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# HIV surveillance in MENA: recent developments and results

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## Arabic Abstract translation

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## ABSTRACT

**Objectives** To provide an overview of the current level of development and results from the national HIV surveillance systems of the 23 countries of the Middle East and North Africa (MENA), and to assess the quality of HIV surveillance systems in the period 2007–2011.

**Methods** A questionnaire was used to collect the information about the structure, activities and the results of HIV surveillance systems from the National AIDS Programmes. Assessment of the quality was based on four indicators: timeliness of data collection, appropriateness of populations under surveillance, consistency of the surveillance sites and groups measured over time, and coverage of the surveillance system.

**Results** Only in four countries did surveillance systems enable assessment of epidemic trends in the same populations and locations over time, such as in pregnant women (Morocco, Iran), injecting drug users (Iran, Pakistan), female sex workers (Djibouti, Morocco) and male sex workers (Pakistan). There is increasing evidence of HIV infection being firmly established in at least one of the populations most at risk of HIV in nine MENA countries, while lower risk populations show elevated HIV prevalence in South Sudan, Djibouti and some parts of Somalia.

**Conclusions** The performance of HIV surveillance systems in several of the MENA countries has improved in recent years. The extent of HIV epidemics in the populations most at risk of HIV is still largely unknown in 10 countries. Multiple data sources that most of the countries still lack would enable indirectly estimation not only of the patterns of HIV epidemics but also the effectiveness of HIV responses.

## INTRODUCTION

According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), in 2010 the total number of people living with HIV in the Middle East and North Africa (MENA) Region was 470 000 (350 000–570 000), compared to less than 320 000 (190 000–450 000) in 2001.<sup>1</sup> In 2011, an estimated 36 000 (26 000–56 000) new HIV infections occurred while 25 000 (17 000–35 000) people died of AIDS.<sup>2</sup>

Most countries in the MENA (except South Sudan and Djibouti) have an estimated HIV prevalence in the general population below 1% and have HIV epidemics concentrated in populations most at risk of HIV with limited spread to the general population.<sup>3</sup> Accordingly, in these countries surveillance activities should focus primarily on monitoring trends in behaviours and HIV prevalence among populations most at risk of HIV.<sup>4</sup> Only in those countries where HIV prevalence has reached 1% or more in lower risk populations (South

Sudan, Djibouti, Somalia) should additional surveys in the general population be recommended.<sup>5</sup>

The challenges related to development of HIV surveillance in the MENA countries have been described elsewhere and include infrequent surveillance of populations most at risk of HIV, lack of behavioural data, over-reliance on HIV case reporting and facility-based surveillance, and limited quality of HIV surveillance in general.<sup>6–8</sup> In an assessment of the quality of HIV surveillance in low- and middle-income countries carried out in 2009, only two countries of the MENA region (Morocco and Sudan) were categorised as having partially functioning HIV surveillance.<sup>9</sup> The need to develop more effective surveillance systems in populations most at risk of HIV was highlighted in a recently conducted comprehensive review of HIV epidemiology in the MENA region.<sup>10</sup>

The aim of this paper is to provide an overview of the current level of development and results of the national HIV surveillance systems in 23 countries of the WHO Eastern Mediterranean Region. These include Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, South Sudan, Syria, Tunisia, United Arab Emirates (UAE), Palestine and Yemen.

## METHODS

We used a questionnaire to collect the information about the structure and activities of HIV surveillance systems from the National AIDS Programmes (NAPs). We also carried out telephone interviews with the NAP managers after they returned a completed questionnaire to seek clarifications on certain responses and data where these were not provided.

The questionnaire sought the following information: availability of HIV and AIDS case reporting and the number of HIV and AIDS cases reported in the year 2010, reporting of CD4 cell counts in newly diagnosed HIV patients, availability and results of facility-based HIV surveillance in patients diagnosed with tuberculosis (TB), sexually transmitted infections (STIs) and in pregnant women, availability and results of integrated bio-behavioural surveillance surveys (IBBSS) in populations most at risk of HIV and estimates of the size of populations most at risk of HIV. The questionnaire was sent to NAPs in 2009, 2010 and 2011 and assessed HIV surveillance activities for the period 2007–2011.

