Report on global sexually transmitted infection surveillance 2015

World Health Organization

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Contents

Abbreviations and acronyms

AMR	antimicrobial resistance
ANC	antenatal care
EMTCT	elimination of mother-to-child transmission
FSW	female sex worker
GARPR	Global AIDS Response Progress Reporting
GASP	Gonococcal Antimicrobial Susceptibility Programme
GUD	genital ulcer disease
MDG	Millennium Development Goal
MIC	minimum inhibitory concentrations
MSM	men who have sex with men
MTCT	mother-to-child transmission
NGO	nongovernmental organization
PID	pelvic inflammatory disease
PMTCT	prevention of mother-to-child transmission
RST	rapid syphilis tests
STI	sexually transmitted infections
UD	urethral discharge
UNPD	United Nations Population Division
WHO	World Health Organization
XDR	extensively drug-resistant

Executive summary

The global burden of sexually transmitted infections (STIs) remains high. In 2012, there were an estimated 357 million new infections (roughly 1 million per day) of the four curable STIs – chlamydia, gonorrhoea, syphilis and trichomoniasis. Prevention and control of STIs are an integral component of the comprehensive sexual and reproductive health services needed to attain the Sustainable Development Goals (SDGs) to reduce child and neonatal mortality (3.2), to end the epidemics of AIDS and other communicable diseases (3.3), to reduce noncommunicable diseases, and to improve mental health (3.4), sexual and reproductive health (3.7) and to achieve universal health coverage (3.8). Surveillance is a key element of the World Health Organization (WHO) STI prevention and control strategy and is an important component of second-generation surveillance systems for human immunodeficiency virus (HIV).

The WHO STI surveillance guidelines were updated in 2012 to take into account the changing epidemiology of STIs and the development of new technologies. This report summarizes the latest country-reported data from Global AIDS Response Progress Reporting (GARPR) and the Gonococcal Antimicrobial Susceptibility Programme (GASP), and provides updates to two previous reports on STI surveillance for 2012 and 2013. Overall, the comparability of surveillance data between countries is limited by varying case definitions and completeness of reporting. When consistently measured over time, results are best used for assessment of trends within countries.

General population STI incidence: case reporting

Case reporting indicators based on STI syndromes and etiological causes were incorporated into GARPR in 2013. The STI indicators are of two types: syndromic case reporting based on clinical diagnosis for urethral discharge (UD) and genital ulcer disease (GUD); and etiologic case reporting based on laboratory diagnosis for syphilis and gonorrhoea. Overall, 53–56 countries reported on each indicator. The greatest number of countries reporting on STI syndromes was from the African Region, with only one country reporting from the European Region. For etiological case reporting, few countries reported from Africa, reflecting the difference in availability of laboratory diagnosis. Case rates varied widely within and across regions and probably underestimate the burden of STI due to limitations and inconsistencies in reporting and diagnosis, as well as barriers to health care seeking behaviours. The median case rates per 100 000 adults were:

- UD in males: 143.5 (range 5.0–3579.2)
- GUD in males and females: 27.4 (range 0–2195.5)
- gonorrhoea in males: 25.5 (range 0.5–385.5)
- syphilis in males and females: 25.1 (range 0.1–1664).

Towards elimination of mother-to-child transmission of syphilis

Antenatal care (ANC) syphilis reporting is generally more robust and is incorporated into health information systems in more countries. Substantial progress has been made towards global elimination of congenital syphilis. A recent analysis showed more than a one third global reduction in maternal and infant syphilis between 2008 and 2012. Cuba achieved elimination of mother-to-child transmission of syphilis and HIV in 2015 and several more countries are promising candidates for elimination of vertical syphilis transmission. Over the period 2008–2014, antenatal syphilis screening coverage increased globally and syphilis seropositivity among pregnant women decreased by nearly half. The syphilis prevalence among ANC attendees was 1% or more in nearly half of the countries reporting in 2014. Efforts to increase testing are needed urgently in many countries with continued low coverage of ANC syphilis screening, especially in the African Region.

Syphilis prevalence among key populations

Monitoring syphilis seroprevalence among key populations is an important indicator of progress on STI control since they are at high risk of exposure to and transmission of STIs and HIV. Targeted interventions with sex workers are conducted in the majority of countries, ranging from 53% of countries in the European Region to over 90% of countries in the South-East Asia and Western Pacific Regions. In general, fewer countries reported working with men who have sex with men.

Syphilis seroprevalence remains high in key populations worldwide, with at least one country in every WHO region reporting over 5% prevalence among female sex workers and men who have sex with men. In 2014, 28 countries reported data on syphilis among female sex

workers with a median seroprevalence of 2.3% (range 0.1–53.0%) and 30 countries reported syphilis data for men who have sex with men with a median seroprevalence of 5.3% (range 0.3–32.2%). More effort is needed to scale up programmes to increase coverage of prevention and treatment services for these most at-risk populations.

Gonococcal antimicrobial susceptibility

GASP results show continued widespread resistance to quinolones and azithromycin and emergence of decreased susceptibility to extended spectrum cephalosporins. Gonococcal antimicrobial resistance (AMR) continues to increase worldwide and could lead to a pandemic of extensively drug-resistant (XDR) Neisseria gonorrohoeae with serious public health consequences. Decreased susceptibility to the extended spectrum (third-generation) cephalosporins, the last option for monotherapy, is becoming more widespread and several countries have reported treatment failures. However, less than half of countries report conducting AMR testing for N. gonorrhoeae in the past five years. GASP data show a steady decline in the number of reporting countries, from 60 in 2009 to 50 in 2013. Overall, surveillance for gonococcal AMR is currently suboptimal and faces many challenges, especially in the most burdened countries. The situation is alarming since there are no new antimicrobials under development for the treatment of gonorrhoea. There is an urgent need to increase the number of countries participating in GASP through laboratory capacity building, as well as renewed advocacy to increase national commitment to monitoring antimicrobial susceptibility as part of routine STI management.

Overall, stronger surveillance is needed to provide the information and data needed to guide the next phase of the STI control strategy post-2015. More funding is needed for prevalence studies (especially among key populations), etiological assessments of STI syndromes and AMR studies, as well as capacity building to improve completeness and consistency of reporting on core STI indicators.

1. Introduction

The global burden of sexually transmitted infections (STIs) remains high. In 2012, there were an estimated 357.4 million new infections (roughly 1 million per day) of the four curable STIs – chlamydia, gonorrhoea, syphilis and trichomoniasis (see Table 1.1). Due to the use of different methods, the number of incident cases cannot be compared with previous World Health Organization (WHO) estimations. However, the syphilis data is more robust and studies using similar methodology suggest a decreasing trend over time. The burden of viral STIs is similarly high, with an estimated 417 million prevalent cases of herpes simplex virus infection and approximately 291 million women infected with human papillomavirus *(1)*. On the other hand, other previously common infections, such as chancroid and lymphogranuloma venereum, have nearly disappeared in many countries.

Table 1.1 Global estimates of new cases of curable STIs in 2012

Sexually Transmitted Infection	n (million)
Chlamydia trachomatis	130.9
Neisseria gonorrhoeae	78.3
Syphilis	5.6
Trichomonas vaginalis	142.6
Total	357.4

Source: Newman et al. (2015) *(2)*.

STI prevention and control has widespread public health benefits. Left untreated, STIs increase the risk of HIV transmission during unprotected sexual contact and lead to complications, such as pelvic inflammatory disease (PID), infertility, ectopic pregnancy, miscarriage, foetal death and congenital infections. STI control contributes to progress towards multiple Millennium Development Goals (MDGs), including MDG 4 (reducing neonatal mortality), MDG 5B (universal access to reproductive health) and MDG 6 (combating HIV/AIDS).

In 2007, WHO published the Global strategy for prevention and control of sexually transmitted infections: 2006–2015 *(3)*. An assessment of progress on the global strategy conducted in 2013 found that 88% of countries have updated their national STI guidelines or recommendations since 2006, and over 75% of countries have a national strategy or action plan in place for STI prevention and control. See Table 1.2 for regional findings.

Surveillance is a key element of the WHO STI strategy, since reliable data are essential for measuring the success of prevention and control interventions. Surveillance provides information on the STI burden at global, regional and country levels; identifies vulnerable population groups; monitors the impact of interventions; and provides information to inform treatment recommendations and for use in programme planning, management and advocacy. STI surveillance is also an important component of second-generation surveillance systems for HIV. Since STIs are markers of unprotected sexual intercourse, surveillance for incident cases could provide an early warning of the epidemic potential of HIV transmission in low-prevalence populations, or indicate a need to intensify interventions in specific populations with high-risk sexual activity.

The WHO STI surveillance guidelines were updated in 2012 to take into account the changing epidemiology of STIs and the development of new technologies such as rapid syphilis tests (RST) *(4)*. The four core components of STI surveillance are:

- case reporting using syndromic and etiological approaches
- prevalence assessments in specific populations
- assessment of etiologies of STI syndromes
- antimicrobial resistance (AMR) monitoring.

As shown in Table 1.2, the majority of countries (108 out of 198) have an STI surveillance system in place. Most countries conduct universal case reporting and some countries also use sentinel sites. However, there is a general lack of standardization among countries and many have yet to implement STI surveillance systems. It is of great concern that fewer countries conduct gonococcal AMR monitoring in light of the global threat of untreatable gonorrhoea; *Neisseria gonorrhoeae* is already showing decreased susceptibility to all available antibiotics with no new drugs in the development pipeline. Even fewer countries have carried out etiological assessments of STI syndromes in recent years despite recommendations for studies every three to five years to ensure that syndromic management guidelines keep pace with the changing epidemiology of STIs *(1)*.

Table 1.2 Progress on implementation of the Global Strategy for Prevention and Control of Sexually Transmitted Infections: 2006–2015, by region, 2013

WHO region	No. countries surveyed (no. countries responding)	No. (%) countries with surveillance systems	No. (%) countries conducting gonococcal AMR monitoring in past 5 years	No. (%) countries conducting etiological studies in past 5 years	No. (%) countries that have updated national STI guidelines or recommendations since 2006	No. (%) countries with national strategy or action plan for STI prevention and control
African Region	47 (26)	20 (43%)	10 (21%)	4 (9%)	33	19 (40%)
Region of the Americas	35 (18)	16 (46%)	10 (29%)	9 (26%)	25	16 (46%)
Eastern Mediterranean Region	22 (13)	10 (45%)	2 (9%)	4 (18%)	11	9 (41%)
European Region	54 (30)	30 (56%)	19 (35%)	0 (0%)	19	22 (41%)
South-East Asia Region	11 (10)	9 (82%)	7 (64%)	3 (27%)	9	9 (82%)
Western Pacific Region	29 (11)	10 (34%)	4 (14%)	3 (10%)	12	11 (38%)

[a] Number of countries surveyed (N=198) is used as denominator for percentages.
Sources: WHO (2015) (1) and GARPR (2013) *(5)*

This report summarizes the latest data from Global AIDS Response Progress Reporting (GARPR) and the Gonococcal Antimicrobial Susceptibility Programme (GASP). It covers the major components of STI surveillance, with the exception of etiology assessments of STI syndromes. It follows on and provides updates to two previous reports of STI surveillance in 2012 and 2013 *(6, 7*). The 10 key STI indicators included in annual GARPR reporting cover general population case reporting of syndromes and etiological diagnoses, mother-to-child transmission (MTCT) of syphilis and prevalence of syphilis among key populations (see Box 1). Among these, the six most critical indicators are included in the recently released *Consolidated strategic information guidelines for HIV in the health sector*: two as priority national indicators and four as additional indicators *(8)*.

Box 1. STI indicators for Global AIDS Response Progress Reporting

1.17.1 Percentage of women accessing antenatal care (ANC) services who were tested for syphilis*
1.17.2 Percentage of antenatal care attendees tested who were positive for syphilis
1.17.3 Percentage of antenatal care attendees positive for syphilis who received treatment*
1.17.4 Percentage of sex workers with active syphilis
1.17.5 Percentage of men who have sex with men with active syphilis
1.17.6 Number of adults reported with syphilis (primary/secondary and latent/unknown)in the past 12 months**
1.17.7 Number of reported congenital syphilis cases (live births and stillbirth) in the past 12 months**
1.17.8 Number of men reported with gonorrhoea in the past 12 months**
1.17.9 Number of men reported with urethral discharge in the past 12 months**
1.17.10 Number of adults reported with genital ulcer disease in the past 12 months

* National indicators in *WHO Consolidated strategic information guidelines for HIV inthe sector (8)*
** Additional indicators in *WHO Consolidated strategic information guidelines for HIV in the sector (8)*
Source: UNAIDS (2014) *(9)*

1.1 Data sources and interpretation

Data for the 10 core STI indicators were obtained from the GARPR system database for 2013 and 2014. For countries that did not report in 2013 or 2014, data from prior years were obtained from previous reports on global STI surveillance and included in tables in the annexes *(6, 7)*. Additional data on the proportion of pregnant women with at least one ANC visit was obtained from the Global Health Observatory *(10)*. WHO GASP provided updated data from regional reference laboratories participating in the programme between 2009 and 2013.

Missing population denominators for STI and congenital syphilis rate indicators were obtained from United Nations Population Division (UNPD) 2015 population estimates *(11)*. In addition, reported population denominators were checked for countries with extremely high STI rates and replaced with the UNPD 2015 estimates if obvious errors were found.

Missing live birth denominators were obtained from most recent estimates at UN data UNPD *(12)*.

Several considerations need to be taken into account when interpreting surveillance data. In general, comparability between countries is limited by varying case definitions and completeness of reporting. Routine programme data may be reported from limited geographical areas or types of facilities and data quality control varies. Special studies, such as integrated bio-behavioural surveys, may be limited to intervention areas and consequently biased towards persons who are accessing services. In general, surveillance data are most useful for monitoring trends within a given country when procedures remain constant over time. A discussion of data quality and interpretation is included in each chapter.

2. General population STI incidence: case reporting

Key points:

- Case rates varied widely within and across regions. They are likely to underestimate the burden of STIs due to limitations in reporting and diagnosis, as well as barriers to health care seeking behaviours.
- Variations in methodologies and completeness of reporting limit the comparability of results between countries. When measured consistently, results are best used for assessment of trends within countries.

Case reporting is an essential component of STI surveillance and provides information on the facility-based burden of STIs. STI case reporting indicators were added to the GARPR in 2013. Although other published and unpublished sources of national case report data were available prior to 2013, this report relies solely on GARPR data.

Diseases are prioritized for surveillance and reporting according to the burden of the disease and its impact on health, epidemic potential, changing patterns of disease, preventability of the disease and its social and economic impact. Based on these criteria, two types of STI case reporting are included in the core STI indicators: syndromic case reporting based on clinical diagnosis for urethral discharge (UD); and genital ulcer disease (GUD) and etiological case reporting based on laboratory diagnosis for syphilis and gonorrhoea.

2.1 Data quality and interpretation

Facility-based case reporting has many advantages. It covers the entire facility-based population, is simpleto implement, is easily integrated into other disease surveillance systems and provides important information for health planning for STI services. However, it has limitations. Case rates are often underestimated due to underreporting, undetected asymptomatic infections and variable health care seeking behaviours.

Case definitions may vary between countries. Some countries include results of active case finding, such as screening asymptomatic women in antenatal clinics, contact tracing or screening among higher-risk key population groups, while others do not. The completeness of reporting is a major factor affecting interpretation of reported case rates. Some countries report cases based on a limited geographical area or restricted to a limited number or type of facilities. As a result, low case rates may indicate either a low burden of STI or a high burden of undiagnosed and untreated infections.

