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Technical paper

The growing threats of hepatitis B and C in the Eastern Mediterranean Region: a call for action

Chronic liver disease related to viral hepatitis has emerged as a leading public health problem in the Eastern Mediterranean Region. This paper raises awareness regarding the burden of disease related to viral hepatitis and the need for urgent action to prevent hepatitis B virus and hepatitis C virus transmission. More than 75% of cirrhosis and hepatocellular carcinoma in the Region is attributable to hepatitis B virus (HBV) or hepatitis C virus (HCV) infection. Despite the availability of effective prevention strategies, HBV and HCV transmission occurs throughout the Region. Many of these infections are acquired in the health care setting. Implementation of infection control, injection safety and blood safety programmes are major challenges.

A draft resolution is attached for consideration by the Regional Committee.

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Executive summary

The global burden of disease due to cirrhosis of the liver and hepatocellular carcinoma (HCC) is high (approximately 2% of all deaths) and is expected to increase over the next two decades. Studies indicate that more than 75% of cirrhosis and hepatocellular carcinoma in the Region is attributable to hepatitis B virus (HBV) or hepatitis C virus (HCV) infection. Despite the availability of effective prevention strategies, HBV and HCV transmission occurs throughout the Region. WHO estimates that around 4.3 million persons are infected with HBV and 800 000 persons with HCV in the Region each year. Many of these infections are acquired in the health care setting, particularly in countries with rapidly evolving health systems and increasing demand for health services. Studies are needed to characterize the epidemiology of HBV and HCV transmission in some countries. Implementation of infection control, injection safety and blood safety programmes are major challenges.

The purpose of this paper is to raise awareness regarding the burden of disease related to viral hepatitis and the need for urgent action to prevent hepatitis B virus and hepatitis C virus transmission in the Eastern Mediterranean Region. Based on current treatment guidelines, the cost of treating 50% of eligible patients with chronic HCV infection in the Region is estimated to be over US\$ 125 billion and is expected to increase over time as additional persons become infected. The cost to treat patients with chronic HBV or HCV infection far outweighs the cost of implementing prevention programmes. A comprehensive strategy is urgently needed to prevent transmission of these blood-borne pathogens.

Recommended strategies include sustainable HepB vaccination of all infants including administration of a birth dose within the first 24 hours of life. Protection of health care workers is crucial. Legislation is needed to ensure that all persons with occupational exposure to blood are vaccinated and educated about the risk of blood-borne pathogen transmission within the health care setting. Schools for health care professionals should ensure all students are vaccinated with HepB vaccine prior to clinical rotations and educate all students about the risk of blood-borne pathogen transmission in the health care setting. Urgent efforts are needed to ensure patient safety, injection safety, safe dental care and quality assurance in health care.

While strategies to prevent blood-borne pathogen transmission are universal, the epidemiological situation and resource capacity in different Member States demand flexibility in setting prevention strategies. Studies and enhanced surveillance activities are needed to characterize the epidemiology of disease, using a unified protocol to enable comparison of data between countries, and assess the impact of prevention strategies. Ministries of Health need to take a leadership role in raising parliamentary awareness of the problem and the actions needed, such as legislation and regulations, as well as financial allocation, to ensure proper implementation of all the recommended strategies and sustainable intervention to prevent HBV infection. Adoption of a regional target of reduction in the prevalence of chronic hepatitis B virus infection to <1% among children over 5 years of age by 2015 is recommended.

1. Introduction

The global burden of disease due to cirrhosis of the liver and hepatocellular carcinoma (HCC) is high (around 2% of all deaths) and is expected to increase over the next two decades [1]. Studies indicate that >75% of cirrhosis and hepatocellular carcinoma in the Eastern Mediterranean Region is attributable to chronic hepatitis B virus (HBV) or hepatitis C virus (HCV) infection [2].

WHO estimates that around 4.3 million persons are infected with HBV and 800 000 persons with HCV each year in the Region. Most of these infections are acquired in the health care setting. It is estimated that approximately that 17 million persons in the Region have chronic HCV infection. The cost of treating patients with chronic HBV or HCV infection far outweighs the cost of implementing prevention programmes [3].

The objective of this paper is to raise awareness regarding the burden of disease related to viral hepatitis and the need for urgent action to prevent hepatitis B virus and hepatitis C virus transmission in the Eastern Mediterranean Region. The paper outlines the epidemiology of HBV and HCV and the contribution of these pathogens to the burden of chronic liver disease in the Eastern Mediterranean Region. The implementation of an effective prevention strategy requires commitment and support at the highest levels of government including laws and regulations to ensure injection safety, safe blood transfusion and occupational safety and health.

2. Situation analysis

2.1 Epidemiology of HBV infection

Approximately 30% of the world's population, or about 2 billion persons, have serologic evidence of current or past HBV infection. Of these, an estimated 361 million persons have chronic HBV infection. Persons with chronic HBV infection are at increased risk of cirrhosis of the liver and hepatocellular carcinoma. WHO estimates that around 600 000 persons die each year due to HBV-related chronic liver disease [2].

