

Summary report on the

WHO-EM/EPI/359/E

**Meeting on enteric and
diarrhoeal diseases
surveillance, prevention
and control with a focus
on cholera, typhoid and
rotavirus in the Eastern
Mediterranean Region**

Cairo, Egypt
2–5 March 2020



REGIONAL OFFICE FOR THE

**World Health
Organization**

Eastern Mediterranean

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1. Introduction

Estimates suggest that the incidence of diarrhoeal diseases in 2015 in the WHO Eastern Mediterranean Region exceeded 300 million episodes, with children under five years of age accounting for 53% of cases. Over 103 692 deaths from diarrhoea occurred in the Region in 2015 (95% uncertainty interval [UI]: 87 018–124 692), with a mortality rate of 16.0 per 100 000 (95% UI: 13.4–19.2). The majority of these deaths (63.3%) occurred in children under 5 (65 670 deaths, 95% UI: 53 640–79 486). WHO estimates that in 2017 there were 11–21 million cases of typhoid fever, leading to 128 000–161 000 deaths.

Since November 2016, Pakistan has experienced an upsurge in reported cases of extensively drug-resistant *Salmonella* Typhi (XDR *S. Typhi*) that is still ongoing. Iraq has also reported over 350 confirmed cases of multidrug-resistant (MDR) typhoid in multiple regions of the country. Cholera is an emerging and re-emerging disease that constitutes a regional threat to public health and reflects lack of social development. WHO estimates that between 1.4 and 4.0 million cholera cases occurred in 2018, leading to 95 000 deaths. Among children < 5 years of age, rotavirus is the most common cause of severe gastroenteritis worldwide, accounting for 37% of deaths from diarrhoea among children in this age group. Since 2011, seven countries in the Region have been experiencing complex emergencies; therefore the true level of morbidity and mortality due to diarrhoeal diseases is likely to be much higher.

Adopting parallel approaches to managing the separate agents of diarrhoeal diseases does not constitute an efficient approach to prevention and control. Within the WHO Regional Office for the Eastern Mediterranean, the Vaccine Preventable Diseases/Polio Transition unit of the Department of Universal Health Coverage/Communicable Diseases and the Infectious Hazard Management unit of the WHO Health Emergencies programme have initiated an integrated approach to

addressing diarrhoeal diseases under one programme that encompasses all interventions. As part of this initiative, the WHO Regional Office held a meeting in Cairo, Egypt, from 2 to 5 March 2020 on enteric and diarrhoeal diseases surveillance, prevention and control with a focus on cholera, typhoid and rotavirus in the Eastern Mediterranean Region.

The objectives of the meeting were to:

- understand the epidemiology and overall burden of diarrhoeal diseases, including rotavirus, cholera and typhoid fever, in the Eastern Mediterranean Region;
- share lessons learned from global paediatric diarrhoeal surveillance and rotavirus surveillance progress in relation to rotavirus vaccine introduction;
- share global updates on the rotavirus vaccine available and in the pipeline;
- discuss the current cholera and typhoid situation in the Region and challenges to managing current outbreaks, including cross-border coordination mechanisms;
- share experiences from countries in the use of oral cholera vaccine, including in prevention and control of cholera in the Region;
- share experiences from countries on the use of typhoid conjugate vaccine, including for prevention and control of extensively drug-resistant salmonella typhoid (XDR S. Typhi); and
- develop an overall approach for the prevention and control of diarrhoeal diseases in the Region.

The meeting included participation from the ministries of health of Djibouti, Iraq, Somalia, Sudan, Syrian Arab Republic, Tunisia and Yemen. There was also representation from the United States Centers for Disease Control and Prevention (CDC), Bill and Melinda Gates Foundation, Monastir University, United Nations Children's Fund Middle East and North Africa Regional Office (UNICEF/MENARO) and the Wellcome

Trust Research Laboratory. Representatives from Afghanistan, Islamic Republic of Iran, Lebanon, Libya, Pakistan and Palestine who were unable to attend due to security issues and travel restrictions related to the start of the COVID-19 pandemic sent their apologies.