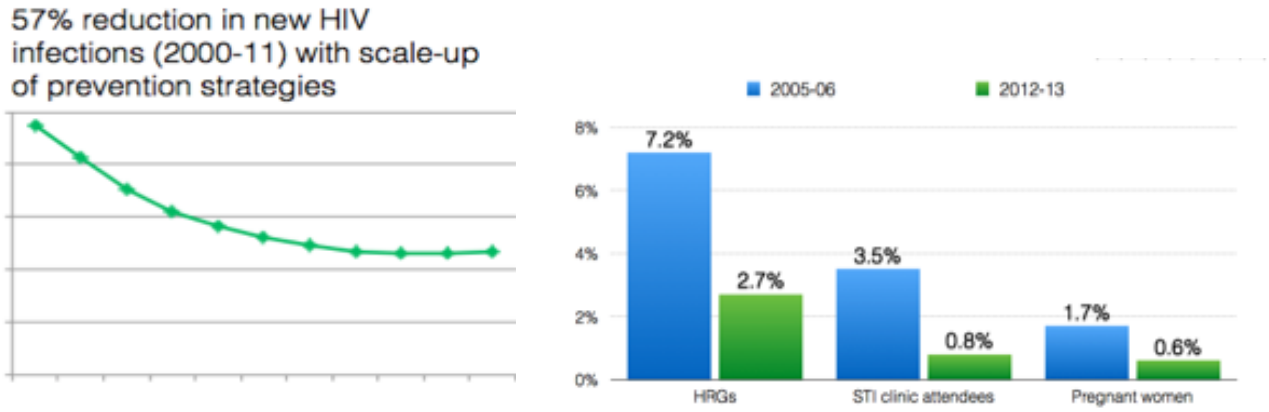
When consistently measured over time, STI case rates are best used within a country to monitor trends rather than for comparison between countries. Even so, an increase in cases in a given country could signal better case finding and diagnosis rather than a worsening STI problem. The local situation needs to be taken into account when interpreting findings. Triangulation with other sources of data, such as prevalence assessments, screening interventions and special studies, will lead to a better understanding of the actual STI burden. An example of case reporting and triangulation is shown in Box 2 and Fig. 2.1.

Since these are new GARPR indicators, countries need to build their capacity to report data accurately, particularly on selection of the denominator. Population sizes that resulted in extremely high case rates were checked against UNPD population estimates and replaced with the 2015 estimate of adult population (over 15 years) for calculation of the indicator value.

Box 2. Case reporting: a key component of STI surveillance in India

India's commitment to STI surveillance and case reporting allows demonstration of patterns and trends of major STIs from over 1000 sentinel sites across the country. With the expansion of STI/HIV prevention programmes and STI screening and treatment, the syphilis seroprevalence has measurably declined in different subpopulations. Regular analysis of STI case report data, including trend analysis and triangulation of multiple data sources, suggests that the prevalence of common curable STIs are at a record low in India. The case reporting data showing declines in syphilis cases among high-risk groups, STI clinic attendees and pregnant women from 2005/2006 to 2012/2013 are shown in Fig. 2.1, along with the concomitant decline in new HIV infections. However, more investigation is needed to validate the data, including an assessment of completeness of reporting, consistency of case definitions and laboratory quality, to determine the true epidemiological situation *(13)*.

Figure 2.1 Declining syphilis seroprevalence among different subpopulations in India



Source: WHO (2015) (13)

2.2 Syndromic case reporting

Most countries have adopted syndromic management of STIs in accordance with the WHO global strategy for STI prevention and control. Over 90% of countries use syndromic management in most regions, with the exception of the European Region, where the greater availability of laboratory resources allows for the use of etiological diagnosis *(1, 3)*. Two syndromes are recommended for monitoring: UD in men and GUD in men and women.

UD is a key syndrome for STI surveillance, affecting only males. It is a preventable and treatable syndrome with an overall high burden, most commonly caused by *N. gonorrhoeae* and *Chlamydia trachomatis*. Left untreated, UD leads to complications in men and in their female partners and unborn children.

GUD is the second key syndrome for STI surveillance because of the high burden of disease in males and females and because it facilitates HIV transmission. The classical causes of GUD are syphilis and chancroid; since both are treatable, strengthening STI management could be expected to lower rates of disease. However, incurable viral infections, such as herpes simplex virus, are becoming more prevalent worldwide. Periodic studies to determine the etiology of STI syndromes are recommended *(4)*.

Indicator 1.17.9: Urethral discharge rate (adult males)

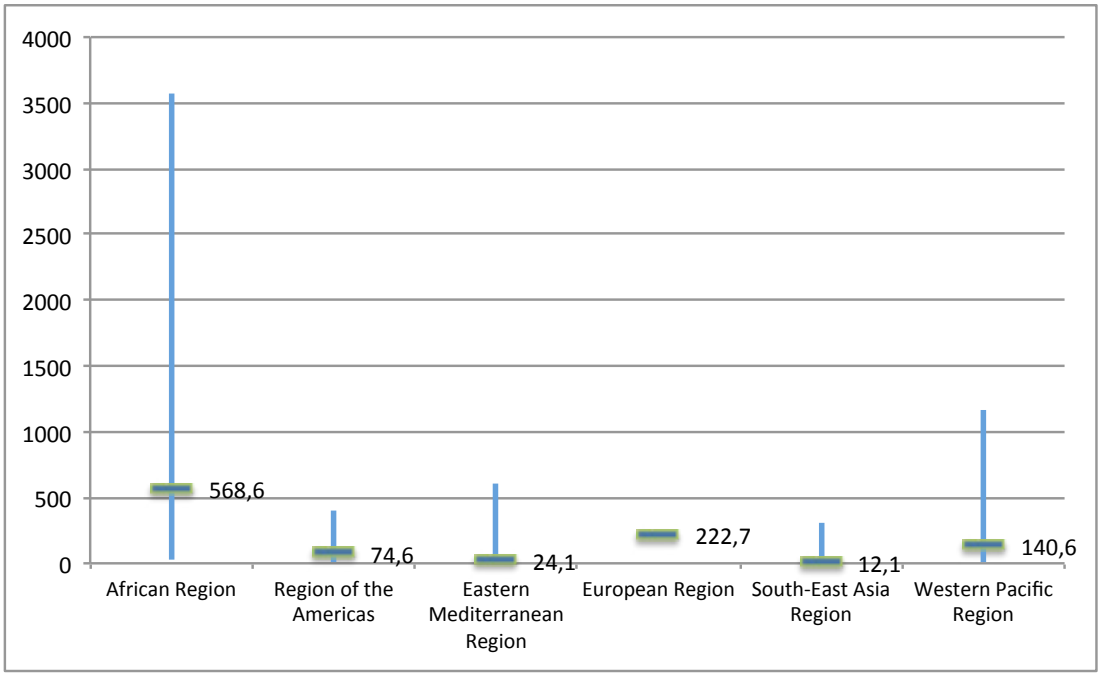
In 2014, 56 countries reported male UD case data to GARPR, mostly from the African Region, the Region of the Americas and the Western Pacific Region. Only one country reported data from the European Region. The overall median UD rate was 143.5 cases per 100 000 adult males (range 5.0–3579.2). The highest case rates were reported in the African Region, followed by the Western Pacific Region (see Table 2.1). As shown in Fig. 2.2, a wide range of rates were reported. The most recently reported UD case rates for 66 countries are shown in Annex 1.

Table 2.1 Urethral discharge rate (cases per 100 000 adult males) reported by 56 countries, by region, 2014

WHO region	No. countries reporting	Median male UD case rate (range)
African Region	20	568.6 (30.1–3579.2)
Region of the Americas	11	74.6 (10.0–400.4)
Eastern Mediterranean Region	8	24.1 (7.3–614.0)
European Region	1	222.7
South-East Asia Region	5	12.1 (5.0–314.2)
Western Pacific Region	11	140.6 (9.0–1170.9)
Overall	56	143.5 (5.0–3579.2)

Source: GARPR database (2015) *(5)*

Figure 2.2 Urethral discharge rate (cases per 100 000 adult males, median and range) reported by 56 countries, by region, 2014



Source: GARPR database (2015) *(5)*

Indicator 1.17.10: Genital ulcer disease rate (adult males and females)

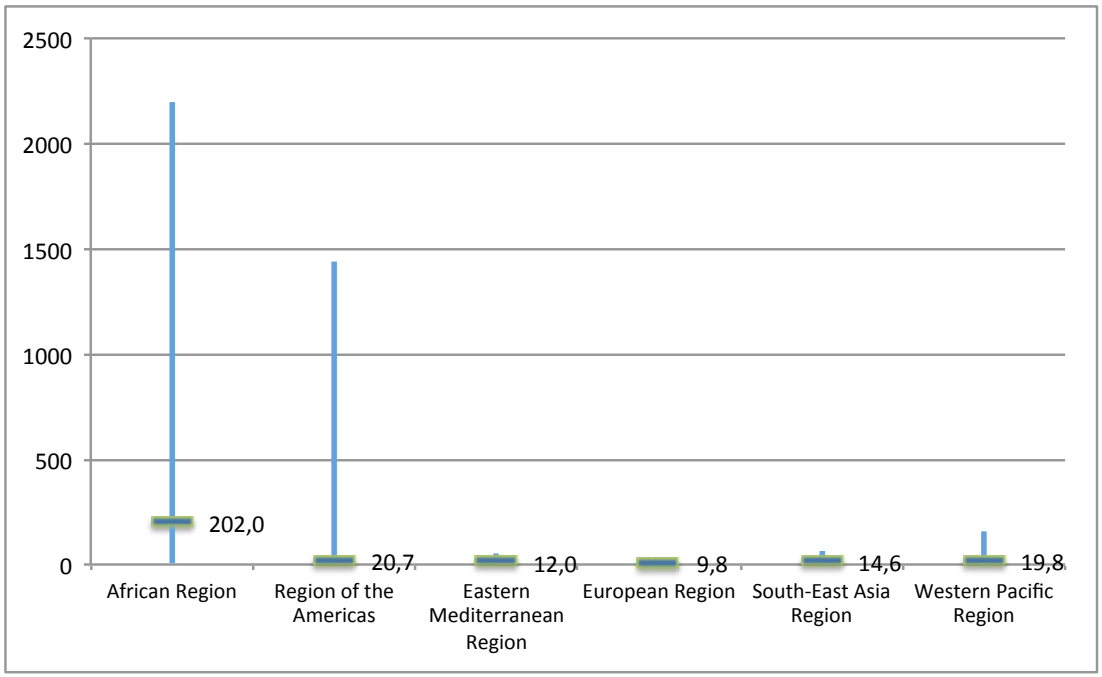
In 2014, 56 countries reported data to GARPR on GUD. The total GUD rate was reported by 55 countries, with 44 countries providing sex-disaggregated data (44 countries reported male GUD rate, 43 reported female GUD rate), with the African Region and the Region of the Americas accounting for over half of the reporting countries. Only one European Region country reported data. The overall median GUD rate was 27.4 cases per 100 000 adult population (range 0–2195.5). The highest rates were reported by the African Region (see Table 2.2). The median case rate was higher for females than males in most regions, although the overall median was slightly lower for females. Among men, GUD rates were generally lower than reported UD rates. A wide range of GUD rates were reported (see Fig. 2.3 and 2.4). The most recently reported GUD case rates for 66 countries are shown in Annex 1.

Table 2.2 Genital ulcer disease rates (cases per 100 000 adult population) reported by 56 countries in 2014, by region: total rate and disaggregated by sex

WHO region	No. countries reporting*	Median GUD case rate (range)		
		Total (n=55)	Males (n=44)	Females (n=43)
African Region	20	202.0 (1.3–2195.5)	195.4 (2.6–2270.5)	308.9 (0–2127.7)
Region of the Americas	13	20.7 (3.6–1436.1)	24.2 (5.5–123.9)	16.7 (1.4–2710.2)
Eastern Mediterranean Region	8	12.0 (0.5–52.2)	10.6 (0.4–47.9)	17.5 (1.4–56.2)
European Region	1	9.8	3.4	16.2
South-East Asia Region	5	14.6 (1.2–69.9)	7.4 (1.1–36.2)	9.8 (1.3–104.5)
Western Pacific Region	9	19.8 (0–156.5)	24.8 (0–162.7)	11.7 (0–150.2)
Overall	**56**	**27.4 (0–2195.5)**	**24.5 (0–2270.5)**	**24.1 (0–2710.2)**

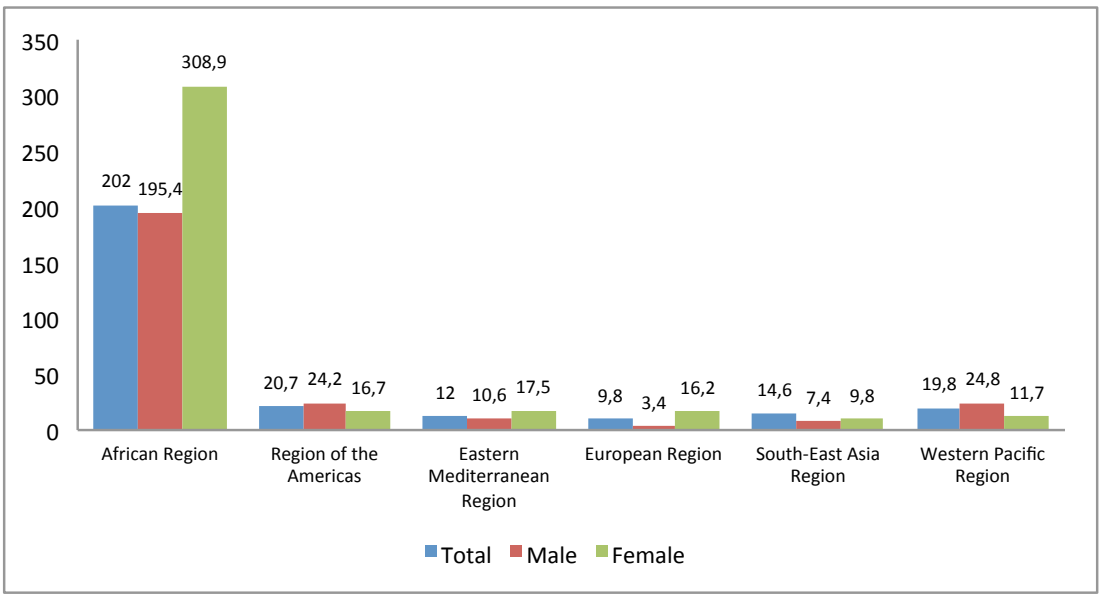
* reporting total and/or sex-disaggregated data
Source: GARPR database (2015) *(5)*

Figure 2.3 Total genital ulcer rate (cases per 100 000 adult population, median and range) reported by 56 countries, by region, 2014



Source: GARPR database (2015) *(5)*

Figure 2.4 Genital ulcer rate (cases per 100 000 adult population, median values) reported by 56 countries, by region and sex, 2014



Source: GARPR database (2015) (5)

2.3 Etiological case reporting

Etiological case reporting is feasible in countries with widespread availability of laboratory services. Two STI etiologies are included in surveillance guidelines: *N. gonorrhoeae* and *Treponema pallidum*, causative agents of UD and GUD. Both infections are preventable and treatable, although high levels of gonococcal resistance to antimicrobials may result in untreatable infections in the future (see Chapter 5: Gonococcal antimicrobial susceptibility). Left untreated, gonorrhoea leads to severe complications and sequelae in both men and women. Syphilis causes stillbirths and neonatal deaths, even in low prevalence settings, and is a cofactor for HIV transmission. Syphilis data are reported for both males and females, while gonorrhoea data are limited to males due to the high rate of asymptomatic infections in women coupled with the low sensitivity of diagnosis by cervical Gram stain and culture.

Several factors may influence reported case rates of gonorrhoea and syphilis. In addition to those described in the introduction to case reporting (section 2.1), the sensitivity and specificity of the diagnostic tests are an important factor. Some countries continue to rely on Gram stain and culture for the diagnosis of gonorrhoea, while others have replaced it with newer nucleic acid amplification tests with higher sensitivity and specificity. RST are increasingly being used for initial screening. However, the diagnosis of active syphilis requires a positive result on both treponemal and non-treponemal tests.[1] Reporting based solely on screening by non-treponemal tests (such as rapid tests) results in high rates of false positives, while screening based solely on treponemal tests measures lifetime syphilis infection (whether treated or not) rather than active syphilis. In addition, the reported disease rates may be more reflective of the availability of laboratory diagnosis than actual disease rates; countries that lack universal access to laboratory diagnosis may report low case rates even in a setting with high burden of disease.

[1] Treponemal tests include rapid syphilis tests, fluorescent treponemal antibody-absorption (FTA-ABS), treponema pallidum hemaglutination assay (TPHA) and treponema pallidum particle agglutination assay (TPPA). Non-treponemal tests include Venereal Disease Research Laboratory (VDRL) and rapid plasma reagin (RPR).