The epidemiology of HBV infection in the Region is complex. Prior to the introduction of hepatitis B vaccine into the Expanded Programme on Immunization (EPI), the prevalence of chronic HBV infection ranged from 2%–3% in several Member States, to >10% in Sudan and Somalia (Table 1). The lifetime risk of HBV infection in the pre-vaccination era ranged from 25% to >75%, with continued transmission from the perinatal period throughout early children and adult life. Without integration of hepatitis B vaccine into EPI, it is estimated that around 100 000 persons from each birth cohort in the Region would die from HBV-related liver disease and hepatocellular carcinoma during their lifetime. HBV is efficiently transmitted by either percutaneous or mucous membrane contact with infected blood or other body fluids. The primary routes of transmission are perinatal, child-to-child, sexual contact and percutaneous exposures (e.g., unsafe injections and blood transfusions). The risk of perinatal transmission is higher from mothers with high titres of HBV DNA, which generally correlates with the presence in blood of hepatitis B e antigen (HBeAg). The risk of transmitting chronic HBV infection is >70% from mothers who are HBeAg-positive and <10% from those who are HBeAg-negative [4].

Despite introduction of hepatitis B vaccine into EPI, HBV continues to be transmitted among unvaccinated older children and adults [5–8]. Studies of patients with acute HBV in Egypt and Oman indicate > 90% of patients were born before vaccine introduction [8,9]. Risk factors for acute HBV infection in the Region include unsafe injections in the health care setting, injecting drug use and exposure to invasive medical procedures [9,10].

Table 1. Prevalence of hepatitis serologic markers among women of childbearing age and different age groups by country prior to the introduction of HepB vaccine into EPI

Countries	Prevalence of hepatitis B serologic markers			
	HBsAg ^a among women of childbearing age	HBeAg ^b among women of childbearing age	Anti-HBc ^c at 5 years of age	Anti-HBc at \geq 30 years of age
Sudan, Somalia	11.5	15	25	77.5
Egypt, Iraq, Morocco, Yemen	4.3	10	10	45
Afghanistan, Pakistan	3.6	20	10	45
Bahrain, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates	2.5	10	6	25

^a HbsAg: hepatitis B surface antigen. This is a marker of chronic hepatitis B infection.

^b HBeAg: hepatitis B e antigen, the presence of which implies active viral replication, making it a marker of greater infectivity in chronic infection.

^c Anti-HBc: antibody to hepatitis B core antigen. This indicates evidence of current or previous HBV infection.

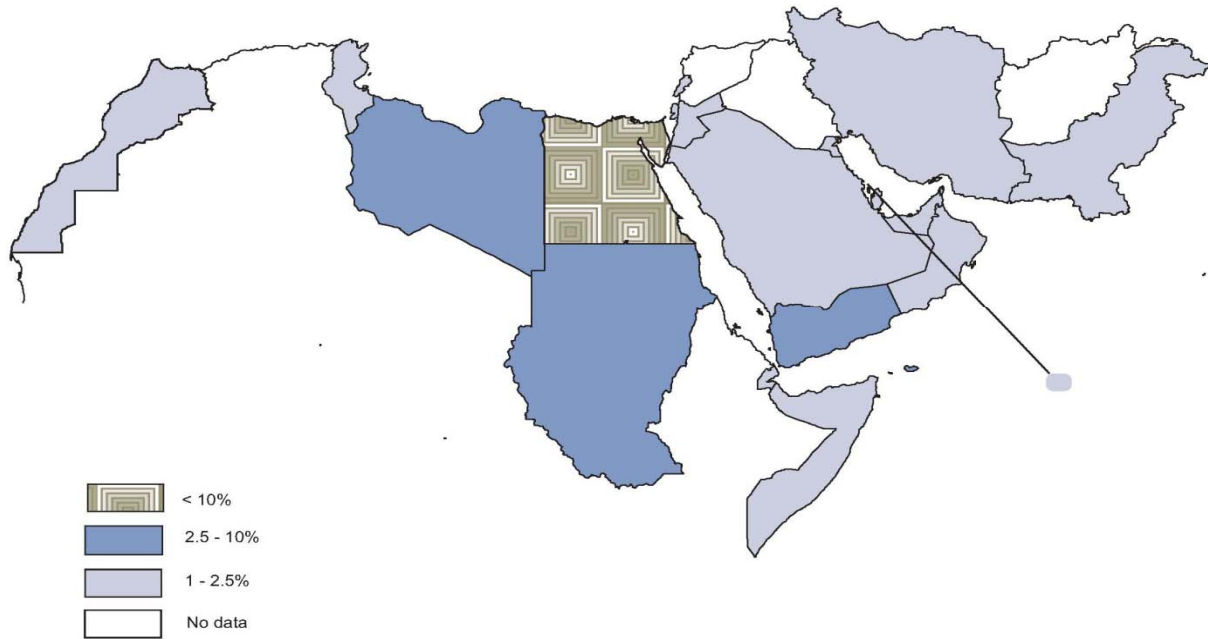
Adapted from [4].

2.2 Epidemiology of HCV infection

It is estimated that 3% of the global population (approximately 170 million people) have chronic HCV infection and that 3–4 million people are newly infected each year. There are no specific estimates of HCV disease burden. However, left untreated, 14% to 45% of patients with HCV infection develop chronic liver diseases and cirrhosis 20 years after acquisition of disease.

