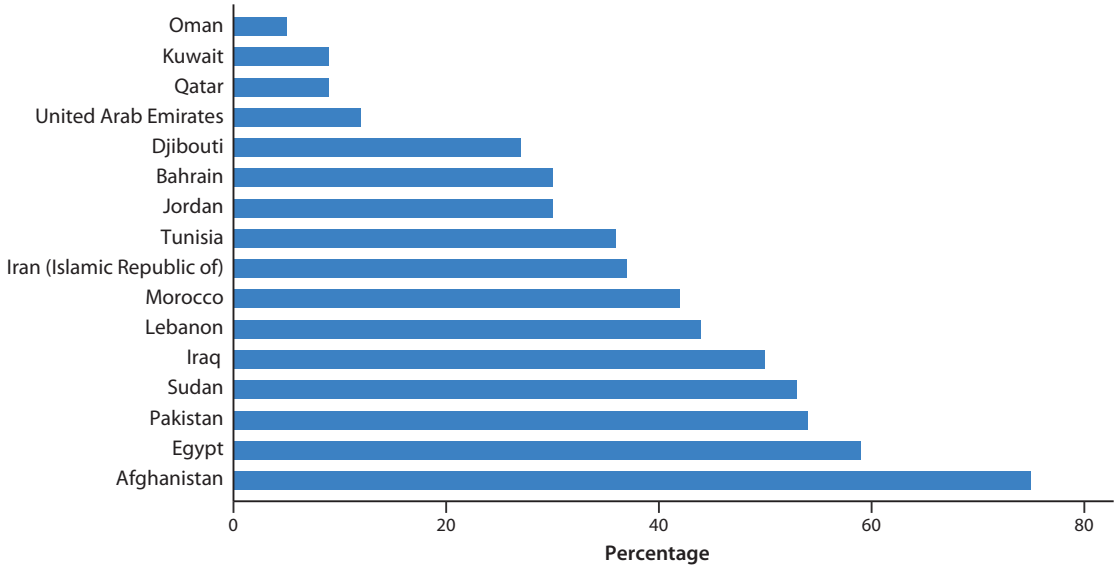
could also explore pooled purchasing arrangements. Finally, most countries have a diverse educated young population who could support health systems and improve the cost efficiency of the health workforce by providing tailored human resources for health national policies.

19.2 Financial protection for achieving UHC

UHC as defined in SDG 3 cannot be achieved without financial protection to prevent financial hardship for people who seek health services; individuals should not have to risk going into poverty because of the high cost of medical care. When governments prioritize spending on health, individuals are protected from financial hardship. Financial hardship due to health spending rose around the world between 2000 and 2015, but the increase was higher in the Eastern Mediterranean Region than in any other WHO Region. In 2015, 11.7% of the Region's population faced catastrophic health expenditure (defined as spending more than 10% of their income on health care), an increase from 8% in 2000 *(373)*. In the Region, the share of public health spending from current health expenditure was around 50% between 2000 and 2015. This low share of public health spending has led to a high share of private spending on health, for which out-of-pocket expenditure is a proxy indicator *(376)*. The average out-of-pocket expenditure on health as a percentage of current health expenditure has been around 40% in the Region since 2000. The share of out-of-pocket spending in current health expenditure varies in countries of the Region from more than 78% in Afghanistan to about 5% in Oman. In 2019–2020, out-of-pocket spending fell in almost all countries except for Lebanon, where it increased by 22% (Fig. 36) *(375)*.

WHO and the World Bank have proposed two measures to track progress on financial risk protection as part of UHC: catastrophic health expenditure and impoverishing health expenditure. The proportion of the population spending over 10% of household total consumption or income on health and the proportion spending over 25% on the same is lower in the Region than the global estimate and lower than estimates for other WHO regions, except the European Region.

Fig. 36. Out-of-pocket spending as a share of the current health expenditure in the Region, 2017–2020



Source: WHO (2023) (377)

It is estimated that high out-of-pocket payments for health services in 2015 caused financial hardship for an estimated 55.5 million people in the Region, and catastrophic payments pushed an estimated 7.7 million people into poverty. The incidence of catastrophic health expenditure in the Region reported in the World Health Statistics 2019 is lower than the global average. However, this needs to be interpreted carefully since some people may not seek health services (and therefore not spend money on them) because they are inaccessible or unaffordable, which is usually the case in many LMICs in the Region *(378)*.

Countries in the Region have followed several approaches to improve financial risk protection for their citizens, such as using public funds and developing prepayment mechanisms. The three different income groups in the Region use different schemes for raising and pooling funds for health. High-income countries rely on general government revenues generated primarily from natural resources (mainly oil) to provide free-of-charge services for all citizens. However, the large expatriate populations do not enjoy the same benefits as nationals: they are either covered by private health insurance or have access to a limited package against nominal payment, and in many cases are not covered. Most middle-income countries have obligatory health insurance contributions, which has expanded coverage to the poor. However, the share of out-of-pocket spending remains high in many of these countries due to a relatively small benefits package, substantial co-payments and lack of coverage of vulnerable population groups. In low-income countries, the level of health financing is inadequate; large segments of the population are facing hardships in paying for health services and the share of out-of-pocket spending is very high in some countries (60% and above). Among these countries, Sudan has managed to provide partial coverage for the poor and for those in the informal sector using government subsidies and *zakat* funds *(379)*.

19.3 Expansion of health insurance in the countries of the Region

Health insurance can support pooling of funds and financial protection from hardship due to health costs, especially if it is universal and supported by the government for the less advantaged. There is a momentum to expand social health insurance in countries of the Eastern Mediterranean Region. In Bahrain, a new health insurance fund (the Social Health Insurance Fund Authority) administers new dedicated taxes for the health sector under revenue generation reforms. In Egypt, the Government has established a universal health insurance agency *(380)*.[8]

Mobilizing sufficient financing resources is a critical factor for achieving UHC. The primary source of revenue should be public financing. Social health insurance could be a supplemental source of revenue provided that it is not entirely based on wage-based contributions. Pooling these funds reduces fragmentation and increases efficiency by sharing financial risks and can guarantee a set of affordable health services. Scaling up prepaid and pooled financing can also reduce out-of-pocket payments providing financial protection and allowing people to improve their health and increase their earnings *(380)*.

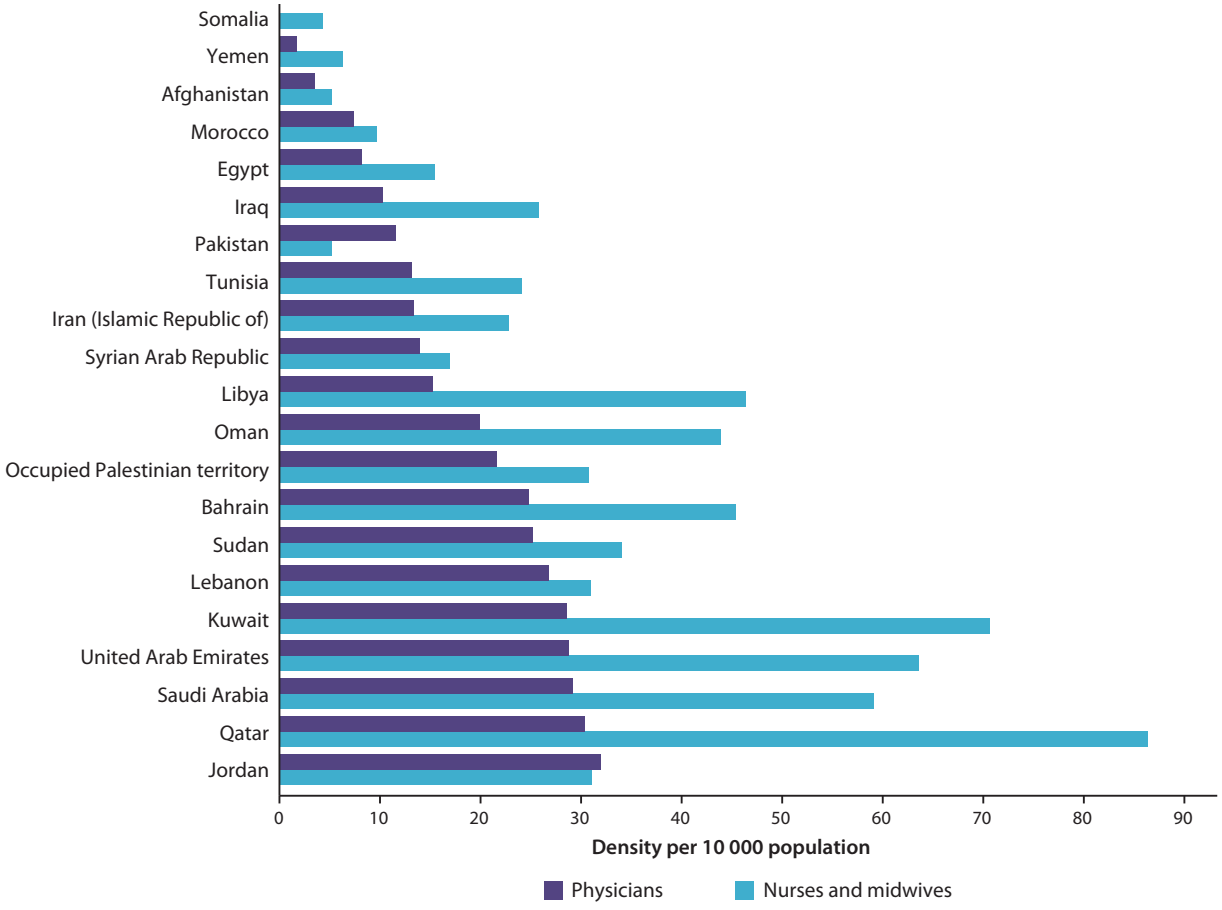
[8] For additional examples of pooling arrangements in countries in the Arab world, please see Mataria, 2021 *(381)*.

20 Health workforce

20.1 Regional and global density of physicians, nurses and midwives

The strength of every health system reflects its health workforce capacity. An effective health system must have an adequate number of health workers who are qualified, competent, motivated to perform and equitably distributed to provide the needed health services. The density of the health workforce in the Region varies greatly between countries; in some countries it is as low as 1.7 physicians per 10 000 population and 5.2 nurses and midwives per 10 000 population (Fig. 37). Though there have been improvements over the past few decades, the Region is facing a protracted crisis of a shortage of health workers; the density of physicians, nurses and midwives in the Region is lower than the global average and the third (for physicians) and second (for nurses and midwives) lowest among all WHO regions. Additionally, six countries (Afghanistan, Djibouti, Iraq, Pakistan, Somalia and Yemen) are included in the WHO health workforce support and safeguard list for those facing the most pressing health workforce challenges to achieving UHC by 2023. These countries have a density of physicians, nurses and midwives below the global median of 48.6 per 10 000 population and a UHC service coverage index lower than 55 *(382)*.

Fig. 37. Density of physicians, nurses and midwives per 10 000 population, 2018–2021



Source: WHO (2022)

The workforce shortage in the Region is most prominently seen in the density of nurses and midwives, who constitute more than 50% of the health workforce. The Region accounts for 17% of the global shortage of nurses. While the global shortage of nurses and midwives is expected to decline by 2030, the shortfall in the Region is predicted to increase from 0.9 to 1.2 million, if current production trends do not increase *(74, 383)*. The ratio of midwives and nurses to physicians, which can be considered a proxy indicator of skill mix, has also declined in more than half the countries in the Region over the past two decades *(383)*.

In addition to the general shortage of health workforce production and availability, which is most prominent in LMICs, the Region faces other challenges including:

- imbalances in skill mix and geographical distribution, with a higher personnel preference for urban settings;
- insufficient primary care workforce and health workforce to deliver EPHFs;
- limited production and employment capacity;
- exacerbation of shortages in some countries due to increased mobility of health professionals within and outside the Region and heavy reliance on migrant health workforce in other countries;
- low quality, competency and productivity, absenteeism and dual practice, as well as challenges in the retention of health workforce;
- insufficient capacities for health workforce governance and regulation of education and practice;
- inadequate capacity for relevant and updated health workforce data, information and evidence;
- protracted emergencies and conflicts that lead to an outflow of health workforce and compromise the safety and security of health personnel *(383, 384)*.

20.2 Policy and regulatory frameworks on health workforce development

Policies and strategies for health workforce development vary from country to country in the Region. Health workforce governance capacities in many countries remain limited in addressing health workforce challenges due to the undermined status of departments/directorates in ministries of health, lack of skilled health workforce managers and suboptimal multisectoral collaboration *(385)*. To respond to challenges in the supply and quality of the health workforce, the Regional Committee in 2017 endorsed the *Framework for action on health workforce development in the Eastern Mediterranean Region 2017–2030 (385)*. The Framework, which aligns with the global strategy adopted by the World Health Assembly in 2016 *(386)*, calls for countries to develop comprehensive evidence-informed health workforce strategic plans based on labour market dynamics, strengthen governance and regulatory capacities and improve health workforce information and evidence. The regulation of health workforce education and practice needs to be developed and strengthened in most countries of the Region.

An initial step is to utilize the existing workforce more effectively through continuous development and retraining, together with redistribution and redeployment of available health workers. However, this is only possible by increasing investment in the health workforce to align with the requirements of the health system, improve working conditions and protecting health

workers. Other regional commitments to health workforce development include the regional framework for action to strengthen nursing and midwifery (2016–2025), which was followed by a call for action to accelerate strengthening the nursing and midwifery workforce by the Regional Committee in October 2019, and the Regional framework for action for reforming medical education, endorsed by the Regional Committee in 2015. A call for action endorsed by the Regional Committee in October 2023 outlines key actions to enhance and scale up a fit-for-purpose health workforce in the Eastern Mediterranean Region.

20.3 Health workforce information

Reliable and updated information and evidence are crucial for health workforce planning, recruitment, deployment and retention. There is a serious gap in health workforce information in the Eastern Mediterranean Region – especially in LMICs – which can affect the planning and management of human resources *(387)*.

WHO, together with Member States, is working to strengthen health workforce information systems by implementing health workforce observatories, resulting in notable improvements in health workforce data availability. Globally, WHO has developed the National Health Workforce Accounts as a tool to facilitate the standardization of health workforce information systems to ensure interoperability and produce comparable data at subnational, national, regional and international levels and to support tracking health workforce policy and performance. This tool comprises a handbook detailing 78 indicators in 10 modules, an implementation guide and an online platform to help countries to identify appropriate and feasible indicators to monitor their health workforce *(388)*. The Regional Office for the Eastern Mediterranean provides ongoing assistance to countries for building and strengthening their national health workforce observatories according to their local context and within international frameworks *(389)*.

20.4 Quality of health workforce training and the role of academia

Developing a balanced, motivated, well-distributed and well-managed health workforce with an appropriate skill mix is a priority for strengthening health systems. The production of these health professionals requires a continuum of undergraduate, postgraduate and continuing education. A rapid increase in the number of medical schools in the Region has been seen in the past decades; however, variations in education and training capacities are wide. The number of active medical schools ranges from only one in Qatar to 51 in Islamic Republic of Iran. An assessment of medical education in the Region conducted by WHO in 2015 revealed that 30–40% of responding medical schools and colleges have no accreditation system and that faculty development programmes are weak or non-existent. Medical schools face challenges in curriculum development, student assessment, programme evaluation and training teachers, which ultimately affect the overall quality of the health workforce. In the majority of medical universities, training methods are hospital-based and teacher-centred with no emphasis on problem solving and community-based education strategies. Continuing professional development systems are not well developed in most countries of the Region and are absent in more than half of countries. Despite the sharp increase in the number of trained physicians in the twenty-first century, the quality of medical education remains a major concern in the Region *(390)*. Data on the density of recent graduates show that high-income countries, despite having the highest density of health workforce, do not make a major contribution to production of the health workforce; as such, the quality of their workforce relies on the quality of medical education in exporting countries.

There have been several initiatives to improve the quality of health workforce training in the Region, including: the development of a regional prototype curriculum for nursing that has been used to guide curriculum review in many countries; the development and pilot of a curriculum for enhancing the capacity of general nurses for the provision of mental health care; the integration of WHO's multi-professional patient safety curriculum in 21 health care-related academic institutions in Oman; the review and update of the curriculum for medical laboratory workforce in Sudan; and the establishment of a BSc nursing programme in Yemen *(33)*. The pandemic highlighted the need to strengthen EPHFs, which led to the development of a workforce competency framework to guide the health workforce requirements for their delivery.

20.5 Protecting and safeguarding health workforce in emergencies and at all times

In the Region, escalating conflicts and humanitarian needs continue to place health workers at great risk. The Region has one of the highest rates of attacks on health care in the world. In 2016, attacks against health care facilities and workers accounted for 83% of all attacks globally *(33)*. In 2018, a total of 725 attacks on health workers occurred in the Region, 76% of the global total, resulting in 137 deaths *(33)*. Every four days in 2019, a health facility was attacked in Syrian Arab Republic *(391)* and in 2020 there were 230 attacks on health care, of which 86% directly impacted health personnel *(209)*. Only in the first month of 2023, there were 13 reported attacks on health care in the Region – which is 56% of the global total *(209, 392)*.

To enhance the safety and security of health workers, it is crucial to initiate specific actions to protect health facilities and personnel, including: preventing harm (from occupational hazards, violence and harassment, situations in protracted crisis); providing support (fair and equitable compensation, provision of personal protective equipment, psychosocial and mental health support, occupational health services), safeguarding their rights as well as community engagement to gain people's collaboration and trust; using simple and visible signage to indicate health care activities; educating health workers on international humanitarian law, human rights and ethics to understand their rights and responsibilities in armed conflict and other emergencies; and communicating with civil society, including religious and community leaders, to strengthen dialogue on protecting health services and health workers *(393)*. The WHO Global Health and Care Worker Compact provides guidance that reflects the needs and priorities of the Eastern Mediterranean Region *(394)*.

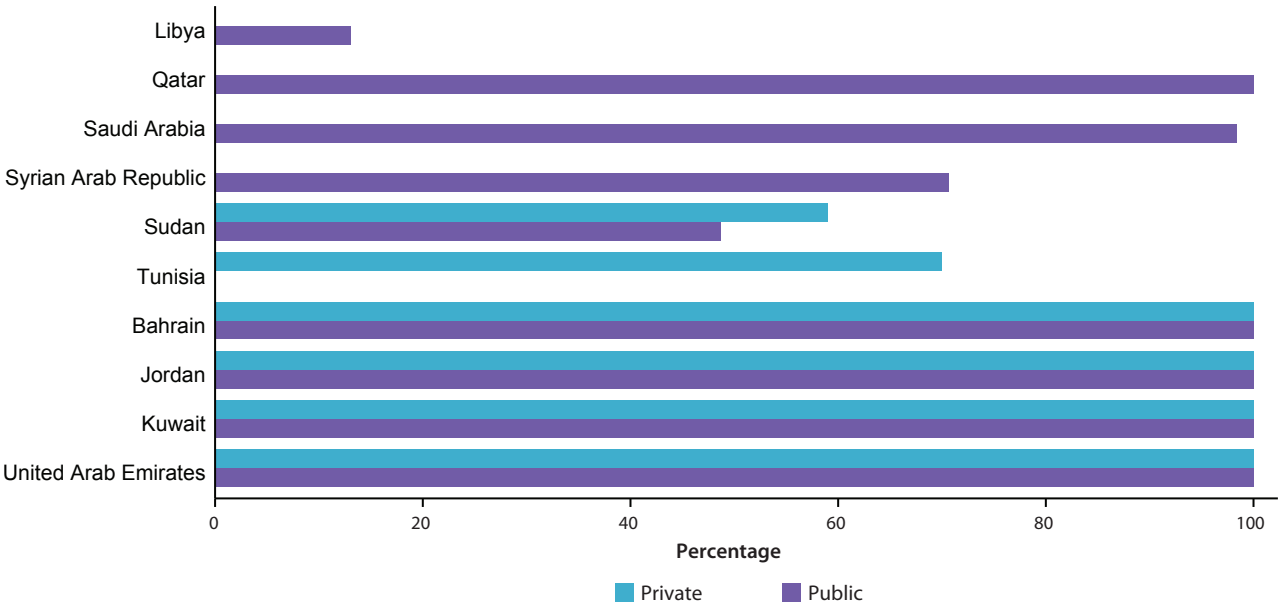
21 Access to medicines, vaccines and health products

Medicine, vaccines and health products (including diagnostics and devices, as well as blood and blood products) are integral components of any health system. Every disease management strategy requires access to medicines and health products for prevention, diagnosis, treatment, palliative care and rehabilitation. However, access to medicines, vaccines and health products continues to be a challenge globally, mainly for LMICs. It is estimated that around 2 billion people worldwide do not have sustainable access to essential medicines or, if they have access, the safety, quality or efficacy of the medicines are not guaranteed, resulting in suffering, prolonged illnesses, needless disabilities and preventable deaths.

Medicines account for a significant share of health spending, ranging from 10 to 20% in developed countries to 20–60% in developing countries *(395)*. In addition, medicines constitute a large proportion of out-of-pocket expenditures in most countries, undermining access and increasing the risk of financial hardship *(396)*. In the Eastern Mediterranean Region, information available from 10 high- and middle-income countries suggests that total pharmaceutical expenditures represent 11–50% of total health spending. On the other hand, in some low- and lower-middle-income countries, close to 50% of out-of-pocket spending goes on medicines: 54% in Afghanistan (2017) *(397)* and 43% in Pakistan (2015–2016) *(398)*. In line with the WHO vision of health for all by all in the Eastern Mediterranean Region and cognizant of the role of access to safe, effective and quality-assured medicines, vaccines and health products in benefiting one billion more people with UHC, WHO developed the *Regional strategy to improve access to medicines and vaccines in the Eastern Mediterranean Region, 2020–2030*, which provides operational and practical guidance to the Region's Member States to improve access to affordable quality essential medicines and vaccines and ensure that they are appropriately used *(399)*.

Information about the level of access to essential medicines in the Region is limited. About 50% of countries report on the availability of selected essential medicines in public health facilities and only eight countries (35%) report on availability in private health facilities (Fig. 38). In the Region, the availability of essential medicines is generally higher in the private than the public sector, and most LMICs are suffering from considerable shortages of essential medicines in both public and private settings.

Fig. 38. Availability of essential medicines (%) in public and private health facilities in selected countries, 2019–2021



Source: WHO (2022) (80)

21.1 Enhancing regulatory status of national authorities for medicines and vaccines

Effective medical product regulation promotes and protects public health by guaranteeing that medicines, vaccines and health products are of the desired quality, safety and efficacy; are appropriately manufactured, stored, distributed and dispensed; illegal manufacturing and trade are discovered and effectively sanctioned; and health professionals and patients have the needed information to enable them to use medicines and health products appropriately. A weak regulatory system can have an impact on patient outcomes and has the potential to damage initiatives for improving access; in addition, weak regulations and enforcement of law in many countries has led to rising substandard and falsified products being on the market.

National regulatory authorities have been instituted in most countries of the Region, mainly for medicines; however, their performance needs to be improved. All countries have adopted conventions related to controlled medicines and have laws to control narcotic and psychotropic substance use. Most national regulatory authorities carry out marketing authorization, import control, licensing, inspection and market control, laboratory testing and quality control, pharmacovigilance and clinical trial control *(400)* but many lack capacities and expertise to assess and regulate biological products. Twenty countries have legal provisions for the marketing authorization of all pharmaceutical products available on the market; however, their performance could be improved. Half of the countries in the Region do not have national guidelines on good manufacturing practices; and none have regulation of blood *(401)*. Seventeen countries are full members of the WHO Programme for International Drug Monitoring, and four countries are associate members *(402)*.