Indicator 1.17.8: Gonorrhoea rate (adult males)

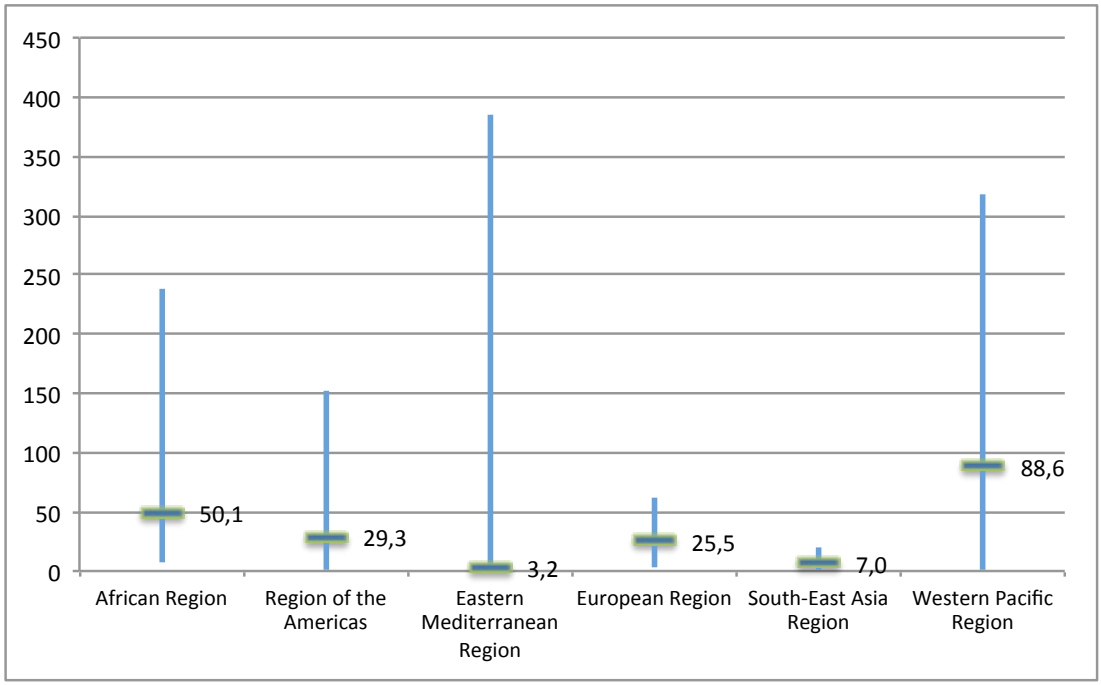
As reported by 53 countries in 2014, the median male gonorrhoea case rate was 25.5 cases per 100 000 adult males (range 0.5–385.5), with the highest case rates reported in the Western Pacific Region. Although the Eastern Mediterranean Region had the lowest median case rate (3.2 cases per 100 000 adult males), Morocco reported the highest rate (385.5) overall. Only five countries in the African Region reported data on gonorrhoea cases compared to 20 countries reporting syndromic case data from the region. Although the reported UD case rates were much higher in the African Region than in other regions, the gonorrhoea rates were not the highest, most likely due to the lower availability of laboratory diagnosis (see Table 2.3 and Fig. 2.5). The most recently reported male gonorrhoea case rates for 65 countries are shown in Annex 2.

Table 2.3 Male gonorrhoea rate (cases per 100 000 adult males) reported by 53 countries, by region, 2014

WHO region	No. countries reporting	Median male gonorrhoea case rate (range)
African Region	5	50.1 (7.2–238.0)
Region of the Americas	18	29.3 (1.9–153.3)
Eastern Mediterranean Region	6	3.2 (0.9–385.5)
European Region	9	25.5 (2.9–61.2)
South-East Asia Region	4	7.0 (2.4–20.4)
Western Pacific Region	11	88.6 (0.5–317.1)
Overall	**53**	**25.5 (0.5–385.5)**

Source: GARPR database (2015) *(5)*

Figure 2.5 Male gonorrhoea rate (cases per 100 000 adult males, median and range) reported by 53 countries, by region, 2014



Source: GARPR database (2015) *(5)*

Indicator 1.17.6: Syphilis rate (adult males and females)

The median syphilis rate was 25.1 cases per 100 000 adult population (range 0.1–1664) among the 55 countries that reported to GARPR in 2014. Sex-disaggregated rates were reported by 44 countries with similar median rates for males and females (17.2 versus 17.7, respectively). Reported syphilis rates were highest in the Western Pacific Region, followed by the African Region. The lowest median syphilis rate was in the Eastern Mediterranean Region; however, Afghanistan's high rate (135.6) was an outlier (see Table 2.4 and Figs 2.6–2.7).

Sex-disaggregated primary syphilis rates were reported by 18 countries. Primary syphilis rates are not included in the median values shown in Table 2.4 and Fig. 2.6, except for the few countries that reported primary syphilis data only. In some countries, the reported primary syphilis rate was similar to the overall rate, while in others the two rates were very different. This highlights the differences in case definitions used by countries and the degree of data cleaning they employ to separate cases of primary syphilis from other stages of syphilis, false positives and previously treated infections.

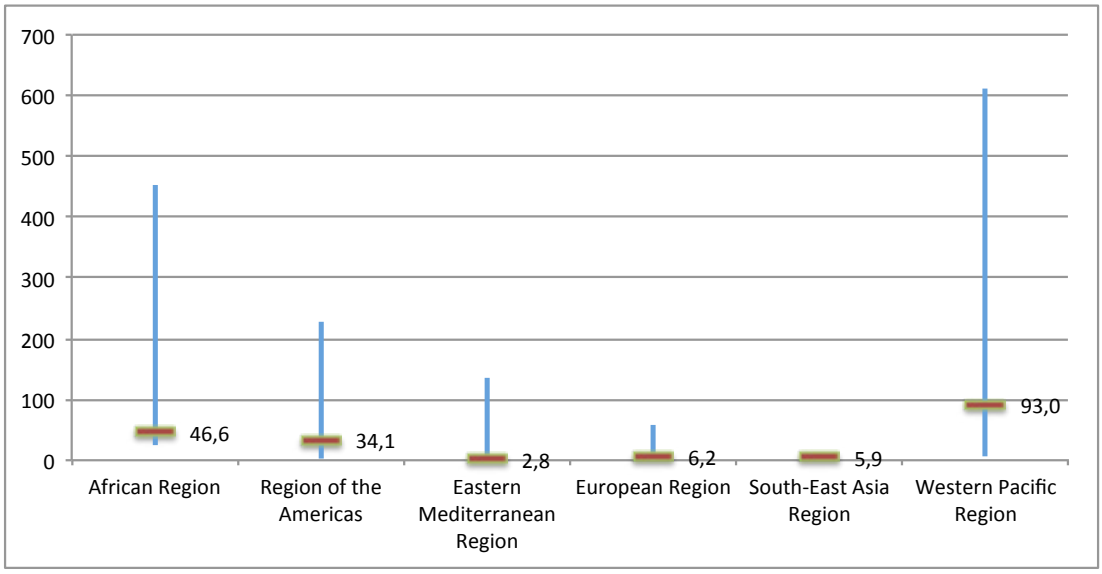
The most recently reported general population syphilis rates for 75 countries (total, male, male primary, female and female primary) are shown in Annex 3. Key population syphilis rates are presented separately in Chapter 4.

Table 2.4 Syphilis case rates (cases per 100 000 adult population) reported by 55 countries, by region, 2014

WHO region	No. countries reporting*	Median syphilis case rate (range)		
		Total	Males	Females
African Region	7	46.6 (23.5–452.4)	22.5 (1.5–358.7)	43.1 (10.5–523.1)
Region of the Americas	18	34.1 (4.3–227.7)	34.2 (2.4–223.7)	17.7 (3.6–231.0)
Eastern Mediterranean Region	5	2.8 (0.2–135.6)	2.6 (0.1–205.3)	8.1 (0.2–56.1)
European Region	11	6.2 (0.1–58.7)	10.1 (0.1–68.8)	6.6 (0–49.7)
South-East Asia Region	4	5.9 (4.8–9.3)	6.7 (5.3–12.7)	5.1 (4.2–6.2)
Western Pacific Region	10	93.0 (7.4–609.5)	54.6 (4.4–232.8)	81.0 (10.6–995.4)
Overall	**55**	**25.7 (0.1–609.5)**	**17.2 (0.1–358.7)**	**17.7 (0–995.4)**

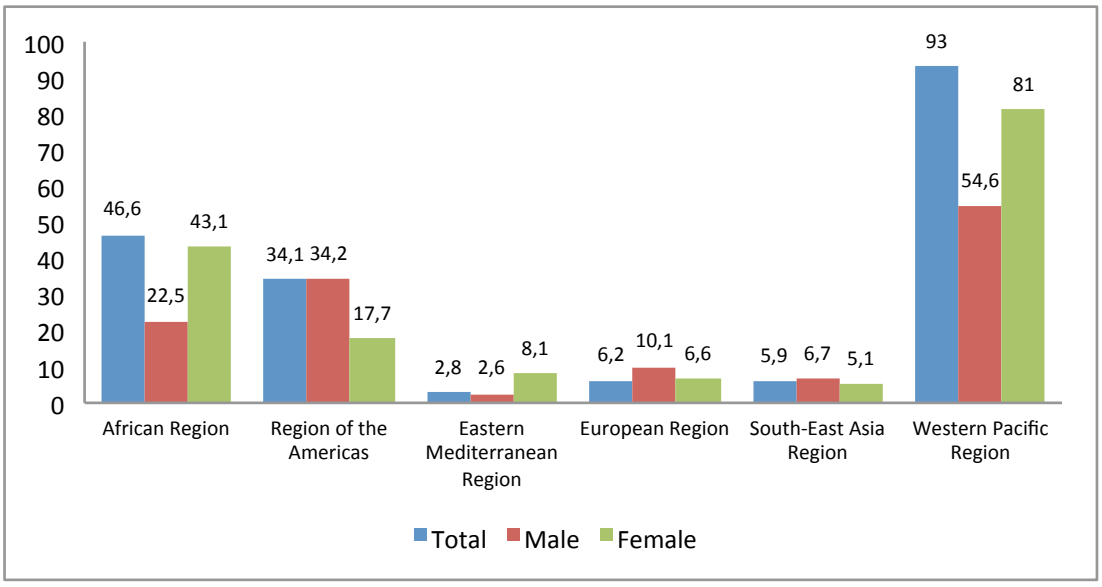
* Not all countries reported sex-disaggregated rates.
Source: GARPR database (2015) *(5)*

Figure 2.6 Total syphilis rate (cases per 100 000 adult population, median and range) reported by 55 countries, by region, 2014



Source: GARPR database (2015) *(5)*

Figure 2.7 Syphilis rate (cases per 100 000 adult population, median values) reported by 55 countries, by region and sex, 2014



Source: GARPR database (2015) *(5)*

3. Towards elimination of mother-to-child transmission of syphilis

Key points:

- Substantial progress has been made towards global elimination of congenital syphilis. Cuba achieved elimination of mother-to-child transmission of syphilis and HIV in 2015 and several more countries are promising candidates for elimination of vertical syphilis transmission.
- Antenatal syphilis screening coverage increased globally and syphilis seropositivity among pregnant women decreased by nearly half between 2008 and 2014.
- Continued efforts to increase testing coverage are needed urgently, since many countries still have low coverage of ANC syphilis screening, especially in the African Region.

Untreated syphilis in pregnancy is a major cause of morbidity and mortality, resulting in fetal deaths and stillbirths, preterm or low-birth-weight infants, neonatal death and syphilis infections in infants, in addition to an increase in HIV transmission among pregnant women. Since the launch of *The global elimination of congenital syphilis: rationale and strategy for action* in 2007, a global effort has been under way by WHO and its partners to eliminate MTCT of syphilis *(14)*. Overall, 60% of reporting countries have implemented a national strategy for elimination of mother-to-child transmission (EMTCT) of syphilis that is either vertical or integrated with other strategies (see Table 3.1).

Table 3.1 Proportion of countries reporting a national EMTCT strategy in place, by region, 2014

WHO Region	% (no.) of countries with strategy for EMTCT of syphilis	Number of countries reporting in 2014
African Region	45% (18)	40
Region of the Americas	89% (25)	28
Eastern Mediterranean Region	50% (6)	12
European Region	50% (13)	26
South-East Asia Region	70% (7)	10
Western Pacific Region	64% (7)	11
Overall	**60% (76)**	**127**

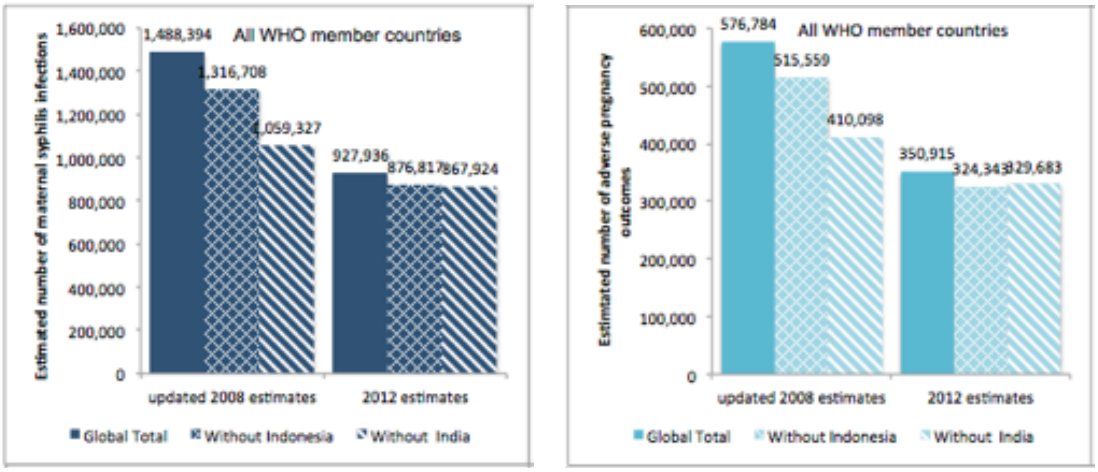
Source: WHO (2015) *(1)*

A recent analysis shows more than a one-third global reduction in maternal and infant syphilis between 2008 and 2012 *(15)* (see Box 3). Although progress has been made towards EMTCT, there is still a substantial burden of adverse outcomes of pregnancy due to maternal syphilis, even among women attending ANC *(15)*. As presented in this chapter, nearly half (38 of 85) of the countries reported syphilis prevalence of 1% or more among women attending ANC services to GARPR in 2014. More effort is needed to strengthen and scale up interventions to increase ANC testing coverage and effective treatment of pregnant women with syphilis. An example of the increase in ANC syphilis screening, the key first step towards EMTCT, following introduction of RST is shown in Box 4.

Box 3. Declines in maternal and congenital syphilis, 2008–2012

Based on analysis of global data, the estimated total number maternal infections and adverse pregnancy outcomes attributed to congenital syphilis decreased by 38% between 2008 and 2012. Maternal infections decreased from 1.4 million to 930 000 over the period. Adverse pregnancy outcomes due to MTCT of syphilis decreased from 520 000 to 350 000 (143 000 early fetal deaths/stillbirths, 62 000 neonatal deaths, 44 000 preterm/low weight births and 102 000 infected infants). The declines were seen in all regions, particularly in South-East Asia, which experienced an 81% decline in maternal infections and 78% decrease in adverse outcomes, largely due to reductions in syphilis seropositivity in India (2.3–0.4%) and Indonesia (5.8–1.2%). Overall, India and Indonesia accounted for more than three quarters of the global decline in maternal infections and adverse outcomes, but the declines were evident even after excluding data from the two countries from the analysis (see Fig. 3.1).