The HCV prevalence in the Eastern Mediterranean Region is variable and ranges from 1% to 2.5% in most countries, with higher prevalence reported in Egypt (>10%), and in Libyan Arab Jamahiriya, Sudan and Yemen (2.5%–10%) (Figure 1). The high prevalence in Egypt has been attributed to campaigns to treat schistosomiasis with injectable medications, which began in the 1930s and ran through the late 1970s and which has resulted in an increase in cirrhosis and hepatocellular carcinoma over the past decade [11,12].

While considerable transmission occurred during this period, epidemiological studies reveal a high prevalence of HCV infection among children born after these campaigns, indicating ongoing transmission due to unsafe injections [13,14]. A high prevalence of HCV infection among children has also been observed in Pakistan, related to unsafe injections (15). More recent data from Pakistan shows wide range of chronic HCV prevalence, from 2% to 14% in different areas. Available data suggests that most HCV transmission in the Region occurs in the health care setting and is primarily associated with unsafe injections.



Source: Weekly Epidemiological Record No 6, 2002, 77, 41-48

Figure 1. Prevalence (%) of hepatitis C virus infection by country (WHO estimates)

2.3 Chronic liver disease and viral hepatitis

Persons with chronic HBV or HCV infection are at increased risk of chronic liver disease including cirrhosis of the liver and hepatocellular carcinoma. The global burden of disease due to cirrhosis and hepatocellular carcinoma is high (approximately 2% of all deaths) and is expected to increase over the next two decades [1].

Numerous studies have documented HBV and HCV as important causes of cirrhosis and hepatocellular carcinoma in the Region [16–30]. The prevalence of HBV and HCV infection among patients with cirrhosis and hepatocellular carcinoma varies by country and generally reflects variable prevalence of these infections in the community. In Egypt, where the prevalence of HCV is high, most patients with chronic liver disease have HCV infection as an underlying cause of disease. In contrast, HBV infection is frequently found among patients with cirrhosis and hepatocellular carcinoma in other countries of the Region. WHO estimates > 75% of cirrhosis and hepatocellular carcinoma in the Region is attributable to chronic HBV or HCV infection [2].

2.4 Blood-borne pathogen transmission in health care settings

Health-care associated infections

Transmission of HBV and HCV in the health care setting should be viewed within the overall context of health-care associated infections. These are emerging as a leading cause of infectious disease deaths worldwide and affect both developed and resource-poor countries. Each year, over 1.4 million people develop serious infections for an unrelated condition during health-care delivery. About 5%–10% of hospitalized patients in developed countries acquire health care associated infections at any given time; the risk is 2–20 fold higher in developing countries. The Eastern Mediterranean Region of WHO has a high frequency (estimated at around 10% in 2006) of health-care associated infections in the world confirming that this is a growing challenge to quality of health care in the Region.

During the past two decades, health care delivery systems in the Region have experienced rapid introduction of new technologies, including provision of complex services and increasing numbers of staff performing invasive procedures, in both the public and private sectors. In addition, there has been increasing demand for health care services, which has stretched the capacity of health facilities to provide quality services for the growing population. The introduction of new technologies and advances in provision of services often occur without significant development of appropriate safeguards to prevent HBV, HCV and other health-care associated infections in the health care setting.

Monitoring HBV and HCV transmission in the health care setting is challenging. A high proportion of acute HBV and HCV infections are asymptomatic. For patients who develop clinical symptoms, the long incubation period results in disease long after exposure and it is frequently not possible to establish a link between unsafe practices and the occurrence of infection. In addition to surveillance, it is important to monitor safe provision of health care services and to ensure adequate training and supplies to prevent blood-borne transmission in the health care setting.

Unsafe injections

WHO estimates that around 2.1 billion injections are provided in health care settings in the Region each year [3], with the majority of these injections occurring in the curative sector. Assessment of injection practices in immunization programmes has been conducted in 11 countries. The proportion of unsafe injections ranged from 0% in 5 countries to > 30% in three countries. In the limited studies conducted in the curative sector, a high proportion of injections were classified as unsafe.

During the past decade, there have been numerous publications on the topic of nosocomial or iatrogenic transmission of HBV, HCV and HIV in the Region not related to transfused blood, plasma-derived products or transplantation. A common theme in these studies is that unsafe therapeutic injections and health care procedures contribute significantly to blood-borne pathogen transmission in the Region. WHO estimates that around 2.5 million HBV infections, 600 000 HCV infections, and 2 200 HIV infections occur each year in the Region due to unsafe injections (Figure 2), accounting for 58% of all HBV infections, 82% of HCV infections and 7% of HIV infections in the Region [3].