Nevertheless, some achievements are being made. All countries in the Region were able to grant emergency use authorization for the first COVID-19 vaccines allocated through the

COVAX Facility within 15 days. By April 2022, countries had granted 215 regulatory approvals for COVID-19 vaccines. Thirteen countries in the Region reported adverse events following immunization with COVID-19 vaccines to the global database. The Egyptian Drug Authority reached maturity level 3 for vaccine regulation and is eligible for inclusion in the transitional WHO Listed Authorities *(403)*. The Saudi Food and Drug Authority achieved maturity level 4 for medicine and vaccine regulation, the highest level of the WHO classification for regulatory authorities. Jordan, Pakistan, Sudan and Yemen are participating in the WHO Collaborative Registration Procedure, which aims to enhance regulatory reliance, facilitate and accelerate regulatory decisions and introduce much-needed quality-assured, effective and safe products in their jurisdictions *(404)*.

21.2 Production capacity of vaccines in response to COVID-19

Vaccines are critical tools in disease prevention programmes and control of infectious diseases. The most recent example is the COVID-19 vaccine that changed the course of the pandemic, saving tens of millions of lives globally. Vaccines contribute to global health security and will be a vital tool in the battle against AMR. The Region is almost fully reliant on imports of vaccines from the global market. For more than 20 years, four countries in the Region (Egypt, Islamic Republic of Iran, Pakistan and Tunisia) have produced traditional vaccines. None of them were self-sufficient to response to national public health needs in terms of vaccines. For several reasons, principally related to quality, local vaccine production has almost disappeared in the Region, except in the Islamic Republic of Iran. Nevertheless, during the COVID-19 pandemic, an increasing number of manufacturers in the Region, including in Egypt, Islamic Republic of Iran, Pakistan and United Arab Emirates, were able to produce COVID-19 vaccines; eight COVID-19 vaccines were produced in 2021. WHO developed a regional strategy to enhance vaccine production in the Eastern Mediterranean Region. Egypt, Pakistan and Tunisia were identified as recipients and training courses on different topics *(405)* were provided to those selected countries to enable them to acquire the mRNA technology and be prepared for producing mRNA vaccines. A survey in 2018 on the capacity of local pharmaceutical manufacturers in the Region showed a low level of compliance with the Good Manufacturing Practice requirements and limited capacity to be self-sufficient. Most of the local pharmaceutical manufacturers in the Region are engaged in finished product manufacture, with less than 20% undertaking active pharmaceutical ingredient production. Even fewer manufacturers are conducting research and development and 60% of countries have established specific guidelines to regulate biotherapeutic products.

21.3 Policy and evidence-based selection of medicines

National medicines policy is a commitment to a goal and a guide for action that expresses and prioritizes medium to long-term goals set by the government for the pharmaceutical sector and identifies the main strategies for attaining them. National medicines policies exist in 18 Member States, but they are incomplete: none of the policies has provisions on regulatory procedures and supply chain management in cases of emergency, pandemics and crisis situations, and they all lack relevant implementation plans *(7)*.

Essential medicines are defined by WHO as "those that satisfy the priority health care needs of the population" *(195)*. They are used as the basis for pharmaceutical procurement and reimbursement and are selected based on disease prevalence, safety, efficacy and comparative cost–effectiveness.

The classification of medicine as essential is a national responsibility and means it should be available for all people without discrimination within the framework of a functioning health system, with assured quality and at an affordable price. Access to essential medicines in the Eastern Mediterranean Region has remained extremely limited in some areas and countries as a result of political conflicts and acute emergencies. The COVID-19 pandemic imposed additional challenges to access essential medicines. National essential medicines lists exist in 20 Member States and were updated in the last five years by 16 Member States; half of these were updated in the last two years.

21.4 Use of health technology assessments

Health technology assessment plays a key role in securing quality products at affordable prices and provides policy-makers with evidence-based information, so they can formulate health policies that are safe, effective, patient-focused and cost-effective. It is also used by national authorities to help make decisions on which technology should be reimbursed at the national level. Tunisia has a national institution responsible for health technology assessment, while the Islamic Republic of Iran has fragmented health technology assessment under more than one institute. The other Member States in the Eastern Mediterranean Region do not have any such institutions.

Irrational medicine use is a very complex problem, which calls for the implementation of a comprehensive package of interventions including educational, financial, regulatory and managerial strategies to enhance the rational use of medicines. Key policy issues include the development of evidence-based clinical guidelines; the establishment and support of drugs and therapeutics committees; control of pharmaceutical promotion activities; promotion of the concepts of essential medicines; continuing education of health care providers; and consumer education.

Nineteen countries have legal provisions that prohibit dispensing prescription medicines without a prescription; however, 16 countries report that antibiotics are sometimes sold over-the-counter. Ten countries allow the substitution of generic equivalents at the point of dispensing. Eight countries in the Region have a public or independently funded national medicines information centre providing information on medicines to prescribers, dispensers and consumers. Six countries have data on national antimicrobial consumption. Twelve countries have regulations requiring hospitals to organize or develop pharmacy and therapeutics committees. Nine countries have mandatory continuing education for medical doctors and pharmacists, including rational use of medicines. Self-medication in relation to the prevention and treatment of COVID-19 is occurring in some countries.

21.5 Access to assistive technology

Assistive technology is needed by a wide range of the population, including people with chronic health conditions, people with disabilities, older people and the broader population who may experience temporary or lifelong impairment or functional decline across the life course. Available data suggest there is increasing need for assistive technology in the Eastern Mediterranean Region. Several factors can account for this need, including the progressive increase in the proportion of older people (predicted to reach almost 15% of the population in 2050), the rise in NCDs, injuries and emergency situations. Given the growing demand, assistive technology services need to be available within health care services at all levels.

In 2016, Member States committed to this crucial public health issue by adopting resolution EM/RC63/R.3 to ensure access to assistive technology and its integration into health systems as an essential component of UHC *(406)*. With leadership efforts by the Government of Pakistan, this regional resolution was reinforced by resolution WHA71.8 on improving access to assistive technology in 2018.

As a first step to operationalize these commitments, a rapid assessment survey on the status of assistive technology in the Region was conducted in 17 countries in 2017. Results showed that service delivery and regulatory mechanisms for assistive technology are inadequate or non-existent in many countries. A strategic action framework to improve access to assistive technology has been developed in close consultation with Member States and endorsed by resolution EM/RC67/R.1 in 2020 *(85, 407)*. Supporting country efforts in this area has been a priority for WHO in the Region. The regional framework was used by Bahrain and Iraq (Ninawa governorate) to develop action plans for improving access to assistive technology at the national and subnational levels, respectively. Eleven countries in the Region contributed to the Global report on assistive technology launched in May 2022 *(408)*. A regional analysis was developed, in preparation for publication in 2023, based on the findings of this report and on rapid assistive technology assessments in Djibouti, Islamic Republic of Iran, Iraq, Jordan and Pakistan. Islamic Republic of Iran, Iraq and Jordan are at different stages of developing national assistive technology reports based on rapid assessments and national action plans. The implementation of a similar rapid assessment towards developing a national action plan for strengthening access to assistive technology has started in Morocco. Jordan is working to integrate assistive technology provision in a PHC centre and in Egypt a Presidential initiative was launched in 2022, starting initially with a focus on mobility and locomotor products. Regional efforts are strongly linked to the WHO Global Cooperation on Assistive Technology initiative. Countries can make use of this initiative to address the core elements of any successful assistive technology strategy, namely: policy and financing; products; personnel; and provision of services.

21.6 Medical devices

Medical devices are an essential component of a health system for the prevention, diagnosis and treatment of disease and for monitoring patients. Establishing priorities in the selection, regulation, assessment and management of medical devices is critical for preventing the inappropriate deployment and use of health technologies *(409)*. The availability of medical devices (computed tomography, magnetic resonance imaging, mammography, radiotherapy) varies a great deal between countries in the Eastern Mediterranean Region. The reported density of medical devices per 1 million people, both in public and private facilities, is extremely low in many LMICs and even in some high-income countries. This impacts the ability of medical personnel to diagnose, prevent, monitor and/or treat diseases and injuries *(410)*.

In 2014, the World Health Assembly approved a resolution to strengthen the regulatory system for medical products to improve public health outcomes and increase access to safe, effective and quality medical products *(411)*. As in other parts of the world, regulation for medical devices is less developed than those for medicines and vaccines. Ten countries in the Region have a national policy on health technology and 15 countries in the Region have a designated unit or team within their ministry of health to oversee and optimize the use of health technologies within health care organizations *(412)*. The vast array of medical devices available, ranging from simple to complex and inexpensive to costly, require a standardized nomenclature to facilitate regulations,

procurement, supply, trade and tracking of medical devices as well as to promote patient safety. Although 10 countries of the Region use a standardized system, only five use an internationally recognized system *(412)*. Additionally, although many countries in the Region have an essential medicines lists, only nine countries have an approved list of priority or essential medical devices for procurement or reimbursement *(412)*.

Thus, significant work is needed to strengthen regulatory systems for medical devices in the Region to promote equitable access to quality, safe and affordable medical products as part of countries' commitment to UHC. WHO is collaborating with the Saudi Arabian Food and Drug Authority, a WHO Collaborating Centre, on building the capacity of the national regulatory authorities in the Region. Also, an essential priority medical devices list for primary care is being developed for the Region. This list is based on the regional UHC priority benefits package.

21.7 Blood and other products of human origin

Blood and other products of human origin are essential components in the proper management of patients with bleeding, severe anaemia, blood and bone marrow disorders and immunodeficiency conditions; patients undergoing advanced medical and surgical procedures; and those requiring cell, tissue and organ replacement therapies. A safe, equitable, sustainable supply of these products is a key component of a health system. The Region collects 8.8 million whole blood donations, with whole blood donation rates ranging from 0.3 to 25 units per 1000 population *(413)* across the Region's countries. However, access to organs, tissues and cells is generally limited across the Region *(414)*.

As in other areas of good governance, efforts are needed to improve national policy and regulations for blood and other products. Some progress is being made in countries in the Region. Egypt and the Islamic Republic of Iran have initiated work in assessing national regulatory capacity for the regulation of blood. Pakistan is revising their national blood policy and establishing a plasma project to use recovered and source plasma for fractionation to meet the needs for plasma-derived medicinal products. Libya has established a national authority for blood transfusion services and Egypt is setting up the National Blood Monitoring Council, which supports national blood regulatory activities. Egypt also started a national plasma project in collaboration with partners; finalized the national blood transfusion standards; and launched a pilot project to enhance community engagement to achieve 100% voluntary blood donation.

Strengthening regulation and developing national programmes for the effective governance of blood and other products of human origin, building quality assurance programmes, improving the safety and efficacy of transfusion and transplantation services and improving data collection systems to inform safe transfusion and transplantation practices are some of the priority areas of work *(413)*. WHO is collaborating with the French Biomedicine Agency in developing a regional strategic framework on donation and transplantation.

22 Digital health

22.1 Role of digital health in the future of health systems

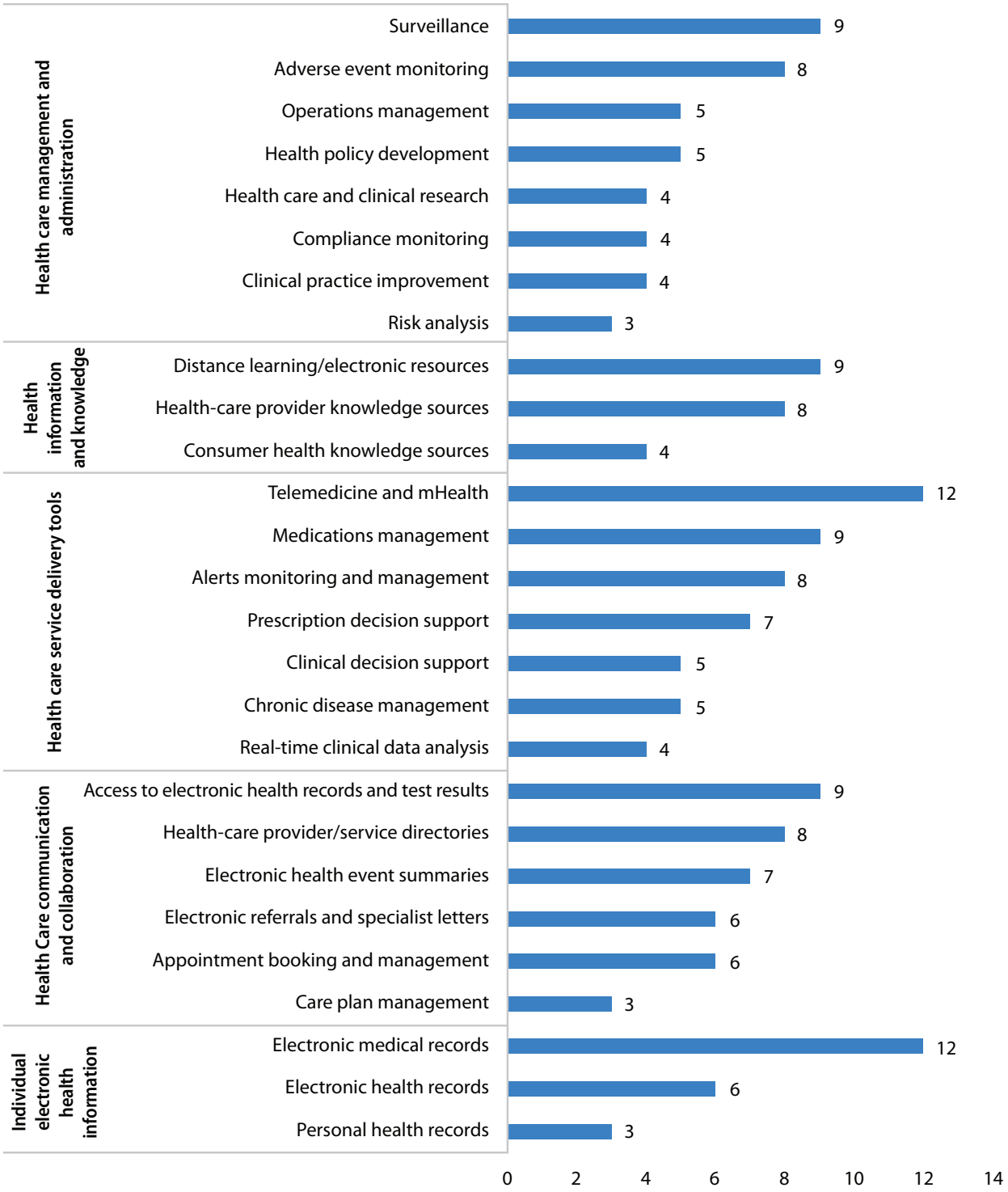
Digital technologies have the potential to accelerate human progress; technology-enabled processes can expand access to services and accelerate progress to meeting the health-related SDGs *(415)*. As highlighted in the preamble to the WHO Regional strategy for fostering digital health in the Eastern Mediterranean Region (2023–2027) *(416)*, digital health can strengthen and improve the accessibility, quality, efficiency and cost–effectiveness of national health systems, enhancing health care delivery and systems through seamless connectivity and access to health information. Digital technologies can help to increase coverage of health services including in remote, rural and migrant settings, as well as to enhance emergency response and improve monitoring of processes and outcomes. Many of these aspects are particularly important in the Eastern Mediterranean Region, where several Member States are experiencing socioeconomic inequalities and ongoing emergencies.

The opportunities and challenges of digital health were particularly highlighted during the COVID-19 pandemic response *(417)*. These included the implementation costs of digital health, weak and fragmented governance, data security, privacy, lack of protection against risks from improper use, and language barriers. WHO surveys in 2021–2022 showed that the majority of Member States of the Region have some relevant policies, strategies and/or legislation in place; however, a minority of countries fully realized the potential of digital health applications during the pandemic and only seven countries have a national digital health strategy *(416)*. Strategic direction is needed to fully realize the potential of digital health in the countries and territories of the Region.

Digital transformation in the health sector empowers health systems through the interaction of two pillars: health information systems for data management and health intelligence targeting evidence-informed policies and decisions *(418)* and digital health solutions and applications which help align multisectoral stakeholder efforts to improve the accessibility, quality, efficiency and cost–effectiveness of health services and products targeting people (including consumers and providers of health services) *(415)*. In fact, digital technologies represent a key transformation needed to meet the SDGs *(419)*; this need was well-recognized by Member States and led to the development and adoption of the global strategy on digital health in 2020 *(415)* and the regional strategy in 2022 *(416)*. In addition, by 2022, seven countries in the Region reported having a national digital health strategy, while eight more were developing one *(416)*.

A recent WHO Regional survey to assess digital health strategic adoption in countries of the Region found that 14 countries have legislations on data security and citizen privacy, while 12 countries reported using electronic medical records for keeping individual electronic health information and using telemedicine and mHealth as health care service delivery tools. Moreover, digital health was reported to be mostly used for surveillance (nine countries) and adverse event monitoring (eight countries) (Fig. 39).

Fig. 39. Reported number of countries that have adopted digital health applications



Source: WHO Regional Committee for the Eastern Mediterranean (416)

22.2 Lessons learned from the expansion of digital health in response to the COVID-19 pandemic

Innovative digital technologies were used on an unprecedented scale during the COVID-19 pandemic, globally and regionally *(417, 420–422)*. During the first year of the pandemic, they were already supporting the public health response through population surveillance, case identification, contact tracing and evaluation of interventions *(417, 420, 421)*. Digital technology, for example, enhanced country capacity to better monitor the COVID-19 situation for testing, diagnosis or disease trends. Smart phone apps used for tracking, tracing and educating the public about COVID-19 helped inform people about COVID-19 symptomatology and improved surveillance timeliness *(420, 423)*. It is estimated, for example, that the COVID-19 app used in England and Wales averted 1 million cases during its first year *(424)*.

A regional mapping of health-related innovations published in peer-reviewed journals conducted during the first year of the pandemic found that 80% were digital and technology-based products and services including health care delivery, public health informatics and prevention *(420)*. Digital innovations included mobile applications, teleconsultations through hotlines, social media and videoconferencing and web-based platforms *(417, 420)*. For example, telemedicine was used for online consultations, referrals to diagnostics and inpatient care and management; mobile applications were used for diagnosing and managing patients; telehealth applications were used for teaching, diagnosis, management and follow-up; digital inventories and registries were used for home delivery of medicines, especially for NCDs *(417, 420)*.

A WHO survey conducted during 2022 (Table 2) reported that the top digital health applications used for COVID-19 response in countries of the Region were for managing vaccinations (15 countries), telemedicine (8 countries), diagnostic applications (6 countries) and digital contact tracing (6 countries) *(416)*. Although these regional surveys reported use and not health impact, they demonstrate how countries of the Region took the opportunity brought on by the COVID-19 pandemic to rapidly design and adopt digital technologies to expand health care delivery, strengthen health informatics, promote continuity of health care services and improve access to education and training for the health workforce.

Table 2. Digital health service provision in the Region during the COVID-19 pandemic

Type of digital health service provided	Number of countries and territories of the Region reporting provision during the COVID-19 pandemic (out of 22)
Vaccine administration and management systems	15
Telemedicine or telehealth services	8
Diagnosis applications	6
Digital contact tracing	6
Chatbots	4
mHealth	3
Hospital bed dashboards	1

Source: WHO, 2022 (416)

22.3 Digital health as a tool for achieving UHC and SDGs

Digital health has a key role to achieving UHC *(416)*. Digital health strategies enable the interoperability needed to support people-centred health services by moving from disease siloes to integrated health systems that can deliver UHC. Telehealth, including teleradiology, telepathology and remote patient monitoring, offer distance health services that can enable greater equity in coverage. National electronic health record systems have the potential to provide clinicians with access to every patient at the point of care, which can improve the quality and timeliness of care and provide better data on the effectiveness and coverage of interventions *(425)*. Prioritizing investment in digital health in support of PHC and UHC is a priority action in the global and regional digital health strategies *(415, 416)*.

Digital health can support delivering more and better services to more people while reducing the financial burden *(426)*. Regional examples provide insight into these possibilities: DoctHERS, a hybrid health care model, and Sehat Kehani, an app and web portal, connect over 40 000 people in remote areas to qualified home-based female physicians in Pakistan. GIS being used to estimate access to health facilities over time in Yemen *(426)*. However, limited and weak regulatory policies represent some of the major barriers to the use of digital health *(417, 420)*.

In Islamic Republic of Iran, electronic medical records provide accurate managerial and administrative information; however, incompleteness of diagnosis and treatment data hinders the quality of services *(427)*. A large number of digital initiatives strengthening reproductive, maternal, newborn and child health services in Jordan and occupied Palestinian territory (including East Jerusalem) have the potential to promote equitable access to health services for these critical population groups but require stronger regulatory mechanisms to protect patient privacy and data security *(428)*. Establishing national digital architecture regulations and plans and using standards to achieve interoperability are some of the priority governance issues addressed by the global and regional digital health strategies. By using a systems approach, where health system strengthening is informed by the digital health capacity user's needs and demands, the efficient provision of quality patient-centred services would be improved *(415)*.

The regional strategy provides key recommendations for action (Table 3). A digital health strategy must be a core part of the broader national health strategy and priorities, to help to ensure that it is successful and that all health care strategies are interlinked and mutually supportive. Health system strengthening programmes should be informed by the needs for digital health capacity. These needs are not limited to hardware or Internet provision; rather, a systems approach will link specific digital health applications to user needs and demands and aim to reinforce the provision of efficient and quality care. Key stakeholders should be engaged in developing the national digital health strategy and its implementation plans, with clear and adequately defined roles for various institutions.

Table 3. Summary of strategic objectives and proposed activities in the regional strategy

Strategic objective	Proposed activities
(1) Strengthening digital health governance, norms and standards at regional, national and subnational levels	Assessment of country priorities with respect to digital health, as well as existing norms, standards, systems, infrastructure, and policies Supporting evidence generation, based on identified priorities, in support of digital health policy-making, and developing national digital health architecture, actions and investment plans Developing digital health governance mechanisms, including legislative and ethical frameworks, linked to countries' digital transformation situation, maturity, infrastructure, facilities, data security and resources (human, logistic, financial and so on)
(2) Advocating for digital health systems and networks that are people-centred, based on regional and national analysis, and supported and enabled by digital technologies, services and applications	Identifying gaps, priorities and resources needed for developing and sustaining digitally-enabled people-centred health systems Monitoring trends in digital technologies and applications that have good potential for supporting health systems and services Fostering the adoption of digital solutions that are consistent with WHO clinical, public health and data recommendations, including people-centred interoperability standards and technical specifications Supporting community-based models that support and advocate health promotion and prevention, rather than disease control and management only
(3) Advancing the development, implementation and evaluation of national digital health strategies, consistent with digital health maturity and linked to advancing national capacities and digital health literacy	Conducting national situation analysis, and identifying related priorities Drafting and disseminating national strategies and action plans with roadmaps Identification and inventory of national activities, digital applications and services and projects Development of national digital health architecture blueprint, investment roadmaps, performance indicators and maturity level assessment
(4) Promoting regional and national stakeholder collaboration towards advancing digital transformation, knowledge translation and innovation	Identification of national/international stakeholders and academic partners Building the necessary infrastructure for intersectoral collaboration and dialogue, collaborative activities (communities of practice, exchange of good practices and lessons learned, policy briefs and so on) Developing and sharing digital health literacy and awareness building programmes Defining priority needs and fostering digital health innovations, as linked to available resources, with special emphasis on modern applications (including robotics, artificial intelligence and management of big data).

Source: WHO, 2022 (416)

Many countries do not have enough university-level programmes related to digital health and health informatics for training qualified digital health workers. Similarly, the recruitment and retention of such professionals may be challenging. Programmes should also include continuous education for health professionals in the areas of digital health and innovation to ensure that wider capacity for programmes is in place. Multistakeholder partnerships and protocols for cooperation between the health sector and other sectors involved in digital health implementation are also key *(416)*.

23 Health data and health information systems

23.1 The health information system as the backbone of a functioning health system

Accurate, timely and comparable health-related statistics are indispensable for understanding population health trends *(429)*. Decision-makers need this information to develop appropriate policies, allocate resources, prioritize interventions and monitor and evaluate the public health situation, health care delivery and outcomes. They also need reliable data that can reveal information about the performance of the health sector, the provision of services as well as their use by different groups in the society *(80)*. Household and facility surveys provide valuable information on health status, health determinants and risks, health needs and health-seeking behaviour. The key source of data for health care use and needs are routine sources such the PHC and hospital information systems, disease surveillance and registry programmes *(430)*, health insurance related data, pharmacy and laboratory services data systems. Whether these services are provided by the public or the private sector, good data are indispensable for the efficient running of the system, and to inform public health and national policies.