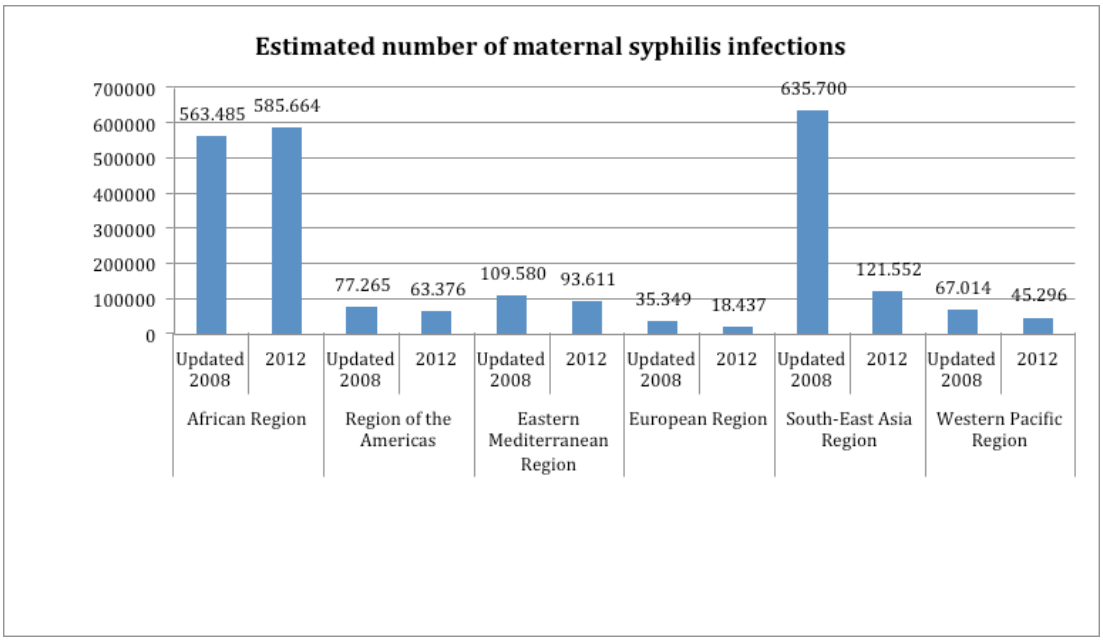
Figure 3.1 Estimated number of maternal syphilis infections and associated adverse pregnancy outcomes, 2008 and 2012

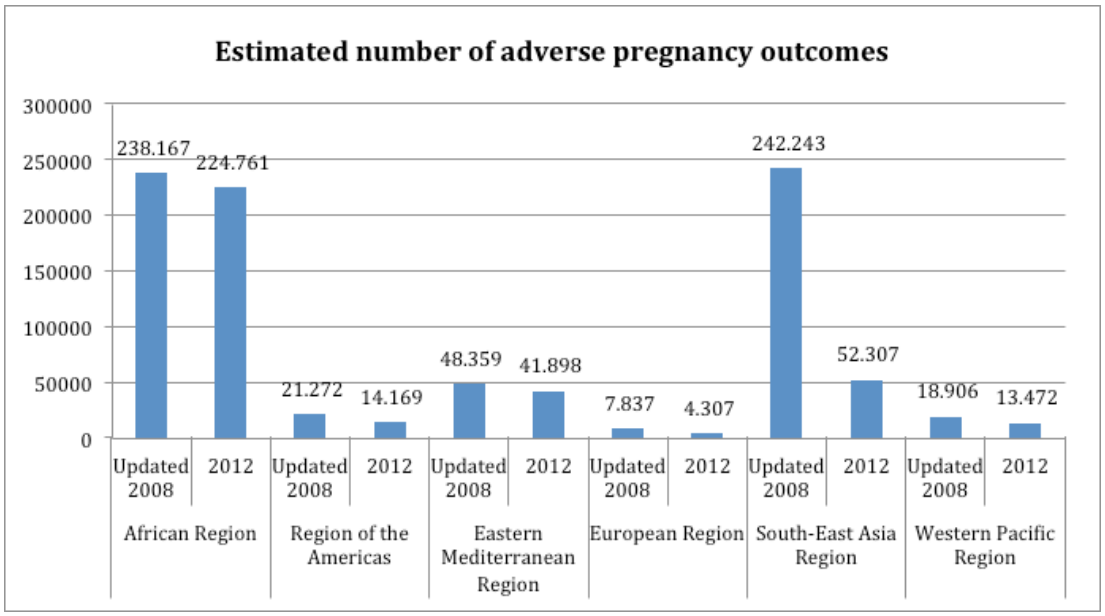


Source: Wijesooriya et al. (2015) *(15)*

Over 90% of maternal infections and adverse outcomes were in low- and middle-income countries. Although the burden of syphilis in pregnancy is greatest in Africa (63% of maternal infections and 64% of adverse outcomes), the region showed the least degree of progress between 2008 and 2012 (see Fig. 3.2). Most of the adverse pregnancy outcomes occurred because of missed opportunities for screening and treatment. In 2012, 84% of pregnant women with syphilis attended ANC at least once. Over half of them (56%) were not tested for syphilis and accounted for 65% of adverse outcomes. Despite substantial progress towards EMTCT, there is still a large burden of adverse outcomes, even among women attending ANC.

Figure 3.2 Estimated number of maternal syphilis infections and associated adverse pregnancy outcomes, by region, 2008 and 2012



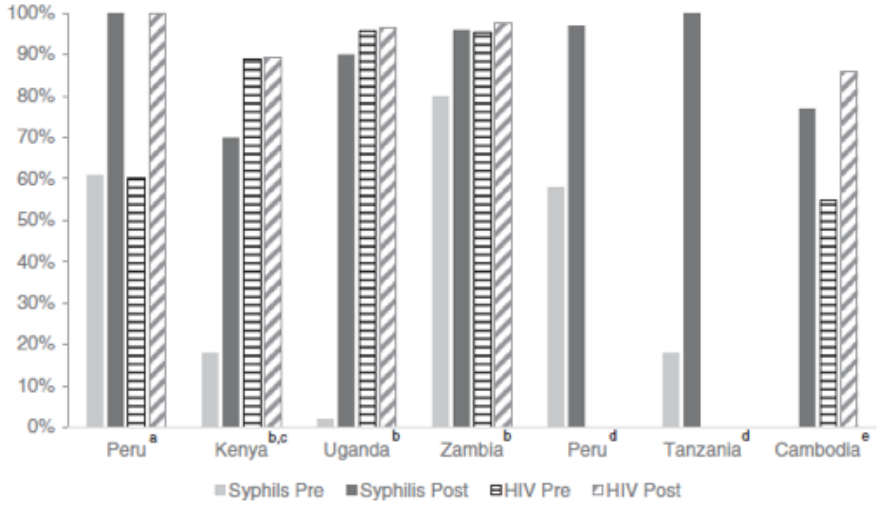


Source: Adapted from Wijesooriya et al. (2015) *(15)*

Box 4. Rapid syphilis tests may increase coverage of ANC syphilis testing

Syphilis screening of pregnant women is a key first step in the EMTCT cascade of services. Most countries recommend screening all ANC attendees for syphilis. Nevertheless, coverage remains sub-optimal in many low- and middle-income countries. Rapid syphilis tests (RST) allow for point-of-care testing in settings with limited laboratory resources. A recent review of the literature suggests that introduction of RST can quickly increase ANC testing coverage. Substantial increases in antenatal syphilis screening were seen in all studies and settings – urban and rural, low-level health facilities and tertiary care hospitals – even in facilities with very low rates of screening before RST was introduced (see Fig. 3.3). Overall, RST were accepted by both pregnant women and health care workers and can contribute to EMTCT of syphilis in low-resource settings.

Figure 3.3 Proportion of pregnant women screened for syphilis and HIV prior to and following the introduction of rapid syphilis testing.



Source: Swartzendruber et al. (2015) *(16)*

a Proportion of pregnant women screened who received their results in less than 45 minutes.
b Proportion of first-time antenatal care attendees screened.
c HIV results are for health facilities that did not experience stock-outs of HIV test kits.
d Proportion of pregnant women screened. No data on HIV presented.
e Proportion of expected number of pregnant women screened. Zero women were screened for syphilis before introduction of RST.

3.1 Country validation of EMTCT of syphilis and HIV

Cuba became the first county to achieve EMTCT of syphilis and HIV in 2015. To be considered for EMTCT of syphilis, countries must meet WHO criteria for two years for process indicators and one year for impact indicators before review by a regional validation team to establish elimination (see Box 5). Several more countries are promising candidates for EMTCT of syphilis. Countries that meet criteria based on the most recently reported (but not validated) indicator data are listed in Table 3.2.

Box 5. Required indicators for validation of EMTCT of syphilis

Impact indicator

Case rate of congenital syphilis ≤ 50 cases per 100 000 live births

Process indicators

ANC coverage (at least one visit) of ≥ 95%

Coverage of syphilis testing of pregnant women of ≥ 95%

Treatment of syphilis-seropositive pregnant women of ≥ 95%

Source: WHO (2014) *(17)*

Table 3.2 Countries meeting or nearly meeting criteria for EMTCT, based on most recently reported GARPR data, 2007–2014

Meet all four criteria	Meet three criteria with missing data for the fourth criterion	Nearly meet criteria*
Antigua and Barbuda	Burkina Faso	Armenia
Cuba	Cook Islands	Cabo Verde
Czech Republic	Cyprus	Chile
Dominica	Denmark	Kyrgyzstan
Malaysia	Kazakhstan	Marshall Islands
Malta	Mauritius	Nauru
Oman	Saint Vincent and the Grenadines	Palau
Ukraine	Sao Tome	Tuvalu
	Seychelles	
	Slovakia	
	Swaziland	
	Thailand	

* Most recent country report revealed: > 90% pregnant women with at least one ANC visit; > 90 % of ANC attendees tested for syphilis; > 90% infected ANC attendees treated and congenital syphilis rate < 50 cases per 100 000 live births (for some countries).

Source: GARPR database (2015) *(5)*

3.2 Monitoring the ANC cascade

Since the 2007 launch of the global initiative for EMTCT of syphilis, 60% of reporting countries have implemented a national strategy, either as a vertical programme or integrated with other strategies *(1)*. An increasing number of countries are monitoring the ANC cascade of syphilis testing and treatment. As shown in Table 3.3, the overall median ANC testing coverage has increased from 78% (based on 51 countries reporting in 2008) to 86% (based on 89 countries reporting in 2014). Over the same period, the median syphilis prevalence among ANC attendees decreased from 1.4% to 0.7% and the median treatment rate remained at more than 95% (see Table 3.3).

Table 3.3 Proportion of pregnant women in antenatal care (ANC) who were tested for syphilis, who tested positive and who received treatment by WHO region, 2008 (or 2010), 2012 and 2014

WHO region	Percentage of ANC attendees tested for syphilis						Percentage of ANC attendees tested who were positive for syphilis						Percentage of syphilis-positive ANC attendees who received treatment					
	2008		2012		2014		2008		2012		2014		2010		2012		2014	
	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value	No. reporting countries	Median value
African Region	18	58.50%	21	71.8%	34	40.10%	30	2.30%	22	1.9%	31	1.60%	15	100%	13	100.0%	21	98.00%
Region of the Americas	14	73.00%	17	82.6%	19	87.50%	14	0.90%	18	0.5%	21	0.40%	16	85%	13	80.5%	19	92.90%
Eastern Mediterranean Region	3	–	0	–	5	42.60%	4	–	2	–	4	0.00%	0	–	0	–	3	80.00%
European Region	9	100.00%	6	93.1%	9	93.40%	9	0.30%	7	0.1%	9	0.10%	3	–	4	–	7	100%
South-East Asia Region	3	–	7	37.4%	7	58.30%	6	1.30%	4		7	0.50%	3	–	4	–	6	89.90%
Western Pacific Region	4	–	10	98.3%	15	100.00%	8	0.30%	11	2.0%	13	1.80%	7	98%	9	93.0%	11	100%
Global	**51**	**78.00%**	**61**	**86.1%**	**89**	**85.50%**	**71**	**1.40%**	**64**	**1.0%**	**85**	**0.70%**	**44**	**99%**	**43**	**94.2%**	**67**	**95.60%**

Source: WHO (2014) (7) and GARPR database (2015) *(5)*

3.3 Data quality and interpretation

When interpreting ANC indicator data, it is important to take into account local factors affecting the quality, generalizability and representativeness. Data may be reported from routine programme monitoring or sentinel surveillance. Some countries only report data from prevention of mother-to-child transmission (PMTCT) intervention sites, sites with access to syphilis testing or limited geographical areas, limiting data generalizability. In addition, most countries do not include private sector data. How well ANC data represent all pregnant women also depends on the proportion of antenatal women who attend ANC services. In countries with low rates of ANC attendance, the indicators do not reflect the majority of pregnant women. Annex 4 illustrates the most recently reported data on the proportion of pregnant women with at least one ANC visit.

The laboratory methods and case definitions used affect the comparability of ANC syphilis prevalence between countries. Two positive tests (one treponemal and one non-treponemal) are required to maximize the sensitivity and specificity of syphilis diagnosis. Most countries reporting in 2014 did not specify the test type or whether they confirmed all positive tests with a second, different type of test. To avoid overestimations, a recent analysis of diagnostic test type for syphilis reporting in pregnant women suggested correction factors of 52.2% for data based on a single reactive non-treponemal test, 53.6% for countries reporting only a reactive treponemal test, and 68.6% for countries not specifying the type of test used *(18)*.

Indicator 1.17.1: ANC syphilis testing coverage

Based on 89 countries reporting in 2014, the median proportion of ANC attendees who were tested for syphilis was 85.5% (range 0.7–100%). The largest number of reporting countries *(34)* was from the African Region, which was also the region with the lowest median ANC testing coverage (40.1%, range 0.7–100%). The highest median ANC testing coverage (100%) was reported by countries in the Western Pacific Region, but a wide range of results were reported from every region, with the exception of the European Region (see Table 10). Overall, 31 countries reported at least 95% testing coverage (mostly in the Western Pacific and African Regions and the Region of the Americas), with 27 reporting less than 50% coverage (mostly in the African Region).

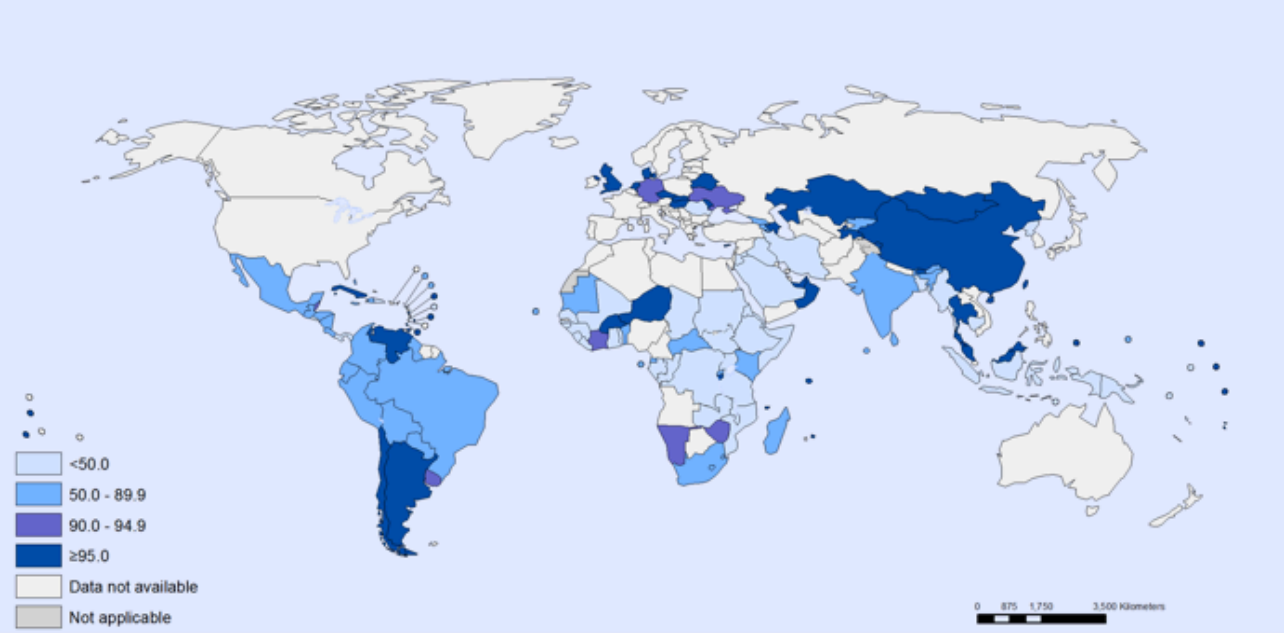
Several differences in definitions and methods for ANC syphilis testing were noted between countries, limiting the comparability of results. Some countries reported testing coverage for the first ANC visit, others reported screening coverage at any visit, and some reported both values. Some countries reported the same data for both first-visit testing and testing on any visit, while others reported first-visit testing one year and testing on any visit the following year. Therefore, it is not clear whether the data were entered correctly. For the purpose of this analysis, either value (testing on first visit or on any visit) was used if countries reported one value; for countries that reported both values, screening at any visit was used. Other differences in definitions were also noted; for example, Jamaica only reports testing data for women who received same-day test results. The latest reported data on ANC syphilis testing coverage is shown in Fig. 3.4 and 3.5, and in Annex 4.