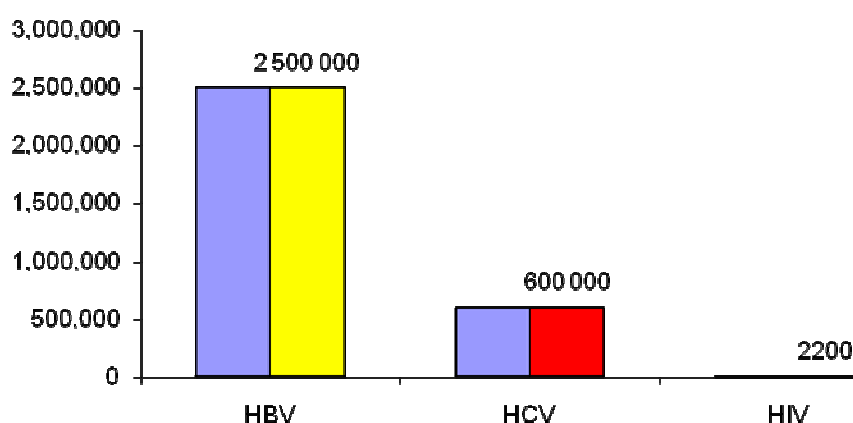


Figure 2. Estimated number of HBV, HCV and HIV infections due to unsafe injections in the Eastern Mediterranean Region

Health care worker exposures

Numerous studies report a high frequency of needlestick injuries and other percutaneous exposures to blood among health care workers (HCWs) in the Region [31–34]. Epidemiological studies of health care workers indicate that they are at increased risk of blood-borne pathogen infection as a result of these exposures. In a serosurvey of health care workers in the Syrian Arab Republic, the prevalence of HCV infection (3%) was higher than the prevalence in the general population (1%), with the highest prevalence being observed among health care workers in dialysis units (6%) [36]. Similar observations have been made in Pakistan and Yemen [37–39]. WHO estimates occupational exposures cause around 10 000 HBV infections and 3500 HCV infections per year among health care workers in the Region [40].

Unsafe blood and blood products

Transfusion of blood, blood components or blood products is a routine medical procedure that saves millions of lives each year. However, blood transfusions may expose the recipient to a number of adverse events, including the transmission of viral or bacterial pathogens including HIV, HBV and HCV. These pathogens are of highest public concern because of the prevalence of these infections in the general population, the morbidity and mortality associated with infection and their high potential for transmission through infected blood.

To decrease the risk of transfusion-associated disease, WHO recommends a number of key interventions, including 100% screening of blood for HBV, HCV and HIV, use of voluntary non-remunerated donors and use of standardized tests and reagents for the screening of blood.

Globally, a significant proportion of the blood supply is either not screened at all for HBV and HCV or not screened properly. In the Eastern Mediterranean Region, most countries report high levels of screening for all three pathogens, however national programmes often do not have accurate information of practices at the community level. For example, in a survey of 25 blood banks in Pakistan, only 55% had capacity to screen for HIV infection and 23% to screen for HCV infection. Half of the facilities reported regularly utilizing paid donors and a high percentage of facilities reported using donor replacements [41]. In countries in complex emergency situations blood banks often experience problems with access to screening reagents and quality of laboratory services. Use of paid donors is common in many areas and studies of paid donors indicate a high prevalence of blood-borne pathogen infection. Problems with screening are highlighted by the relatively high percentage of patients with acute HBV or HCV infection reporting receipt of a transfusion in the 6 months prior to illness, suggesting that there is continued transmission due to transfusion of unscreened blood [7].

Blood-borne pathogen transmission among injecting drug users

Different studies have documented high risk behaviour among injecting drug users (sharing of needles and injection equipment, exchanging sex for money, having multiple partners, low condom use) resulting in the increasing prevalence of hepatitis B and C in injecting drug users and the potential for transmission into the general community.

In developed countries with low HCV endemicity, injecting drug users constitute the largest proportion of people infected with the virus. It is estimated that there are 1 million injecting drug users in the Eastern Mediterranean Region. Serosurveys among injecting drug users in the countries of the Region report high prevalence of HBV and HCV, ranging from 15% in the Islamic Republic Iran to 94% in Karachi, Pakistan (Table 2). Studies in Lahore [54] and Quetta confirmed a high prevalence of HCV infection (88%) in other major cities in Pakistan.

Table 2. Studies evaluating the prevalence of blood-borne pathogen infections among injecting drug users in the Eastern Mediterranean Region

Country	Year	No. of subjects	Percentage of subjects with infection			Reference
			HCV	HBsAg	HIV	
Afghanistan	2006	464	37	6.5	3	42
Islamic Republic of Iran	2002	149	32	NA	1	43
Islamic Republic of Iran	2004	202,13	52	NA	23	44, 45
Islamic Republic of Iran	2006	499	NA	NA	24	46
Islamic Republic of Iran	2007	214	14.5	2	1.4	47
Lebanon	2008	NA	49	6	<1	Ministry of Health
Pakistan	2003	161	94	7.5	0.6	48
Pakistan	2003	175	NA	NA	9.7	49
Pakistan	2003	351	88	NA	0	50
Pakistan	2007 ^a	250	NA	22	NA	51
Pakistan	2006–2007	4039	NA	NA	15.8	52
Syrian Arab Republic	'1998	38	61	5.3	NA	53

^a Year of report

3. Current response and challenges

3.1 Hepatitis B immunization

In 1992, WHO recommended the inclusion of hepatitis B vaccine (HepB) into the childhood EPI schedule for all countries. HepB has now been introduced into EPI in all countries of the Region except Somalia (and southern Sudan). Since HepB introduction, there has been a progressive increase in the percentage of the Region's birth cohort who have received 3 doses of HepB (Figure 3). In 2007, around 85% of infants born in the Region received 3 doses of hep B vaccine.