Unfortunately, in many countries of the Region, routine health information systems (HISs) do not perform efficiently and surveys are used as stopgaps rather than in preplanned and systematic manners, resulting in data gaps for many key health-related indicators. These problems are further aggravated by the deficiencies in the civil registration and vital statistics data, mainly in areas of birth registration, death registration and confirmation of the causes of death. In addition, the data systems do not provide enough disaggregation to be able to monitor and enhance the health systems in response to inequities resulting from socioeconomic, gender, ethnic and geographical factors *(431)*. Improvement in health information not only relies on the generation and collection of valid data, it also requires the appropriate management and analysis of the data. The strengthening of HISs is a priority for WHO in the Eastern Mediterranean Region, as highlighted in Vision 2023 *(356)* and the latest WHO policies and strategies *(432)*.

23.2 Initiatives for establishing and strengthening effective HISs

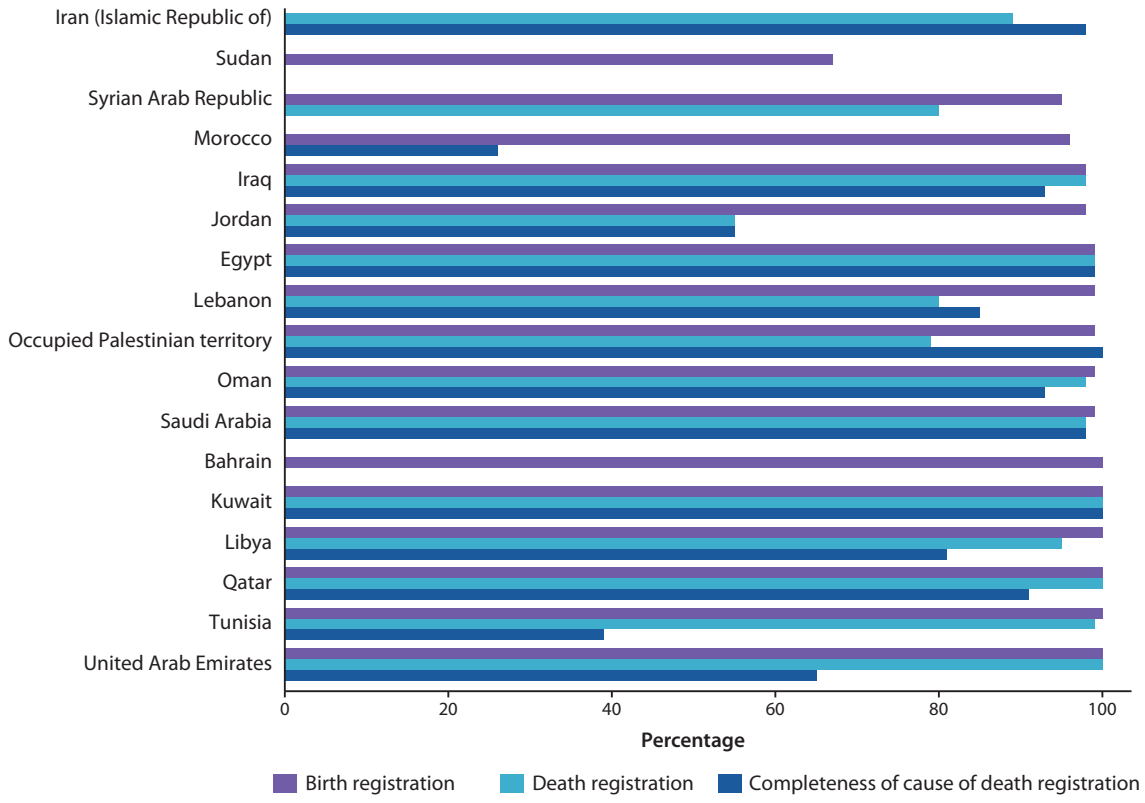
23.2.1 Civil registration and vital statistics

Within the context of the 2030 Agenda for Sustainable Development, countries are encouraged to generate reliable data to track progress and inform decision-making. Since the Regional Committee for the Eastern Mediterranean decisions in 2012 and 2013 on strengthening HISs (EM/RC59/R.3) and civil registration and vital statistics (EM/RC60/R.7), respectively, there have been notable improvements in the registration of births, deaths and causes of death *(433, 434)*. As part of the civil registration and vital statistics agenda, a regional strategy was developed and implemented in 2014–2019 *(435, 436)*. Assessments of civil registration and vital statistics systems were conducted in all countries of the Region, and road maps and improvement plans were developed for all countries. These resulted in notable improvements in birth and death registration and in the quality of reporting of causes of death. In 2013, birth registration completeness ranged from 0% to 100% in different countries of the Region, with a regional weighted average of 62%. Death registration also ranged from 0% to 100%, but with a weighted regional average of 23%. By 2018, the timely registration of births and deaths in the Region had reached 70% and 54%, respectively *(356)*.

In 2023, all countries of the Region had birth registration systems, although the level of coverage varied widely. Coverage of birth registration is 76.8% in the Region (Fig. 40). All countries of the Region have a mechanism for death registration with different levels of efficiency and coverage. In half of the countries, the coverage of death registration is 80% or above (Fig. 40). Since 2020, 14 countries have reported mortality data disaggregated by cause of death based on the International Classification of Diseases, 10th revision (ICD-10) and/or total deaths by age and sex, with data completeness of causes of death above 60% *(33)*, based on the data of the last available year *(80)*. However, most countries of the Region still have considerable challenges in the confirmation and accurate reporting of causes of death. Improving the data on causes of death should remain among the highest data related priorities for countries of the Region as this affects national policies and underpins several key health indicators that guide the national agenda *(437)*.

Due to the need to assess the true impact of COVID-19 on mortality, the Region mobilized technical resources to strengthen the timely and more frequent aggregation and reporting of total deaths by age and sex *(199)*. The WHO Regional Office coordinated the dissemination of standards of total death registration and training on the use of an excess mortality calculator and establishment of a mortality surveillance system. Despite delays in reporting of cause of death data due to overstretched health systems, the aggregation and registration of total deaths due to all causes provided a base for calculating excess mortality compared with the pre-pandemic period. In fact, 55% of countries provided at least one data set of annual total deaths disaggregated by age and sex for the pandemic period.

Fig. 40. Birth, death and completeness of cause of death registration (%), 2017–2021



Source: WHO (2022) (80, 278)

23.2.2 Routine HIS

Ongoing initiatives in the Region focus on improving the privacy and accuracy of data collection and data processing, including implementing electronic information systems in countries. Since 2015, Jordan has been implementing an innovative national programme called the Interactive Electronic Reporting System with support from WHO. The programme includes modules on communicable diseases, NCDs, mental health, pandemic influenza preparedness and event-based surveillance. The system also covers refugees residing in Jordan and has a specific module on foreigner screening to monitor the status of TB, HIV and hepatitis B among refugees. In Lebanon, since 2017, WHO has supported the development and scale-up of an information technology platform (DHIS2) *(438)*. The goal of the platform is to support existing surveillance sites at all PHC centres within the Ministry of Public Health network, as well as in laboratories, hospitals, private clinics and schools, and to support establishing new surveillance sites *(181)*.

In 2018, the 65th session of the Regional Committee adopted resolutions EM/RC65/R.2 and EM/RC65/R.3, which urged Member States to strengthen HISs, encompassing the private as well as the public sector *(439, 440)*. In 2019, resolution EM/RC66/R.5 urged countries to ensure systematic approaches to enhancing use of data as part of evidence-informed decision-making for health *(441)*. Recently, the HIS agenda has been expanded to include the Primary Health Care Measurement Initiative and to develop a similar approach to support hospital information systems. Following the release of the 11th revision of the International Classification of Diseases (ICD-11), work has been undertaken to support its adoption in countries as the basic standard for data reporting on mortality and morbidity *(442)*. This work is being expanded to encompass the International Classification of Health Interventions released in 2020. Technical support is being provided to ensure that all health-related data systems are based on these global approaches and WHO-sanctioned standards for health data *(443)*.

WHO will continue its efforts to support the countries of the Region in strengthening national HISs. This includes comprehensive HIS assessments, developing national HIS strategies, improving national capacity in death certification and analysis, ICD coding, enhancing the reporting of routine data at hospital and primary care levels and strengthening disease surveillance. WHO has also expanded its efforts to improve facility information systems at the PHC level, as well as hospital information systems *(444)*. Such programmes are key to ensure countries have access to the needed information for decision-making at local and national levels.

23.2.3 PHC and integrated disease surveillance

In October 2021, the 68th Regional Committee of the Eastern Mediterranean Region adopted the Regional Strategy for Integrated Disease Surveillance: Overcoming data fragmentation in the Eastern Mediterranean Region. Effective integrated disease surveillance entails good governance and multisectoral coordination to organize the convergence of disease and programme-specific surveillance systems towards integration. The regional strategy for integrated disease surveillance aims to guide Member States in strengthening and integrating their national surveillance systems and outlines 10 areas of work (governance; guidance; information technology; financing; infrastructure; human resources; tools and forms; data analysis and dissemination; public health laboratory support; and quality assurance and monitoring and evaluation) with key WHO outputs, country outcomes and indicators to measure progress. This strategy will allow Member States to clarify the objectives of their national surveillance systems and guide them in the adoption and application of standardized procedures and tools. It will also feed into regional and global efforts to strengthen collective public health intelligence.

Since the adoption of the regional strategy, an Integrated Disease Surveillance Technical Working Group has been established with the endorsement of the WHO Regional Director to provide strategic support to Member States. Discussions have been initiated between WHO headquarters and the WHO Regional Office for the Eastern Mediterranean regarding the development of integrated disease surveillance guidelines and training materials. WHO has provided technical support to Member States, including deploying epidemic intelligence from open sources in 12 countries to strengthen public health event detection capacity, supporting 10 countries in developing national guidelines and standard operating procedures for event-based surveillance, conducting a desktop review of the surveillance systems in seven countries and providing DHIS2 support to five countries and supporting Pakistan and Somalia to establish and implement integrated surveillance systems with plans to extend this to other countries. In 2024, WHO hopes to deploy the DHIS2 surveillance module to countries in the Region and a regional meeting was scheduled for May 2023 to facilitate the development of integrated disease surveillance implementation roadmaps.

23.2.4 Hospital information systems

Information and information exchange are critical to the delivery of health care *(445)*. A hospital information system plays a vital role in delivering care by supporting administration, clinical and medical activities and monitoring and evaluation. The administration function includes the management of appointments and physician's schedules, patient and provider reminders, and the management of resources from hospital beds to personnel, pharmacy, laboratory and inventory. It also enables the management of finances, billing, payments and health insurance claims. Clinical and medical activities require information management to store and retrieve patient records, clinical notes and test results. Further, providers need access to the latest evidence and clinical guidelines and decision-support tools when delivering care. Finally, hospital information systems also serve the purpose of evaluating hospital performance and monitoring population health by reporting data to a higher level where they are aggregated into regional and national figures.

Recent developments in the HIS landscape provide opportunities which, if leveraged, can increase the efficiency, safety and quality of health care delivery as well as reduce inequalities in access to services and health outcomes. These opportunities include the implementation of electronic medical records, the availability (in some countries) of health insurance claims data, the potential to link clinical and service utilization data with other data sources (for example, census data measures of poverty and other socioeconomic indicators) and linking hospital information systems with clinical guidelines and clinical decision-support tools.

In 2021, a study was conducted to gain insights into the strengths, weaknesses, and potential of HIS in the WHO Eastern Mediterranean Region *(446)*. The study found strong evidence of individual country efforts to establish HIS and develop infrastructure and standards to advance interoperability. These concerted efforts to advance HIS are not confined to the wealthiest and most politically stable countries in the Region; rather, all countries surveyed or interviewed are making strides towards enhanced HIS. For some countries, this also involves efforts to develop and deploy electronic medical records on a wider scale.

The spectrum of variation in the level of functionality and interoperability of the hospital information systems in the Region varied widely, both between but also within countries (e.g. private versus public hospitals). In countries with fewer resources, hybrid systems (paper and electronic) prevail in which data are most often collected in paper forms at the lowest level and

digitalized at the district level. The digitalized data are mostly aggregated data rather than patient level data. In quite a few countries (particularly those at earlier stages of HIS strengthening), the private sector reported minimal data to the Ministry of Health (e.g. only vaccination data). The use of standards such as ICD coding needs to be strengthened in a number of countries, not just the ones at earlier stages of information system strengthening.

In conclusion, hospital information systems are essential information management platforms to deliver quality health care and a key source of data to monitor national, regional (Vision 2023) and global health care targets (SDGs and the GWP13). The Regional Office will continue to support countries in their own unique journeys towards strengthening their hospital information systems through health information assessments and strategy development as well as technical assistance in the implementation of reforms to strengthen such systems.

23.2.5 Interoperability and linkages between information systems

The 2030 Agenda for Sustainable Development highlights the role of information and communications technology and global interconnectedness in accelerating human progress, bridging the digital divide and developing knowledge societies. Strategic and innovative use of digital health solutions will be a key enabling factor in meeting WHO's triple billion targets included in its Thirteenth General Programme of Work, 2019–2023 *(415)*. Despite the increased growth in digital health solutions in most LMICs in the last few decades, many of these interventions focus on specific programmes, such as HIV or malaria, or different aspects of the health system, such as disease surveillance and clinical records, resulting in fragmented information systems *(447)*.

Interoperability refers to the ability of two or more information systems or components to exchange information based on standards, and to use the information that is exchanged. Interoperability also enables different information systems to work together in and across organizational boundaries to promote the health status of individuals and communities and improve service delivery *(447)*. Interoperability and data linkages between information systems enables faster, more efficient and more reliable information exchange, which ultimately increases access to health data across a range of devices and has the potential to improve service delivery, reduce medical errors and optimize health outcomes for individuals and communities.

Although a number of countries in the Region are implementing interventions towards fully interoperable systems, most of these interventions are scattered and localized. Challenges for interoperable system development in most countries of the Regions is limited architecture and expertise at the national level, lack of standard guidelines for system development and legislation limiting data sharing and exchange.

Improving the integration and interoperability of the routine HIS should be based on four guiding principles *(429)*. The national HIS should include comprehensive facility-based information. Service management at facilities and subnational levels requires interoperability between the central integrated HIS platform and other data sources for regular data exchange. Summary health statistics should be available on the central integrated platform, making data accessible to all different users. These routine systems should use unique identification and a national comprehensive master facility list.

Achieving interoperability of HISs is a long-term goal for the Region. Although challenges exist in the Region to develop interoperable systems, some countries have well-established systems, such as the Al-Shifa hospital management information system in Oman. The interconnected

system, designed collaboratively with users and producers of data by the Ministry of Health, follows international standards for data exchange *(448)* and provides a model and architecture for interoperability for countries of the Region. Tools are available that can help countries identify gaps in their existing digital health systems and then develop a roadmap for addressing these needs based on the HIS Interoperability Maturity Model *(447)*.

23.3 National household and facility surveys

Most countries in the Region suffer from a lack of long-term plans for the conduct of national household and facility surveys. As result, it is not uncommon to see that such surveys are concentrated in certain years interspersed with substantial time gaps when several years pass without a necessary survey. This usually occurs as a result of external donor interests (in countries relying on external support) or because of changes in responsibilities and management within a country. In any case, this is a key challenge. Therefore, WHO has started a programme to provide technical support to countries in planning their surveys, ensuring they are appropriately based, that overlaps remain limited and survey capacities are used to respond to wider needs for data by ensuring programme coordination and consultation *(449)*. Such coordinated surveys have been conducted in few countries of the Region, including Bahrain, Islamic Republic of Iran, Kuwait, Qatar and Sudan *(438)*.

The COVID-19 pandemic delayed the conduct of population-based household surveys. Since 2022, countries have begun to prepare for new rounds of household examination surveys to update indicators of population health including risk factors, health care utilization, health expenditure, housing, socioeconomic, children's health, reproductive health, disability, as well as overall health and well-being indicators. Bahrain, Kuwait, Saudi Arabia and United Arab Emirates are at different stages of preparation for a new round of national health examination survey for nationals and non-nationals. WHO is providing technical support for the preparation of survey methods including sampling and questionnaires and field implementation. There is an ongoing need in low resource countries to assess the distribution and functionality of health facilities due to the ongoing risk of limited availability of medicines and equipment and readiness of health staff to provide quality services; thus, WHO has developed a harmonized health facility assessment survey tool for this purpose. Somalia has completed data collection in two regions, Banadir and Puntland, with ongoing work in South-West State. Djibouti and Sudan were preparing to conduct the same tasks.

23.4 Comprehensive HIS assessment as a tool for strategic planning for national progress

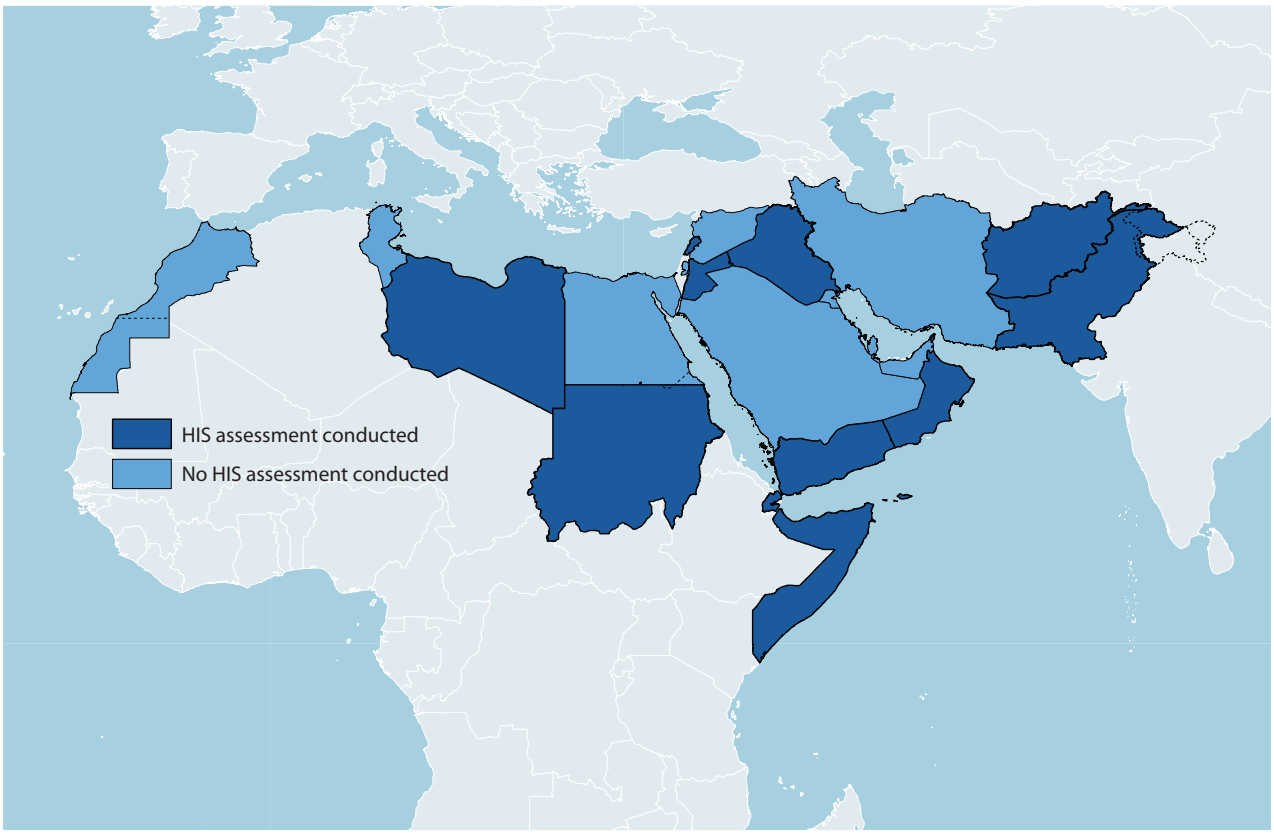
As part of its strategic aim to maximize positive impact in countries, WHO works to enhance national HISs through a range of activities such as enhancing the collection of data and other information and the development of strategic plans to guide investments. One of the strategic initiatives is the comprehensive assessment of national HISs, which has been conducted at the request of the ministries of health in half of the countries of the Region since 2016 (namely in Afghanistan, Djibouti, Iraq, Jordan, Lebanon, Libya, Oman, Pakistan, Somalia, Sudan and Yemen (Fig. 41). The comprehensive HIS assessment is a situation analysis made through document reviews, site visits and national stakeholder meetings aimed at informing the development of HIS strategic plans. The assessments are aimed at reviewing the different sources of data for HIS; identifying areas for improvement particularly on information flow and systems-level use of

data; providing an understanding of data sources content, data elements, associated reporting burden and how these information systems are used and by whom; studying the existing governance structures, HIS functions, infrastructure and support mechanisms to sustain the generation of high-quality data; and developing action plans in line with global and regional HIS standards, indicator frameworks and guidelines.

Some of the reports from these assessments are publicly available *(448)*. These assessments have led to the development of costed national action plans to improve country health data systems and improve the quality and availability of data for decision-making. For example, in Jordan, Libya, Pakistan, Sudan, Somalia and Yemen, the assessments were followed by the development of a costed national HIS strategy.

Future work will focus on supporting Member States to address the remaining HIS challenges with. In particular, countries will be supported to develop national survey plans to promote the regular and focused implementation of population-based surveys; implementation of DHIS-2 to enhance the collection, processing, analysis and reporting of health data; and enhancing civil registration and vital statistics systems to improve the availability and quality of data on cause of death.

Fig. 41. **Implementation of comprehensive HIS assessment for strategic planning in the countries of the Region, 2016–2022**



Disclaimer: The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

24 Research capacity and governance for health

24.1 Research governance

Health research evidence is vital to improve health policies and practices, prioritize researchareas, resources and the workforce and generate high-quality, convenient and feasible research outputs for priority agendas *(450)*. Shaping the research agenda and stimulating the generation, translation and dissemination of valuable knowledge is one of WHO's core functions, as also highlighted in a key WHO resolution in 2019 *(451)*. Harnessing the power of science and research is among the frequent key priorities of WHO five-year plans *(3)*. Research has been identified as vital for streamlining the evidence base that informs health policy-making in WHO's strategy for the Eastern Mediterranean Region 2020–2023; and it includes two main strategic directions: investing in research capacity for regional and national priorities; increasing national capacity for ethical oversight of research and improving research standards *(452)*.

Globally, the importance of research in health and research capacity is increasingly being recognized, especially as part of the COVID-19 pandemic response *(453)*. In the Region, there is an increasing trend in biomedical and health research *(450, 454, 455)*. Between 2004 and 2018, research production in the Region increased from 1.0 to 6.0 articles per 100 000 population *(450)*. However, only five countries contribute to most published articles (Egypt, Islamic Republic of Iran, Pakistan, Saudi Arabia and Tunisia). The top 25 institutions published 43% of all biomedical and health research, while three academic institutions alone produced over 10% of the research *(450)*. Most publications (78%) were affiliated with academic institutions in the Region *(455)*. Even in countries with a larger production of health research, priority topics including health systems requirements may not be adequately addressed, there might be imbalance in the geographical coverage of research in the country or certain sectors of the populations might not be adequately studied to provide evidence for decision-making *(456)*.

The need to strengthen national health research systems is well-recognized by researchers in the Region *(450, 454, 457, 458)*. Although a wide array of population and public health research is being conducted in the Region, misalignment with national health research priorities remains a challenge *(450, 458)*. This limitation along with the lack of coherent national research strategies, policies and regulations, limited research capacity to generate policy-relevant information in many countries of the Region, limited funding and low demand for and use of evidence for policy decisions are some of the key challenges *(450, 453, 457, 459)*. Despite research management systems and the capacity to carry out research encompassing a wide range of areas of public health in some research or academic institutions, a large portion of researchers have reported the lack of a national strategy for health research and poorly articulated national health research priorities *(450, 460–462)*.