Table 3.4 Percentage of ANC attendees who were tested for syphilis (ANC syphilis testing coverage) as reported by 89 countries, by region, 2014

WHO region	No. countries reporting	Median ANC syphilis testing coverage (range)
African Region	34	40.1% (0.7–100)
Region of the Americas	19	87.5% (16.8–100)
Eastern Mediterranean Region	5	42.6% (5.6–100)
European Region	9	93.4% (85.5–100)
South-East Asia Region	7	58.3% (1.2–96.8)
Western Pacific Region	15	100% (44.9–100)
Overall	**89**	**85.5% (0.7–100)**

Source: GARPR database (2015) *(5)*

Figure 3.4 Percentage of antenatal care attendees tested for syphilis at first visit based on most recent data available since 2007



Source: WHO Global Health Observatory (2015)

Indicator 1.17.2: ANC syphilis seroprevalence

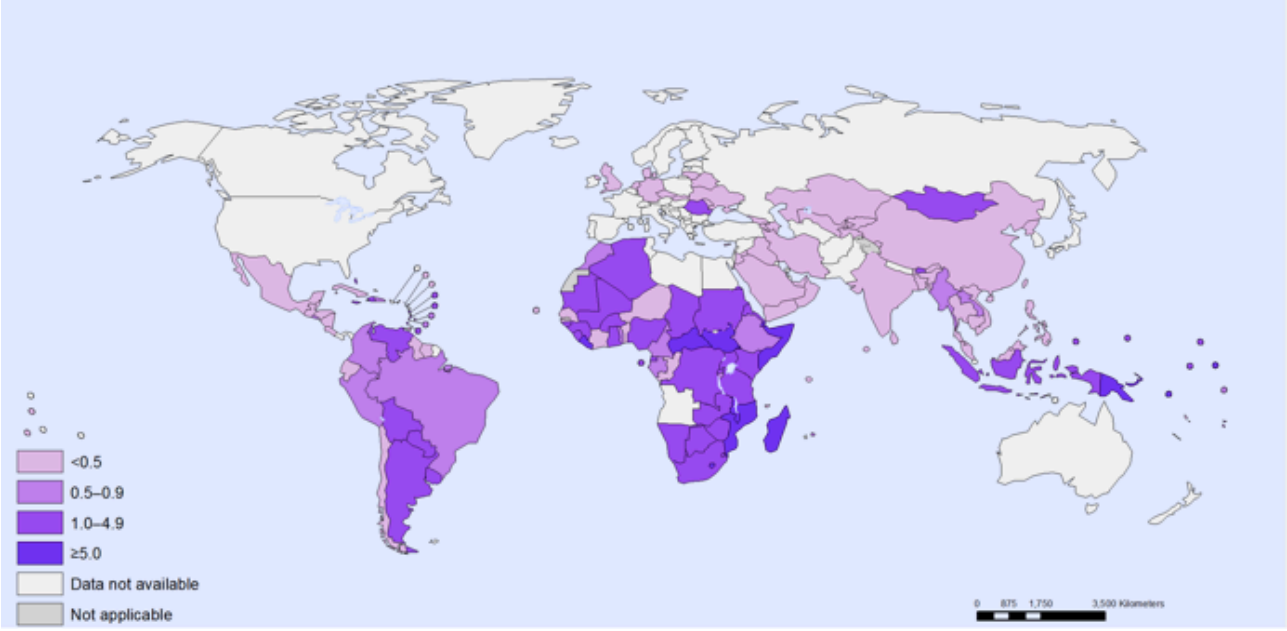
In 2014, 85 countries reported the percentage of ANC attendees tested for syphilis who were found to be positive. Among these, 26 provided age-disaggregated data. The greatest number of countries reporting was from the African Region, followed by the Region of the Americas. The median syphilis prevalence was 0.7% (range 0–13.5%) and was highest in the Western Pacific and African Regions (see Table 3.5 and Fig. 3.6). Overall, 38 (45%) countries reported ≥ 1% ANC seroprevalence. Methodologies varied between countries with some reporting results from routine programme data and others reporting data based on sentinel surveillance.

Table 3.5 Proportion of ANC attendees who tested positive for syphilis (ANC syphilis seroprevalence) as reported by 85 countries, by region, 2014

WHO Region	No. countries reporting	Median ANC syphilis seroprevalence (range)
African Region	31	1.6% (0–11.3)
Region of the Americas	21	0.4% (0–3.1)
Eastern Mediterranean Region	4	0.0% (0–1.5)
European Region	9	0.1% (0–1%)
South-East Asia Region	7	0.5% (0.1–1.7)
Western Pacific Region	13	1.8% (0–13.5)
Overall	85	0.7% (0–13.5)

Source: GARPR database (2015) *(5)*

Figure 3.5 Percentage of antenatal care attendees who tested positive for syphilis based on most recent data available since 2005



Source: WHO Global Health Observatory (2015)
Available at: http://gamapserver.who.int/mapLibrary/Files/Maps/gho_sti_anc_syphilis_positive.png

Indicator 1.17.3: ANC syphilis treatment

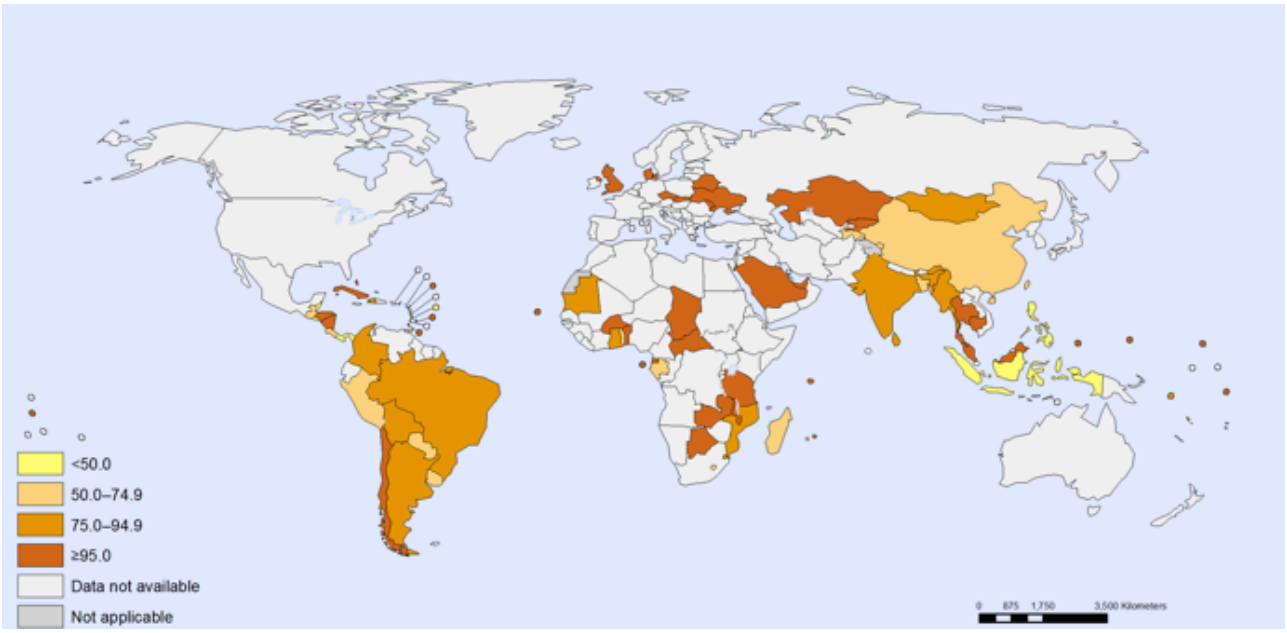
Overall, 66 countries reported a median of 95.6% (range 6.1–100%) of ANC attendees who were positive for syphilis and who received treatment in 2014. Two additional countries (Cook Islands and Saudi Arabia) identified no cases of syphilis, making a total of 68 reporting countries. Countries that clearly indicated 100% treatment as per policy, as opposed to data on actual practice, were excluded from the analysis. The median proportion of women receiving treatment was 90% or greater in all regions except the Eastern Mediterranean (see Table 3.6. Half of the countries (33 out of 66) reported ≥ 95% treatment coverage in 2014. Less than 75% of syphilis-positive pregnant women were treated in 19 countries. Fig. 3.6 and Annex 4 show the most recently reported data on syphilis treatment.

Table 3.6 Percentage of ANC attendees positive for syphilis who received treatment as reported by 66 countries, by region, 2014

WHO Region	No. countries reporting	Median % receiving treatment (range)
African Region	21	98.0% (6.1–100)
Region of the Americas	19	92.9% (50.0–100)
Eastern Mediterranean Region	3	80.0% (46.7–100)
European Region	7	100% (28.8–100)
South-East Asia Region	6	89.9% (20.9–100)
Western Pacific Region	10	100% (63.5–100)
Overall	**66**	**95.6% (6.1–100)**

Source: GARPR database (2015) *(5)*

Figure 3.6 Percentage of antenatal care attendees positive for syphilis who received treatment as reported by countries, 2014



Source: WHO Global Health Observatory (2015)
Available at: http://gamapserver.who.int/mapLibrary/app/searchResults.aspx

[2] Stillbirth, live birth or fetal loss at > 20 weeks of gestation or > 500 grams to a syphilis-seropositive mother without adequate syphilis treatment OR stillbirth, live birth, or child age < 2 years with microbiological evidence of syphilis infection. Microbiological evidence of congenital syphilis includes any one of the following: demonstration by dark field microscopy or fluorescent antibody detection of T. *pallidum* in the umbilical cord, the placenta, a nasal discharge, or skin lesion material; detection of *T. pallidum*-specific IgM; or infant with a positive non-treponemal serology titre greater than fourfold that of the mother *(17)*.

Indicator 1.17.7: Congenital syphilis rate

The congenital syphilis rate measures the adverse outcomes of untreated syphilis infection in pregnancy and is an indicator of progress in EMTCT of syphilis. The congenital syphilis rate was piloted as an indicator in two regions in 2012 and became a routine GARPR indicator in 2013. The global congenital syphilis case definition[2] is recommended for monitoring and reporting. WHO tools are available to assist countries in incorporating congenital syphilis into existing reporting systems *(19)*.

Fewer countries were able to report data on congenital syphilis than for other indicators in the EMTCT cascade. Overall, 49 countries reported in 2014, mostly from the Region of the Americas and the European Region. The overall median rate was 4.9 cases per 100 000 live births (range 0–1233.5). As shown in Table 3.7 and Fig. 3.7, the reported median rate was highest in the Region of the Americas. Few countries in the African Region reported on congenital syphilis and the range of reported rates was very wide. Overall, 37 countries (75%) reported rates of less than 50 cases per 100 000 live births, the cut-off level to meet EMTCT criteria.

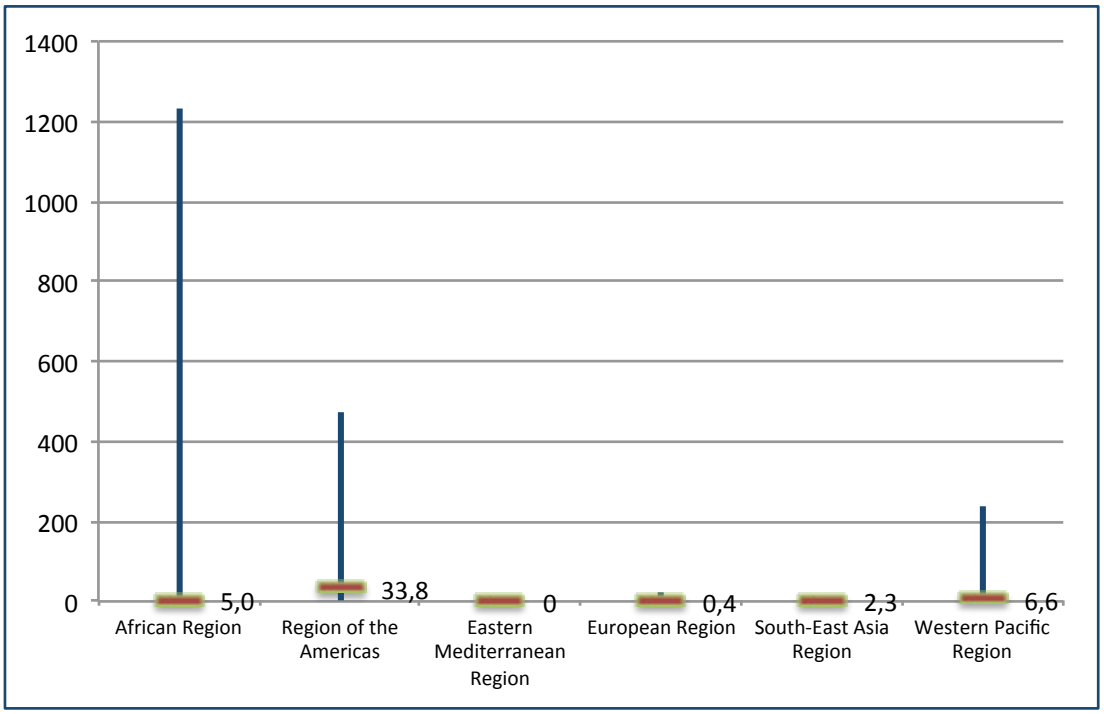
However, the data on congenital syphilis have many limitations. Several factors result in underestimation of the scale of the problem, including lack of diagnosis and follow-up of syphilis-positive pregnant women and their infants, inconsistent case definitions for congenital syphilis and incomplete reporting.

Table 3.7 Congenital syphilis rate (cases per 100 000 live births) as reported by 49 countries, by region, 2014

WHO region	No. countries reporting	Median congenital syphilis rate (range)
African Region	6	5.0 (0–1233.5)
Region of the Americas	18	33.8 (0–472.2)
Eastern Mediterranean Region	4	0
European Region	11	0.4 (0–19.8)
South-East Asia Region	1	2.3
Western Pacific Region	9	6.6 (0–235.0)
Overall	49	4.9 (0–1233.5)

Source: GARPR database (2015) *(5)*

Figure 3.7 Congenital syphilis rate (cases per 100 000 live births, median and range) as reported by 49 countries, by region, 2014



Source: GARPR database (2015) *(5)*

4. Syphilis prevalence among key populations

Key points:

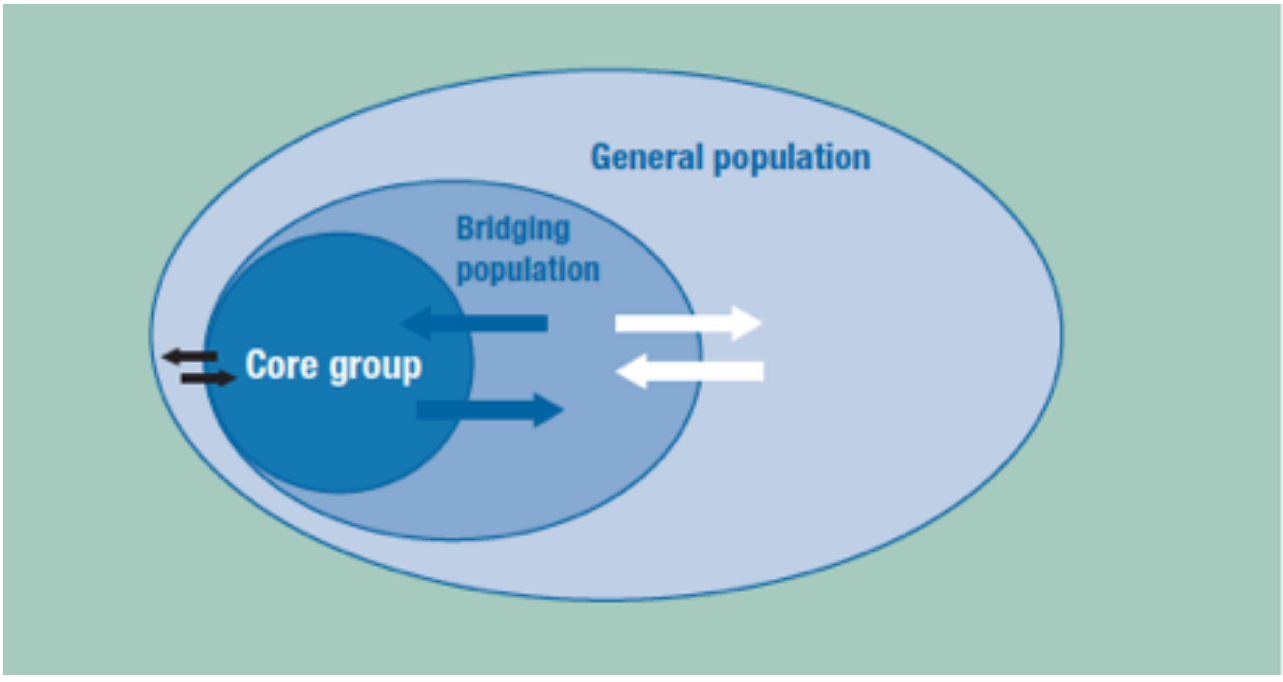
- Syphilis seroprevalence among key populations is an important indicator of progress in STI control.
- Syphilis seroprevalence remains high in key populations worldwide, with at least one country in every WHO region reporting more than 5% prevalence among female sex workers and men who have sex with men.
- Different laboratory methodologies and sampling frames limit the comparability of results between countries.