To assess the quality of HIV surveillance systems we adapted the method developed by WHO and UNAIDS that has been used to evaluate the HIV surveillance systems in low- and middle-income countries since 2002.<sup>9 11 12</sup> We used four parameters to assess the quality of HIV surveillance



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**Table 1** Parameters used to assess the quality of HIV surveillance systems in the Middle East and North Africa countries

Parameter	Description	Scoring
Timeliness of data collection	Number of times surveys were conducted in 2007–2011 in TB and STI patients, pregnant women, FSW, MSM and IDUs.	Range: from 0 if no survey was done, to a maximum of 30 if surveys were done in each of these groups annually between 2007 and 2011.
Appropriateness of populations under surveillance	For low-level HIV epidemics: implementation of at least one survey in FSW and MSM and IDUs in the period 2007–2011; For concentrated epidemics: at least one survey in FSW and MSM and IDUs, and one round of a survey in pregnant women in at least one urban site; For generalised epidemics: at least one survey in pregnant women at urban and rural sites, or a national-level general population survey.	0=non-appropriate system 1=appropriate system
Consistency of the surveillance sites and groups over time	The extent to which a surveillance system enables assessment of epidemic trends in the same populations and locations over time.	0=no pattern of consistency in urban and rural sentinel sites in facility-based surveys and IBBSS 1=there is some repetition in sites and at least two rounds of surveillance surveys in at least one group at risk were implemented 2=a clear pattern of consistency is evident and at least three rounds of surveys in at least one group were implemented, appropriate to the epidemic context.
Coverage of the surveillance system	The extent to which a surveillance system is set up in key geographical areas	0=poor coverage 1=surveillance activities appropriate for the epidemic context are operational in major urban areas. <sup>4 5</sup> 2=surveillance activities are set up in the parts of the country outside of major urban areas (substantial national coverage)

FSW, female sex workers; IBBSS, integrated bio-behavioural surveillance survey; IDUs, injecting drug users; MSM, men who have sex with men; STI, sexually transmitted infection; TB, tuberculosis.

systems in the MENA countries: timeliness of data collection, appropriateness of populations under surveillance, consistency of the surveillance sites and groups measured over time, and coverage of the surveillance system (table 1).

In the total addition of scores, the countries that scored more than 10 were rated as having fully implemented HIV surveillance systems. Partially implemented systems were scored as 5–9 while poorly implemented as having less than four points.

The status of HIV epidemics in the countries was classified as low-level, concentrated and generalised as categorised by UNAIDS/WHO.<sup>5</sup>

## RESULTS

Data were obtained from the NAPs from all 23 countries. Some results of the HIV surveillance activities were already published in peer-reviewed journals, while others are only available in surveillance reports or were provided by the NAPs in the questionnaires.

### HIV case reporting

HIV case reporting data disaggregated by sex and mode of transmission were submitted by 18 countries, while AIDS cases were available in 13 countries for the year 2010 (table 2). With the exception of Djibouti, Morocco, Somalia and Syria, the male-to-female ratio in reported HIV cases reported is high, ranging from 1.4:1 in Oman to 7:1 in Bahrain suggesting that substantial HIV transmission might have occurred via male-to-male sex, or that female HIV cases are underreported. However, in eight out of 16 countries for which data were available the most commonly reported mode of transmission in men is heterosexual followed by unknown mode in four countries. Injecting drug user (IDU) is the most common transmission category in HIV cases in men in Iran (82.0%), followed by Tunisia (18.5%) and Saudi Arabia (7.1%). Men who have sex with men (MSM) is the most frequently reported transmission category only in Lebanon. The majority of HIV cases in women were attributed to heterosexual transmission, with unknown mode of

transmission less frequently reported than in men. The highest contribution of mother to child transmission of 4.4% as a proportion of all HIV cases was found in Djibouti.

Sex differences are also evident in AIDS case reporting, with Sudan and Tunisia being the only countries where the number of AIDS cases is higher in women compared to men.