More specifically, mapping exercise on health research governance in the Region conducted in 2021 identified challenges and opportunities. Sixteen countries (72.7%) have a health research governance mechanism in the ministry of health, 12 countries (54.5%) have national research

ethics committees with policies and procedures but only four have a national research legal framework. Nine countries (40.9%) have a national regulatory body for the mandatory registration of clinical trials but only two countries (9.09%) reported regularly registering their clinical trials in a registry linked to the WHO International Clinical Trial Registry Platform *(463)*. Fewer than half (38%) of the countries were signatories of the Trade-Related Aspects of Intellectual Property Rights Agreement and only one country (4.5%) reported having intellectual property rights within its national health research legal framework. Clearly defining the responsibilities and jurisdiction of health research governance entities, empowering them for implementation through political-regulatory support, stakeholder acceptability and ownership of mandates, and ensuring adequate resources, qualified-credible professionals and funding and materials are key priorities. Additionally, strengthening national health research systems in the Region will involve building institutional capacities to plan, implement, use and promote research, setting national health research priorities, raising awareness on the importance of evidence-informed health policy-making and developing knowledge translation products and evidence briefs and other methods to scale-up dissemination of research findings *(450)*.

24.2 Funding and capacity for health research

Every year, billions of dollars are spent on research and developing new or improved health products, technologies, medicines, vaccines, diagnostics and assistive devices. However, in LMICs, funding is not in alignment with public health needs with only 0.2% of all direct grants by major funding agencies allocated for biomedical research *(464)*. In the Region, in a recent WHO survey only half the countries reported the availability of public health research funding, public–private partnerships for health research funding and government incentives for private sector investment in health research. Among research institutions in the Region, limited internal funding and lack of grant management systems, mismatch between funding opportunities and priorities and the sustainability of funding are among barriers to research funding. The shortage of health researchers and difficulty in retaining qualified researchers and research assistants probably reflect funding challenges *(457)*.

Low investment in research funding may be due to limited awareness of the importance of health research in improving health systems and public health. It may also be due to the lack of national strategies and policies governing health research and health research priorities *(457)*. More important is the financial inability of countries, especially LMICs, to allocate national budget for health research, along with weak institutional capacity to attract funds for health research from international funding agencies *(457)*. Numerous calls have been made to increase funding for health research including calling countries to invest at least 2% of national health expenditure, 2% of WHO funds at country level and 5% of development assistance funds in essential national health research *(451)*. During the COVID-19 pandemic, WHO substantially expanded its support for key research studies conducted in countries in the Region, such as for small scale studies in response to regional calls for responding to priority areas, support for the conduct of surveys at country level, the conduct of the solidarity trial for assessing COVID-19 therapeutics and major studies to assess COVID-19 vaccines' effectiveness in the countries of the Region *(199, 465)*. All these efforts were accompanied with a strong national capacity-building element that enhanced countries' capacity to respond to other research needs. Such efforts should continue. The World Health Assembly made a renewed call in May 2023 for expanding the conduct of key research studies, including randomized controlled trials, especially in LMICs, and ensuring priority areas are addressed within them *(466)*.

24.3 Research ethics

Research ethics govern the standards of conduct for scientific researchers, ensuring adherence to ethical principles to protect the dignity, rights and welfare of research participants *(467)*. At the national level, national ethics or bioethics committees are established to provide advice and guidance *(468)*. Advances have been made to build national capacity in research ethics in the Region. A majority of health research institutions in the Region have research ethics boards (which can have various names, including ethics review committees, research ethics committees, institutional review boards, etc.), particularly when it comes to public health as well as clinical research *(450, 457)*. Three WHO collaborating centres on bioethics are hosted by regional institutions, in Beirut, Lebanon (American University of Beirut – Salim El-Hoss Bioethics Professionalism Programme), Karachi, Pakistan (Sindh Institute of Urology & Transplantation – Centre of Bioethics and Culture) and Tehran, Islamic Republic of Iran (Tehran University of Medical Sciences – Centre of Medical Ethics and History of Medicine). Such centres support the agenda of bioethics via a wide array of capacity-building activities and webinars and by contributing to research and modern applications of ethics (e.g. ethics of artificial intelligence, vector-borne diseases and genome editing) on regional and global scales.

The work of ethics in the Region is also backed by close collaboration between WHO and other related UN agencies, especially UNESCO. The two agencies support bioethics in general and research ethics in particular through collaborating on the work of the Eastern Mediterranean Research Ethics Review Committee, planning and conducting webinars and capacity-building activities, fostering the development of national ethics/bioethics committees in the Member States of the Region, as well as contributing to global and regional bioethics meetings, including three regional bioethics meetings held in the past five years: 2017 (Oman), 2019 (Egypt) and 2023 (Oman).

24.4 Research impact and its role in policy-making

Certain types of research are more responsive to addressing policy questions. Such studies may not be of paramount priority for the research institutions unless they are actively promoted. Policy-makers demand and request for research evidence is also a limiting factor *(469)*. Enhancing the application and understanding of knowledge translation concepts could provide further opportunities for the promotion of research capacity and demand for its outputs *(470)*. Health research mapping can be used to observe advances in policy-related activities. Political commitment to use research evidence for decision-making in the Region reflects the increased understanding and importance of evidence for policy-making *(451)*. However, lack of financial support and academic capacity, as discussed earlier, represent some of the challenges for increasing health research on national priorities. Limited engagement of research institutions in national priority-setting exercises and their weak methodology are also barriers *(450, 457)*. At the same time, limited evidence suggests many research studies may not have their intended impact *(470)*. While research impact is not limited to its effect on decisions and policies, further research study is needed to guide national policies and governance mechanisms for health research. WHO strongly promotes open access publication, in order to ensure the advancement of knowledge remains available to all regardless of financial resources and without barriers *(471)*. In the Region, there are several open access journals that provide the opportunity for publication of research findings. Within the WHO, the Eastern Mediterranean Health Journal is a monthly, open access, peer-reviewed health research journal which is focused on public health priorities *(472)*.

Nevertheless, opportunities exist to strengthen health research in the Region with respect to enhancing research governance mechanisms, national research prioritization, appropriate funding of health research priorities, robust research ethics capacities and mechanisms and national capacities in fields related to health research. Bridging the gap between evidence-generating institutions and policy-makers and nurturing the culture of using evidence for sound health policy-making is discussed further in Section 25.

25 Institutionalizing evidence-informed policy-making

25.1 Multiconcept approach for institutionalizing evidence-informed policy-making at the national level

The Eastern Mediterranean Region has made significant progress in institutionalizing evidence-informed policy-making. An integrated multiconcept approach, endorsed by the Regional Committee in 2019, was developed to bring different sources of evidence and approaches of evidence to policy together to strengthen national institutional capacity for evidence-informed policy-making (Fig. 42). This aims to enhance decision-making approaches that take into account the best available evidence for effective interventions *(451)*. While many countries have adopted parallel approaches to evidence-informed policy-making, this multiconcept approach recommends moving towards an integrated approach to streamline national policy-making and better utilize limited resources.

25.2 The Network of Institutions for Evidence and Data to Policy

The Network of Institutions for Evidence and Data to Policy is a regional network formally launched by the WHO Regional Office for the Eastern Mediterranean in 2021. Its mission is to facilitate the development and implementation of evidence-informed policies and practices through strengthening national capacity for the generation and use of research, evidence and data and for knowledge translation. The network aims to promote collaboration among institutions in the Region to share knowledge and expertise in evidence-informed policy-making. The network

Fig. 42. Integrated multiconcept approach for evidence-informed policy-making for health

has brought together 32 member institutions (including research and academic institutions, ministries of health and a few civil society organizations) working at the national level in 21 of the 22 countries/territories in the Region. In addition, 13 renowned regional and global institutions from Belgium, Canada, Egypt, Islamic Republic of Iran, Lebanon, Netherlands, Norway, Saudi Arabia, Switzerland, United Kingdom of Great Britain and Northern Ireland and United States of America are also part of the network as supporting institutions.

25.3 Use of data and evidence for policy

The Index Medicus for the Eastern Mediterranean Region provides access to research published in national languages or in academic journals not listed in the main international databases of academic literature *(473)*. It includes more than 200 000 citations from about 700 peer-reviewed health and biomedical science journals published in 20 countries of the Region. Limited availability of research evidence for policy-making due to the obscurity or inadequacy of studies conducted in countries in the Region and the availability and use of consolidated sources of evidence such as systematic reviews of published literature are key challenges for evidence-based policy-making *(469)*.

Although the importance of using evidence in health policy is recognized, knowledge translation is hampered by limited interaction between researchers and policy-makers during the policy-making process; lack of institutional and financial incentives to support knowledge translation; political sensitivity of some research findings; practical constraints to implementation; and non-receptive policy environments. An assessment of the status of institutional capacity for evidence-informed policy-making conducted with 68 senior policy-makers (including former ministers of health) and senior policy developers within health ministries and academia from all 22 countries/territories of the Region in 2018–2019 found that the limited national capacity was a key challenge to evidence-informed policy-making (Box 1).

Box 1. Summary of perception of senior policy-makers within health ministries and academia in the Region, 2018–2019 (n = 68)

Evidence-informed policy-making is understood and viewed favourably in the Region *(451)*[9]

- 90% believed that their organizations support the use of research evidence in decision-making;
- 69% believed that their organizations support the professional development of policy analysts;
- 74% reported regular attendance in meetings on policy development.

Limited availability of resources and capacity for evidence-informed policy-making are important challenges

- 90% of their organizations had five or fewer policy analysts;
- 79% of their organizations had conducted five or fewer research projects that addressed national needs to support health policy-making;
- 51% believed that their organizations provide adequate support for evidence-informed policy-making.

[9] Percentages in brackets are the percentage of respondents who supported the action.

Despite global calls for action, work on knowledge translation and utilization of evidence in policy-making is still limited in the Region. Policy-makers often do not collaborate with researchers; many believe that research evidence is not being delivered at the right time or it does not contain actionable messages *(451, 474)*. Only a small fraction of researchers and policy-makers in the Region report that evidence products such as policy briefs are developed and used systematically in national priority-setting activities *(451, 458, 475)*. A framework for enhancing institutional capacity for evidence-informed policy-making for health in countries of the Region was endorsed by the Regional Committee in October 2019 *(441)* followed by the regional action plan for implementation of the framework published in 2021 *(476)*. The regional action plan paved the way for consolidated action at regional and national levels in 2020–2024.

25.4 Enhancing technical capacity and partnership for evidence-informed policy-making

WHO efforts to promote evidence-informed policy-making in the Region have focused on enhancing technical capacities and partnerships by delivering capacity-building and training programmes to policy developers, policy-makers, researchers and other stakeholders. A publicly available web-based training package launched in April 2022 and includes a flow chart specific to the needs of researchers and policy-makers, which guides users through 13 subject areas relevant to evidence-informed policy-making.

A key strategy for WHO is to enhance support for the development and adaptation of evidence-based guidelines in the Region. WHO supported the adaptation of selected clinical practice guidelines in Qatar in collaboration with King Saud University and the establishment of a national guideline programme in Egypt.

In January 2023, WHO developed a rapid advice tool for country action on evidence-informed policy-making to support countries in identifying the best national modalities for evidence-informed policy-making. This tool outlines a set of priority actions to support the institutionalization of evidence-informed policy-making, including the development of a national action plan. The recommended priority actions are based on the country context and align with the strategic priorities of the regional action plan *(476)*.

Various institutions dedicated to evidence-informed policy-making processes have been established in the Region, such as the Knowledge Management Centre, Morocco, the Evidence to Policy Unit, Ministry of Health, Kuwait, the National Program for Guideline Development and Adaptation, Egypt and the National Institute of Health and Department of Policy and Planning, Ministry of Health, Somalia. However, sustained efforts are needed to strengthen national and regional technical capacities for evidence-informed policy-making and address the challenges of limited resources, low political will and weak policy-making structures and processes.

25.5 Lessons learned from country experiences in use of evidence in decision-making in response to the COVID-19 pandemic

The COVID-19 pandemic revealed the crucial necessity of sufficient evidence to inform decisions and effectively respond to the emergency while taking into consideration a specific country's needs, priorities and resources. To enhance evidence-informed policy-making capacity during the pandemic, since 2021 WHO has supported an initiative for implementing a

regional COVID-19 vaccine efficacy study through enhancing technical capacity, strengthening research infrastructures and leveraging existing surveillance systems in four countries (Egypt, Islamic Republic of Iran, Jordan and Pakistan). The benefits of establishing a sustainable regional COVID-19 vaccine efficacy network through capacity-building among Members States are manifold; the most important of these include ensuring the reliability of study results, achieving higher statistical power through pooling data across national studies and generating more accurate vaccine efficacy estimates – all of which ultimately contribute towards efficient evidence-informed policy-making for immunization programmes on a national and regional level.

To showcase how countries used global and local evidence and data to inform the policy-making process in response to COVID-19 challenges, 15 case studies were jointly developed by members of the Regional Network of Institutions for Evidence and Data to Policy, representatives of ministries of health and other institutions with 13 countries (Afghanistan, Islamic Republic of Iran, Jordan, Libya, Morocco, occupied Palestinian territory (including East Jerusalem), Oman, Pakistan, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic and Yemen). Lessons learned from these case studies include the importance of community engagement, stakeholder involvement, multisectoral approaches and support from high-level authorities. Decision-makers often relied on evidence and relevant public health bodies during the pandemic, indicating a growing demand for evidence in the Region. Effective communication with all stakeholders, including traditional and social media, was crucial for raising awareness, increasing compliance and avoiding misinformation. In addition to the engagement of policy-makers, orienting the media through capacity-building workshops and creating standardized formats to communicate emerged as successful strategies to counter the infodemic and reduce misunderstandings. The trust and involvement of the local authorities and the community facilitated appropriate health-seeking behaviour and population adherence to the policies implemented. Adaptation of global guidelines to local contexts was also important for effective implementation of COVID-19 responses.

26 Coordination and collaboration among United Nations agencies and other partners

WHO's five-year plan and the regional Vision 2023 calls for solidarity and joint action on health for all by all and better engagement with health stakeholders to advance towards health and well-being. Over the years, the WHO Regional Office for the Eastern Mediterranean has been working with UN agencies, parliamentarians, civil society including the media and academia, and the private sector to strengthen their engagement in health sector decision-making and monitoring of progress both at regional and country levels. Partner coordination and engagement mechanisms enabled WHO, partner agencies and countries to deliver more efficiently and collaboratively for the COVID-19 pandemic response *(190)*.

In 2019, the Communication, Resource Mobilization and Partnership programme was established in the Regional Office to improve WHO strategic positioning and expand collaborative and support networks. By 2022, a comprehensive partner mapping with recommendations was completed, and strategic dialogues were held with existing partners that paved the way for more structured engagement. In addition, discussions are under way in establishing new regional partnerships, including with the Abu Dhabi Agriculture and Food Authority, Al Maktoum Foundation and the Eastern Mediterranean Public Health Network. Regional and global partnerships events and meetings were successfully conducted, including the Qatar FIFA Sports and Health Project. Resource mobilization efforts guided by the newly developed regional resource mobilization strategy contributed to raising over US$ 800 million in 2022 and building WHO staff capacity on resource mobilization at the country level. The establishment of the programme also strengthened and expanded communication channels with an increased social media following due to the COVID-19 pandemic. The rolling out of a new communication for health strategy informed by social, behavioural and communication sciences will consolidate achievements and ensure long-term improvements in the provision of credible health information for improved public health outcomes.

The only subregional Member State collaborative health platform, Group 5, was initiated by Islamic Republic of Iran to enhance and strengthen subregional cooperation on health between Afghanistan, Iraq, Islamic Republic of Iran and Pakistan and WHO and established in June 2005. Tajikistan subsequently joined as an observer. Over the years, several meetings to discuss priority health issues and capacity-building training have been conducted in collaboration with WHO on diverse topics, including health system strengthening and improving integrated disease surveillance systems. The countries of the Group recently developed a subregional action plan on the control and prevention of communicable diseases, 2024–2027.

Two key collaborative platforms were established with parliamentarians in 2019. The Regional Parliamentary Forum for Health and Well-being brings together parliamentarians who are working together to address regional strategic public health priorities to advance the health and well-being of their populations. The Regional Forum for Road Safety Legislators was established to set priorities and exchange best practices in road injury prevention as well as advocate for and adopt legislation to improve road safety at all levels.

In 2020, WHO launched the Regional Health Alliance, to harmonize action between regional partners to support progress on the health-related SDGs and implement the *Global Action Plan for Healthy Lives and Well-being for All (477)*. The Alliance comprises 16 partners with WHO acting as the Alliance Secretariat; the partners include the regional offices of UNAIDS, UNDP, UNFPA, UNICEF, UN Women, the World Bank Group and WFP, which are all signatories to the Global Action Plan for Healthy Lives and Well-being for All, as well as IOM, the International Telecommunication Union (ITU), UNESCO, the United Nations Human Settlements Programme (UN-Habitat), UNHCR, the United Nations Industrial Development Organization (UNIDO), the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and UNRWA. Together they implement biannual workplans linked to seven accelerators (i.e. PHC; sustainable financing for health; community and civil society engagement; health determinants; innovative programming in fragile and vulnerable settings; research and development, innovation and access; data and digital health). A gender advisory group facilitates mainstreaming gender in the work of the Alliance. Major undertakings include improving access to quality health services for all through strengthening the PHC approach and enhancing community and civil society engagement and joint work to address needs in emergency countries. Linking with the UN issue-based coalitions is streamlining joint action on the health-related SDGs in the Arab States. Plans aim to further strengthen collaborative work on tackling social determinants of health, promoting healthy environments and addressing climate change and in emergency countries, advocating for health, development and peace as a coherent nexus.

The H6 partnership, signed in September 2017, pulls together six United Nations agencies, related organizations and programmes to improve the health and save lives of women, children and adolescents in response to the *Global Strategy for Women's, Children's and Adolescents' Health (2016–2030)*. The H6 partnership comprises WHO, UNAIDS, UNFPA, UNICEF, UN Women and the World Bank. The objective of this partnership is to support countries in implementing evidence-based, cost–effective interventions with emphasis on quality of care and measurement tools. The H6 partnership is particularly active in Afghanistan, Djibouti, Egypt, Morocco and Pakistan in strengthening coverage of quality reproductive, maternal, newborn, child and adolescent health services.

The UHC Partnership serves as an important platform for collaboration, knowledge sharing and resource mobilization to advance UHC globally, with a particular focus on supporting countries in need of assistance to strengthen their health systems and move closer to achieving UHC. Since its inception in 2011 with seven countries, the UHC Partnership progressively expanded to include 66 countries by 2018 *(478)* and 125 or more, globally, by July 2019 *(479)*. It is funded by the European Commission, France, Ireland, Japan, Luxembourg and the United Kingdom of Great Britain and Northern Ireland. The UHC Partnership is supporting 14 countries/territories (Afghanistan, Djibouti, Egypt, Jordan, Lebanon, Islamic Republic of Iran, Iraq, Pakistan, occupied Palestinian territory (including East Jerusalem), Somalia, Sudan, Morocco, Tunisia and Yemen). The support provided to these countries includes technical expertise, capacity-building, policy development and implementation guidance to help them progress towards achieving UHC, such as developing context-specific PHC-oriented models of care *(480)*.

The Framework of Engagement with Non-State Actors was adopted by the 69th World Health Assembly in 2016 *(481)*. It is the first overarching framework for WHO that governs all types of engagement with all kinds of non-State actors (nongovernmental organizations, private sector entities, philanthropic foundations and academic institutions). Its purpose is to provide a set of rules in order to strengthen and enhance WHO's engagement with non-State actors while reinforcing WHO's management of the potential risks related to these engagements. To strengthen capacity at regional and country levels, WHO has conducted staff training and briefing sessions,

developed an internal electronic tracking system to process requests for due diligence and risk assessments and issued guidance documents. There has been a significant increase in proposed engagements with non-State actors in recent years; they cover a wide range of stakeholders and different types of engagement, such as WHO staff participation in non-State actors meetings and technical collaboration *(482)*.

Partnerships are vital for preventing and minimizing the effects of health emergencies on people's health, communities and economies. Three primary operational partnerships for health emergencies that WHO has worldwide are all engaged in the Region: the Global Outbreak Alert Response Network includes 12 partners; the Emergency Medical Teams Initiative is developing in five countries, and the Global Health Cluster includes over 700 national and international partners in eight countries in the Region, serving over 40 million affected people. These networks are essential for preparing for and responding to emergencies, as well as for ongoing work on the front lines of major crises in the Region. Operational partner platforms were formed in response to the COVID-19 pandemic, cholera outbreaks and the food security crisis in the Horn of Africa. WHO also continues to invest in technical collaborations with academic institutions such as the American University of Beirut and Johns Hopkins University, as well as WHO collaborating centres such as the Central Public Health Laboratory in Oman and the Public Health Authority of Saudi Arabia. The Whole of Syria response in collaboration with WHO's Regional Office for Europe, a new joint emergency action plan with the WHO's Regional Office for Africa and the Africa Center for Disease Control, a seven-country cooperation with the Intergovernmental Authority on Development in the Horn of Africa, are examples of growth in cross-regional partnerships in emergency preparedness and response.

Civil society plays a vital role in raising awareness among a variety of audiences, including the general public, marginalized populations and government stakeholders. The COVID-19 pandemic demonstrated the importance of civil society as a key partner in multisectoral approaches to promote health. The increased acceptability of civil society's role in the multicultural context of the Region provides a good foundation to broaden civil society engagement in addressing the determinants of health, strengthening preparedness and response, improving RCCE, expanding community-based surveillance, increasing access to health care and promoting health *(190, 483–487)*. Although civil society organizations in the Region experience common obstacles in achieving their targets, such as lack of funding and expertise, weak collaboration with academia in generating evidence, inadequate coordination between different organizations and even competition or duplication of efforts and potential conflict of interest in partnerships with industry and industry interference, opportunities exist to expand partnerships to promote Vision 2023, health for all by all *(484)*.

Building leadership capacity of senior decision-makers in ministries of health and WHO Regional Office and country level staff is central to expanding partnership and collaboration and to building solidarity around the regional Vision 2023. WHO, together with the United Nations Systems Staff College, designed several courses for WHO representatives and senior leaders of ministries of health in the Region, including the leadership course on health and well-being conducted at the regional level in February 2019 and subregionally with the GCC in November 2019, and the leadership course on epidemic and pandemic preparedness and response conducted in 2021. In collaboration with Human Impact5, WHO conducted an 11-part training on health diplomacy focusing on leveraging the global policy environment to advance national and regional health issues. It included practical sessions on various items on the global health agenda, including pandemic preparedness and response and sustainable financing at WHO.

27 Conclusion

The world, and the Region, has changed in fundamental ways since the adoption of the SDGs in 2015. Climate change and environmental degradation have accelerated, conflict and protracted emergencies crises have expanded, and science and technology have advanced. The Eastern Mediterranean Region represents almost 10% of the global population and includes many countries facing high rates of material and financial deprivation exacerbated by socioeconomic challenges, including unequal access to education and health care, gender and geographical inequity concerns, environmental risk factors and natural disasters and the COVID-19 pandemic. This regional health profile presents the latest evidence on the health status of the population in the Region and shares examples of country and regional efforts to address health challenges and strengthen health systems, including important lessons learned from the pandemic.

The health status of the population in the Region has seen improvement in some areas but not in others. The maternal mortality ratio, under-5 mortality rate and neonatal mortality rate have dropped substantially in the past 20 years. However, a quarter of the countries in the Region are at risk of not achieving the 2030 global targets in these areas. NCDs are the main cause of death in nearly all countries of the Region and more than 13 million DALYs are lost due to mental disorders. The Region faces a double burden of malnutrition where one in four children are stunted and an increasing number are overweight. Some progress is being made on the priority communicable diseases, such as TB, hepatitis and neglected tropical diseases. The Region experienced several outbreaks of vaccine-preventable diseases due to the drop in immunization coverage caused by the pandemic. Due to its topography, complicated geopolitical situation and large mass gatherings for religious and sporting events, the Region is facing a high risk of emergence of zoonotic and vector-borne diseases.