Key populations are at high risk of exposure to and transmission of STIs and HIV due to their sexual risk behaviours. The WHO global STI control strategy prioritizes female sex workers (FSWs), people who inject drugs, men who have sex with men (MSM) and transgender women for prevention and treatment of STI and HIV through peer outreach, condom programmes, STI screening and treatment services. Structural interventions are also recommended to reduce legal and social barriers, including stigma and discrimination, that block access to quality STI services and prevent early diagnosis and treatment of STIs *(3, 20, 21, 22)*.

The sexual networks among key populations play a critical role in population-level transmission of STIs and HIV. FSWs transmit infections to clients, who in turn act as a bridging population as they pass the infection to lower-risk populations, including their wives and unborn children. In the same way, MSM often have female partners who become infected (see Fig. 4.1). Effective STI control among key populations leads to a decline in STI incidence in the population as a whole. A recent review from Asia found that countries with high levels of condom use among sex workers had declining (or low and stable) trends for the incidence of both STIs and HIV. Importantly, the decreasing trends occurred in sex workers and in the general population. The greatest declines were found in countries that implemented large-scale structural interventions *(23)*. Targeted interventions with sex workers are conducted in the most regions, ranging from 53% of countries in the European Region to more than 90% of countries in the South-East Asia and Western Pacific Regions. In general, fewer countries reported working with MSM. Most countries promote and/or provide condoms (see Table 4.1).

Two indicators of STIs among key populations are included among the core indicators to guide the national response to STIs: the seroprevalence of syphilis among MSM and that among FSWs.

Figure 4.1 Transmission dynamics of STIs at the population level



Source: WHO (2007) *(3)*

Table 4.1 Proportion of countries with targeted interventions for FSW and MSM and condom promotion and provision, by region, 2013

WHO region	No. countries surveyed (no. of countries responding)*	No. (%) countries conducting targeted interventions for FSW	No. (%) countries conducting targeted interventions for MSM	No. (%) countries that promote condoms	No. (%) countries that provide condoms
African Region	47 (26)	18 (38%)	12 (26%)	23 (49%)	24 (51%)
Region of the Americas	35 (18)	16 (46%)	14 (40%)	18 (51%)	18 (51%)
Eastern Mediterranean Region	22 (13)	9 (41%)	7 (32%)	8 (36%)	10 (45%)
European Region	54 (30)	18 (33%)	19 (35%)	24 (44%)	20 (37%)
South-East Asia Region	11 (10)	9 (82%)	9 (82%)	9 (82%)	10 (91%)
Western Pacific Region	29 (11)	9 (31%)	9 (31%)	10 (34%)	11 (38%)

* Number of countries surveyed (N=198) is used as denominator for percentages.
Source: WHO (2015) *(1)*

4.1 Data quality and interpretation

Data on syphilis seroprevalence among MSM and FSWs are obtained from special surveys, sentinel surveillance or routine health information systems. Since different methodologies may be used, it is not possible to compare results across countries. Even within countries, results are seldom representative of key populations overall. Many countries report special studies from limited geographical areas, such as urban areas, and that may be restricted to capital city data. Survey sampling often relies on nongovernmental organizations (NGOs) working with hard-to-reach populations, resulting in studies that are limited to intervention areas and results that are biased towards members of key population groups who are in contact with services. While the definition of active syphilis requires two different test results (treponemal and non-treponemal), countries seldom specify laboratory methods when reporting data. Laboratory and data quality control also vary between countries. Nevertheless, the key population data show generally high levels of syphilis globally in key populations. In addition, the data can be used to assess trends over time in a given country when the same survey methods are used consistently.

Indicator 1.17.4: Syphilis in sex workers

In 2014, 28 countries reported data on syphilis prevalence among FSWs. Most countries reported results based on special surveys, including integrated bio-behavioural surveys. However, eight countries reported routine programme data without clarification on laboratory methods or definition of a positive test.

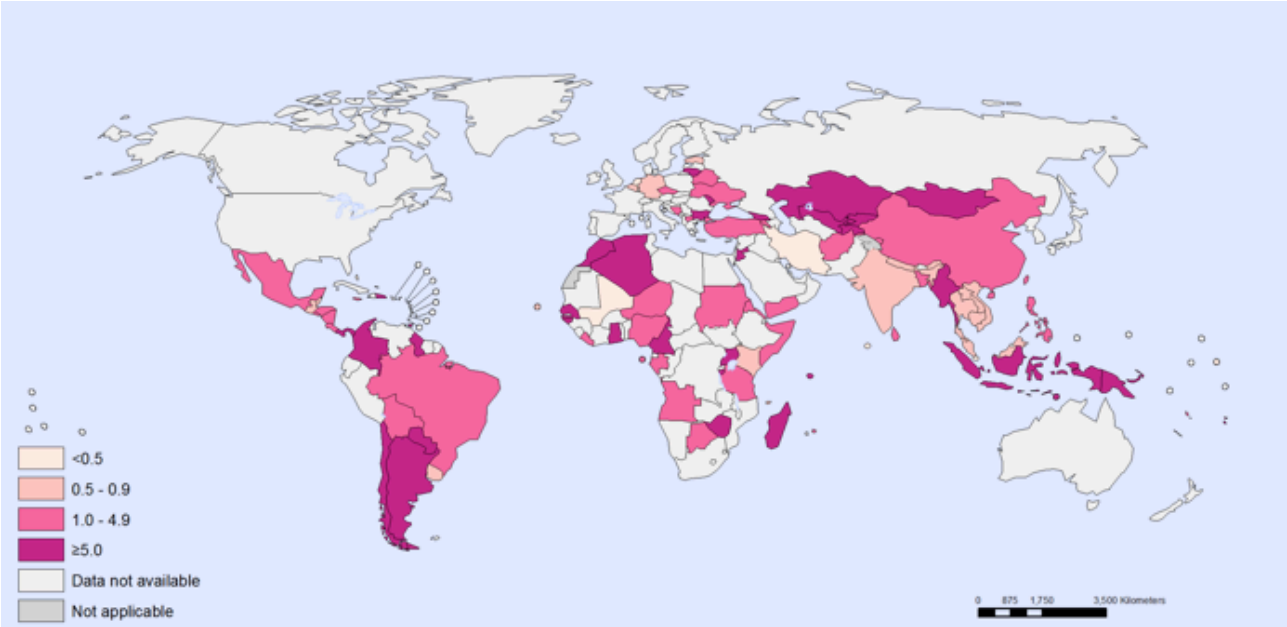
The median reported syphilis seroprevalence was 2.3% (range 0.1–53.0%), as shown in Table 4.2 The highest levels were reported from the Region of the Americas and the African Region. Overall, 10 countries reported 5% or higher prevalence. Among them, six countries reported greater than 10% prevalence, including three (Lesotho, Mongolia and Panama) that reported more than 20% (see Annex 5 and Fig. 4.2 for the global distribution of syphilis prevalence among FSW based on the latest reported data since 2005). These data include a prevalence figure of more than 5% among FSWs and MSM in every WHO region.

Table 4.2 Syphilis seroprevalence among FSWs reported by 28 countries, by region, 2014

WHO region	No. countries reporting	Median FSW syphilis prevalence (range)
African Region	8	5.2% (0.8–27.2)
Region of the Americas	9	2.3% (0.5–53.0)
Eastern Mediterranean Region	2	2.9% (0.8–5.0)
European Region	0	–
South-East Asia Region	4	2.4% (0.3–8.7)
Western Pacific Region	5	1.3% (0.1–29.6)
Overall	28	2.3% (0.1–53.0)

Source: GARPR database (2015) *(5)*

Figure 4.2 Percentage of FSWs with syphilis (latest reported data since 2005)



Source: WHO Global Health Observatory (2015)
Available at: http://gamapserver.who.int/mapLibrary/Files/Maps/gho_sti_sexworkers_syphilis.png

Indicator 1.17.5: Syphilis in men who have sex with men

Data on syphilis prevalence among MSM were reported to GARPR by 30 countries in 2014. The data were based mostly on special surveys, including integrated bio-behavioural surveys, although the reports from eight countries were based on routine programme data. Data based on survey sample sizes of less than 40 or Internet surveys with self-reported infections were excluded.

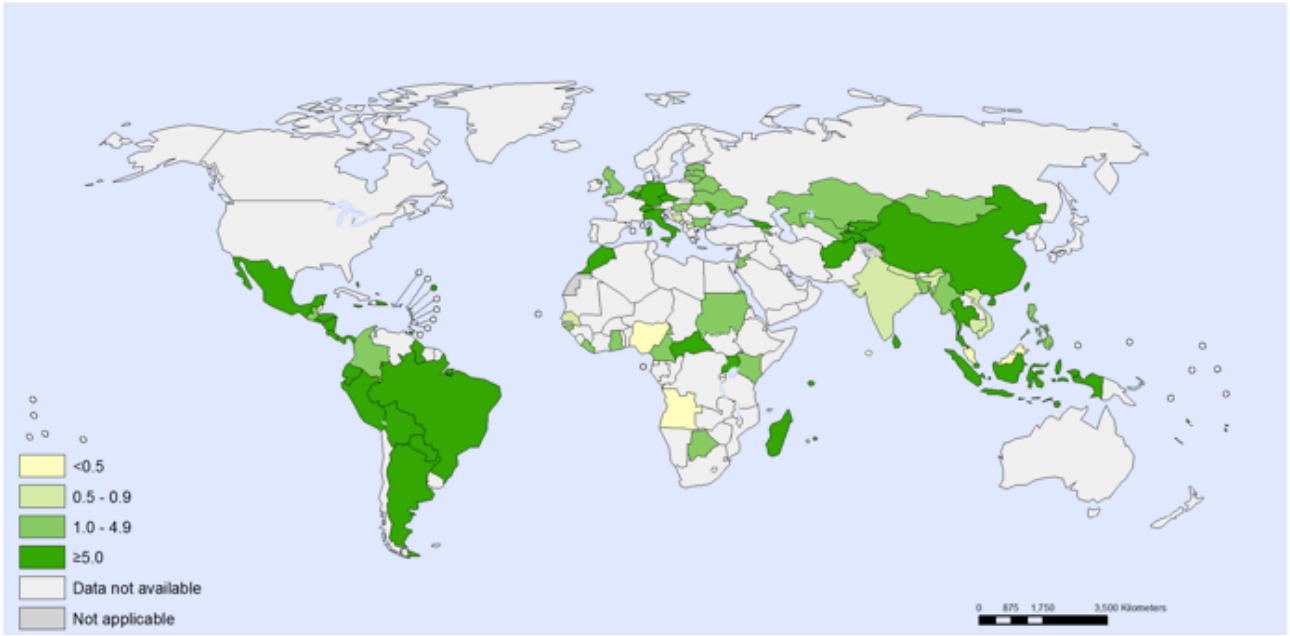
The median reported syphilis seroprevalence among MSM was 5.3% (range 0.3–32.2%), with the highest values reported from the Region of the Americas, as shown in Table 4.3. Interestingly, only five countries reported from the African Region. Over half of the countries (16 out of 30) reported more than 5% prevalence, with seven countries reporting more than 10% and two countries (Plurinational State of Bolivia and Panama) reporting more than 20%. Based on the latest data reported since 2006, a prevalence of more than 5% in at least one country has been reported in every WHO region (see Fig. 4.3 and Annex 5).

Table 4.3 Syphilis seroprevalence among MSM reported by 30 countries, by region, 2014

WHO region	No. countries reporting	Median MSM syphilis prevalence (range)
African Region	5	5.1% (1.1–9.4)
Region of the Americas	12	10.3% (1.0–32.2)
Eastern Mediterranean Region	1	10.1%
European Region	4	2.3% (0.3–6.8)
South-East Asia Region	5	1.2% (0.3–16.4)
Western Pacific Region	3	6.0% (4.2–7.1)
Overall	30	5.3% (0.3–32.2)

Source: GARPR database (2015) *(5)*

Figure 4.3 Percentage of MSM with syphilis (latest reported data since 2006)



Source: WHO Global Health Observatory (2015)
Available at: http://gamapserver.who.int/mapLibrary/Files/Maps/gho_sti_msm_syphilis.png

5. Gonococcal antimicrobial susceptibility

Key points:

- Gonococcal antimicrobial resistance (AMR) continues to increase worldwide and could lead to a pandemic of extensively drug-resistant (XDR) N. gonorrohoeae with serious public health consequences.
- Surveillance for gonococcal AMR is currently suboptimal and presents many challenges, especially in the countries with the greatest burden.
- No new drugs are under development for the treatment of XDR gonorrhoea.

Gonococcal AMR has been a public health concern since sulphonamides became ineffective in the 1940s. Since then, *N. gonorrhoea* has developed resistance to penicillins, tetracyclines, spectinomycin, quinolones (e.g. ciprofloxacin) and macrolides (e.g. azithromycin) after showing initial high susceptibility to each class of drugs. Overuse and misuse of antibiotics and the widespread availability of counterfeit drugs with low levels of active compounds contribute to the development of resistance. It is further exacerbated by the inherent properties of *N. gonorrhoeae* that allow it to acquire and retain resistance to several classes of antibiotics at the same time, persisting even after use of those antibiotics has been discontinued. Many strains of *N. gonorrhoeae* are still resistant to penicillin, despite penicillin use being discontinued long ago *(24)*.

Decreased susceptibility to the extended spectrum (third-generation) cephalosporins – the last option for monotherapy – is becoming more widespread and ten countries have reported treatment failures *(1)*. A WHO global partners meeting on AMR in N. gonorrhoeae in 2014 concluded that the increasing proportion of strains with elevated minimum inhibitory concentrations (MICs) for extended spectrum cephalosporins will eventually result in untreatable gonorrhoea, with serious sexual and reproductive health consequences *(25)*. Two extensively drug-resistant (XDR) strains of *N. gonorrhoeae* have been reported from Japan and Europe, and a large proportion of the circulating strains worldwide are very close to developing into XDR strains[3] *(26, 27)*. The situation is alarming since there are no new antimicrobials under development for the treatment of gonorrhoea. Some countries are responding by implementing dual therapy with ceftriaxone plus azithromycin. There is also interest in exploring the effectiveness of some of the newer macrolides and other drugs on the market that have shown in vitro activity against gonorrhoea and to assess whether older drugs, such as gentamicin and spectinomycin, may offer effective treatment of gonorrhoea *(26)*.

Considering that gonorrhoea is among the most common STIs worldwide, with an estimated 85 million new cases in 2012, lack of effective treatment would result in a major public health problem. Untreated PID leads to severe reproductive complications, such as ectopic pregnancies and infertility. An increase in cases of gonococcal pharyngitis and proctitis would be expected and other rare conditions due to *N. gonorrhoeae* would become more common, including adult conjunctivitis, endocarditis, tenosynovitis, arthritis, meningitis, Fitzhugh-Curtis syndrome and disseminated gonococcal infection. An increase in asymptomatic cases would also occur, contributing to the spread of disease, and untreated gonorrhoea would increase the risk of HIV transmission *(28)*.

5.1 Gonococcal Antimicrobial Surveillance Programme (GASP)

Monitoring the susceptibility patterns of *N. gonorrhoea* is essential to detect and track emerging resistance and to adjust treatment recommendations for optimal outcomes. GASP is a global laboratory network of more than 60 countries in six regions, each with focal points and regional coordinating centres to monitor the antimicrobial susceptibility of gonorrhoea in participating countries.