The meeting aimed at understanding the epidemiology and overall burden of diarrhoeal diseases. It discussed the current situation of rotavirus, cholera and typhoid fever (XDR) in the Eastern Mediterranean Region, shared lessons learned from participating countries and provided global updates on rotavirus vaccines available and in the pipelines.

Dr Rana Hajjeh, Director of Programme Management, WHO Regional Office for the Eastern Mediterranean, inaugurated the meeting by delivering a message on behalf of Dr Ahmed Al-Mandhari, WHO Regional Director for the Eastern Mediterranean. Dr Al-Mandhari thanked country participants and partners for their continued support and stressed the importance of collaboration in the prevention and control of diarrhoeal diseases. Dr Yvan Hutin, Director of the Department of Universal Health Coverage/Communicable Diseases at the WHO Regional Office, underlined the importance of the meeting in regrouping all partners to support countries to overcome the large burden of diarrhoeal diseases in the Region. Dr Nadia Teleb, WHO Regional Advisor for Vaccine Preventable Diseases & Immunization, said that the meeting presented a good opportunity to exchange ideas and experiences in order to develop an effective integrated approach to country support that was key to the control of all diarrhoeal diseases, including those caused by rotavirus, typhoid and cholera.

2. Summary of discussions

Diarrheal diseases burden and surveillance

Describing the burden of diarrhoeal diseases at global and regional levels and examination of the top eight etiologies of diarrhoeal diseases, focusing on the three main etiological agents in the Region (rotavirus, cholera and typhoid), reveals differences in the magnitude of diarrhoeal diseases between WHO regions. The successful experience of reducing the burden of rotavirus and frequency of cholera outbreaks in several countries in the WHO South-East Asia Region can be used as an example.

Countries differ in the way they have developed their surveillance systems, ranging from national to sentinel sites. Most countries in the Eastern Mediterranean Region have parallel systems for surveillance of different diseases with little integration. Countries may have different sentinel sites for different diseases based on administrative decisions. This prevents an integrated approach to prevention and control of all diarrhoeal diseases.

The burden of typhoid fever remains high worldwide, with the additional threat of the emergence of XDR typhoid in many countries. Pakistan had reported 11 000 cases by the end of 2019. In the Region, rotavirus surveillance started in most of the countries in 2008, using sentinel or nationwide recruitment. Unfortunately, these systems have stopped reporting due to various reasons, mainly financial or administrative. In 2020, only four countries were still regularly reporting their rotavirus surveillance data.

Cholera mostly occurs as outbreaks and is a major cause of mortality among children. Weak surveillance systems for diarrhoeal diseases control programmes or maternal and child health programmes prevent identification of the factors associated with large outbreaks. This leads

to missed prevention opportunities. Differences in approaches (for example, surveillance of acute watery diarrhoea versus surveillance of cholera) prevents comparisons of the performance of surveillance between countries such as Yemen and Pakistan. In addition, poor sanitation facilitates the spread of cholera in Yemen, while the emergency situation has led to a focus on other priorities, mainly food and provision of medications; it is therefore difficult to focus on the interventions required to prevent this deadly disease

Laboratory surveillance

Laboratory surveillance is an integral part of diarrhoeal diseases surveillance given the need to identify infectious agents. Laboratory performance, reflected in laboratory performance indicators, affects the usefulness of surveillance in every country. Laboratory equipment, supplies, kits and personnel are the key pillars of laboratory performance. However, the majority of countries participating in laboratory surveillance are struggling with one or more of these pillars, affecting the surveillance of diarrhoeal diseases. WHO supports laboratories in a number of countries in the Region, offering hands-on training of personnel at the regional level with the participation of a number of smaller countries or onsite in-country training in the larger countries. WHO also provides laboratory supplies and kits.

Expanding the capacity of laboratories to diagnose more than one pathogen depends on local capacity in virology and bacteriology. Certain technical requirements and the availability of skilled personnel are needed to improve laboratory capacity. Large public health laboratories may have this capacity, but others do not. New technologies for multiple antigen detection have been introduced in global paediatric diarrhoeal surveillance and piloted in Sindh province, Pakistan. This diagnostic procedure allows identification of 21 pathogens in one run but

necessitates specific equipment and specific reading cards (TaqMan Array cards). While this allows integration, it is costly and requires special training for laboratory personnel. Setting up this technology at a regional reference laboratory would help several countries take advantage of this new tool.