Preventing perinatal HBV transmission is a challenge in many countries. Children born to HBsAg-positive mothers are at increased risk of perinatal HBV infection and chronic HBV infection. Perinatal transmission can be prevented with administration of the first dose of HepB within the first 24 hours of life and timely completion of the vaccination series. The contribution of perinatal HBV transmission to overall disease burden (e.g. persons with chronic disease) can be high, particularly in settings where a high proportion of HBsAg positive pregnant women are also HBeAg positive. It is estimated that around 10 000 excess deaths due to perinatal HBV transmission can be averted in the Region each year if all countries use a birth dose of HepB [4]. Currently in the Region, only 13 countries offer a birth dose of HepB and only 33% of births in the Region occur in countries that offer such a birth dose.

Approximately half of the countries report having immunization programmes for health care workers. Published data and reports from national programmes indicate that vaccination coverage of health care workers remains low even among countries that report the existence of a national programme [35,55–57]. Of particular concern is the low coverage reported among health professions students and housekeeping health staff, who report high frequencies of percutaneous injuries.

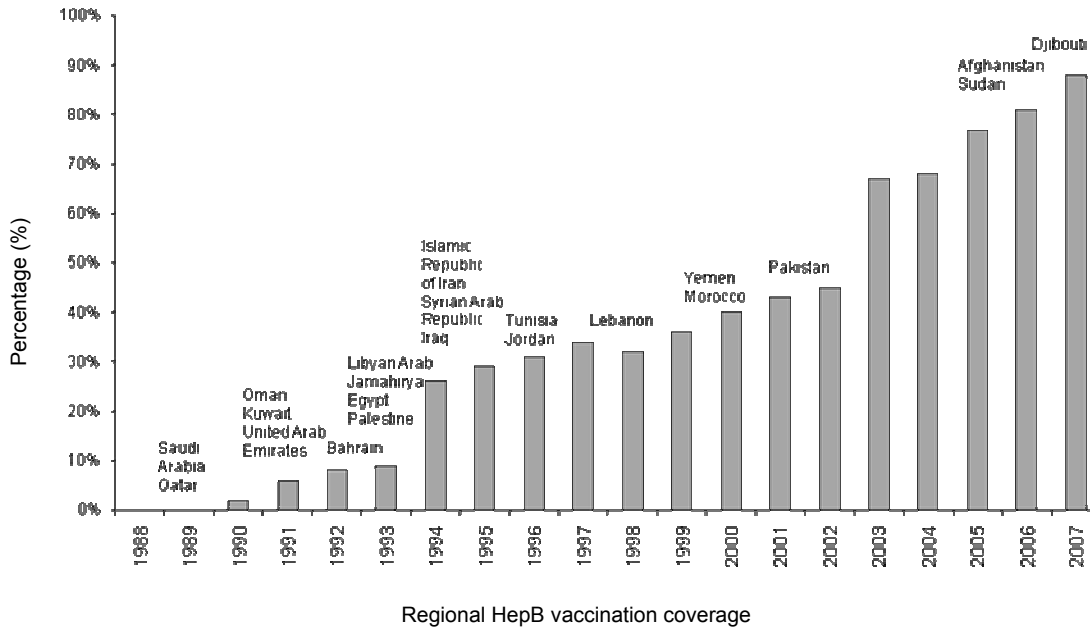


Figure 3. Year of hepatitis B vaccine introduction for each country and HepB vaccination coverage of Eastern Mediterranean Region birth cohorts, 1988–2007

3.2 Prevention of blood-borne pathogen transmission in health care settings

Safe injections

Ensuring safe injections is a high priority. In 2004, a regional plan of action and strategy for injection safety in EPI was developed. Key interventions include the development of national policies and programmes on injection safety; ensuring adequate provision of auto-disable syringes, waste disposal equipment and supplies; training of health care workers; and raising public awareness to increase safety and reduce unnecessary injections. There has been considerable progress in ensuring safe injections in EPI.

However, there are considerable challenges in implementing safe injections in the broader health sector. Patient demand for injections is high, despite the availability of oral medications with equivalent effectiveness. Few Member States use auto-disable syringes in the curative sector and in many countries there are limited supplies of injection equipment, pushing patients to purchase injection equipment themselves. In some communities, informal health care providers provide injections at low cost. Many of these providers lack understanding about the adverse events associated with unsafe injections.

Infection control

Regional efforts to promote infection control include development of guidelines, training materials and a “health systems” approach to ensure high quality care. There are considerable challenges in implementing national programmes for infection control. Infection control is not a well recognized discipline and investment in infection control is often not linked to reimbursement for the provision of health services.

Studies of health care workers in Egypt suggest that promotion of personal protection leads to increased concern about transmission of blood-borne pathogens in the health care setting and behaviour change in the provision of health care services [58]. Occupational safety and education

of health care workers is a key element of infection control and has reduced HBV transmission and improved infection control practices remarkably in the United States of America [59].