WHO is working to make GASP as effective as possible and to address its many challenges, which include limited national leadership, commitment and funding in many countries. The magnitude of the gonococcal AMR problem is incompletely known due to the lack of data in many countries. A recent survey of 108 countries found that less than half *(46)* had conducted AMR testing for gonorrhoea in the past five years *(1)*. The lack of information is particularly acute in countries with the highest gonorrhoea burden and the greatest need for AMR monitoring. These are often countries with suboptimal diagnosis and surveillance

[3] XDR strains are defined as resistant to two or more of the antibiotic classes currently recommended for the treatment of gonorrhea, or three or more of the less frequently used antibiotic classes.

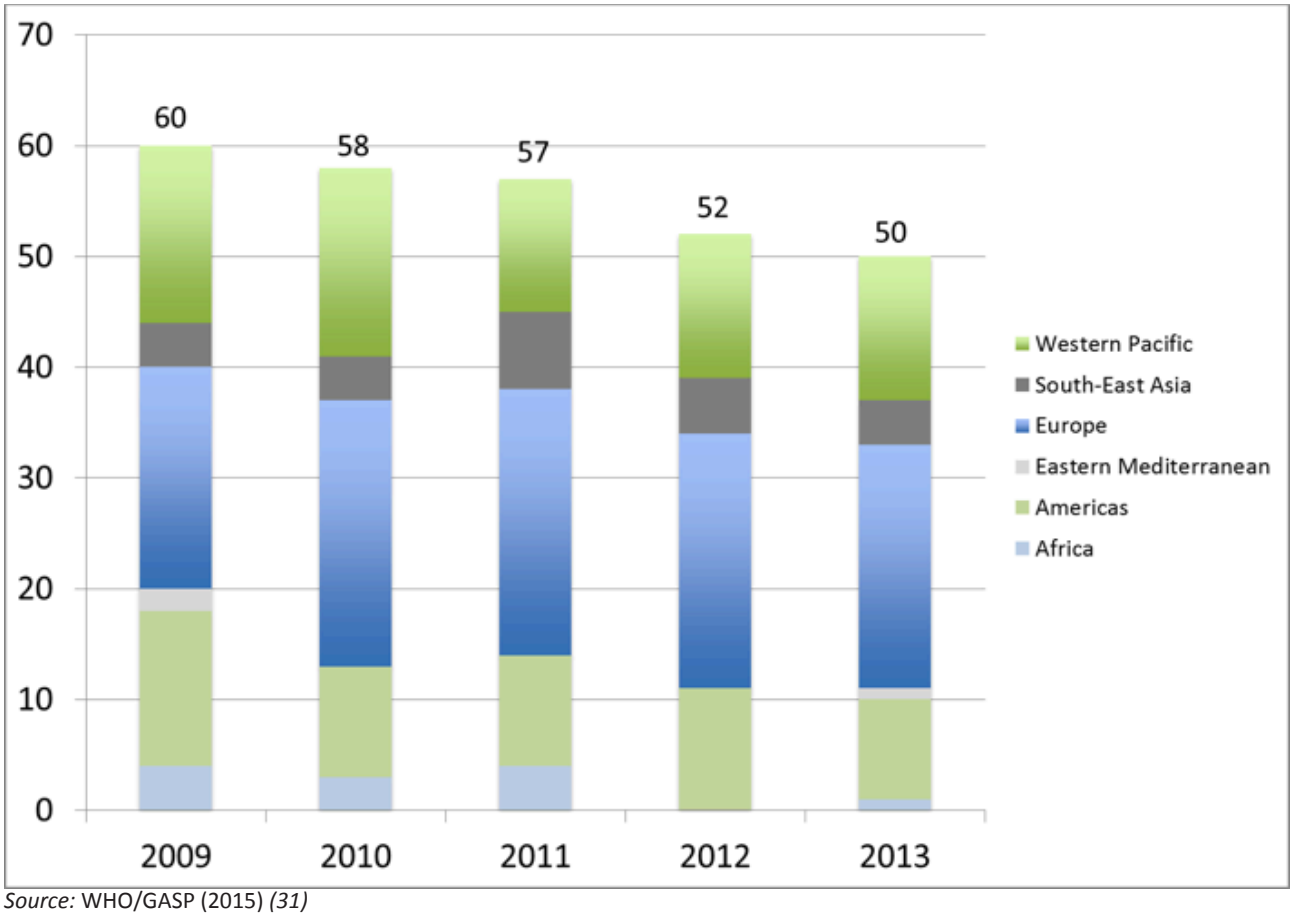
capacity, where antibiotics are freely available (including counterfeit drugs), and lack of drug quality control contributes to the rapid development of resistance. They are also the countries most likely to rely on syndromic management of STIs, leading to a shortage of samples for AMR monitoring and lack of capacity and supplies for specimen collection, culture and sensitivity testing. Cultures are also carried out less frequently in more developed countries as diagnosis is improved by the use of molecular methods *(25)*. Countries in the African, South-East Asia and Eastern Mediterranean Regions (as well as Eastern Europe and Central Asia) particularly lack functioning programmes to assess gonococcal AMR *(27, 29, 30)*.

Recommendations to improve monitoring of AMR include advocacy to increase political support and engagement at the country level; improving country-level capacity by developing and implementing a minimum package for gonococcal AMR and laboratory antimicrobial susceptibility testing; and updating the WHO reference panels for external quality assessment and laboratory capacity building *(25)*. In addition, new technologies may enhance surveillance by molecular methods using samples that are positive by nucleic acid amplification testing in countries where cultures are not available *(26, 27)*. These interventions need to be combined with a holistic public health approach, including prevention of transmission, improved services for key populations, improved drug quality control, and reduction in overuse/misuse of antibiotics.

5.2 Antimicrobial susceptibility data

The cumulative number of countries reporting to GASP increased from 52 in 2009 to 68 in 2012 *(1)*. However, the number of countries reporting susceptibility data for at least one antibiotic each year shows a declining trend, from 60 countries reporting in 2009 to 50 countries in 2013. The WHO European Region accounts for the majority of reporting countries, while the African and Eastern Mediterranean Regions are the least represented (see Fig. 5.1). Overall, the most recent GASP data from 2012 and 2013 show continued widespread gonococcal resistance to quinolones and azithromycin and emergence of decreased susceptibility to extended spectrum cephalosporins (see Table 5.1).

Figure 5.1 Number of countries reporting data on antimicrobial susceptibility to cephalosporins, azithromycin or quinolones, 2009–2013



Source: WHO/GASP (2015) *(31)*

Table 5.1 Number of countries reporting ≥ 5% of gonococcal isolates with resistance to azithromycin and ciprofloxacin/quinolones and elevated minimum inhibitory concentrations of cefixime (0.25 µg/ml) or ceftriaxone (> 0.125 µg/ml), 2012–2013*

Reported % resistant isolates	Africa (n=1)	Americas (n=11)	Eastern Mediterranean. (n=1)	Europe (n=24)	South-East Asia (n=5)	Western Pacific (n=14)	Total (n=56)
Ceftriaxone/ cefixime							
≥ 5% decreased susceptibility	0	1	0	9	0	4	14
Of which ≥ 10% decreased susceptibility	0	0	0	4	0	2	6
Azithromycin							
≥ 5% resistant isolates	1	1	–	13	0	1	15
Of which ≥ 10% resistant isolates	1	0	–	9	0	1	10
Ciprofloxacin/ quinolones							
≥ 5% resistant isolates	1	10	–	24	5	15	55
50–90% resistant isolates	1	2	–	14	0	3	20
> 90% resistant isolates	0	0	–	1	5	6	12

* Several countries did not report test results for all antibiotics.

Source: WHO/GASP (2015) *(31)*

5.3 Data quality and interpretation

AMR data are based generally on small sample sizes, resulting in sampling bias. Quality control varies by country. Many countries do not provide data on an annual basis and the proportion of countries reporting varies by region. As a result, wide variations in results in a single country are noted from year to year and AMR data are not comparable across countries and regions.

5.4 Extended-spectrum cephalosporins

Since 2009, 46 countries have reported decreased susceptibility to extended-spectrum cephalosporins. Data on the susceptibility of *N. gonorrhoeae* to extended-spectrum cephalosporins was reported by 49 countries in 2012 and/or 2013, with 59% (29 of 49) countries reporting decreased susceptibility in 2012/2013 (see Fig. 5.2 and Annex 6).

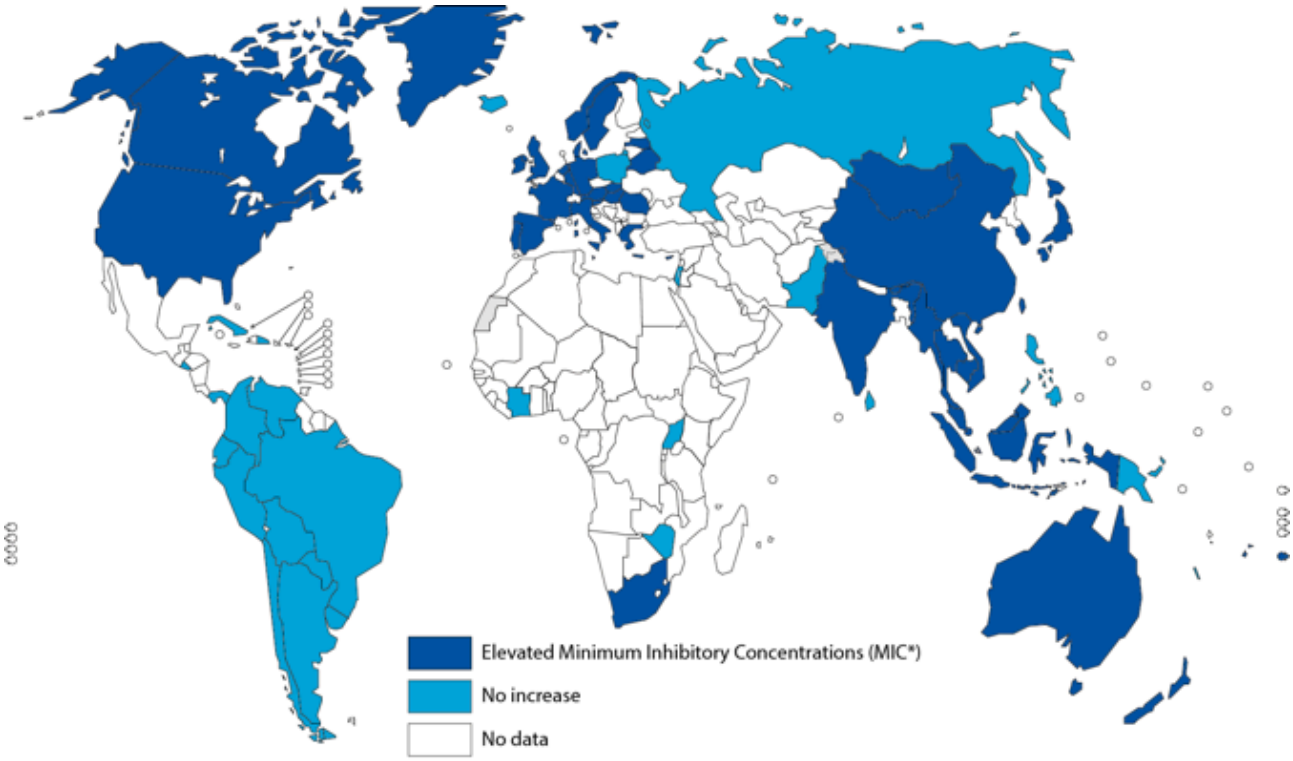
Antibiotic susceptibility monitoring is well established in the European Region, which accounted for half of the reporting countries in 2012/2013. Among the 23 countries reporting, less than 1% of isolates in the region overall exhibited decreased sensitivity to ceftriaxone. Nine countries in the region reported MICs greater than 0.25 µg/ml for cefixime in 5% or more of isolates, with four countries reporting elevated minimum inhibitory concentrations in 10% or more. Only seven countries reported no decreased susceptibility to cefixime; among these, five countries reported decreased susceptibility in previous years and one reported data for the first time in 2013.

Decreased susceptibility to ceftriaxone was reported by 10 of the 12 Western Pacific Region countries submitting data for 2012/2013, with four reporting decreased susceptibility in 5% or more of isolates: the cut-off for changing treatment guidelines. An additional three countries in the region reported at least 5% decreased susceptibility in past years. Only two countries reported no isolates with decreased susceptibility (New Caledonia and the Philippines) in any reporting year.

In the Region of the Americas, two countries reported decreased susceptibility to ceftriaxone – Canada and the United States of America (USA) – with Canada reporting over 5%. Decreased susceptibility to cefixime among less than 5% of isolates was also reported by Canada and the USA.

Ceftriaxone susceptibility data are more limited in the remaining regions. In the South-East Asia Region, only two countries reported ceftriaxone susceptibility data in 2012/2013. Of the seven countries that reported to GASP between 2009 and 2013, five reported some decreased susceptibility to ceftriaxone; among these, four reported decreased susceptibility in over 5% of isolates. Only one country in the African Region and one in the Eastern Mediterranean Region reported in 2012 and/or 2013, and neither reported decreased susceptibility to ceftriaxone. Of note, only four countries have reported from the African Region and two from the Eastern Mediterranean Region since 2009. Among these, only two countries reported decreased susceptibility to ceftriaxone: Côte d'Ivoire (> 10%) and South Africa (< 5%).

Figure 5.2 Countries with documented elevated minimum inhibitory concentrations to cefixime and/or ceftriaxone, 2009–2013.

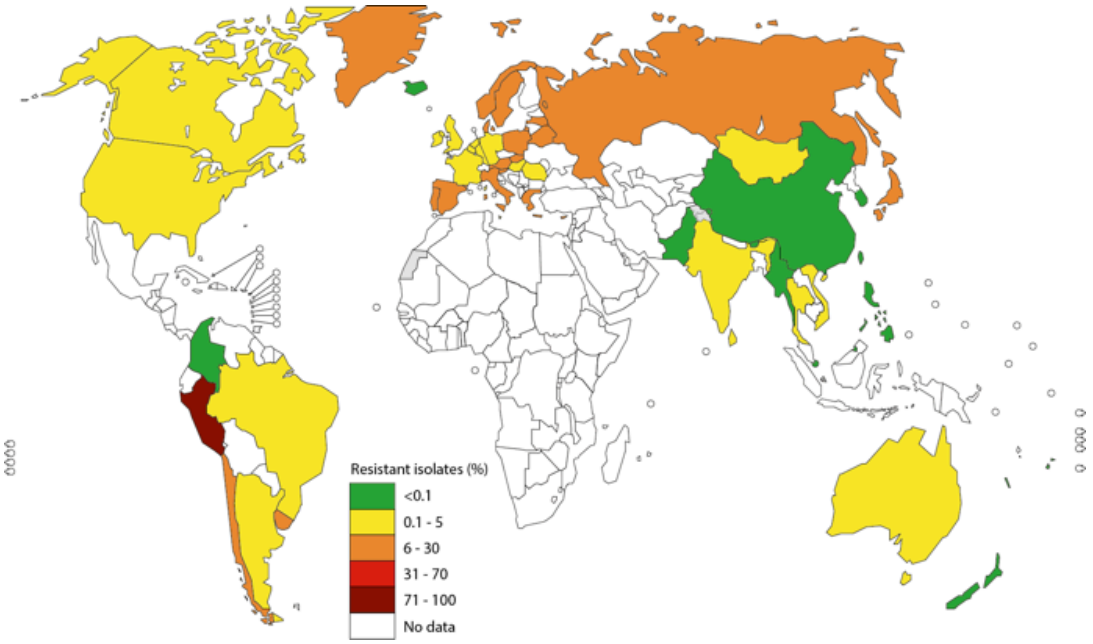


Source: WHO/GASP data 2015 *(31)*

5.5 Azithromycin

Among 42 countries reporting azithromycin susceptibility in 2012/2013, 17 reported resistance in 5% or more of isolates. Across all regions, only seven countries reported no resistant isolates. The majority of countries reporting in 2012/3 were in the European Region. Among the 24 countries reporting from the region, 13 reported 5% or more resistant isolates. Among these, nine countries reported over 10%, including Cyprus and Greece with over 20% resistance. Three countries in the European Region reported no resistant isolates; however, two of them reported resistance in previous years and the third reported AMR data for the first time in 2013 (see Fig. 5.3 and Annex 6).