The experience – unique in the Region – of Pakistan’s global paediatric diarrhoeal surveillance has led other countries to express interest in starting similar projects to detect multiple etiologies of diarrhoea in children. However, the cost of specimen transportation and the lack of a regional reference laboratory that can perform the test are still a challenge for the Region.

Vaccination

Vaccination is one of the most important preventive measures against many communicable diseases. It has proven its success in prevention of the three diarrhoeal diseases: rotavirus, typhoid and cholera. While vaccination is effective, it is best used alongside other preventive measures.

Except for seven countries, all countries of the Region have introduced rotavirus vaccine in the routine schedule of vaccination in the first year of life. WHO has pre-qualified four vaccines against rotavirus, and four more vaccines are in the pipeline at different phases of clinical trial. Post-introduction surveillance has reported intussusception as an undesired effect of the vaccine, although the rate of intussusception is lower after the second dose. This suggests a stronger role for viral replication than for immunogenicity. Coverage of the vaccine in most countries that have introduced it has not met the 90% standard. Experience indicates that high coverage of rotavirus vaccine has an impact in controlling rotavirus diarrhoeal disease among children under 5 years of age. This is a lesson that countries with low rotavirus vaccine coverage have begun to realize.

The integration of vaccination services for the three diseases has shown financial and service delivery benefits as far as programme operations are concerned. The delivery of cholera and typhoid vaccine campaigns could easily be integrated with the oral polio campaigns that are still taking place in the majority of countries in the Region. For cholera, two key preventive measures have to be implemented together to prevent and control circulation and outbreaks. The first is personal hygiene and sanitation; the second is vaccination.

Yemen succeeded in procuring the required quantity of oral cholera vaccine for its campaign, despite a global shortage affecting the stockpile. However, lack of integration between water and sanitation measures and use of the oral cholera vaccine within campaigns limited the effectiveness of the control measures taken against the outbreak. The integration of vaccination against the three diseases provided a good example of the desired approach for the prevention and control of rotavirus, typhoid and cholera.

Sindh province of Pakistan introduced typhoid conjugate vaccine in a province-wide campaign. Punjab will conduct another similar campaign before the country introduces the vaccine in the routine immunization schedule for children.

Countries experiencing emergencies and conflicts shared their experience in developing rapid response teams (RRTs). These gather personnel from different programmes, including EPI, surveillance, outbreak response and water, sanitation and hygiene (WASH). The teams have been able to respond to challenging outbreaks, such as those of cholera in Somalia and Yemen. The successful performance of the team in Iraq provides a useful experience to learn from for other countries. Readiness assessment and improvement of the response gap was an important determinant in the success of outbreak detection and rapid response.

Role of partners

In light of the challenges that the Region is facing, partners affirmed their willingness to support countries in reducing morbidity and mortality due to diarrhoeal diseases. Two main areas of support highlighted by partners were well received by countries. The first is expanding detailed assessment and hotspot mapping for cholera outbreaks in high-risk countries and includes risk assessment for typhoid.

The second area of support is facilitating a broader use of rotavirus vaccine. This includes the introduction of rotavirus vaccine in those countries that have not introduced it yet and efforts to increase coverage along with strong surveillance, mainly in Iran (Islamic Republic of), Iraq and Syrian Arab Republic. The support will be mainly technical in nature through the development of the needed guidelines and tools and provision of the necessary training for the concerned teams. Financial support could be sought when available.

Partners will have an important role to play in guiding the different programmes dealing with different diarrhoeal diseases to streamline their work, overcome their fragmentation or verticality, increase their efficiency and decrease costs. This will require the development of unified policies and plans for surveillance, prevention and control of diarrhoeal diseases.