Data on CD4 counts at the time of HIV diagnosis were reported in eight countries in 2009: Djibouti, Morocco, Oman, Pakistan, Palestine, Tunisia, Syria and Saudi Arabia. Completeness of reporting assessed as a proportion of newly diagnosed HIV cases who had CD4 count data reported 3 months within HIV diagnosis ranged from 10.8% in Syria to 100% in Palestine (only two cases of HIV were reported in Palestine in 2009). When data are analysed for these eight countries, 52% (median value) of newly diagnosed HIV cases had CD4 counts <350 cells/mm<sup>3</sup> at the time of diagnosis.

### Facility-based HIV surveillance

Facility-based HIV surveillance of pregnant women in antenatal care services and/or TB patients and/or patients with STIs is the main surveillance component in Djibouti, Iran, Morocco, Somalia, South Sudan, and exists to some extent in Egypt, Afghanistan, Lebanon, Sudan, Saudi Arabia, Yemen and Tunisia.

HIV prevalence data in pregnant women from at least one survey have been available in ten countries since 2007. The highest recorded HIV prevalence was in South Sudan (3.4% in 2007 decreasing to 3.0% in 2009), followed by Djibouti (2.1% in 2007–1.6% in 2009). Data from Somalia indicate HIV prevalence in Somaliland of 1.3% in 2007 and 1.1% in 2010, while in Puntland it was 0.7% and 0.3%, respectively. HIV prevalence data in pregnant women are available from more than three points in time in Morocco, ranging from 0.08% in 2007 to 0.2% in 2009, Iran (zero prevalence) and Djibouti.

A total of ten countries reported conducting HIV prevalence assessment surveys in TB patients since 2007. These showed a high burden of HIV in South Sudan across 10 sites (14.7%, 2010), followed by Djibouti (13.6% in 2007–11.3% in 2010)

**Table 2** The number of newly diagnosed HIV cases by sex and transmission category, and AIDS cases by sex (National AIDS Programmes, 2010)

	Male HIV cases					Total HIV	Male AIDS cases Total AIDS	Female HIV cases					Total AIDS
	IDU	MSM	Heterosexual	MTC	Not known			IDU	Heterosexual	MTC	Not known		
Bahrain	6	0	8	0	0	14	NA	0	2	0	0	2	NA
Egypt	80	39	88	10	109	326	NA	0	62	4	17	83	NA
Djibouti*	0	0	58	0	20	78	NA	0	94	9	20	125	NA
Iran	1102	0	102	24	116	1344	414	19	219	22	31	291	71
Jordan	0	0	9	0	0	9	7	0	3	0	0	3	0
Kuwait	0	0	8	0	0	8	3	0	2	0	0	2	2
Lebanon†	0	11	1	0	0	18	22	0	3	0	0	3	4
Morocco‡	6	13	112	8	6	158	284	0	136	2	20	161	187
Oman	1	17	20	1	30	69	19	0	30	2	18	50	5
Qatar	0	0	1	0	0	1	4	0	0	0	0	0	2
Palestine	0	0	0	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	22	2	89	3	193	309	44	0	30	4	43	77	9
Somalia	NA	NA	NA	NA	NA	274	NA	NA	NA	NA	NA	391	NA
Sudan	NA	NA	NA	NA	NA	1189	60	NA	NA	NA	NA	817	65
Syria§	0	3	15	0	1	21	19	0	21	1	2	25	4
Tunisia	5	0	12	1	9	27	7	0	16	2	0	18	13
United Arab Emirates	1	1	0	0	19	21	NA	0	0	0	4	4	NA
Yemen¶	0	20	89	8	45	164	80	1	50	1	13	72	37

\*In Djibouti, there are two female cases whose mode of transmission was categorised as being due to the receipt of blood or blood products.

†In Lebanon, there are six male HIV cases whose mode of transmission was categorised as 'bisexual'.

‡In Morocco, three HIV cases in men and one in women had nosocomial mode of transmission reported; in two female HIV cases receiving blood products was reported as a mode of transmission; 10 male HIV cases had a bisexual mode of transmission reported.

§In Syria, in two HIV cases in men and one case in women HIV transmission was reported as being due to the receipt of blood or blood products.

¶In Yemen, in two HIV cases in men and seven cases in women HIV transmission was reported as being due to the receipt of blood or blood products.