Safe transfusions

Regional efforts are being made to improve safety of blood and blood products and to rationalize the use of blood transfusion, with a particular focus on life-saving transfusions in countries emerging from disaster situations. WHO recommends a number of key interventions, including 100% screening of blood for HBV, HCV and HIV, use of voluntary non-remunerated donors, and use of standardized tests and reagents for the screening of blood. However, implementation of this recommendation is far from optimal in several countries of the Region.

Challenges in blood safety include systematic weaknesses, particularly in low-income and middle-income countries, and the small increase in voluntary blood donations. Under-funded and inadequately staffed health systems are negatively affecting the development of an effective service. The situation is acute in countries facing complex emergencies. Despite promotion and advocacy, the increase in voluntary blood donation falls far short of the growing need of transfusion services.

Harm reduction

At the regional level, WHO continues to support countries in strengthening the role of civil society organizations in harm reduction, targeting injecting drug users, through the Middle East and North Africa Harm Reduction Association (MENAHRRA) and the three sub-regional knowledge hubs on harm reduction. In addition, WHO is supporting civil society organizations to establish or scale up harm reduction programmes, providing technical support to civil society organizations and undertaking advocacy actions at country and regional levels.

The Islamic Republic of Iran is the only country which has implemented a comprehensive package of harm reduction interventions targeting drug users. This includes opioid substitution therapy and needle and syringe programmes. Pakistan is achieving large scale coverage of needle and syringe programmes for injecting drug users in the provinces with highest prevalence of injecting drug users. Afghanistan, Egypt, Lebanon, Morocco and Oman have pilot projects offering services to injecting drug users. These countries have received support to introduce new or to scale up existing harm reduction services.

Treatment of HBV and HCV infection

In the past decade there has been considerable progress in the clinical management of patients with chronic HBV and HCV infection. In particular, combination therapy of pegylated interferon with ribavirin has been successfully used to treat HCV, including genotypes prevalent in the Region [60,61]. HCV treatment is not simple, well tolerated or economically favourable. Clinical response is dependent on stage of illness, virus genotype and numerous patient factors, including age, compliance and the prevalence of concomitant infections such as HIV or HBV infection. Depending on genotype and stage of illness, a high percentage of patients (around 80%) will respond to therapy. Among patients with less favourable patient factors, as few as 40% will clear the infection.

The cost to treat HCV-infected patients far outweighs the cost of implementing prevention programmes. Standard treatment costs US\$ 12 000 to US\$ 22 000 [62,63] for a full course of therapy. These costs do not include the cost of medical evaluation and follow-up which can be considerable. Many countries are experiencing increased health care costs in order to diagnose and treat patients with hepatitis-related chronic liver disease. Based on prevalence data and indications for therapy, the potential cost to treat currently infected patients is considerable for each Member State and is estimated to be > US\$ 125 billion for the Region as a whole (Table 3).

Table 3. Estimated number of persons with HCV infection and cost of treating patients with chronic infection based on HCV prevalence by country

Country	Population	Anti-HCV prevalence (%)	No. of persons with HCV infection	No. of persons with chronic HCV infection (70%)	No. of candidates for therapy (50% of those with chronic infection)	Cost of treatment (US\$ 15 000 per patient)
Afghanistan	29 547 078	3.00	886 412	620 489	310 245	4 653 675 000
Bahrain	680 000	1.80	12 240	8568	4284	64 260 000
Djibouti	840 000	0.60	5040	3528	1764	26 460 000
Egypt	76 117 421	13.50	10 275 852	7 193 096	3 596 548	53 948 220 000
Iran, Islamic Republic of	70,050,000	1.00	700 500	490 350	245 175	3 677 625 000
Iraq	26 000 000	3.21	834 600	584 220	292 110	4 381 650 000
Jordan	5 460 000	2.10	114 660	80 262	40 131	60 165 000
Kuwait	2 214 000	1.80	39 852	27 896	13 948	209 220 000
Lebanon	4 550 000	0.70	31 850	22 295	11 148	167 220 000
Libyan Arab Jamahiriya	5 901 000	1.60	94 416	66 091	33 046	495 690 000
Morocco	30 495 000	3.00	914 850	640 395	320 198	4 802 970 000
Oman	2 903 000	1.20	34 836	24 385	12 193	182 895 000
Pakistan	158 000 000	4.90	7 742 000	5 419 400	2 709 700	40 645 500 000
Qatar	840 000	1.10	9240	6468	3234	48 510 000
Saudi Arabia	24 294 000	1.80	437 292	306 104	153 052	2 295 780 000
Somalia	8 304 000	1.50	124 560	87 192	43 596	653 940 000
Sudan	39 148 000	2.80	1 096 144	767 301	383 651	5 754 765 000
Syrian Arab Republic	18 881 000	1.00	188 810	132 167	66 084	991 260 000
Tunisia	10 105 000	1.20	121 260	84 882	42 441	636 615 000
United Arab Emirates	3 524 000	1.80	63 432	44 402	22 201	333 015 000
Yemen	20 000 000	1.10	220 000	154 000	77 000	1 155 000 000
Total	537 853 499		23 947 846	16 763 491	8 381 749	125 726 235 000

Treatment of patients with hepatitis B is evolving [63–65]. Peginterferon induces long-term remissions in disease in one-third of patients with typical hepatitis B e antigen (HBeAg) positive chronic hepatitis B, but a lesser proportion of those without HBeAg. Several oral nucleoside analogues with activity against HBV have been shown to be effective in suppressing viral levels and improving biochemical and histological features of disease in a high proportion of patients with and without HBeAg in the short term. What is uncertain is which agent or combination of agents is most effective, how long therapy should last, and which criteria should be used to start, continue, switch or stop therapy.