3. Conclusions

Discussions demonstrated the interest of countries in improving their surveillance systems for diarrhoeal diseases based on other countries' experience. Improving rotavirus vaccine coverage was seen as crucial for decreasing diarrhoeal disease morbidity and mortality among children under 5 years of age. It was also agreed that surveillance, outbreak preparedness and response, coupled with WASH preventive

measures, need to be combined to manage and control cholera outbreaks in the Region. While commending the hard work and support that partners have extended to Pakistan to achieve the successful typhoid conjugate vaccine campaign in Sindh, it was noted that challenges still exist in the Region, closely related to those affecting diarrhoeal diseases programmes in general.

Participants expressed their interest and willingness to adopt integrated approaches to tackling all diarrhoeal diseases, including rotavirus, typhoid and cholera. This would use available resources more efficiently. As current resources are insufficient, countries will have to discuss the administrative, technical and financial challenges in depth. Ultimately, addressing these challenges will improve their capacity to overcome diarrhoeal disease morbidity and mortality. However, an integrated approach constitutes an innovation for many countries and adopting an integrated approach in epidemiological and laboratory surveillance will require technical and financial support to expand and regroup existing systems and to build capacity among national health care workers.

Participants proposed recommendations based on the knowledge and experiences shared by countries and the support offered by partners. The recommendations point to the need for robust integrated approaches to all aspects of surveillance, prevention and control of diarrhoeal diseases in the Region. The recommendations addressed several areas including surveillance, outbreak preparedness and response, case management, laboratory enhancement, and building on existing systems and mechanisms to optimize health benefits and make use of existing resources.

4. Recommendations

Participants agreed on the following recommendations that focus on practical solutions for different areas of improvement of diarrhoeal diseases prevention and control.

General recommendations

Surveillance, outbreak preparedness and response

1. Survey countries in the Region to assess diarrhoeal diseases surveillance capacity and data needs in order to guide WHO and partners in the establishment of a comprehensive diarrhoeal diseases surveillance system, including outbreak investigation and response guidance documents for waterborne diseases, especially cholera and typhoid surveillance activities.
2. Establish rotavirus surveillance in countries where it does not exist.
3. Establish a rotavirus regional reference laboratory.
4. Resume and expand rotavirus surveillance in countries of the Region who have a successful surveillance system.
5. Start implementation and expand global paediatric diarrhoeal surveillance in Pakistan and possibly the Region.
6. Establish a standardized (sentinel site) surveillance platform for diarrhoeal diseases, namely rotavirus and typhoid, in countries.
7. Enhance capacities in the Region to track XDR-typhoid in coordination with work on antimicrobial resistance in *S. Typhi*.
8. Improve understanding of the burden of typhoid fever in countries of the Region and increase awareness and advocacy for the prevention and control of typhoid fever (and associated antimicrobial resistance) as a public health priority in the Region.
9. Integrate different cholera surveillance mechanisms (community-based and event-based).

10. In collaboration with the Global Task Force on Cholera Control, support cholera risk assessments to identify and prioritize hotspot districts for oral cholera vaccine (OCV) campaigns in cholera-affected countries.
11. Enhance bacteriological laboratory testing for typhoid and cholera, based on the needs of countries.
12. Strengthen laboratory capacity to integrate basic bacteriological molecular diagnostic tests for all diarrhoeal disease pathogens.
13. Deploy molecular detection tools such as genetic sequencing in the further characterization of diarrhoeal diseases outbreaks.
14. Support establishment of comprehensive diarrhoeal diseases surveillance.
15. Strengthen typhoid disease surveillance and evaluation of current typhoid burden data to guide typhoid conjugated vaccine introduction in countries of the Region considering introduction.
16. Develop or update national cholera control plans aligned to the Ending Cholera global 2030 roadmap.
17. Coordinate with relevant institutions to conduct modelling and forecasting studies for cholera and other waterborne diseases.

Vaccination

18. Strengthen capacity in countries to follow diagnostic procedures for diagnosis of typhoid and cholera.
19. Build capacity and follow WHO recommendations on vaccination against typhoid and cholera.
20. Ensure implementation of OCV campaigns in a timely manner in relation to cholera outbreaks, including development of risk communication materials and monitoring and documentation of OCV campaigns in targeted countries.
21. Generate an evidence-based strategy for the pre-emptive use of OCV in cholera hotspot areas, targeting all vulnerable areas.