IDU, injecting drug use; MSM, men who have sex with men; MTC, mother-to-child transmission; NA, not available.

and Somalia (8.2%, 2010, data collected at five sites). Lower rates were reported in Iran from a survey that included 3133 TB patients in 2010 (3.8%) and Yemen (1.6%, 2009).

In Morocco the prevalence ranged from 0.4% in 2007 to 0.8% in 2010. In all other countries reported HIV prevalence rates in TB patients ranged from zero in Palestine and Jordan to 0.4% in Saudi Arabia.

Eight countries report HIV prevalence data in STI patients but their validity is limited due to non-specific eligibility and inclusion criteria for STI cases. In Somalia, HIV prevalence was 6.3% in Somaliland and 2.3% in Puntland in 2007 while in other countries surveillance studies rarely detected HIV cases in STI patients.

#### HIV surveillance in populations most at risk of HIV

HIV prevalence data for populations most at risk of HIV are still not available in Bahrain, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, South Sudan, Syria and UAE.

HIV prevalence estimates from more than three rounds of surveys are available in Pakistan, and, along with Pakistan, Egypt, Lebanon and Tunisia conducted IBBSS in all three key transmission groups—female sex workers (FSW), IDUs and MSM.

Eleven countries conducted IBBSS or HIV serosurveys in FSW and the prevalences were reported as below 4% in all the countries with the exception of Somalia (5.2%, 2007), Iran and Djibouti.<sup>13</sup> Though aggregated data from HIV surveys in Iran collected at facilities for women at higher risk suggest an HIV prevalence of 4.5% in 2011, a respondent-driven sampling (RDS) survey in Shiraz found a slightly higher rate of 5.2%. HIV prevalence trend data are available in Morocco (2.6% in

2007–2.7% in 2010) and Djibouti (19.7% in 2007–15.4% in 2009). However, both Djibouti and Morocco have facility-based surveillance in FSW based on convenience samples. Surveys in male sex workers (MSW) were conducted only in Pakistan and demonstrated HIV prevalences of 1.5% (0–7.5% per city) in 2007–1.6% (0–5.9%) in 2011 in MSW (using RDS), and 1.8% (0–14.0%) and 5.2 (0–14.9%), respectively in Hijra sex workers (these are transgender homosexual and bisexual men and hermaphrodites who sell sex to other men) using network sampling.<sup>14 15</sup>

HIV prevalence was assessed among IDUs in nine countries, and of these Iran and Pakistan, which also record the highest levels of HIV in IDUs have trend data showing an increase in the epidemic in both countries. In 2011 the overall prevalence in Pakistan was 27.2% (3.3–52.5% per city) in surveys using cluster-based sampling in 16 cities compared to 15.8% in 12 cities in 2007 (0–51.3%).<sup>14 15</sup> In Iran, HIV prevalence among IDUs recruited from harm reduction services ranged from 13.3% in 2007–15.0% in 2011.

In Afghanistan, the RDS surveys done in three cities in 2009 found the variable prevalence of 1% in Mazar to 18.2% in Herat.<sup>16</sup> In Egypt surveys using RDS in 2010 found that 6.8% of IDUs in Cairo and 6.5% in Alexandria were HIV infected<sup>17</sup> Lower rates of 2.4% were observed in Tunisia in 2011 (0–2.7% per city) while RDS surveys done in Jordan, Lebanon and Palestine found no HIV cases in IDUs.

Only a third of the countries conducted IBBSS in MSM. The highest measured prevalence of 13.0% was in Tunisia in 2011 in surveys using time-location sampling in six cities (0–16.0% per city) compared to 4.9% in 2009. Sudan in 2005 (9.3% in

receptive and 7.8% in insertive MSM in Khartoum), Egypt (5.9% in Alexandria, and 5.7% in Cairo in RDS surveys carried out in 2011 while no cases were found in Luxor), Morocco (2.8% in Marrakesh and 5.6% in Agadir, RDS), 5.5% in Yemen in 2011 and Lebanon (3.6%, RDS, 2007).<sup>17-21</sup>

Estimates of the size of populations most at risk of HIV were obtained by primary data collection so far only in Pakistan and Morocco while other eight countries base their estimates mainly on consensus of different stakeholders.<sup>21-23</sup> A comprehensive approach to size estimates of high risk groups in Pakistan started using a mapping method in 2005 in eight cities, subsequently expanding to 19 cities in 2011.<sup>23</sup> The 2011 round of mapping estimated that there were 7.2 FSW per 1000 male population in all cities mapped, compared to 3.7/1000 for IDUs, 1.9/1000 for Hijra sex workers and 1.6/1000 for MSW.