4. Proposed action/strategies

4.1 Establishing a regional goal to reduce the prevalence of chronic HBV infection

The main goal of hepatitis B immunization is to reduce the prevalence of chronic HBV infection. WHO recommends serologic surveys to demonstrate reduction in the prevalence of chronic HBV infection among children born after vaccine introduction and to validate the expected impact from coverage data. In 2006, the technical advisory group for EPI in the Eastern Mediterranean Region recommended that Member States adopt a goal of reducing the prevalence of chronic HBV infection (HBsAg) among cohorts of children born after vaccine introduction to <1%. In 2008 the technical advisory group recommended this be set as a regional goal also. A number of countries have monitored the impact of HepB vaccination through serosurveys among children born post-vaccine introduction (Table 4). Most of these surveys, including those conducted in Saudi Arabia, Oman and Egypt, demonstrate a reduction in the prevalence of chronic HBV infection to <1% [66–71]. Conducting such surveys is particularly important in countries that do not provide a birth dose and settings where the prevalence of HBsAg is high (e.g. upper Egypt, Sudan, Djibouti).

4.2 Providing a birth dose of HepB vaccine within 24 hours of life

In 2006, the regional technical advisory group for EPI also recommended the use of a birth dose of HepB vaccine in all countries. A number of countries that do not offer a birth dose report having a relatively high proportion of births in health care facilities or births attended by skilled workers suggesting that access to services is high and administration of a birth dose is feasible. With appropriate training, HepB vaccine can also be administered through traditional birth attendants and community health workers. Vaccination at birth is particularly important in settings where the prevalence of HBsAg is high.

4.3 Development of blood-borne pathogen standard precautions

The development of comprehensive blood-borne pathogen standard precautions with attendant regulations in each country is urgently needed to reduce transmission of HBV and HCV infection in health care settings. The implementation of such a standard needs governance and support at high levels, including legislation and/or regulations to ensure that health care workers are protected and that health care facilities are compliant with standard precautions. In addition to legislation, intersectoral collaboration with ministries of labour or social welfare as well as nongovernmental institutions can be helpful in organizing these efforts. Key elements of such a standard include the following.

Table 4. Studies^a monitoring the impact of hep B immunization on the prevalence of chronic HBV infection (HBsAg) among children born after vaccine introduction.

Study site	No. tested	Follow-up (years)	Vaccine coverage	% Chronic infection	
				Before	After
Egypt	1000	5	NA	NA	0.8
Egypt	720	10	NA	NA	0.6
Egypt	180	1-5	100	NA	0
Oman				NA	0
Saudi Arabia	4791	1–8	85%	6.7	0.16
Saudi Arabia	1355	16-18	NA		0
Saudi Arabia	229	1-10	NA	8.8	0.9

^a Adapted from [59].

Occupational safety and health

Mandatory education and vaccination of persons with occupational exposure to blood is needed in all countries. This can only be accomplished with leadership from the Ministry of Health and support from the legislative branch of government. All health care employers should be required to provide yearly training and hepatitis B vaccination to all persons with occupational exposure to blood at no cost to the employee. Legislation/regulation should include the private sector and indicate what sector of the government is responsible for monitoring compliance. Vaccination and education of health care worker with occupational exposure to blood is a key step in preventing HBV and HCV transmission in the health care setting. Health care facilities should be instructed to develop plans to prevent needlestick and sharps exposures among health care workers.

Injection safety and infection control

Considerable resources and technical support have been provided to ensure injection safety in the Expanded Programme on Immunization. While these efforts have been moderately successful, they have had minimal impact on transmission of viral hepatitis in the Region since most injections are provided in the curative sector. Efforts are urgently needed to expand injection safety activities in all sectors of health care service.

An intersectoral approach is urgently needed to address all the challenges in promoting safe injections. In particular, educational programmes are needed to train health care workers on proper administration of injections and aseptic techniques when using multi-dose vials. Health care facilities should be instructed to develop plans to prevent needlestick and sharps exposures among health care workers. Communication strategies are needed to decrease patient demand for therapeutic injections and raise public awareness about the risks associated with reuse of injection equipment. Support is needed from the medical syndicate to promote use of oral medicines where appropriate. Support is also needed from pharmaceutical manufacturers and essential drug policy formulators to promote use of oral medications. Development of strong infection control programmes provides a programmatic approach to promoting injection safety in the curative sector.