22. Improve rotavirus vaccine coverage in countries of the Region.
23. Introduce rotavirus vaccine in countries that have not yet introduced it.

Multisectoral approach

24. Bill & Melinda Gates Foundation, CDC, UNICEF and WHO should support operational research to address the knowledge gap on the burden of typhoid fever.
25. Strengthen capacity to follow diagnostic procedures and case management of typhoid and cholera as per WHO recommendations.
26. Bill & Melinda Gates Foundation, CDC, UNICEF and WHO should support countries to generate evidence to guide decision-making for inclusion of typhoid conjugate vaccine in national immunization programmes.
27. UNICEF should continue to support countries in applying WASH measures to control typhoid and cholera outbreaks.
28. Countries should adopt a multisectoral approach, including collaboration between different ministries, in prevention and control of cholera outbreaks.
29. Countries should align the national cholera control plan to the Ending Cholera global roadmap.
30. UNICEF should use its Communication For Development (C4D) approach to provide support for the behaviour-monitoring process.
31. Countries should enhance community awareness and engagement as an integral component of prevention and control of diarrhoeal diseases.
32. Enhance coordination between partners for health and sanitation for diarrhoeal disease prevention and control.

WASH

33. The Global Task Force on Cholera Control should work on better coordination with stakeholders on the ground in countries for different WASH interventions for control of cholera outbreaks.
34. Strengthen the health system through hygiene promotion activities in alignment with the Ending Cholera global roadmap.
35. Strengthen coordination with other sector partners on different WASH activities to control cholera in affected countries.
36. The WASH sector and other partners should develop an integrated preparedness plan for cholera control.
37. Adopt community-led total sanitation approaches to address sanitation gaps in cholera-affected areas.
38. UNICEF and WHO should support governments in cholera-affected areas to improve water quality.
39. Mobilize resources to address WASH gaps in urban, especially cholera-affected, areas.
40. Strengthen health promotion units of ministries of health and integrate their input into the wider response plan.

Country-specific recommendations

Iraq

41. Develop a proactive diarrhoeal diseases outbreak preparedness plan.
42. Enhance rotavirus surveillance and genotyping and conduct an impact study of vaccine introduction.
43. Adopt the available cholera risk assessment tools for identification of hotspots and to update preparedness and response accordingly.

Pakistan

44. Establish global paediatric diarrhoeal surveillance in Punjab.
45. Ensure the success of the upcoming typhoid conjugated vaccine campaign in Punjab by leveraging the lessons learned in the Sindh campaign to achieve better uptake of the vaccine.
46. Expand the sentinel surveillance sites for typhoid fever (MDR/XDR).

Somalia

47. Establish a rotavirus surveillance system and explore possibilities to leverage it for other diarrhoeal diseases.
48. Strengthen laboratory capacity for all diarrhoeal diseases pathogens.
49. Better estimate the impact of the OCV campaign according to WHO guidelines.
50. Implement the country cholera roadmap.

Sudan

51. Develop a preparedness plan for cholera outbreaks.
52. Establish an integrated surveillance system for all diarrhoeal diseases through capacity-building of surveillance officers and laboratory technicians.
53. Strengthen coordination between WASH interventions and OCV in campaigns, along with ensuring robust surveillance data.
54. Implement better-targeted and focused community sensitization for OCV campaigns.
55. Build the capacities of hospital specialists for cholera case management as per WHO guidelines.

Yemen

56. Establish an integrated surveillance system for diarrhoeal diseases through capacity-building of surveillance officers and laboratory technicians dealing with different diarrhoeal diseases pathogens.
57. Enhance the capacity of diarrhoeal diseases surveillance data managers.
58. Partners should find an alternative mechanism for delivering laboratory supplies in a timely manner.
59. Strengthen social mobilization to enhance demand for rotavirus and cholera vaccines.
60. Better assess the OCV campaign according to WHO guidelines.
61. Partners should support the government's commitment to establishing a national cholera control plan.



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