Countries are increasingly recognizing the importance of using a whole-of-society, whole of-government approach to address their most pressing priorities, whether they be COVID-19, NCDs or AMR, while expanding capacities within the ministries of health and the health sector. Several countries in the Region have developed Health-in-All-Policies strategies and are discussing institutional transformation plans. National institutional capacities are being expanded in countries for evidence-informed policy-making and developments in the use of digital health and information systems all contribute to the advancement towards UHC and ensuring priority needs are equitably met to safeguard health and well-being and leave no one behind. The Healthy Cities programme provides a multisectoral platform for developing health initiatives for a common vision for health and well-being. The One Health approach helps countries address the increasing health risks posed by endemic, emerging and re-emerging zoonoses, food safety risks, AMR and environmental threats.

UHC and health security are essential for a health system to maintain its core functions during a crisis and bounce back to a more efficient one. Although the Region missed its UHC target of ensuring that 100 million more people were covered by 2023, countries made efforts to catch up on COVID-19 service backlogs, recover services and respond to emerging needs. That said, the Region is a low investor in financing health care, which results in a high share of private spending and high out-of-pocket expenditure. Strengthening governance capacity to address health workforce challenges, increasing access to essential medicines and implementing PHC as the

backbone of the Region's health systems would go a long way in making quality health services universally available and affordable.

The COVID-19 pandemic instilled resilience and enabled the mobilization of resources in the countries of the Region. The next few years require bold action to make progress on the SDGs and address the social determinants of health. Advancing UHC requires investing in health; it requires putting health and well-being at the core of government policy-making. Promoting health requires policy coherence and integrated action to maximize efforts across various sectors to address the determinants of health and upstream factors affecting health. In a Region faced by disasters and crises more than other regions, protecting our population requires adopting an all-hazard, whole-of-government approach to public health preparedness and response.

Valuing health for all requires sustained attention and investment in health systems, strengthening public health capacity, building healthy and resilient communities and empowering health workers. The health sector has a role in protecting the environment and should also demand countrywide action towards reducing pollution that threatens the livelihood and health of populations. Putting health at the centre of decision-making at a national level, based on the best available evidence, is key to promoting health. Through regional solidarity, individuals, communities and countries can leverage available technical capacities and financial capabilities in the Region in our collective efforts towards achieving the SDGs.

References[1]

1. World health statistics 2023: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2023 (https://www.who.int/publications/i/item/9789240074323).
2. Progress on the health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2023. Cairo: WHO Regional Office for the Eastern Meditteranean; 2023 (https://applications.emro.who.int/docs/9789292742126-eng.pdf).
3. Thirteenth General Programme of Work, 2019–2025, Report on the outcomes of the Member States consultation process, Report by the Director-General (EB152/28). 2022, World Health Organization: Geneva.
4. World population prospect 2022 [website]. New York: United Nations; 2022 (https://population.un.org/wpp/).
5. Second Arab multidimensional poverty report. Beirut: United Nations Economic and Social Commission for Western Asia; 2023.
6. Build back fairer, Achieving health equity in the Eastern Mediterranean Region; Introducing the Report of the Eastern Mediteranean Region Commission on social determinants of health, Executive brief. WHO Regional Office for the Eastern Mediterranean Region: Cairo; 2021.
7. Global Health Observatory. Geneva: World Health Organization; 2016 (http://apps.who.int/gho/data/node.home).
8. Human Development Report 2021–22, Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World. New York: United Nations Development Programme; 2022 (https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22reportenglish_0.pdf).
9. Al-Yousfi AB, Bakir H, Malkawi M, The environmental health nexuses within the Strategic Roadmap: regional work priorities for the WHO Eastern Mediterranean Region (Editorial). East Mediterr Health J. 2018;24(2):117–118.
10. Malkawi M, Al-Yousfi AB, Mandil AMA, Air quality and health impacts in the Eastern Mediterranean Region: an eye on COVID-19. East Mediterr Health J. 2021; 27(1):3–4.
11. Salalah Declaration on Universal Health Coverage 2018; The Road to Universal Health Coverage in the Eastern Mediterranean Region. WHO Regional Office for the Eastern Mediterranean Region: Cairo; 2018.
12. Tracking universal health coverage: 2021 global monitoring report. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240040618).
13. UHC global monitoring report, 2023. Geneva: World Health Organization; 2023 (https://www.who.int/publications/i/item/9789240080379).
14. Health and well-being profile of the Eastern Mediterranean Region, An overview of the health situation in the Region and its countries in 2019. WHO Regional Office for the Eastern Mediterranean Region: Cairo; 2020 (https://applications.emro.who.int/docs/9789290223399-eng.pdf).
15. Advancing health for all by all, Report on the implementation of Vision 2023 for the Eastern Mediterranean Region (Meeting version). Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
16. Achieving well-being - A draft global framework for integrating well-being into public health utilizing a health promotion approach (draft). Geneva: World Health Organization; 2022.
17. Geneva charter for well-being. Geneva: World Health Organization; 2022 (https://www.who.int/publications/m/item/the-geneva-charter-for-well-being).
18. Regional Committee for the Eastern Mediterranean resolution EM/RC69/6 on promoting health and well-being in the Eastern Mediterranean Region: moving from theory to action to achieve the health-related Sustainable Development Goals. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022.

[1] All references were accessed on 22 December 2024.

19. Improving health literacy [website]. Geneva: World Health Organization; 2023 (https://www.who.int/activities/improving-health-literacy).
20. Health literacy development for the prevention and control of noncommunicable diseases: Volume 4. Case studies from WHO National Health Literacy Demonstration Projects. Geneva: World Health Organization; 2022.
21. Wikkeling-Scott LF, Ajja RJY, Rikard RV. Health literacy research in the Eastern Mediterranean Region: an integrative review. Int J Public Health. 2019. 64(4):523–533.
22. Sarhan MBA, Fujiya R, Kiriya J, Htay ZW, Nakajima K, Fuse R, Jimba M. Health literacy among adolescents and young adults in the Eastern Mediterranean region: a scoping review. BMJ Open. 2023. 13(6):e072787.
23. Anwar WA, Mostafa NS, Hakim SA, Sos DG, Cheng C, Osborne RH, Health literacy co-design in a low resource setting: harnessing local wisdom to inform interventions across fishing villages in Egypt to improve health and equity. Int J Environ Res Public Health. 2021. 18(9):4518.
24. Regional Committee for the Eastern Mediterranean technical paper EM/RC69/6 on promoting health and well-being in the Eastern Mediterranean Region: moving from theory to action to achieve the health-related Sustainable Development Goals. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://applications.emro.who.int/docs/Promoting-health-well-being-EMR-eng.pdf?ua=1).
25. Community health workers: a strategy to ensure access to primary health care services. Cairo: WHO Regional Office for the Eastern Mediterranean; 2014.
26. Regional Committee for the Eastern Mediterranean technical paper EM/RC66/3 on a regional implementation framework on ending preventable newborn, child and adolescent deaths and improving health and development. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
27. Abubakar A, Khan W, Abou El Naja H, Al Ariqi L, Bélorgeot VD, Hauck SJ. COVID-19 pandemic response in the WHO Eastern Mediterranean Region. BMJ Global Health. 2022;7(Suppl 3):e008782.
28. De Leeuw E, Simos J. Healthy cities: the theory, policy, and practice of value-based urban planning. New York: Springer; 2017.
29. Regional healthy city network [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (https://applications.emro.who.int/hcn/).
30. De Leeuw E. A brief overview of healthy cities evidence [website]. Sydney: Glocal Health Consultants; 2015 (https://glocalhealthconsultants.com/a-brief-overview-of-healthy-cities-evidence/).
31. Handbook of civil society case studies: noncommunicable disease prevention and control in the Eastern Mediterranean Region. Geneva: NCD Alliance; 2017.
32. Global Health and Peace Initiative (GHPI), Fifth draft of the roadmap. Geneva: World Health Organization; 2023.
33. The work of WHO in the Eastern Mediterranean Region, Annual Report of the Regional Director, 2018. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/9789290222781-2019-en.pdf?ua=1).
34. The work of WHO in the Eastern Mediterranean Region, Annual Report of the Regional Director 2017. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://applications.emro.who.int/docs/RD_Annual_Rep_2018_20507_EN.pdf).
35. Nikoloski Z, Wannis H, Menchini L, Chatterjee A. Primary healthcare and child and maternal health in the Middle East and North Africa (MENA): A retrospective analysis of 29 national survey data from 13 countries. SSM Popul Health. 2021;13:100727.
36. Ghattas H, Acharya Y, Jamaluddine Z, Assi M, El Asmar K, Jones AD. Child–level double burden of malnutrition in the MENA and LAC regions: Prevalence and social determinants. Matern child nutr. 2020;16(2):e12923.
37. Joulaei H, Keshani P, Ashourpour M, Bemani P, Amiri S, Rahimi J, Salehi-Abargouei A. The prevalence of stunting among children and adolescents living in the Middle East and North Africa region (MENA): A systematic review and meta-analysis. J Glob Health. 2021;11:04070.

38. Ghiasvand H, Mohamadi E, Olyaeemanesh A, Kiani MM, Armoon B, Takian A. Health equity in Iran: A systematic review. Med J Islam Repub Iran. 2021;35:51.
39. Boutayeb A. Social determinants of health and adolescent childbearing in WHO Eastern Mediterranean countries. Int J Equity Health. 2023;22(1):78.
40. Situation analysis of gender and health in the Eastern Mediteranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
41. GEO-6 regional assessment for West Asia. Nairobi: United Nations Environment Programme; 2016.
42. Atwoli L, Baqui AH, Benfield T, Bosurgi R, Godlee F, Hancocks S, Vázquez D. Call for emergency action to limit global temperature increases, restore biodiversity and protect health: Wealthy nations must do much more, much faster. Int J Epidemiol. 2021;50(6):1761–1764.
43. Landrigan PJ, Fuller R, Acosta NJR, Adeyi O, Arnold R, Basu N, Zhong M. Lancet Commission on pollution and health. Lancet;2018;391(10119):462–512.
44. Household air pollution [website]. Geneva: World Health Organization. 2022; (https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health).
45. Regional Committee for the Eastern Mediterranean resolution EM/RC66/7 on accelerating regional implementation of the Political Declaration of the Third High-level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases, 2018. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://iris.who.int/bitstream/handle/10665/371121/EMRC667-eng.pdf?sequence=1&isAllowed=y).
46. WHO ambient air quality database, 2021 update. Geneva: World Health Organization; 2021 (https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database).
47. Akasha H, Ghaffarpasand O, Pope FD. Climate change, air pollution and the associated burden of disease in the Arabian Peninsula and neighbouring regions: A critical review of the literature. Sustainability. 2023;15(4):3766.
48. Progress report on the regional plan of action for implementation of the roadmap for an enhanced global response to the adverse health effects of air pollution. Cairo: WHO Regional Office for the Eastern Mediterranean; 2017 (https://applications.emro.who.int/docs/RC_technical_papers_2017_inf_doc_3_20013_en.pdf).
49. Compendium of WHO and other UN guidance on health and environment, 2022 update. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/WHO-HEP-ECH-EHD-22.01).
50. WHO global strategy on health, environment and climate change: the transformation needed to transform lives and well-being sustainably through healthy environments. Geneva: World Health Organization; 2020 (https://iris.who.int/bitstream/handle/10665/331959/9789240000377-eng.pdf).
51. Progress report on health, the environment and climate change. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/RC_Technical_Papers_2019_Inf_Doc_2_en.pdf).
52. Global chemicals outlook II. From legacies to innovative solutions: implementing the 2030 Agenda for Sustainable Development. Nairobi: United Nations Environment Programme; 2019.
53. Poisons centre training manual, training materials for poisons information staff (Trainer's Version). Geneva: World Health Organization; 2013 (https://iris.who.int/handle/10665/329502).
54. World health statistics 2019: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2019 (https://www.who.int/publications/i/item/9789241565707).
55. Boedeker W, Watts M, Clausing P, Marquez E. The global distribution of acute unintentional pesticide poisoning: estimations based on a systematic review. BMC Public Healt., 2020;20(1):1875.
56. Alberreet MS, Ferwana MS, AlSalamah MA, Alsegayyir AM, Alhussaini AI, Alotaibi YM, Alkewaibeen AM. The incidence and risk factors of carbon monoxide poisoning in the Middle East and North Africa: Systematic Review. 13(2). J Health Inform Developing Countries. 2019;3(2).
57. Chemicals road map. Geneva: World Health Organization; 2017 (https://www.who.int/publications/i/item/WHO-FWC-PHE-EPE-17.03).

58. Guidelines for establishing a poison centre. Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/9789240009523).
59. WHO global strategy for food safety 2022–2030: towards stronger food safety systems and global cooperation. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/9789240057685).
60. WHO global strategy for Food Safety 2022-2030 - update of status (CX/CAC 21/44/15 Add.3). Joint FAO/WHO Food Standards Programme Codex Alimentarius Commission Forty-fourth Session, 2021 (https://www.fao.org/fao-who-codexalimentarius/sh-proxy/it/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-701-44%252FWorking%2BDocuments%252Fcac44_15%2BAdd3e.pdf).
61. Foodborne Disease Burden Epidemiology Reference Group [website]. Ghent: Foodborne Disease Burden Epidemiology Reference Group (https://www.foodbornediseaseburden.org/ferg/estimates).
62. Philippe V, Neveen A, Marwa A, Ahmad Basel A-Y. Occurrence of pesticide residues in fruits and vegetables for the Eastern Mediterranean Region and potential impact on public health. Food Control. 2021;119:107457.
63. Hajat S, Proestos Y, Araya-Lopez J-L, Economou T, Lelieveld J. Current and future trends in heat-related mortality in the MENA region: a health impact assessment with bias-adjusted statistically downscaled CMIP6 (SSP-based) data and Bayesian inference. Lancet Planet Health. 2023;7(4):e282-e290.
64. 64. Thiébault J-P, Moatti S. The Mediterranean region under climate change: a scientific update. Marseille: IRD Éditions/AllEnvi; 2016.
65. Mahase E. The climate emergency could be the ultimate health opportunity, says WHO's Maria Neira. BMJ. 2023;383:2217.
66. Wyns A. COP27 establishes loss and damage fund to respond to human cost of climate change. Lancet Planet Health. 2023;7(1):e21-e22.
67. Regional Committee for the Eastern Mediterranean resolution EM/RC70/R.5 on climate change, health and environment: a regional framework for action, 2023–2029. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://applications.emro.who.int/docs/Climate-change-RC70-eng.pdf).
68. The Somali health and demographic survey 2020. Mogadishu: Somalia National Bureau of Statistics; 2020.
69. Federal Ministry of Health (Sudan), Sudan S3M II (2018): Report of a Simple Spatial Surveying Method S3M II in Sudan. 2018, Federal Ministry of Health (Sudan),: Khartoum.
70. Yemen SMART Survey 2021–2022. Geneva: UN Office for the Coordination of Humanitarian Relief.
71. Egypt family health survey 2021. Cairo: Central Agency for Public Mobilization and Statistics; 2021.
72. Nutrition in times of crisis. Beirut: Lebanon Nutrition Sector; 2022.
73. Nutrition fact sheet. Khartoum: UNICEF Sudan; 2022.
74. Mediterranean health observatory [website]. Cairo: WHO Regional Office for the Eastern Meditteranean; 2022 (https://rho.emro.who.int/data-r).
75. UNICEF, World Food Programme, United Nations Food and Agriculture Organization. Call to action to address maternal and child undernutrition in the Middle East and North Africa, Eastern Mediterranean and Arab regions. Cairo: WHO Regional Office for the Eastern Meditteranean; 2022.
76. UNICEF data: Monitoring the situation of children and women [website] (https://data.unicef.org/).
77. Al Jawaldeh G, Sayed A. Implementation of the International Code of Marketing of Breast-milk Substitutes in the Eastern Mediterranean Region. East Mediterr Health J. 2018;24(1).
78. Al-Jawaldeh A, Abul-Fadl A. Assessment of the baby friendly hospital initiative implementation in the eastern Mediterranean region. Children. 2018;5(3):41.
79. Strategy on nutrition for the Eastern Mediterranean Region 2020–2030. Cairo: WHO Regional Office for the Eastern Meditteranean; 2020 (https://applications.emro.who.int/docs/9789290222996-eng.pdf).
80. Monitoring health and health system performance in the Eastern Mediterranean Region 2022. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://iris.who.int/handle/10665/372999).

81. Regional framework for action to implement the United Nations Political Declaration on Noncommunicable Diseases (NCDs), including indicators to assess country progress by 2030. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
82. Progress report on accelerating regional implementation of the Political Declaration of the Third High-level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases, 2018. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://iris.who.int/bitstream/handle/10665/346441/EMRC68INFDOC8-eng.pdf?sequence=1&isAllowed=y).
83. WHO global report on trends in tobacco smoking 2000–2025. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/348537/9789240039322-eng.pdf?sequence=1).
84. WHO report on the global tobacco epidemic 2021: addressing new and emerging products. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/343287/9789240032095-eng.pdf?sequence=1).
85. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC67/1 on the annual report of the Regional Director for 2019. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020 (https://applications.emro.who.int/docs/EMRC67R1-eng.pdf).
86. Global status report on physical activity 2022. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/363607/9789240059153-eng.pdf?sequence=1).
87. Global Action Plan on Physical Activity, 2018– 2030. Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/272722/9789241514187-eng.pdf?sequence=1).
88. Active people healthier lives in the Eastern Mediterranean Region, 2018– 2030. Cairo: WHO Regional Office for the Eastern Meditteranean; 2022.
89. FAOSTAT [website]. Rome: Food and Agriculture Organization (FAO). (https://www.fao.org/faostat/en/#data).
90. Policy statement and recommended actions to lower national salt intakes and lower death rates from high blood pressure and strokes in the Eastern Mediterrean Region. Cairo: WHO Regional Office for the Eastern Meditteranean; 2014
91. Powles J, Fahimi S, Micha R, Khatibzadeh S, Shi P, Ezzati M, D Mozaffarian. Global, regional and national sodium intakes in 1990 and 2010: a systematic analysis of 24 h urinary sodium excretion and dietary surveys worldwide. BMJ Open, 2013. 3(12):e003733.
92. Al-Jawaldeh A, Taktouk M, Naalbandian S, Aguenaou H, Al Hamad N, Almamary S, Hoteit M. Sugar reduction initiatives in the Eastern Mediterranean Region: A systematic review. Nutrients, 2022;15(1):55.
93. Nasreddine L, Ayoub JJ, Al Jawaldeh A. Review of the nutrition situation in the Eastern Mediterranean Region. East Mediterr Health J. 2018;24(1).
94. Regional Committee for the Eastern Mediterranean technical paper EM/RC65/6 Rev. 1 on promoting health and well-being. Cairo: WHO Regional Office for the Eastern Meditteranean; 2018 (https://applications.emro.who.int/docs/RC_Technical_Papers_2018_6_20540_EN.pdf?ua=1).
95. Al-Jawaldeh A, Taktouk M, A Chatila, Naalbandian S, Al-Thani A-AM, Alkhalaf MM, Binsunaid FF. Salt reduction initiatives in the Eastern Mediterranean Region and evaluation of progress towards the 2025 global target: a systematic review. Nutrients. 2021;13(8):2676.
96. Global database on the implementation of nutrition action (GINA) [online database] (https://extranet.who.int/nutrition/gina/).
97. Health system profile Oman. Cairo: WHO Regional Office for the Eastern Meditteranean; 2006 (http://hinfo.humaninfo.ro/gsdl/healthtechdocs/documents/s17304e/s17304e.pdf).
98. Al-Jawaldeh A, Hammerich A, Doggui R, Engesveen K, Lang K, McColl K. Implementation of WHO recommended policies and interventions on healthy diet in the countries of the Eastern Mediterranean region: from policy to action. Nutrients. 2020;12(12):3700.
99. Al-Jawaldeh R, Megally A. Impact evaluation of soft drink taxes as part of nutrition policies in Gulf Cooperation Council countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. F1000Research. 2021;9:1287.

100. Al-Jawaldeh A, Taktouk M, Chatila A, Naalbandian S, Abdollahi Z, Ajlan B, Alobaid R. Systematic review of trans fat reduction initiatives in the Eastern Mediterranean Region. Front Nutr. 2021:965.
101. Abul-Fadl A, Farghaly NF, Alsumaie MA, Bozo M, Al-Jawaldeh A. Satisfaction with code implementation and baby-friendly practices in the Eastern Mediterranean region: Health professional perspectives from 15 countries. Indian J Child Health. 2021;8(2).
102. Global status report on alcohol and health 2018. Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/274603/9789241565639-eng.pdf?sequence=1).
103. Diabetes mellitus and chronic kidney disease in the Eastern Mediterranean Region: findings from the Global Burden of Disease 2015 study. Int J Public Health. 2018;63(Suppl 1):177–186.
104. Framework for action on diabetes prevention and control in the WHO Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021.
105. Boutayeb A, Boutayeb S, Boutayeb W. Multi-morbidity of non communicable diseases and equity in WHO Eastern Mediterranean countries. Int J Equity Health. 2013;12(1):1–13.
106. Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings. Geneva: World Health Organization; 2010 (https://iris.who.int/bitstream/handle/10665/334186/9789240009226-eng.pdf?sequence=1).
107. HEARTS: technical package for cardiovascular disease management in primary health care: risk-based CVD management. Geneva: World Health Organization; 2020 (https://iris.who.int/bitstream/handle/10665/333221/9789240001367-eng.pdf?sequence=1).
108. Political declaration of the third high-level meeting of the General Assembly on the prevention and control of non-communicable diseases, and mental health. Geneva: World Health Organization; 2023 (https://apps.who.int/gb/ebwha/pdf_files/EB152/B152_6-en.pdf).
109. Hammerich A. How are countries dealing with their current cardio-vascular disease burden? A snapshot from the WHO Eastern Mediterranean Region (EMR). Glob Cardiol Sci Pract. 2018;2018(1):1.
110. Estimated number of new cases in 2020, World, both sexes, all ages (excl. NMSC) [website]. Lyon: International Agency for Research on Cancer (https://gco.iarc.fr/today/online-analysis-table?v=2020&mode=cancer&mode_population=continents&population=900&populations=900&key=asr&sex=0&cancer=39&type=0&statistic=5&prevalence=0&population_group=0&ages_group%5B%5D=0&ages_group%5B%5D=17&group_cancer=1&include_nmsc=0&include_nmsc_other=1, accessed 5 April 2023).
111. Fadhil I. Introduction. In: Cancer control Eastern Mediterranean Region. Woodbridge, UK: Global Health Dynamics; 2022.
112. Hammerich A, Lodge M, Hajjeh R, Fadhil I, Pourghanzian N, Fouad HM. Cancer control in the Eastern Mediterranean Region. In: Eastern Mediterranean Region Special Report. Cairo: WHO Regional Office for the Eastern Meditteranean; 2022:7.
113. Lyons G, Sankaranarayanan R, Millar AB, Slama S. Scaling up cancer care in the WHO Eastern Mediterranean Region. East Mediterr Health J. 2018;24(1):104–110.
114. Regional framework for action on cancer prevention and control. Cairo: WHO Regional Office for the Eastern Meditteranean; 2017.
115. Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M,. A Abdelalim. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10258):1204–1222.
116. Song P, Adeloye D, Salim H, Dos Santos JP, Campbell H, Sheikh A, Rudan I. Global, regional, and national prevalence of asthma in 2019: a systematic analysis and modelling study. J Glob Health. 2022;12:04052.
117. Asthma [website] Cairo: WHO Regional Office for the Eastern Meditteranean (https://www.emro.who.int/health-topics/asthma/index.html).
118. Masjedi M, Ainy E, Zayeri F, Paydar R. Assessing the prevalence and incidence of asthma and chronic obstructive pulmonary disease in the Eastern Mediterranean Region. Turk Thorac J. 2018;19(2):56–60.