### Assessment of the quality of HIV surveillance systems

Table 3 shows the results of the assessment of the quality of HIV surveillance systems. In Djibouti, Iran, Morocco and Pakistan surveillance systems enable to assess epidemic trends in the same populations and locations over time, using the same sampling methods. Only in these countries it is possible to assess the trends in HIV prevalence in some population sub-groups such as pregnant women (Morocco, Iran), IDUs (Iran, Pakistan), FSW (Djibouti, Morocco) and MSW (Pakistan). Overall, Djibouti, Iran, Morocco and Pakistan have developed fully functioning HIV surveillance with national-level coverage while Afghanistan, Egypt, Jordan, Lebanon, Somalia, Sudan, South Sudan, Tunisia and Yemen have partially functioning systems. In the other 10 countries HIV surveillance is functioning insufficiently well mainly due to low frequency of implementation and non-inclusion of populations most at risk of HIV.

## DISCUSSION

### Recent developments

There is increasing evidence of HIV infection being firmly established in at least one of the populations most at risk of HIV in nine MENA countries while lower risk populations show elevated HIV prevalence in only few countries that is, in South Sudan, Djibouti and some parts of Somalia. In these highest burden countries data collected in pregnant women show that HIV prevalence might be decreasing. Of note is the increase in HIV prevalence in IDUs in Iran and Pakistan, in MSM in Tunisia, and in Hijra MSW in Pakistan.

HIV prevalence also increased in Egypt in IDUs (from 0.6% in 2006 to 6.8% in 2010 in Cairo).<sup>17 24</sup>

Four MENA countries can be classified as having fully functioning HIV surveillance systems. The key positive development is that a number of countries recently implemented multicentric IBBSS in populations most at risk of HIV mainly using a quasi-probabilistic method of RDS, which is an effective tool for sampling hard-to-reach groups that are socially well networked.<sup>25</sup> The geographical coverage of HIV surveillance systems at the beginning of 2000s was adequate only in Morocco while 10 years later Pakistan and Iran, and to some extent Djibouti and Sudan are on the way of achieving almost national HIV surveillance coverage in often challenging political and social environments.<sup>9</sup>

### Remaining challenges

The paucity of HIV data, including the lack of IBBSS in any of the high risk groups is particularly evident in Bahrain, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, South Sudan, Syria and UAE.

No country has HIV prevalence trend data in MSM. Difficulty in reaching MSM in surveillance is reflected in HIV case reporting data where undetermined mode of transmission

**Table 3** The estimated quality of the HIV surveillance systems in the countries and the classification of the epidemic

	Frequency	Appropriateness	Consistency	Coverage	Total scores	Status of the epidemic
Afghanistan	6	0	1	1	8	C
Bahrain	0	0	0	0	0	L
Djibouti	9	1	2	1	13	G
Egypt	6	1	1	1	9	C
Iran	16	1	2	2	21	C
Iraq	0	0	0	0	0	L
Jordan	8	1	0	0	9	L
Kuwait	0	0	0	0	0	L
Lybia	0	0	0	0	0	C
Lebanon	5	1	0	1	7	L
Morocco	14	1	2	2	19	C
Oman	1	0	0	0	1	C
Pakistan	9	1	2	2	14	C
Palestine	1	0	0	0	1	L
Qatar	0	0	0	0	0	L
Saudi Arabia	0	0	0	0	0	L
Somalia	6	1	1	1	9	G
South Sudan	2	1	1	1	5	G
Sudan	6	1	1	1	9	C
Syria	0	0	0	0	0	L
Tunisia	6	1	1	0	8	C
United Arab Emirates	0	0	0	0	0	L
Yemen	3	1	1	1	6	L

C, concentrated HIV epidemic; G, generalised HIV epidemic; L, low-level HIV epidemic.

occurs frequently in male cases, possibly due to reluctance to disclose the true mode of transmission. Remarkably high male-to-female ratios in HIV cases in the majority of the countries suggests that male-to-male HIV transmission might have a greater contribution than the proportion of cases officially attributed to MSM, or that female HIV cases are less likely to be diagnosed or reported, or both. Another salient issue is insufficient HIV surveillance in bridging groups, which creates a 'missing link' in some parts of the Region where there is already established or recently emerging evidence that HIV transmission has progressed beyond core groups, such as South Sudan, Djibouti and Somalia, and in some parts of Iran and Morocco.