Implementation of infection control

Strategies for infection prevention and control associated with health-care delivery rely upon successful interplay of several management systems, including patient pathways, staff–patient ratios, organizational learning and adoption of innovation and training, as well as upon the clinical care delivered by individual staff. Low-cost, high quality and high yielding interventions exist to prevent infection in health care facilities.

The development of guidelines and an accreditation process can facilitate a structured approach to monitor infection control activities. Public health officials should support these activities with ongoing training programmes, risk management tools and standardized surveillance methods to monitor the burden of health-care associated infections. These interventions need to be embedded and sustained in a comprehensive patient-safety programme. Special efforts are needed to monitor the implementation of infection control guidelines and to monitor injection safety at all levels of health care service delivery.

Safe transfusion and use of blood products

Many countries have voiced concerns over the quality and safety of blood transfusion services indicating the serious impact on national morbidity and mortality indicators. The following blood transfusion-related activities should be included in a regional approach:

- strengthening of national regulatory activities related to quality assurance and safety of blood products and related in-vitro procedures;
- promotion of safe blood donation through voluntary non-remunerated blood donation;
- collaboration with regional and international interest groups to promote safe transfusion services;
- strengthening of laboratory and blood transfusion networks and ensuring adequate screening of blood, particularly in under-funded health systems and/or countries in complex emergency.

Harm reduction

To prevent transmission of blood-borne pathogens among injecting drug users and subsequent transmission into the general population, a comprehensive harm reduction strategy in all countries is needed. Key activities include opioid substitution therapy and needle and syringe programmes, condom programmes for injecting drug users and their spouses and sexual partners, testing and counselling for HIV, hepatitis B and C, and/or tuberculosis, and hepatitis B vaccination of injecting drug users at all opportunities within the health care system.

4.4 Strengthening surveillance to monitor the incidence and prevalence of viral hepatitis and the impact of prevention activities

Hepatitis surveillance is complex due to the diversity of pathogens causing disease, high frequency of asymptomatic infections, variability in the clinical presentation of disease and high costs of diagnostic testing. Despite these constraints, surveillance can be helpful in characterizing the epidemiology of all forms of viral hepatitis and identifying high-risk groups for prevention activities. Sentinel surveillance can limit the cost of hepatitis surveillance and provide high quality information. Special studies are needed in several countries to characterize the epidemiology of HBV and HCV infection. Countries are encouraged to conduct serosurveys to monitor the impact of vaccination programmes.

5. Conclusions

Chronic liver disease related to viral hepatitis has emerged as a leading public health problem in the Eastern Mediterranean Region. There continues to be considerable HBV and HCV transmission in the Region. WHO estimates approximately 4.3 million persons are infected with HBV and 800 000 persons are infected with HCV each year. Most of these infections are acquired in the health care setting. It is estimated approximately 17 million persons in the Region have chronic HCV infection. Based on current treatment guidelines for hepatitis C, the cost to treat 50% of eligible patients in the Region is estimated to be >US\$ 125 billion. The cost of treating patients with chronic HBV or HCV infection far outweighs the cost of implementing prevention programmes.

Key strategies to reduce HBV and HCV transmission include promotion of injection safety and infection control in the health care setting, ensuring safety of blood and blood products, and reducing the demand for unnecessary injections. The epidemiology of HBV and HCV infection is not well characterized in many countries. Special studies and enhanced surveillance activities are needed to refine prevention strategies and monitor the impact of prevention activities. The Regional Office can provide technical support in several areas such as: protocols to document hepatitis B disease reduction; guidelines for infection control; treatment guidelines for chronic HBV and HCV infection; consultations and meetings to develop a comprehensive strategy to reduce transmission of blood-borne pathogens in the health care setting.

6. Recommendations to Member States

1. Endorse a regional target of reduction in the prevalence of chronic hepatitis B virus infection to <1% among children below 5 years of age by 2015.
2. Expand hepatitis B vaccination programmes to include: provision of a birth dose of vaccine to all infants within the first 24 hours of life; vaccination of all persons with occupational exposure to blood and infectious body fluids; and vaccination of other high-risk populations, including injecting drug users.
3. Establish strong intersectoral collaboration between the health sector, legislative branch and key ministries in order to pass legislation ensuring safety of all injections in the health care setting, universal vaccination of workers with occupational exposure to blood and introduction of strategies for harm reduction.
4. Promote infection control through adoption of national guidelines and an accreditation process to monitor compliance.
5. Conduct necessary studies/surveillance activities to better understand the epidemiology of hepatitis C in selected countries.
6. Ensure transfusion safety through: strengthening national regulatory activities related to quality assurance and safety of blood products and related in-vitro procedures; promotion of safe blood donation through voluntary non-remunerated blood donation; collaboration with national and international interest groups to promote safe transfusion services; strengthening of laboratory and blood transfusion networks, particularly in under-funded health systems and/or countries in complex emergency situations.
7. Expand harm reduction interventions among drug users including: opioid substitution therapy and needle and syringe programmes; condom programmes for injecting drug users and their spouses and sexual partners; testing and counselling for HIV, hepatitis B and C, and/or tuberculosis; and hepatitis B vaccination of injecting drug users at all opportunities within the health care system.

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