119. Forum of International Respiratory Societies. The global impact of respiratory disease, second edition. Sheffield: European Respiratory Society; 2017.
120. Global oral health status report: towards universal health coverage for oral health by 2030. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/9789240061484).
121. Kale S, Kakodkar P, Shetiya S. Prevalence of dental caries among children aged 5–15 years from 9 countries in the Eastern Mediterranean Region: a meta-analysis. East Mediterr Health J. 2020;26(6):726–735.
122. Elamin A, Garemo M, Mulder A. Determinants of dental caries in children in the Middle East and North Africa region: a systematic review based on literature published from 2000 to 2019. BMC Oral Health. 2021;21(1):1–30.
123. Abuhaloob L, MacGillivray S, Mossey P, Freeman R. Maternal and child oral health interventions in Middle East and North Africa regions: a rapid review. Int Dent J. 2019;69(6):409–418.
124. World mental health report: transforming mental health for all. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/356119/9789240049338-eng.pdf?sequence=1).
125. World drug report 2022. Vienna: United Nations Office on Drugs and Crime; 2022 (https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2022.html).
126. Global action plan on the public health response to dementia 2017–2025. Geneva: World Health Organization; 2017 (https://iris.who.int/bitstream/handle/10665/259615/9789241513487-eng.pdf?sequence=1).
127. Epilepsy: a public health imperative. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/325440/WHO-MSD-MER-19.2-eng.pdf?sequence=1).
128. GBD Results Tool. In: Global Health Data Exchange [website]. Seattle, WA: 2019 (http://ghdx.healthdata.org/gbd-results-tool?params=gbd-api-2019-permalink/5066348dc958b095cb6ceb4bfd9c3e07).
129. Charlson F, van Ommeren M, Flaxman A, Cornett J, Whiteford H, Saxena S. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. Lancet. 2019;394(10194):240–248.
130. WHO Global Health Observatory. Global health estimates: Leading causes of DALYs [website]. Geneva: World Health Organization (https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys).
131. Global Health Estimates 2019: Deaths by cause, age, sex, by country and by region, 2020–2019. Geneva: World Health Organization; 2020.
132. Suicide worldwide in 2019: Global health estimates. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/341728/9789240026643-eng.pdf?sequence=1).
133. Preventing suicide: a global imperative. Geneva: World Health Organization; 2014 (https://iris.who.int/bitstream/handle/10665/131056/9789241564779_eng.pdf?sequence=1).
134. Mental health action plan 2013–2020. Geneva: World Health Organization; 2013 (https://iris.who.int/bitstream/handle/10665/89966/9789241506021_eng.pdf?sequence=1).
135. mhGAP intervention guide for mental, neurological and substance use disorders in non-specialized health settings, version 2.0. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/250239/9789241549790-eng.pdf?sequence=1).
136. Integrating mental health in primary health care package. Cairo, WHO Regional Office for the Eastern Mediterranean; 2023 (https://www.emro.who.int/mnh/publications/integrating-mental-health-in-primary-health-care-package.html).
137. Integration of mental health in primary health care [online course]. Cairo, WHO Regional Office for the Eastern Mediterranean; 2023 (https://moodle.emro.who.int/enrol/index.php?id=228).
138. Saraceno B, Gater R, Rahman A, Saeed K, Eaton J, Ivbijaro G, Underhill C. Reorganization of mental health services: from institutional to community-based models of care. East Mediterr Health J. 2015;21(7):477–85.

139. Barry MM, Clarke AM, Petersen I. Promotion of mental health and prevention of mental disorders: priorities for implementation. East Mediterr Health J. 2015;21(7):503–11.
140. Regional Committee for the Eastern Mediterranean progress report EM/RC68/INF.DOC.3 on scaling up mental health care: a framework for action resolution. Cairo: WHO Regional Office for the Eastern Meditteranean; 2021.
141. World drug report 2021. Vienna: United Nations Office on Drugs and Crime; 2021 (https://www.unodc.org/unodc/en/data-and-analysis/wdr2021.html).
142. Regional Committee for the Eastern Mediterranean resolution EM/RC66/8/R.7 on a regional framework for action to strengthen the public health response to substance use. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/RC66-R7-eng.pdf?ua=1).
143. Substance use atlas 2021. Cairo: WHO Regional Office for the Eastern Meditteranean; 2023 (https://applications.emro.who.int/docs/9789292740764-eng.pdf?ua=1).
144. Regional Committee for the Eastern Mediterranean resolution EM/RC66/R.7 on the regional framework for action on substance use. Cairo: WHO Regional Office for the Eastern Meditteranean; 2019 (https://applications.emro.who.int/docs/RC66-R7-eng.pdf).
145. Global status report on road safety 2018. Geneva: World Health Organization; 2018 (https://www.who.int/publications/i/item/9789241565684).
146. Road safety in the Eastern Mediterranean Region: facts from the global status report on road safety 2015. Cairo: WHO Regional Office for the Eastern Mediterranean; 2015 (https://applications.emro.who.int/docs/EMROPUB_2017_EN_19676.pdf).
147. Violence against women prevalence estimates, 2018: global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/341337/9789240022256-eng.pdf?sequence=1&isAllowed=y).
148. First gender-based violence strategic plan launched in Iraq. Baghdad: United Nations; 2022.
149. WHO and Ministry of Health initiate implementation of GBV referral guideline in Iraq, Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
150. Strengthening the health system response to gender-based violence in the Eastern Mediterranean Region [website] Cairo: WHO Regional Office for the Eastern Meditteranean; 2018 (http://www.emro.who.int/violence-injuries-disabilities/violence-events/international-day-eliminating-violence-against-women-2018.html).
151. Summary of key performance indicators, Syria. Damascus: World Health Organization; 2022.
152. Global status report on preventing violence against children. Geneva: World Health Organization; 2020 (https://iris.who.int/bitstream/handle/10665/332394/9789240004191-eng.pdf?sequence=1).
153. Responding to child maltreatment: a clinical handbook for health professionals. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/361272/9789240048737-eng.pdf?sequence=1).
154. Global report on health equity for persons with disabilities. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/9789240063600).
155. Disability in the Arab world 2018. Beirut: United Nations Economic and Social Commission for Western Asia; 2018 (https://www.who.int/publications/i/item/9789240063600).
156. Dizaj JY, Soleimanifar M, Hashempour R, Karyani AK, Mohsen F, Zali ME, Mirzaii H. The burden of musculoskeletal disorders in the countries of the Eastern Mediterranean region of the World Health Organization (EMRO): Study period 2000–2017. 2021.
157. Moradi-Lakeh M, Forouzanfar MH, Vollset SE, Bcheraoui CE, Daoud F, Afshin A, Mokdad AH. Burden of musculoskeletal disorders in the Eastern Mediterranean Region, 1990–2013: findings from the Global Burden of Disease Study 2013. Ann Rheum Dis. 2017;76(8):1365–1373.
158. Zhang Y, Lazzarini PA, McPhail SM, van Netten JJ, Armstrong DG, Pacella RE. Global disability burdens of diabetes-related lower-extremity complications in 1990 and 2016. Diabetes Care. 2020;43(5):964–974.

159. Heydarpour P, Khoshkish S, Abtahi S, Moradi-Lakeh M, Sahraian MA. Multiple sclerosis epidemiology in Middle East and North Africa: a systematic review and meta-analysis. Neuroepidemiology. 2015;44(4):232–244.
160. Children with disabilities in the Middle East and North Africa: A statistical overview of their well-being. New York: UNICEF; 2022.
161. Olusanya BO, Wright SM, Nair M, Boo N-Y, Halpern R, Kuper H, NK Arora. Global burden of childhood epilepsy, intellectual disability, and sensory impairments. Pediatrics. 2020;146(1).
162. Olusanya BO, Davis AC, Wertlieb D, Boo N-Y, Nair MKC, Halpern R, Kassebaum NJ. Developmental disabilities among children younger than 5 years in 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Glob Health. 2018;6(10):e1100-e1121.
163. Assistive technology in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/9789290223030-eng.pdf).
164. GBD 2015 Eastern Mediterranean Region Vision Loss Collaborators. Burden of vision loss in the Eastern Mediterranean region, 1990–2015: findings from the Global Burden of Disease 2015 study. Int J Public Health. 2018;63(1):199–210.
165. Xu Y, Wang A, Lin X, Xu J, Shan Y, Pan X, Shan PF. Global burden and gender disparity of vision loss associated with diabetes retinopathy. Acta Ophthalmol. 2021;99(4):431–440.
166. Warusavithana S, Atta H, Osman M, Hutin Y. Review of the neglected tropical diseases programme implementation during 2012–2019 in the WHO-Eastern Mediterranean Region. PLOS Negl Trop Dis. 2022;16(9):e0010665.
167. Assistive technology in the Eastern Mediterranean Region: results of a rapid assessment. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://iris.who.int/bitstream/handle/10665/333456/9789290223047-eng.pdf?sequence=1&isAllowed=y).
168. Universal eye health: a global action plan 2014–2019. Geneva: World Health Organization; 2013 (https://iris.who.int/bitstream/handle/10665/105937/9789241506564_eng.pdf?sequence=1).
169. World report on vision. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/328717/9789241516570-eng.pdf?sequence=18).
170. Eye care in health systems: guide for action. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/354382/9789240050068-eng.pdf?sequence=1).
171. Executive Board of the World Health Assembly. Integrated people-centred eye care, including preventable vision impairment and blindness, report by the Director-General. Geneva: World Health Organization; 2021.
172. World report on hearing. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240020481).
173. Ear and hearing care. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021.
174. GBD 2019 Hearing Loss Collaborators. Hearing loss prevalence and years lived with disability, 1990–2019: findings from the Global Burden of Disease Study 2019. Lancet. 2021;397(10278):996–1009.
175. Global strategies and plans of action that are scheduled to expire within one year, WHO global disability action plan 2014–2021: better health for all people with disability. Geneva: World Health Organization; 2021.
176. Resolution 74.8. The highest attainable standard of health for persons with disabilities. Geneva: World Health Organization; 2021.
177. Regional Committee of the Eastern Mediterranean information document EM/RC65/12 on the development of a draft global action plan on the health of refugees and migrants. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018.
178. Suzuki E. Newly released data show refugee numbers in 2021 are the highest ever: An update [website]. Washington, DC: World Bank; 2022 ().

179. Mid-year trends 2022. New York: United Nations High Commissioner for Refugees; 2022
180. Sharara E, Akik C, Martini M, J DeJong. Health system considerations related to voluntary and forced displacement in the Eastern Mediterranean Region: a critical analysis of the available literature. East Mediterr Health J. 2021;27(12):1214–1228.
181. Health of refugees and migrants. Situation analysis and practices in addressing the health needs of refugees and migrants: Examples of public health interventions and practices. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018.
182. El Chammay R. Reforming mental health in Lebanon amid refugee crises. Bull World Health Organ. 2016;94(8):564.
183. Jamaluddine Z, Paolucci G, Ballout G, Al-Fudoli H, Day LT, Seita A, Campbell OM. Classifying caesarean section to understand rising rates among Palestinian refugees: results from 290,047 electronic medical records across five settings. BMC pregnancy and childbirth. 2022;22(1):935.
184. Regional Committee for the Eastern Mediterranean item EM/RC69/3 on the annual report of the Regional Director for 2021. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022.
185. International Health Regulations (IHR): consultation discusses regional strategy and plan of action on health of migrants and refugees [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (https://www.emro.who.int/international-health-regulations/ihr-news/promoting-health-of-migrants-and-displaced-populations-in-the-eastern-mediterranean-region.html).
186. Doocy S, Lyles E, Roberton T, L Akhu-Zaheya, Oweis A, Burnham G. Prevalence and care-seeking for chronic diseases among Syrian refugees in Jordan. BMC Public Health. 2015;15:1–10.
187. COVID-19 situation in the Region – total report 2023 2 April 2023 [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://www.emro.who.int/health-topics/corona-virus/index.html).
188. WHO Coronavirus (COVID-19) dashboard [website]. Geneva: World Health Organization (https://data.who.int/dashboards/covid19/cases?n=c).
189. COVID-19 strategic preparedness and response plan: sustaining an effective response to end the acute phase of the pandemic and transitioning to recovery in WHO's Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022.
190. WHO's response to COVID-19 in the Eastern Mediterranean Region. New York: Dalberg Advisors; 2023.
191. COVID-19 pandemic response in the Eastern Mediterranean Region. Progress report of the Incident Management Support Team, 2021. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022.
192. Adib K, Hancock PA, Rahimli A, et al. A participatory modelling approach for investigating the spread of COVID-19 in countries of the Eastern Mediterranean Region to support public health decision-making. BMJ Glob Health. 2021;6:e005207. doi: 10.1136/ bmjgh-2021-005207.
193. Jalal A, Iwamoto K, Gedik G, Ravaghi H, Kodama C. Health workforce capacity of intensive care units in the Eastern Mediterranean Region. PLOS ONE. 2023;18(6):e0286980.
194. Kodama C, Kuniyoshi G, Obaid BAS, Martinez EG, Heinzelmann A, Rashad A, et al. Building critical care capacity for resource-limited countries with complex emergencies in the World Health Organization Eastern Mediterranean Region: Developing and Implementing a Critical Care National Training Program in Yemen. Med Res Arch. 2022;10(10).
195. WHO model list of essential medicines, 22nd list, 2021. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/345533/WHO-MHP-HPS-EML-2021.02-eng.pdf?sequence=1).
196. Kodama C, Salem M, Kuniyoshi G, Koya S, Othman MM, Iwamoto K, et al. Medical oxygen as a life-saving medicine: a rapid review of the oxygen landscape and innovative efforts in the World Health Organization Eastern Mediterranean Region in response to COVID-19 and beyond. Med Res Arch. 2023;11(7.2).
197. Resolution WHA76/3. Increasing access to medical oxygen. In: Seventy-Sixth World Health Assembly, 21–30 May 2023. Geneva: World Health Organization; 2023.

198. International Federation of Red Cross and Red Crescent, United Nations Children's Fund. Regional guiding framework for risk communication and community engagement for the COVID-19 response in the Eastern Mediterranean Region/Middle East and North Africa. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021.
199. Rashidian A, Wu K, Ariqi LA, Aly E, Mandil A, Barakat A, et al. WHO's support for COVID-19 research and knowledge management in the Eastern Mediterranean Region. BMJ Glob Health. 2022;7(Suppl 3):e008737.
200. FY23 List of Fragile and Conflict-affected Situations., Washington DC: World Bank; 2023.
201. Addressing health emergencies in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
202. Palik J, Obermeier AM, Rustad SA. Conflict trends: a global overview, 1946–2021. Oslo: The Peace Research Institute; 2022.
203. Progress report on health issues facing populations affected by disasters and emergencies, including the International Health Regulations (2005). Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://applications.emro.who.int/docs/Progress-report-health-emergencies-IHR-eng.pdf).
204. Hostilities in the Gaza Strip and Israel - reported impact | Day 68 [website]. East Jerusalem: United Nations Office for the Coordination of Humanitarian Affairs; 2023 (https://www.ochaopt.org/content/hostilities-gaza-strip-and-israel-reported-impact-day-68).
205. oPt Emergency situation update, Issue 16. Cairo: WHO Regional Office for the Eastern Mediterranean.
206. WHO appeals for protection of the health system from further attacks and degradation of its capacity. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
207. oPt Emergency situation update, Issue 15. Cairo: WHO Regional Office for the Eastern Mediterranean.
208. WHO's Executive Board adopts resolution on access for life-saving aid into Gaza and respect for laws of war [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://www.who.int/news/item/10–12–2023-who-s-executive-board-adopts-resolution-on-access-for-life-saving-aid-into-gaza-and-respect-for-laws-of-war).
209. Surveillance system for attacks on health care [online database]. Geneva: World Health Organization; 2017 (https://extranet.who.int/ssa/Index.aspx).
210. Strategic framework for prevention and control of emerging and epidemic-prone infectious diseases in the Eastern Mediterranean Region 2020–2024. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020 (https://applications.emro.who.int/docs/9789290226161-eng.pdf).
211. WHO Regional Committee for the Eastern Mediterranean progress report EM/RC65/INF.DOC.4 on the strategic framework for strengthening health laboratory services 2016–2020. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020 (https://applications.emro.who.int/docs/RC_Technical_Papers_2018_Inf_Doc_4_20519_EN.pdf?ua=1).
212. Strategic plan: strengthening public health emergency operations centers in the member states of the African continent and the Eastern Mediterranean Region (2023–2027). Cairo: WHO Regional Office for the Eastern Mediterranean; 2023.
213. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC69/5 on advancing the implementation of One Health in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://applications.emro.who.int/docs/RC_Technical_Papers_2018_Inf_Doc_4_20519_EN.pdf?ua=1).
214. A regional strategy for integrated disease surveillance – overcoming data fragmentation in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021.
215. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC68/3 on a regional strategy for integrated disease surveillance – overcoming data fragmentation in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021 (https://applications.emro.who.int/docs/EMRC68R3-eng.pdf).

216. Psychological first aid: guide for field workers. Geneva: World Health Organization; 2011 (https://iris.who.int/bitstream/handle/10665/44615/9789241548205_eng.pdf?sequence=1).
217. World Health Organization and United Nations High Commissioner for Refugees, mhGAP Humanitarian Intervention Guide. Geneva: WHO; 2011.
218. WHO Immunization data portal [online database]. Geneva:World Health Organization (https://immunizationdata.who.int/listing.html?topic=&location=).
219. WHO Regional Committee for the Eastern Mediterranean progress report EM/RC66/INF.DOC.4 on implementation of the Eastern Mediterranean vaccine action plan and the regional malaria action plan 2016–2020. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/RC_Technical_Papers_2019_Inf_Doc_4_en.pdf).
220. Van den Ent M, Mallya A, Sandhu H, Anya BP, Yusuf N, Ntakibirora M, et al. Experiences and lessons from polio eradication applied to immunization in 10 focus countries of the polio endgame strategic plan. J Infect Dis. 2017;216(suppl_1):S250-s259.
221. Reaching every district (RED) strategy [website]. Geneva: World Health Organization (https://cdn.who.int/media/docs/default-source/immunization/reaching-every-district-red/red-factsheet.pdf).
222. Eastern Mediterranean vaccine action plan 2016–2020: a framework for implementation of the global vaccine action plan. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/RC_Technical_Papers_2019_Inf_Doc_4_en.pdf).
223. Buliva E, Chasela C, Elnossery S, Tayyab M, Mahboob A, Marinda E, et al. Infectious disease outbreaks in the World Health Organization Eastern Mediterranean Region in 2019. Cogent Pub Health. 2023;10(1):2225149.
224. Wilkinson AL, Diop OM, Jorba J, Gardner T, Snider CJ, Ahmed J. Surveillance to track progress toward polio eradication - worldwide, 2020–2021. MMWR Morb Mortal Wkly Rep. 2022;71(15):538–544.
225. Maher C. The push to eradicate poliomyelitis in the Eastern Mediterranean Region (Editorial). East Mediterr Health J. 2017;23(9):587–588.
226. Polio outbreak simulation exercise conducted in Tripoli (website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://www.emro.who.int/lby/libya-news/polio-outbreak-simulation-exercise-conducted-in-tripoli.html).
227. Buliva E, Elhakim M, Tran Minh NN, Elkholy A, Mala P, Abubakar A, Malik S. Emerging and reemerging diseases in the World Health Organization (WHO) Eastern Mediterranean Region-progress, challenges, WHO initiatives. Front Public Health. 2017;5:276.
228. Regional Committee for the Eastern Mediterranean progress report EM/RC65/INF.DOC.1 on eradication of poliomyelitis. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://applications.emro.who.int/docs/RC_Technical_Papers_2018_Inf_Doc_1_20510_EN.pdf).
229. Global tuberculosis report 2022. Geneva: World Health Organization; 2022 (https://applications.emro.who.int/docs/RC_Technical_Papers_2018_Inf_Doc_1_20510_EN.pdf).
230. Global tuberculosis report 2019. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/329368/9789241565714-eng.pdf?sequence=19).
231. Multisectoral accountability framework to accelerate progress to end tuberculosis by 2030. Geneva: World Health Organization; 2019.
232. AIDSinfo [website]. Geneva: UNAIDS; 2022 (https://aidsinfo.unaids.org/).
233. Global progress report on HIV, viral hepatitis and sexually transmitted infections, 2021. Accountability for the global health sector strategies 2016–2021: actions for impact. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/341412/9789240027077-eng.pdf?sequence=1).
234. The regional action plan for the implementation of the global health sector strategies on HIV, hepatitis and sexually transmitted infections 2022–2030. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022, WHO Regional Office for the Eastern Mediterranean (https://applications.emro.who.int/docs/9789292743383-eng.pdf).

235. World AIDS Day 2021 [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2021 (https://www.emro.who.int/world-aids-campaigns/wad2021/index.html).
236. Alaama AS, Khattabi H, Mugisa B, Atta H, Hermez J, Hutin YJ. Progress towards elimination of viral hepatitis by 2030 in the WHO Eastern Mediterranean Region, 2019. Lancet Gastroenterol Hepatol. 2022;7(9):862-870.
237. Hayashi T, Hutin YJF, Bulterys M, Altaf A, Allegranzi B. Injection practices in 2011–2015: a review using data from the demographic and health surveys (DHS). BMC Health Serv Res. 2019;19(1):600.
238. Global health observatory (GHO) data. Neglected tropical diseases [website] Geneva: World Health Organization (https://www.who.int/data/gho/data/themes/neglected-tropical-diseases).
239. Global update on implementation of preventive chemotherapy against neglected tropical diseases in 2018. Wkly Epidemiol Rec. 2019;94(38):425–438.
240. WHO Alliance for the Global Elimination of Trachoma by 2020: progress report on elimination of trachoma, 2018. Wkly Epidemiol Rec. 2019;94(29):317–328.
241. Global leishmaniasis surveillance: 2021, assessing the impact of the COVID-19 pandemic. Wkly Epidemiol Monit. 2022;45(97):575–590.
242. Schistosomiasis and soil-transmitted helminthiases: numbers of people treated in 2018. Wkly Epidemiol Rec. 2019;94(50):601–612.
243. Raad II, Chaftari A-M, Dib RW, Graviss EA, Hachem R. Emerging outbreaks associated with conflict and failing healthcare systems in the Middle East. Infect Control Hosp Epidemiol. 2018;39(10):1230–1236.
244. Memish ZA, Al-Rabeeah AA. Public health management of mass gatherings: the Saudi Arabian experience with MERS-CoV. Bull World Health Organ. 2013;91(12):899-899A.
245. Communicable disease alert and response for mass gatherings. Key considerations. Geneva: World Health Organization; 2008.
246. Kayali G, Webby RJ, Samhouri D, Mafi AR, Bassili A. Influenza research in the Eastern Mediterranean Region: the current state and the way forward. Influenza Other Respir Viruses. 2013;7(6):914–921.
247. Buliva E, Elhakim M, Minh T, Nguyen N, Elkholy A, Mala P, et al. Emerging and reemerging diseases in the World Health Organization (WHO) Eastern Mediterranean Region—progress, challenges, WHO initiatives. Front Public Health. 2017;5:276.
248. Madani TA, El Azhar E-T, Abuelzein M, Kao M, Al-Bar HM, Abu-Araki H, T, et al. Alkhumra (Alkhurma) virus outbreak in Najran, Saudi Arabia: epidemiological, clinical, and laboratory characteristics. J Infection. 2011;62(1):67–76.
249. Carletti F, Castilletti C, Di Caro A, Capobianchi MR, Nisii C, Suter F, et al. Alkhurma hemorrhagic fever in travelers returning from Egypt, 2010. Emerg Infect Dis. 2010;16(12):1979.
250. Memish ZA, Fagbo SF, Osman Ali A, AlHakeem R, Elnagi FM, EA Bamgboye. Is the epidemiology of alkhurma hemorrhagic fever changing? A three-year overview in Saudi Arabia. PLoS One. 2014;9(2):e85564.
251. Mostafavi E, Ghasemian A, Abdinasir A, Nematollahi Mahani SA, Rawaf S, Salehi Vaziri M, et al. Emerging and re-emerging infectious diseases in the WHO Eastern Mediterranean region, 2001–2018. Int J Health Policy Manag. 2022;11(8):1286–1300.
252. Badra R, Abubakar A, Tempia S, Alam N, ElNaja HA, Kayali G, et al. State and situation of avian influenza in the Eastern Mediterranean Region. Influenza Other Respir Viruses. 2023;17(4):e13137.
253. Cumulative number of confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003–2023, 5 January 2023 [website]. Geneva: World Health Organization; 2023 (https://www.who.int/publications/m/item/cumulative-number-of-confirmed-human-cases-for-avian-influenza-a(h5n1)-reported-to-who-2003-2022-5-jan-2023, accessed 9 March 2023).
254. Cumulative number of confirmed human cases of avian influenza A(H5N1) reported to WHO [website]. Geneva: World Health Organization (https://www.who.int/publications/m/item/cumulative-number-of-confirmed-human-cases-for-avian-influenza-a(h5n1)-reported-to-who--2003-2023--3-october-2023).