Furthermore, the absence of estimates of the size of populations most at risk of HIV in a number of countries hinders the assessment of the needs for HIV prevention and measurement of coverage with prevention services.

The results of the available CD4 count surveillance show that more than a half of newly diagnosed HIV cases are eligible for treatment at the time of diagnosis, indicating that HIV testing services should be scaled up to facilitate earlier diagnosis in those at the highest risk.

### Ways forward

Arguably, IBBSS of the priority populations should be the main component of surveillance efforts in all the countries and population size estimates should be planned to be conducted along with the surveys' implementation. In addition, the current circumstances of limited resources globally make a stronger case for strengthening systems of monitoring and evaluation and collection of data on service coverage and quality.

The sample size in IBBSS should be high enough to allow the calculation of HIV prevalence in younger than 25 years old and those recently exposed to HIV-related risk behaviours, such as IDUs who started injecting recently. This is important in light of the lack of HIV incidence estimates in the MENA countries that would enable identification of groups and areas with the highest ongoing HIV transmission. More efforts should be focused on expanding the voluntary provider-initiated HIV testing in pregnant women and TB and STI patients, which would enable to discontinue mandatory testing that is still present in some countries.<sup>26</sup> HIV testing data can be a valuable surveillance component particularly in countries that have limited resources for surveillance and where surveillance surveys are done irregularly, provided that quality of HIV testing data, such as representativeness, coverage and the level of bias can be estimated.<sup>27</sup>

Countries with relatively well developed surveillance should invest more efforts in the use of data for evaluating the scale and quality of HIV interventions. The public health benefits of surveillance will be maximised by comparing multiple data sources as part of HIV data triangulation and data synthesis, which is particularly relevant in the MENA countries given the heterogeneity in the quality of single sources of data.<sup>28</sup>

CD4 counts reporting in newly diagnosed cases should be established in countries where this diagnostics is available as that is an effective tool in monitoring the frequency of late diagnoses and would allow NAP to assess the needs for care and treatment services.

### Limitations

The review was done using information provided by the NAPs, which might have missed data sources that are collected by other agencies. The coverage and completeness of HIV case reporting vary among the countries, depending on the existence and accessibility of HIV testing services and reporting practices.

The assessment of the quality of surveillance systems did not take into account other important parameters such as sample sizes in IBBSS, refusal rates, availability of behavioural indicators and the use of data.

### CONCLUSION

In conclusion, the availability and quality of HIV surveillance data has increased in the recent years, primarily as a result of efforts to implement well-designed surveys in most at-risk groups. Continuing support for surveillance and capacity building of NAP and academic staff who can carry out rather complex HIV surveillance activities is essential, but has to be accompanied with destigmatisation of populations most at risk of HIV (legal and societal), which can enable the reach to the most vulnerable groups for surveillance and prevention. In settings where HIV prevention efforts for populations most at risk of HIV are limited, surveillance activities, in particular formative research, can provide the first contact with those most at risk.

### Key messages

- ▶ The quality of HIV surveillance systems in the Middle East and North African countries has improved, and four countries have fully functioning systems.
- ▶ HIV prevalence data in most at-risk groups are still not available in Bahrain, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, South Sudan, Syria and United Arab Emirates.
- ▶ In the period 2006–2011, there has been an increase in HIV prevalence in injecting drug users in Iran, Pakistan and Egypt, in men who have sex with men in Tunisia, and in Hijra male sex workers in Pakistan.
- ▶ In South Sudan, Djibouti and some parts of Somalia, HIV prevalence is >1% in pregnant women, though there has been a slight decrease in the period 2007–2010.

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