255. Gomaa MR, El Rifay AS, Zeid DA, Elabd MA, Elabd E, Kandeil A, et al. Incidence and seroprevalence of avian influenza in a cohort of backyard poultry growers, Egypt, August 2015–March 2019. Emerg Infect Dis. 2020;26(9):2129.
256. Gomaa MR, Kayed AS, Elabd MA, Zeid DA, Zaki SA, El Rifay AS, et al. Avian influenza A (H5N1) and A (H9N2) seroprevalence and risk factors for infection among Egyptians: a prospective, controlled seroepidemiological study. J Infect Dis. 2015;211(9):1399–1407.
257. Samaha H, Ibrahim MS, Ayoub M, Shaaban SI. Seroepidemiology of avian influenza viruses H5 and H9 in Beheira Governorate. Alexandria J Vet Sci. 2015;44(1).
258. Kayali G, Kandeil A, El-Shesheny R, Kayed AS, Maatouq AM, Cai Z, et al. Avian influenza A (H5N1) virus in Egypt. Emerg Infect Dis. 2016;22(3):379.
259. Egypt: upsurge in H5N1 human and poultry cases but no change in transmission pattern of infection [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2015 (http://www.emro.who.int/egy/egypt-news/upsurge-h5n1-human-poultry-cases-may-2015.html).
260. Egypt. Pandemic influenza [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (http://www.emro.who.int/egy/programmes/influenza.html).
261. Kammon A, Heidari A, Dayhum A, Eldaghayes I, Sharif M, Monne I, et al. Characterization of avian influenza and Newcastle disease viruses from poultry in Libya. Avian Dis. 2015;59(3):422–430.
262. Epidemic and pandemic-prone diseases. MERS situation update, April 2019 [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (http://www.emro.who.int/pandemic-epidemic-diseases/mers-cov/mers-situation-update-april-2019.html).
263. Middle East respiratory syndrome coronavirus (MERS-CoV) [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (https://www.who.int/health-topics/middle-east-respiratory-syndrome-coronavirus-mers#tab=tab_1).
264. Middle East respiratory syndrome: global summary and assessment of risk - 16 November 2022 [website]. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/WHO-MERS-RA-2022.1).
265. Middle East respiratory syndrome coronavirus (MERS-CoV). WHO MERS Global Summary and Assessment of Risk, July 2019. Geneva: World Health Organization; (https://iris.who.int/bitstream/handle/10665/326126/WHO-MERS-RA-19.1-eng.pdf).
266. Bannazadeh Baghi H, Alinezhad F, Kuzmin I, Rupprecht CE. Perspective on rabies in the Middle East—beyond neglect. Vet Sci A. 2018;5(3):67.
267. Rabies [website]. Geneva: World Health Organization (https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/rabies).
268. Horton DL, McElhinney LM, Freuling CM, Marston DA, Banyard AC, Goharrriz H, et al. Complex epidemiology of a zoonotic disease in a culturally diverse region: phylogeography of rabies virus in the Middle East. PLoS Negl Trop Dis. 2015. 9(3):e0003569.
269. Al Abaidani I, Al Abri S, Prakash K, Hussain MH, Hussain MH, Al Rawahi A. Epidemiology of rabies in Oman: a retrospective study [1991–2013]. East Mediterr Health J. 2015;21(8):591–597.
270. Fact sheet. Rabies [website]. Geneva: World Health Organization; 2024 (https://www.who.int/news-room/fact-sheets/detail/rabies/?gad_source=1&gclid=Cj0KCQjw8MG1BhCoARIsAHxSiQmtCVXgSXrQkOAUKfe65KZYl3qOX_my6RxLl6FGfvoapwBt4KMH9DgaAvPjEALw_wcB).
271. Kassir M, El Zarif T, Kassir G, Berry A, Musharrafieh U, Bizri A. Human rabies control in Lebanon: a call for action. Epidemiol Infect. 2019;147.
272. Musallam I, Abo-Shehada M, Hegazy Y, Holt H, Guitian F. Systematic review of brucellosis in the Middle East: disease frequency in ruminants and humans and risk factors for human infection. Epidemiol Infect. 2016;144(4):671–685.
273. WHO announces end of Ebola outbreak in southern Sudan [website]. Geneva: World Health Organization; 2004 (https://www.who.int/emergencies/disease-outbreak-news/item/2004_08_07-en).

274. Ebola virus disease [website]; Geneva: World Health Organization (https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease).
275. Madani TA, Al-Mazrou YY, Al-Jeffri MH, Mishkhas AA, Al-Rabeah AM, Turkistani AM, et al. Rift Valley fever epidemic in Saudi Arabia: epidemiological, clinical, and laboratory characteristics. Clin Infect Dis. 2003;37(8):1084–1092.
276. Outbreak of Rift Valley fever—Saudi Arabia, August-October, 2000. Atlanta: Centers for Disease Control and Prevention. Morb Mortal Wkly Rep. 2000;49(40):905–908.
277. Hassan OA, Ahlm C, Evander M. A need for one health approach–lessons learned from outbreaks of Rift Valley fever in Saudi Arabia and Sudan. Infect Ecol Epidemiol. 2014;4(1):20710.
278. Monitoring health and health system performance in the Eastern Mediterranean Region 2020; Core indicators and indicatorson the health-related Sustainable Development Goals. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020.
279. World Malaria Report 2022. Geneva: World Health Organization; 2022 (https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022).
280. World Malaria Report 2018. Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/275867/9789241565653-eng.pdf?sequence=1).
281. Ghouth ASB. Dengue in the WHO Eastern Mediterranean Region: challenges to understand its epidemiology. Health Prim Care. 2018;2(2):1–2.
282. Infectious disease outbreaks reported in the Eastern Mediterranean Region in 2018. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (http://www.emro.who.int/pandemic-epidemic-diseases/news/infectious-disease-outbreaks-reported-in-the-eastern-mediterranean-region-in-2018.html).
283. Markoff L. Yellow fever outbreak in Sudan. N Engl J Med. 2013;368(8):689–691.
284. Andayi F, Charrel RN, Kieffer A, Richet H, Pastorino B, Leparc-Goffart I, et al. Sero-epidemiological study of arboviral fevers in Djibouti A, Horn of Africa. PLoS Negl Trop Dis. 2014. 8(12):e3299.
285. Eybpoosh S, Fazlalipour M, Baniasadi V, Pouriayevali MH, Sadeghi F, Vasmehjani AA, et al. Epidemiology of West Nile Virus in the Eastern Mediterranean region: A systematic review. PLoS Negl Trop Dis. 2019;13(1):e0007081.
286. Al-Abri SS, Al Abaidani I, Fazlalipour M, Mostafavi E, Leblebicioglu H, Pshenichnaya N, et al. Current status of Crimean-Congo haemorrhagic fever in the World Health Organization Eastern Mediterranean Region: issues, challenges, and future directions. Int J Infect Dis. 2017;58:82–89.
287. Al-Abri SS, Hewson R, Al-Kindi H, Al-Abaidani I, Al-Jardani A, Al-Maani A, et al. Molecular epidemiology and high mortality of Crimean-Congo hemorrhagic fever in Oman: a re-emerging infection. bioRxiv. 2018;502641.
288. Wasfi F, Dowall S, Ghabbari T, Bosworth A, Chakroun M, Varghese A, et al. Sero-epidemiological survey of Crimean-Congo hemorrhagic fever virus in Tunisia. Parasite. 2016;23.
289. Gradoni L. The leishmaniases of the Mediterranean Region. Curr Trop Med Rep. 2017;4(1):21–26.
290. Fazaludeen Koya S, Abdalla SM, Kodama C, Keita M, Abubakar A. Vector-borne and zoonotic diseases in the Eastern Mediterranean Region: A systematic review. J Epidemiol Glob Health. 2023;13(1):105–114.
291. Murray CJL, Ikuta KS, Sharara F, Swetschinski L, Robles Aguilar G, Gray A, et al. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. Lancet. 2022;399(10325):629–655.
292. So A, Ramachandran R, Love D, Korinek A, Fry J, Heaney C. Framework for costing the lowering of antimicrobial use in food animal production. Baltimore: Johns Hopkins Center for a Livable Future; 2016.
293. Bracing for superbugs: Strengthening environmental action in the One Health response to antimicrobial resistance. Geneva: United Nations Environment Programme; 2023 (https://www.unep.org/resources/superbugs/environmental-action#:~:text=The%20report%20Bracing%20for%20Superbugs,key%20part%20of%20the%20solution).

294. Regional Committee for the Eastern Mediterranean technical paper EM/RC64/6 Rev.1 on antimicrobial resistance in the Eastern Mediterranean Region Cairo: WHO Regional Office for the Eastern Mediterranean; 2017 (https://iris.who.int/bitstream/handle/10665/259051/RC_technical_papers_2017_6_20046_en.pdf?sequence=2&isAllowed=y).
295. The WHO AWaRe (Access, Watch, Reserve) antibiotic book. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/9789240062382).
296. Infertility prevalence estimates 1990–2021. Geneva: World Health Organization; 2023 (https://iris.who.int/bitstream/handle/10665/366700/9789240068315-eng.pdf?sequence=1).
297. Sexual and reproducitve health and rights, policy portal [website] Geneva: World Health Organization (https://platform.who.int/data/sexual-and-reproductive-health-and-rights/national-policies/srh/policies-and-legislation-on-assisted-reproductive-technology).
298. UNICEF, UNFPA, World Bank Group, UNDESA/Population Division. Trends in maternal mortality 2000 to 2020. Geneva: World Health Organization; 2023 (https://iris.who.int/bitstream/handle/10665/366225/9789240068759-eng.pdf?sequence=1).
299. World health statistics 2015. Geneva: World Health Organization; 2015 (https://www.who.int/docs/default-source/gho-documents/world-health-statistic-reports/world-health-statistics-2015.pdf).
300. Robson classification: implementation manual. Geneva: World Health Organization; 2017 (https://iris.who.int/bitstream/handle/10665/259512/9789241513197-eng.pdf?sequence=1).
301. Female genital mutilation: Evidence brief. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/bitstream/handle/10665/329885/WHO-RHR-19.19-eng.pdf?ua=1).
302. Central Statistical Organization (Iraq), Kurdistan Region Statistics Office (Iraq), Ministry of Health, United Nations Children's Fund (UNICEF). Iraq Multiple Indicator Cluster Survey 2018. Washington, DC: World Bank; 2019.
303. Female genital mutilation (FGM) prevention and care: a resource kit for the health sector. Geneva: World Health Organization; (https://srhr.org/fgmresources/).
304. Standards for improving quality of maternal and newborn care in health facilities. Geneva: World Health Organization; 2016 (https://iris.who.int/bitstream/handle/10665/249155/9789241511216-eng.pdf?sequence=1).
305. WHO labour care guide: user's manual. Geneva: World Health Organization; 2020 (https://iris.who.int/bitstream/handle/10665/337693/9789240017566-eng.pdf?sequence=1).
306. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (https://iris.who.int/bitstream/handle/10665/250796/9789241549912-eng.pdf?sequence=1).
307. Medical eligibility criteria wheel for contraceptive use – 2015 update. Geneva: World Health Organization; 2015.
308. Integrating sexual and reproductive health and rights package in national health policies, programmes and practices in the Eastern Mediterranean Region. East Mediterr Health J. 2019;25, 763–764.
309. Summary report on the consultative meeting and workshop on adopting an integrated sexual and reproductive health and rights package in national health policies, programmes and practices in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
310. Burstein R, Henry NJ, Collison ML, Marczak LB, Sligar A, Watson S, et al. Mapping 123 million neonatal, infant and child deaths between 2000 and 2017. Nature. 2019;574(7778):353–358.
311. United Nations Inter-agency Group for Child Mortality Estimation. Levels and trends in child mortality report 2022. New York: UNICEF; 2022.
312. World Health Organization, UNICEF. Survive and thrive: transforming care for every small and sick newborn. Geneva: WHO; 2019.
313. Lawn JE, Ohuma EO, Bradley E, Idueta LS, Hazel E, Okwaraji YB, et al. Small babies, big risks: global estimates of prevalence and mortality for vulnerable newborns to accelerate change and improve counting. Lancet, 2023.

314. Hofmeyr, GJ, Black RE, Rogozińska E, Heuer A, Walker N, Ashorn P,. A Koivu, Evidence-based antenatal interventions to reduce the incidence of small vulnerable newborns and their associated poor outcomes. Lancet, 2023;401(10389):1707-1719.
315. Countdown to 2030. The countdown profiles: a tool for action [online database]. New York: Unicef; 2023 (https://data.unicef.org/countdown-2030/).
316. World Health Organization, UNICEF. Global nutrition targets 2025, breastfeeding policy brief (WHO/NMH/NHD/14.7). Geneva: World Health Organization; 2014.
317. Saving the lives of mothers and children [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (https://www.emro.who.int/about-who/regional-director/saving-the-lives-of-mothers-and-children.html).
318. Qazi S, Aboubaker S, MacLean R, Fontaine O, Mantel C, Goodman T, et al. Ending preventable child deaths from pneumonia and diarrhoea by 2025. Development of the integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea. Arch Dis Child. 2015;100(Suppl 1):S23-S28.
319. Global accelerated action for the health of adolescents (AA-HA!): guidance to support country implementation. Geneva: World Health Organization; 2017 (https://iris.who.int/bitstream/handle/10665/255415/9789241512343-eng.pdf?sequence=1).
320. The global strategy for women's, children's and adolescents' health (2016–2030): Survive, thrive, transform. New York: United Nations; 2015.
321. Regional Committee for the Eastern Mediterranean technical paper EM/RC64/5 on the operationalization of the adolescent health component of the Global Strategy for Women's, Children's and Adolescents' Health, 2016–2030. Cairo: WHO Regional Office for the Eastern Mediterranean; 2017 (https://iris.who.int/bitstream/handle/10665/259050/RC_technical_papers_2017_5_20043_en.pdf?sequence=2&isAllowed=y).
322. Health of the elderly [website]. Cairo: WHO Regional Office for the Eastern Mediterranean (https://www.emro.who.int/entity/elderly-health/index.html).
323. Global status report on the public health response to dementia. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/344701/9789240033245-eng.pdf?sequence=1).
324. Araujo de Carvalho I, Epping-Jordan J, Pot AM, Kelley E, Toro N, Thiyagarajan JA, et al. Organizing integrated health-care services to meet older people's needs. Bull World Health Organ. 2017;95(11):756–763.
325. Decade of healthy ageing: baseline report. Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/9789240017900).
326. Integrated care for older people (ICOPE): Guidance for person-centred assessment and pathways in primary care. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/326843/WHO-FWC-ALC-19.1-eng.pdf?sequence=17).
327. Health systems: governance [website]. Geneva: World Health Organization (https://www.who.int/health-topics/health-systems-governance#tab=tab_1).
328. Papanicolas I, Rajan D, Karanikolos M, Soucat A, Figueras J, editors. Health system performance assessment: a framework for policy analysis. Geneva: World Health Organization; 2022.
329. Sheikh K, Sriram V, Rouffy B, Lane B, Soucat A, Bigdeli M. Governance roles and capacities of ministries of health: a multidimensional framework. Int J Health Policy Manag. 2021;10(5):237.
330. Building resilient health systems to advance universal health coverage and ensure health security in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://applications.emro.who.int/docs/Build-resilient-health-systems-UHC-EMR-eng.pdf).
331. Building health systems resilience for universal health coverage and health security during the COVID-19 pandemic and beyond. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/346515/WHO-UHL-PHC-SP-2021.01-eng.pdf?sequence=1).

332. Health systems for health security: a framework for developing capacities for International Health Regulations, and components in health systems and other sectors that work in synergy to meet the demands imposed by health emergencies. Geneva: World Health Organization; 2021 (https://iris.who.int/bitstream/handle/10665/342006/9789240029682-eng.pdf?sequence=1).
333. Lal A, Erondu NA, Heymann DL, Gitahi G, Yates R. Fragmented health systems in COVID-19: rectifying the misalignment between global health security and universal health coverage. Lancet. 2021;397(10268):61–67.
334. Fridell M, Edwin S, Von Schreeb J, Saulnier DD. Health system resilience: what are we talking about? A scoping review mapping characteristics and keywords. Int J Health Policy Manag. 2020. 9(1):6.
335. Ebi KL, Fawcett SB, Spiegel J, Tovalin H. Carbon pollution increases health inequities: lessons in resilience from the most vulnerable. Rev Panam Salud Pública. 2016;40:181–185.
336. Therrien M-C, Normandin J-M, Denis J-L. Bridging complexity theory and resilience to develop surge capacity in health systems. J Health Organ Manag. 2017;31(1):96–109.
337. Khan Y, O'Sullivan T, Brown A, Tracey S, Gibson J, Généreux M, et al. Public health emergency preparedness: a framework to promote resilience. BMC Public Health. 2018;18:1–16.
338. Ghebreyesus TA, Jakab Z, Ryan MJ, Mahjour J, Dalil S, Chungong S, et al. WHO recommendations for resilient health systems. Bull World Health Organ. 2022;100(4):240.
339. Health systems resilience toolkit, WHO global public health good to support building and strengthening of sustainable health systems resilience in countries with various contexts. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/354177/9789240048751-eng.pdf?sequence=1).
340. Squires NA, Garfield R, Mohamed-Ahmed O, Iversen BG, Tegnell A, Fehr A, et al. Essential public health functions: the key to resilient health systems. BMJ Global Health, 2023. 8(7):e013136.
341. Mohamed-Ahmed O, Aboutaleb H, Latif S, et al. Reviewing essential public health functions in the Eastern Mediterranean Region post COVID-19 pandemic: a foundation for system resilience. BMJ Glob Health. 2024.9(3):e013782. doi: 10.1136/bmjgh-2023-013782
342. Assessment of essential public health functions in countries of the Eastern Mediterranean Region: assessment tool. Cairo: WHO Regional Office for the Eastern Mediterranean; 2017 (https://applications.emro.who.int/dsaf/EMROPub_2017_EN_19354.pdf?ua=1).
343. Regional Committee for the Eastern Mediterranean technical paper EM/RC70/5 on health workforce in the Eastern Mediterranean Region: from COVID-19 lessons to action. Cairo: WHO Regional Office for the Eastern Mediterranean; 2023 (https://applications.emro.who.int/docs/Health-workforce-EMR-COVID19-eng.pdf?ua=1).
344. Rabbani F, Shipton L, White F, Nuwayhid I, London L, Ghaffar A, et al. Schools of public health in low and middle-income countries: an imperative investment for improving the health of populations? BMC Public Health. 2016;16(1):1–12.
345. Nuwayhid I, Krisht G, Jabbour S, DeJong J, Zurayk H. Mapping university-based master of public health programs in the Arab world. Ann Glob Health. 2021;87(1).
346. Zeeshan MF, Raza U, Anwar S, Khan D, Abbas A, et al. Public health education and health system needs in Pakistan: a mixed methods study. East Mediterr Health J. 2018;24(9):813-822.
347. Jahanmehr N, Rashidian A, Farzadfar F, Khosravi A, Shariati M, Akbari Sari A, et al. Ranking universities of medical sciences as public health services provider institutions in Iran: A result-chain analysis. Arch Iran Med. 2022;25(4):214–223.
348. Naal H, El Koussa M, El Hamouch M, Hneiny L, Saleh S. Systematic review of global health capacity building initiatives in low-to middle-income countries in the Middle East and North Africa region. Glob Health A. 2020;16:1–16.
349. WHO Regional Committee for the Eastern Mediterranean progress report EM/RC57/INF.DOC.4 on strengthening primary health care-based health systems. Cairo: WHO Regional Office for the Eastern Mediterranean; 2010 (https://applications.emro.who.int/docs/EM_RC57_inf_doc_4_en.pdf).

350. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC60/R.2 on universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://applications.emro.who.int/docs/RC60_Resolutions_2013_R2_15135_EN.pdf?ua=1).
351. Report on primary health care in the Eastern Mediterranean Region: review of progress over the last decade (2008–2018), draft version. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://www.who.int/docs/default-source/primary-health-care-conference/phc-regional-report-eastern-mediterranean.pdf?sfvrsn=2a5a2528_2).
352. WHO Regional Committee for the Eastern Mediterranean technical discussion EM/RC63/Tech. Disc.1.Rev.1 on scaling up family practice in the Eastern Mediterranean Region: progressing towards universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2016 (https://iris.who.int/bitstream/handle/10665/250425/RC_technical_papers_2016_tech_disc_1_19022_EN.pdf?sequence=2&isAllowed=y).
353. Salah M, Kidd H. Family practice in the Eastern Mediterranean Region: primary health care for universal health coverage. Boca Raton: CRC Press; 2019.
354. WHO Regional Committee for the Eastern Mediterranean technical paper EM/RC66/5 on introducing the framework for action for the hospital sector in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/RC_Technical_Papers_2019_5_en.pdf).
355. Mirza Z, Mataria A, Salah H, Gedik G, Ismail A. Health benefits package: a centerpiece of universal health coverage. East Mediterr Health J. 2018;24(4):405–406.
356. Vision 2023: Eastern Mediterranean Region: health for all by all. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://applications.emro.who.int/docs/RD_Vision_2018_20675_en.pdf?ua=1&ua=1).
357. Developing a package of services for universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean.
358. Resolution WHA72.6. Global action on patient safety. In: Seventy-second World Health Assembly, 20–28 May 2019. Geneva: World Health Organization; 2019.
359. Patient safety [website]. Geneva: World Health Organization; 2019 (https://www.who.int/news-room/fact-sheets/detail/patient-safety).
360. Letaief M, Hirschhorn LR, Leatherman S, Sayed AA, Sheikh A, Siddiqi S. Implementation research on measuring quality in primary care: balancing national needs with learning from the Eastern Mediterranean Region. Int J Qual Health Care. 2021;33(3):mzab119.
361. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC65/8 on private sector engagement for advancing universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://iris.who.int/bitstream/handle/10665/371557/EMRC658-eng.pdf?sequence=1&isAllowed=y).
362. WHO Regional Committee for the Eastern Mediterranean progress report EM/RC69/INF.DOC.3 on private sector engagement for advancing universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://applications.emro.who.int/docs/Progress-report-PrvHS-Engagement-UHC-eng.pdf).
363. Institute for Health Metrics and Evaluation [website]. Seattle: Institute for Health Metrics and Evaluation (https://www.healthdata.org/).
364. Rehabilitation. Geneva: World Health Organization; 2023 (https://www.who.int/news-room/fact-sheets/detail/rehabilitation).
365. Rehabilitation in health systems: guide for action. Geneva: World Health Organization; 2019 (https://iris.who.int/bitstream/handle/10665/325607/9789241515986-eng.pdf).
366. Emergency care as an essential component of universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2016.
367. Davies S, Pettersson T, Öberg M. Organized violence 1989–2021 and drone warfare. J Peace Res. 2022;59(4):593–610.

368. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC63/R.1 on the annual report of the Regional Director for 2015. Cairo: WHO Regional Office for the Eastern Mediterranean; 2016 (https://applications.emro.who.int/docs/RC63_Resolutions_2016_R1_19194_EN.pdf?ua=1).
369. Mowafi H, Sakr H, Ravaghi H, Elmahal O, Slama S, Samhouri D, et al. Leveraging the COVID-19 response to improve emergency care systems in the Eastern Mediterranean Region. East Mediterr Health J. 2020;26(6):626–629.
370. Sleeman KE, De Brito M, Etkind S, Nkhoma K, Guo P, Higginson IJ, et al. The escalating global burden of serious health-related suffering: projections to 2060 by world regions, age groups, and health conditions. Lancet Glob Health. 2019. 7(7):e883-e892.
371. Fourth round of the global pulse survey on continuity of essential health services during the COVID-19 pandemic. Interim report. Geneva: World Health Organization; 2023.
372. Current health expenditure (CHE) as percentage of gross domestic product (GDP)(%) [online database]. Geneva: World Health Organization; 2023 (https://www.who.int/data/gho/data/indicators/indicator-details/GHO/current-health-expenditure-(che)-as-percentage-of-gross-domestic-product-(gdp)-(-)
373. Global expenditure on health: public spending on the rise? Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240041219).
374. Health financing [website]. Geneva: World Health Organization (https://www.who.int/health-topics/health-financing#tab=tab_1).
375. Global health expenditure database [online database]. Geneva: World Health Organization; 2014 (https://apps.who.int/nha/database/Select/Indicators/en).
376. Strengthening health financing systems in the Eastern Mediterranean Region towards universal health coverage: health financing atlas 2018. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/EMROPUB_2019_EN_22347.pdf).
377. Global health expediture database [online database]. 2023; (https://apps.who.int/nha/database/Select/Indicators/en).
378. Tracking universal health coverage: first global monitoring report. Geneva: World Health Organization; 2015 (https://iris.who.int/bitstream/handle/10665/174536/9789241564977_eng.pdf?sequence=1&isAllowed=y).
379. Siddiqi S, Mataria A, Banzon E. Benefits and pitfalls of social health insurance in pursuit of universal health coverage: lessons for the Eastern Mediterranean. East Mediterr Health J. 2014;20(9):527.
380. Mataria A, El-Saharty S, Hamza MM, Hassan HK. Transforming health financing systems in the arab world toward universal health coverage. In: Handbook of Healthcare in the Arab World. Cham: Springer; 2021.
381. Primary health care on the road to universal health coverage: 2019 global monitoring report. Geneva: World Health Organization; 2021 (https://www.who.int/docs/default-source/documents/2019-uhc-report.pdf).
382. Health workforce support and safeguards list 2020. Geneva: World Health Organization; 2020 (https://cdn.who.int/media/docs/default-source/health-workforce/hwf-support-and-safeguards-list8jan.pdf?sfvrsn=1a16bc6f_5).
383. WHO Regional Committee for the Eastern Mediterranean technical paper EM/RC66/4 on strengthening the nursing workforce to advance universal health coverage in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://iris.who.int/bitstream/handle/10665/371127/EMRC664-eng.pdf?sequence=1&isAllowed=y).
384. Gedik FG, Buchan J, Mirza Z, Rashidian A, Siddiqi S, Dussault G. The need for research evidence to meet health workforce challenges in the Eastern Mediterranean Region. East Mediterr Health J. 2018. 24(9):811.
385. Framework for action for health workforce development in the Eastern Mediterranean Region 2017–2030. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018 (https://iris.who.int/bitstream/handle/10665/275462/EMROPub_2018_EN_20314.pdf?sequence=1&isAllowed=y).

386. Global strategy on human resources for health: workforce 2030. Geneva: World Health Organization; 2016 (https://iris.who.int/bitstream/handle/10665/250368/9789241511131-eng.pdf?sequence=1).
387. Bader L, Bates I, John C. From workforce intelligence to workforce development: advancing the Eastern Mediterranean pharmaceutical workforce for better health outcomes. East Mediterr Health J. 2018. 24(9):899–904.
388. National health workforce accounts: a handbook. Geneva: World Health Organization; 2017 (https://iris.who.int/bitstream/handle/10665/259360/9789241513111-eng.pdf).
389. Meeting on health workforce observatories in the Eastern Mediterranean Region. East Mediterr Health J. 2018;24(9):965–7.
390. WHO Regional Committee for the Eastern Mediterranean technical paper EM/RC62/3 Rev.1 on review of medical education in the Eastern Mediterranean Region: challenges, priorities and a framework for action. Cairo: WHO Regional Office for the Eastern Mediterranean; 2015 (https://iris.who.int/bitstream/handle/10665/250489/RC_technical_papers_2015_3_16503_EN.pdf?sequence=2&isAllowed=y).
391. In 4 years, 494 attacks on health killed 470 patients and health staff in Syria [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020 (https://www.emro.who.int/syria/news/in-4-years-494-attacks-on-health-killed-470-patients-and-health-staff-in-syria.html).
392. Surveillance system for attacks on health care [online database]. Geneva: World Health Organization; 2023 (https://extranet.who.int/ssa/Index.aspx).
393. World Health Organization, International Labour Organization. Occupational safety and health in public health emergencies: a manual for protecting health workers and responders. Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/275385/9789241514347-eng.pdf?sequence=1).
394. Global health and care worker compact, technical guidance compilation. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/373347/9789240073852-eng.pdf?sequence=1).
395. Chan M. Access to medicines: making market forces serve the poor. In: Ten years in public health 2007–2017. Geneva: World Health Organization; 2017.
396. Sum G, Hone T, Atun R, Millett C, Suhrcke M, Mahal A, et al. Multimorbidity and out-of-pocket expenditure on medicines: a systematic review. BMJ Glob Health. 2018; 3(1):e000505.
397. Afghanistan national health accounts with disease accounts,. Kabul: Ministry of Public Health; 2019.
398. National health accounts Pakistan 2015-2016. Islamabad: Pakistan Bureau of Statistics; 2018.
399. Regional strategy to improve access to medicines and vaccines in the Eastern Mediterranean, 2020–2030, including lessons from the COVID-19 pandemic. Cairo: WHO Regional Office for the Eastern Mediterranean; 2020.
400. Global benchmarking tool (gbt) for evaluation of national regulatory system of medical products - revision VI. Geneva: World Health Organization; 2021.
401. Development of country profiles and monitoring of the pharmaceutical situation in countries. Geneva: World Health Organization (https://www.who.int/tools/monitoring-and-evaluation/pharmaceutical-sector-country-profile).
402. The WHO Programme for International Drug Monitoring [website]. Uppsala: Uppsala Monitoring Centre (https://who-umc.org/about-the-who-programme-for-international-drug-monitoring/).
403. List of national regulatory authorities (NRAs) operating at maturity level 3 (ML3) and maturity level 4 (ML4). Geneva: World Health Organization; 2022.
404. Collaborative Procedure for Accelerated Registration [website]. Geneva: World Health Organization; 2023 (https://extranet.who.int/pqweb/medicines/collaborative-procedure-accelerated-registration).
405. WHO announces first technology recipients of mRNA vaccine hub with strong support from African and European partners. Geneva: World Health Organization; 2022.

406. WHO Regional Committee for the Eastern Mediterranean technical paper EM/RC63/R.3 on improving access to assistive technology. Cairo: WHO Regional Office for the Eastern Mediterranean; 2016 (https://applications.emro.who.int/docs/RC_technical_papers_2016_4_19025_EN.pdf?ua=1).
407. Strategic action framework to improve access to assistive technology in the Eastern Mediterranean Region. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://iris.who.int/bitstream/handle/10665/352488/9789290226604-eng.pdf?sequence=1&isAllowed=y).
408. World Health Organization, UNICEF. Global report on assistive technology. Geneva: WHO; 2022 (https://iris.who.int/bitstream/handle/10665/354357/9789240049451-eng.pdf?sequence=1).
409. Global atlas of medical devices: WHO medical devices technical series. Geneva: World Health Organization; 2017 (https://www.who.int/publications/i/item/9789241512312).
410. Eze S, Ijomah W, Wong TC. Accessing medical equipment in developing countries through remanufacturing. J Remanufact. 2019;9:207–233.
411. Resolution WHA67.20. Regulatory system strengthening for medical products. In: Sixty-Seventh World Health Assembly, 19–24 May 2014. Geneva: World Health Organization; 2014.
412. Global atlas of medical devices 2022. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/364709/9789240062207-eng.pdf?sequence=1).
413. Global status report on blood safety and availability 2021. Geneva: World Health Organization; 2022 (https://iris.who.int/bitstream/handle/10665/356165/9789240051683-eng.pdf?sequence=1).
414. International report on donation and transplantation activities 2021. Madrid: Global Observatory on Donation and Transplantation; 2022 (https://www.transplant-observatory.org/2021-global-report-5/).
415. Global strategy on digital health, 2020-2025. Geneva: World Health Organization; 2021 (https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf).
416. WHO Regional Committee for the Eastern Mediterranean technical paperEM/RC69/8 on regional strategy for fostering digital health in the Eastern Mediterranean Region (2023–2027). Cairo: WHO Regional Office for the Eastern Mediterranean; 2022 (https://applications.emro.who.int/docs/Digital-Health-EMR-2023-2027-eng.pdf).
417. Mandil A, Mabry R, Milani B, Nour M, Afifi M, Abdel-Ghani K. Mapping of health innovations in response to the COVID-19 pandemic in Eastern Mediterranean and selected Arab Countries. East Mediterr Health J. 2022;28(2).
418. Guidance for health information system governance. Copenhagen: WHO Regional Office for Europe; 2021 (https://iris.who.int/bitstream/handle/10665/342572/WHO-EURO-2021-1999-41754-57182-eng.pdf?sequence=1).
419. Sachs JD, Schmidt-Traub G, Mazzucato M, Messner D, Nakicenovic N, Rockström J. Six transformations to achieve the Sustainable Development Goals. Nature Sustain. 2019;2(9):805–814.
420. Elden NMK, Mandil AMA, Hegazy AA, Nagy N, Mabry RM, Khairy WA. Health innovations in response to the COVID-19 pandemic: perspectives from the Eastern Mediterranean Region. J Public Health (Oxf). 2023;45(2):470-480.
421. Budd J, Miller BS, Manning EM, Lampos V, Zhuang M, Edelstein M. Digital technologies in the public-health response to COVID-19. Nature Med. 2020;26(8):1183–1192.
422. Mandil A, Rashidian A, Nour M, Fouad H, Hajjeh R. Enhancing capacity and use of digital health in the eastern Mediterranean region: an urgent priority for action. East Mediterr Health J. 2021;27(II):1031–1033.
423. Pandit JA, Radin JM, Quer G, Topol EJ. Smartphone apps in the COVID-19 pandemic. Nature Biotechnol. 2022;40(7):1013–1022.
424. Kendall M, Tsallis D, Wymant C, Di Francia A, Balogun Y, Didelot X, et al. Epidemiological impacts of the NHS COVID-19 app in England and Wales throughout its first year. Nat Commun. 2023;14(1):858.

425. Global diffusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth. Geneva: World Health Organization; 2016 (https://www.afro.who.int/publications/global-diffusion-ehealth-making-universal-health-coverage-achievable).
426. Wilson D, Sheikh A, Görgens M, Ward K. Technology and Universal Health Coverage: Examining the role of digital health. J Glob Health. 2021;11:16006.
427. Zabolinezhad H, Eslami S, Hassibian MR, Dorri S. Assessing the quality of electronic medical records in academic hospitals: A multi-center study in Iran. Front Digit Health. 2022;4:856010.
428. Nemer M, Khader YS, Alyahya MS, Pirlot de Corbion A, Sahay S, Abu-Rmeileh NME. Personal data governance and privacy in digital reproductive, maternal, newborn, and child health initiatives in Palestine and Jordan: a mapping exercise. Front Digit Health. 2023.5:1165692.
429. Strategy for optimizing routine health information systems: to deliver primary health care and universal health coverage. Geneva: World Health Organization; 2023 (https://iris.who.int/bitstream/handle/10665/376094/9789240087163-eng.pdf?sequence=1).
430. Hammerich A, Fouad H, Rashidian A, Hajjeh R, Al Mandhari A. Enhancing the quality and accuracy of national cancer registries in the Eastern Mediterranean Region. East Mediterr Health J. 2023;29(8):603–604.
431. Ferrario A, Doctor H, Gupta K, Basha H, Krishnan R, A Rashidian. Enhancing the use of geographic information systems for public health planning and decision-making in the WHO Eastern Mediterranean Region. East Mediterr Health J. 2023;29(5):307–308.
432. Report WHA75/53. Programme budget 2022–2023: revision, extending the Thirteenth General Programme of Work, 2019–2023 to 2025, report by the Director General. In: Seventy-Fifth World Health Assembly, 22–28 May 2022. Geneva: World Health Organization; 2022.
433. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC59/R.3 on health systems strengthening in countries of the Eastern Mediterranean Region: challenges, priorities and options for future action. Cairo: WHO Regional Office for the Eastern Mediterranean; 2012 (https://iris.who.int/bitstream/handle/10665/123147/RC_Resolutions_2012_3_14693_EN.pdf?sequence=1&isAllowed=y).
434. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC60/R.7 on the regional strategy for the improvement of civil registration and vital statistics systems 2014–2019. Cairo: WHO Regional Office for the Eastern Mediterranean; 2013 (https://applications.emro.who.int/docs/RC60_Resolutions_2013_R7_15140_EN.pdf).
435. Regional strategy for the improvement of civil registration and vital statistics systems 2014–2019. Cairo: WHO Regional Office for the Eastern Mediterranean; 2014.
436. WHO Regional Committee for the Eastern Mediterranean Progress report EM/RC66/INF.DOC.3 on the regional strategy for the improvement of civil registration and vital statistics systems 2014–2019. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
437. Zhao L, Cao B, Borghi E, Chatterji S, Garcia-Saiso S, Rashidian A, et al. Data gaps towards health development goals, 47 low- and middle-income countries. Bull World Health Organ. 2022;100(1):40–49.
438. Sahay S, Rashidian A, Doctor HV. Challenges and opportunities of using DHIS2 to strengthen health information systems in the Eastern Mediterranean Region: A regional approach. Electron J Inf Sys Dev Ctries. 2020;86(1):e12108.
439. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC65/R.2 on the regional approach to implementing the Thirteenth General Programme of Work 2019–2023. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018.
440. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC65/R.3 on private sector engagement for advancing universal health coverage. Cairo: WHO Regional Office for the Eastern Mediterranean; 2018.
441. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC66/R.5 on developing national institutional capacity for evidence-informed policy-making for health. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.

442. Doctor H, Rashidian A, Hajjeh R, Al-Mandhari A. Improving health and mortality data in Eastern Mediterranean Region countries: implementation of the International Classification of Diseases, 11th Revision (ICD-11). East Mediterr Health J. 2021;27(2):111–112.
443. Rashidian A. Effective health information systems for delivering the Sustainable Development Goals and the universal health coverage agenda. East Mediterr Health J. 2019;25(12):849–851.
444. Rashidian A, Doctor H, Aly E, Badr A. Health information in primary care and family practice: concept, status and a vision for the Eastern Mediterranean Region (EMR), in family practice in the Eastern Mediterranean Region: universal coverage and quality primary care. Boca Raton: CRC Press; 2019.
445. National Academy of Engineering (US) and Institute of Medicine (US) Committee on Engineering and the Health Care System, Reid PP, Compton WD, Grossman JH, Fanjiang G, editors. Building a better delivery system: a new engineering/health care partnership. Washington,DC: National Academies Press (US); 2005.
446. Assessment of Regional Stakeholder Views on Hospital Health Information Systems, Cairo: WHO Regional Office for the Eastern Mediterranean; in press.
447. MEASURE evaluation, health information systems interoperability maturity toolkit: users' guide. Chapel Hill: MEASURE Evaluation; 2017.
448. Health information system assessments [website] Cairo: WHO Regional Office for the Eastern Mediterranean (https://www.emro.who.int/health-topics/health-information-systems/index.html?format=html#information-resources).
449. National population-based surveys for better reporting of WHO regional core indicators and SDG health-related indicators. East Mediterr Health J. 2018;24(8):800–801.
450. Health research in the Eastern Mediterranean Region: current status and challenges. Cairo: WHO Regional Office for the Eastern Mediterranean; 2022.
451. Regional Committee for the Eastern Mediterranean resolution EM/RC66/6 on developing national institutional capacity for evidence-informed policy-making for health. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019.
452. WHO's strategy for the Eastern Mediterranean Region, 2020–2023, Turning Vision 2023 into action [website]. Cairo: WHO Regional Office for the Eastern Mediterranean; 2019 (https://applications.emro.who.int/docs/EMRPUB-RDO-014–2019-EN.pdf).
453. Hanney SR, Kanya L, Pokhrel S, Jones TH, Boaz A. How to strengthen a health research system: WHO's review, whose literature and who is providing leadership? Health Res Policy Sys. 2020;18(1):1–12.
454. Tadmouri GO, Mandil A, Rashidian A. Biomedical and health research geography in the Eastern Mediterranean Region. East Mediterr Health J. 2019;25(10):728–743.
455. Saad RK, Al Nsour M, Khader Y, Al Gunaid M. Public health surveillance systems in the Eastern Mediterranean Region: Bibliometric Analysis of Scientific Literature. JMIR Public Health Surveill. 2021;7(11):e32639.
456. Rashidian A, Jahanmehr N, Jabbour S, Zaidi S, Soleymani F, Bigdeli M. Bibliographic review of research publications on access to and use of medicines in low-income and middle-income countries in the Eastern Mediterranean Region: identifying the research gaps. BMJ Open. 2013;3(10):e003332.
457. Mandil A, El-Jardali F, El-Feky S, Nour M, Al-Abbar M, Bou-Karroum L. Health research institutional mapping: an Eastern Mediterranean Regional perspective. East Mediterr Health J. 2018;24(2):189–197.
458. El-Jardali F, Mandil A, Jamal D, BouKarroum L, El-Feky S, Nour M, et al. Engagement of health research institutions in knowledge translation in the Eastern Mediterranean Region. East Mediterr Health J. 2018;24(7):672–679.
459. Shroff ZC, Javadi D, Gilson L, Kang R, Ghaffar A. Institutional capacity to generate and use evidence in LMICs: current state and opportunities for HPSR. Health Res Policy Sys. 2017;15(1):1–11.

460. Mandil A, Rashidian A, Hajjeh R. Health research prioritization: global and regional perspectives. East Mediterr Health J. 2020;26(3):254–256.
461. Mandil AMA, Motevalian SA, Altaf A, Obeidat R, Muthu N, Afzal S, et al. Research on health priorities: a regional agenda and its implementation in Jordan and Pakistan. East Mediterr Health J. 2021;27(4):319–320.
462. Badakhshan A, Arab M, Rashidian A, Mehrdad N, Zendehdel K. Priority-setting in health research in Iran: a qualitative study on barriers and facilitators. Health Res Policy Sys. 2018;16(1):57.
463. Feizabadi M, Fahimnia F, Mosavi Jarrahi A, Naghshineh N, Tofighi S. Iranian clinical trials: An analysis of registered trials in International Clinical Trial Registry Platform (ICTRP). J Evid Based Med. 2017;10(2):91–96.
464. World health statistics 2022: monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2022.
465. Kheirandish M, Karimian Z, Fahmy K, Rashidian A, Hajjeh R. Capacity-building for conducting COVID-19 vaccine effectiveness studies to enhance evidence-informed vaccination policymaking in the Eastern Mediterranean Region. East Mediterr Health J. 2023;29, 562–569.
466. Resolution WHA75.8 on strengthening clinical trials to provide high-quality evidence on health interventions and to improve research quality and coordination. In: Seventy-Fifth World Health Assembly, 22–28 May 2022. Geneva: World Health Organization; 2022.
467. Ensuring ethical standards and procedures for research with human beings [website] Geneva: World Health Organization (https://www.who.int/activities/ensuring-ethical-standards-and-procedures-for-research-with-human-beings).
468. Mandil P, Dingwall A. Promoting bioethics in the Eastern Mediterranean Region..East Mediterr Health J. 2017;23(4):265–266.
469. Yousefi-Nooraie R, Rashidian A, Nedjat S, Majdzadeh R, Mortaz-Hedjri S, Etemadi A, et al. Promoting development and use of systematic reviews in a developing country. J Eval Clin Pract. 2009;15(6):1029–1034.
470. Kalbarczyk A, Rodriguez DC, Mahendradhata Y, Sarker M, Seme A, Majumdar P, et al. Barriers and facilitators to knowledge translation activities within academic institutions in low- and middle-income countries. Health Policy Plan. 2021;36(5):728-739.
471. WHO policy on open access. Geneva: World Health Organization; 2021 (https://www.who.int/about/policies/publishing/open-access).
472. Dingwall P, Mandil A, Rashidian A. Developing the East Mediterranean Health Journal to support public health research in the Region (Editorial). East Mediterr Health J. 2019;24(12):1117–1118.
473. WHO Regional Committee for the Eastern Mediterranean resolution EM/RC28A/R.9 on the regional medical library. Alexandria: WHO Regional Committee for the Eastern Mediterranean; 1978.
474. El-Jardali F, Lavis JN, Ataya N, Jamal D. Use of health systems and policy research evidence in the health policymaking in eastern Mediterranean countries: views and practices of researchers. Implement Sci. 2012;7(1):2.
475. Maleki K, Hamadeh RR, Gholami J, Mandil A, Hamid S, Butt ZA, et al. The knowledge translation status in selected Eastern-Mediterranean universities and research institutes. PLoS One. 2014;9(9):e103732.
476. Regional action plan for the implementation of the framework for action to improve national institutional capacity for the use of evidence in health policy-making in the Eastern Mediterranean Region (2020–2024). Cairo: WHO Regional Office for the Eastern Meditteranean; 2021.
477. Al-Mandhari A, Hamelmann C, Rashidian A, Mabry R, Mandil A. Addressing the health-related SDGs in the Eastern Mediterranean region: Regional Health Alliance strengthens collaboration towards better health. East Mediterr Health J. 2021;28(1):3–4.
478. Universal Health Coverage Partnership: supporting policy dialogue on national health policies, strategies and plans and universal health coverage. Year 6 report 2017. Geneva: World Health Organization; 2018.

479. Universal Health Coverage Partnership [website] Geneva: World Health Organization; 2021 (https://extranet.who.int/uhcpartnership/).
480. UHC Partnership annual report 2021. Geneva: World Health Organization; 2023.
481. Framework of engagement with non-State actors. Geneva: World Health Organization; 2018.
482. Report EB154/36 on engagement with non-State actors, Report on the implementation of the Framework of Engagement with Non-State Actors, Report by the Director-General. In: Executive Board of the World Health Assembly, 154th session. Geneva: World Health Organization; 2023.
483. Letaief M, Leatherman S, Tawfik L, Alboksmaty A, Neilson M, Horemans D. Quality of health care and patient safety in extreme adversity settings in the Eastern Mediterranean Region: A qualitative multicountry assessment. East Mediterr Health J. 2021;27(2):167-176.
484. Al-Mandhari A, El-Adawy M, Khan W, Ghaffar A. Health for all by all-pursuing multi-sectoral action on health for SDGs in the WHO Eastern Mediterranean Region. Glob Health. 2019;15(1):64.
485. Ravaghi H, Naidoo V, Mataria A, Khalil M. Hospitals early challenges and interventions combatting COVID-19 in the Eastern Mediterranean Region. PLOS ONE. 2022;17(6):e0268386.
486. Fadhil I, Lyons G, Payne S. Barriers to, and opportunities for, palliative care development in the Eastern Mediterranean Region. Lancet Oncol. 2017;18(3):e176-e184.
487. Girgis L, Van Gurp G, Zakus D, Andermann A. Physician experiences and barriers to addressing the social determinants of health in the Eastern Mediterranean Region: a qualitative research study. BMC Health Serv Res. 2018;18(1):614.