Figure 5.3 Proportion of *N. gonorrhoeae* strains resistant to azithromycin reported in countries, 2009–2013



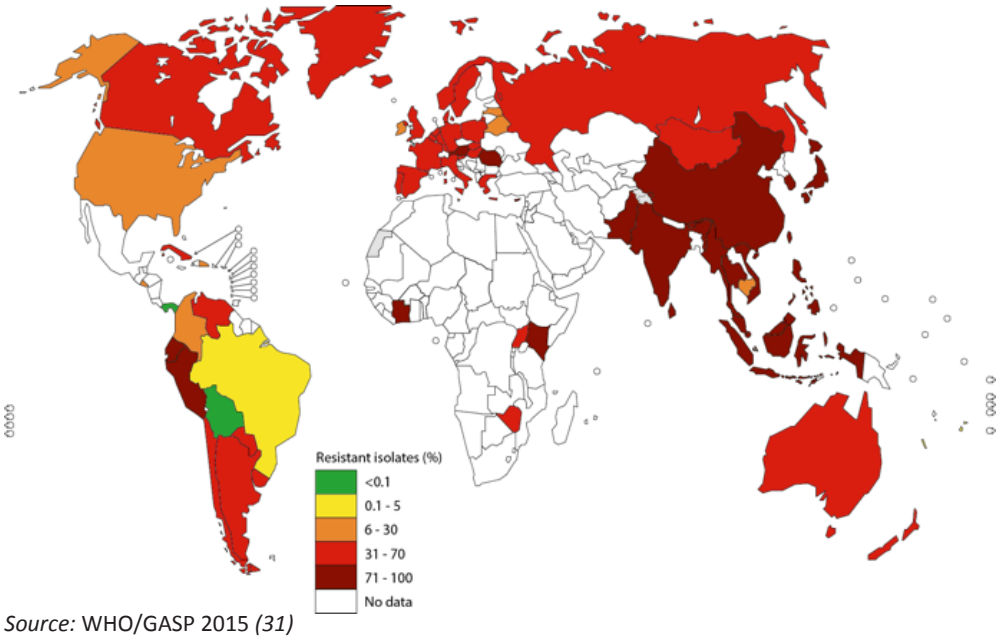
Source: WHO/GASP data 2015 *(31)*

Countries in Asia began reporting susceptibility data for azithromycin in 2011. In the four countries reporting from the South-East Asia Region between 2011 and 2013, three reported less than 5% resistant isolates and one reported no resistant isolates. Among the nine Western Pacific Region countries that have submitted data, six reported resistant isolates with only one country reporting over 5% resistant isolates (Japan reported over 10% in both 2012 and 2013). Four countries reported from the Region of the Americas and all of them (including Canada and the USA) found isolates resistant to azithromycin; only one country (Chile) reported over 5% resistance. No countries reported data from the Eastern Mediterranean Region. The first country to report on AMR for azithromycin in the African Region was Côte d'Ivoire in 2013, which reported over 10% resistant isolates.

5.6 Quinolones

In 2012 and 2013, 56 countries reported susceptibility data for ciprofloxacin. High levels of resistance were reported from all regions with nearly every country reporting over 20% resistant isolates. Very high levels of resistance (over 90% of isolates) were reported by 12 countries, mostly in Asia. Only four countries reported less than 5% resistant isolates – Dominican Republic, Fiji, New Caledonia and Panama (although the Dominican Republic reported > 20% resistance in previous years; see Fig. 5.4 and Annex 6).

Figure 5.4 Proportion of *N. gonorrhoeae* strains resistant to ciprofloxacin and/or other quinolones reported in countries, 2009–2013



Source: WHO/GASP 2015 *(31)*

6. Conclusion

This is the third global report on STI surveillance since the release of the WHO *Strategies and laboratory methods for strengthening surveillance of sexually transmitted infection 2012 (4)*. STI surveillance systems are evolving and the majority of countries have a system in place. However, capacity building is needed to harmonize and strengthen STI reporting systems since they are not standardized or consistent between countries. As a result, the findings are best used to assess trends over time within countries.

Case reporting data on syndromes and etiological causes are available for additional countries since the inclusion of the case rate indicators in the annual GARPR for the first time in 2013. However, the reported rates vary widely between countries and interpretation of results is limited by inconsistencies in reporting between countries. Case definitions and completeness of reporting vary by country. In general, case rates are likely to be underestimated due to incomplete reporting and barriers to health care seeking behaviours.

ANC syphilis reporting is generally more robust and incorporated into health information systems in many countries. Between 2008 and 2014, substantial progress has been made towards global elimination of congenital syphilis. The median antenatal syphilis screening coverage increased globally and syphilis seropositivity among pregnant women decreased by nearly half. In addition, Cuba became the first country to declare EMTCT of syphilis in 2015 and several other countries are promising candidates for elimination. Nevertheless, many countries still report high rates of ANC syphilis and low rates of testing coverage. Continued efforts to increase antenatal syphilis testing coverage and treatment of infected pregnant women are urgently needed to continue advancing towards achievement of global EMTCT of syphilis.

Syphilis seroprevalence remains high in key populations worldwide; for both FSWs and MSM, at least one country in every WHO region reported a prevalence of at least 5%. Existing programmes are only reaching a small fraction of the target population and struggle with persistent barriers to health care seeking behaviours among key populations, stigmatization, political interference and financial constraints. More effort is needed to scale up programmes to increase coverage of prevention and treatment services for these most at-risk populations.

Despite efforts to improve antimicrobial susceptibility monitoring in response to the threat of a pandemic of XDR *N. gonorrohoeae*, surveillance for gonococcal AMR is currently suboptimal and faces many challenges, especially in the highest-burden countries. Widespread gonococcal AMR to quinolones and azithromycin and decreasing susceptibility to extended-spectrum cephalosporins have been documented with no new drugs under development for treatment of XDR gonorrhoea. There is an urgent need to increase the number of countries participating in GASP through laboratory capacity building, as well as advocacy to increase national commitment to monitoring antimicrobial susceptibility as part of routine STI management.

Although most countries have adopted the syndromic approach to the management of STIs, as recommended by WHO, most are not carrying out the regular etiological assessments required to validate the management of the syndromes. In some countries, no etiological studies have been conducted in the last decade. As viral pathogens play an increasing role in the changing epidemiology of STIs, countries will need to respond by adjusting management guidelines and recommending locally appropriate prevention and treatment strategies. On a global level, research is needed to develop more effective prevention technologies, such as vaccines and microbicides. Increasing the availability of rapid diagnostic tests is another strategy that can augment syndromic management as the epidemiology changes.

Stronger surveillance is needed to provide the necessary information and data to guide the next phase of the STI control strategy post-2015, which will focus on (i) increasing universal coverage of effective interventions and access to treatment of STI and (ii) developing improved methods for behaviour change interventions and new technologies, such as improved diagnostics, vaccines and microbicides. More funding is needed for prevalence studies (especially among key populations), etiological assessments of STI syndromes and AMR studies, as well as capacity building to improve completeness and consistency of reporting.

Annexes

Annex 1. Reported cases of STI syndromes: genital ulcer disease (GUD) in males and females and urethral discharge (UD) in males (cases per 100 000 adults), based on most recently reported Global AIDS Response Progress Reporting (GARPR) system data, 2012–2014

Country	GUD rate				UD rate	
	Total	Males	Females	Year*	Males	Year*
African Region						
Botswana	1156.8	1263.1	1064.3	2014	3579.2	2014
Burkina Faso	257.3	195.4	308.9	2014	445.4	2014
Cabo Verde	37.6	16.0	59.0	2014	291.0	2014
Central African Republic	53.0	3.5	7.0	2013	–	–
Comoros	52.7	18.2	87.2	2012	24.2	2012
Côte d'Ivoire	51.8	31.7	72.9	2014	389.1	2014
Equatorial Guinea	27.4	–	–	2014	151.2	2014
Gabon	1.3	2.6	0.0	2014	30.1	2014
Gambia	83.0	–	–	2014	816.9	2014
Madagascar	303.1	262.2	343.5	2014	1246.7	2014
Mali	156.7	104.8	205.4	2014	713.6	2014
Mauritius	–	–	–	–	691.8	2013
Mozambique	1134.9	1186.5	1089.3	2014	2379.1	2014
Namibia	468.5	–	–	2014	2366.0	2014
Niger	138.1	–	–	2014	311.6	2014
Senegal	247.2	–	0.0	2014	81.0	2014
Seychelles	47.6	47.0	48.1	2014	385.3	2014
South Africa	6.8	7.2	6.4	2014	113.2	2014
Swaziland	2195.5	2270.5	2127.7	2014	6155.2	2013
Togo	83.4	76.7	89.2	2014	342.1	2014
Uganda	570.6	427.9	710.9	2014	723.8	2014
Zambia	772.8	934.5	618.3	2014	986.3	2014
Zimbabwe	597.5	669.7	533.9	2014	1573.7	2014
Region of the Americas						
Antigua and Barbuda	–	–	–	–	79.8	2014
Argentina	–	–	–	–	10.0	2014
Bahamas	3.6	6.0	1.4	2014	11.2	2014
Belize	25.1	32.5	17.9	2014	19.2	2013
Bolivia (Plurinational State of)	1436.1	123.9	2710.2	2014	135.9	2014
Cuba	–	–	–	–	37.8	2014
Dominican Republic	32.5	–	–	2013	174.6	2013
Ecuador	30.9	–	–	2014	74.6	2014
El Salvador	–	–	–	–	0.4	2013
Guatemala	4.0	5.5	2.7	2014	–	–
Guyana	37.3	27.4	48.8	2014	400.4	2014
Honduras	8.4	–	–	2014	45.7	2014
Mexico	9.8	10.6	9.0	2014	–	–
Nicaragua	19.6	–	–	2014	146.5	2014
Panama	20.7	24.7	16.7	2014	–	–
Peru	16.9	18.9	15.1	2014	54.0	2014
Saint Lucia	96.8	107.6	86.4	2014	–	–
Suriname	51.1	–	–	2014	–	–
Trinidad and Tobago	22.5	24.2	20.7	2014	138.0	2014

Country	GUD rate				UD rate	
	Total	Males	Females	Year*	Males	Year*
Eastern Mediterranean Region						
Bahrain	–	2.8	2.9	2012	26.4	2014
Djibouti	16.6	11.7	19.7	2013	21.7	2013
Iran	–	10.6	–	2014	31.2	2014
Jordan	–	0.0	91.1	2012	100.2	2012
Morocco	52.2	47.9	56.2	2014	614.0	2014
Oman	4.8	2.6	9.8	2014	7.3	2014
Saudi Arabia	0.8	0.4	1.4	2014	7.9	2014
Sudan	12.0	8.6	15.3	2014	100.6	2014
Tunisia	17.5	10.8	24.1	2014	18.8	2014
United Arab Emirates	0.5	–	–	2014	0.1	2012
European Region						
Malta	31.4	6.3	5.4	2013	61.2	2013
Slovakia	2.1	–	–	2013	–	–
Tajikistan	9.8	3.4	16.2	2014	222.7	2014
South-East Asia Region						
Bhutan	52.6	35.7	73.0	2012	278.1	2012
India	14.6	19.2	9.8	2014	210.0	2014
Indonesia	1.2	1.1	1.3	2014	12.1	2014
Maldives	18.9	7.4	35.2	2014	5.0	2014
Myanmar	2.6	3.5	1.8	2014	5.0	2014
Timor-Leste	69.9	36.2	104.5	2014	314.2	2014
Western Pacific Region						
Cambodia	35.2	41.6	29.4	2014	356.1	2014
Cook Islands	–	0.0	0.0	2014	107.1	2014
Fiji	19.2	–	–	2014	247.4	2014
Kiribati	–	–	–	–	128.6	2014
Lao People's Democratic Republic	–	43.6	11.7	2014	112.9	2014
Malaysia	0.9	1.1	0.6	2014	9.0	2014
Mongolia	9.3	12.8	6.0	2014	33.4	2014
Papua New Guinea	35.7	–	–	2014	756.7	2014
Singapore	19.8	24.8	14.2	2014	140.6	2014
Solomon Islands	156.5	162.7	150.2	2014	1170.9	2014
Tonga	–	–	–	–	1051.7	2014
Tuvalu	0.0	0.0	0.0	2013	1170.9	2013

* Year of data collection

Annex 2. Male gonorrhoea rates (cases per 100 000 adult males) based on most recently reported Global AIDS Response Progress Reporting (GARPR) system data, 2012–2014

Country	Male gonorrhoea rate	Year*
African Region		
Burkina Faso	4.5	2013
Cabo Verde	7.2	2014
Central African Republic	2.0	2013
Comoros	24.2	2012
Equatorial Guinea	86.4	2014
Gabon	50.1	2014
Mauritius	20.8	2013
Seychelles	238.0	2014
Region of the Americas		
Antigua and Barbuda	29.9	2014
Argentina	2.5	2014
Bahamas	153.3	2014
Barbados	149.8	2014
Belize	10.0	2013
Bolivia (Plurinational State of)	3.4	2014
Chile	19.6	2013
Costa Rica	60.4	2014
Cuba	59.2	2014
Dominica	0.6	2013
El Salvador	22.9	2013
Grenada	78.6	2013
Guatemala	2.7	2014
Guyana	8.2	2014
Honduras	27.9	2014
Mexico	1.9	2014
Nicaragua	28.7	2014
Panama	68.9	2013
Peru	2.5	2014
Saint Lucia	35.9	2014
Saint Vincent and the Grenadines	56.9	2014
Trinidad and Tobago	74.6	2014
Eastern Mediterranean Region		
Bahrain	3.7	2014
Iran	2.2	2014
Morocco	385.5	2014
Oman	3.9	2014
Saudi Arabia	2.7	2014
United Arab Emirates	0.9	2014
European Region		
Armenia	24.5	2013
Belarus	45.5	2014
Georgia	30.4	2014
Kazakhstan	60.0	2013
Kyrgyzstan	25.9	2014
Montenegro	2.9	2014
Republic of Moldova	61.2	2014
Serbia	4.3	2014
Tajikistan	8.0	2014

Country	Male gonorrhoea rate	Year*
Turkey	0.1	2013
Ukraine	25.5	2014
South-East Asia Region		
Indonesia	7.7	2014
Myanmar	2.4	2014
Sri Lanka	6.3	2014
Thailand	20.4	2014
Western Pacific Region		
Australia	112.8	2013
Brunei Darussalam	85.1	2013
China	14.1	2014
Cook Islands	91.8	2014
Fiji	317.1	2014
Kiribati	5.7	2014
Malaysia	13.5	2014
Micronesia (Federated States of)	88.6	2014
Mongolia	237.2	2014
Nauru	158.9	2013
Singapore	0.5	2014
Solomon Islands	40.8	2014
Tonga	273.1	2014
Tuvalu	27.6	2013

* Year of data collection

Annex 3. Syphilis rates: Female, male, female primary, male primary and total rates (cases per 100 000 adults) based on most recently reported Global AIDS Response Progress Reporting (GARPR) system data, 2012–2014

Country	Total rate	Female rate	Female primary rate	Male rate	Male primary rate	Year*
African Region						
Algeria	1.4	–	–	–	–	2013
Burkina Faso	–	–	–	–	13.6	2014
Cabo Verde	24.4	10.5	–	38.3	–	2014
Central African Republic	0.7	0.8	–	6.2	–	2013
Equatorial Guinea	452.4	523.1	–	358.7	–	2014
Gabon	23.5	46.1	–	1.5	–	2014
Mauritius	46.6	–	–	–	–	2013
Senegal	23.9	40.1	–	6.7	–	2014
Seychelles	65.7	–	–	–	–	2014
Uganda	372.8	–	–	–	–	2014
Region of the Americas						
Antigua and Barbuda	52.2	70.8	–	30.1	–	2013
Argentina	24.5	–	–	–	–	2014
Bahamas	141.1	131.1	–	151.8	–	2014
Barbados	41.5	15.0	–	53.7	–	2014
Belize	23.0	30.1	28.5	15.8	13.3	2013
Bolivia (Plurinational State of)	36.2	49.4	–	22.6	–	2012
Chile	30.6	27.9	–	33.5	–	2014
Costa Rica	49.0	46.4	–	51.8	–	2014
Cuba	37.6	24.6	24.4	50.8	50.5	2014
Dominican Republic	0.6	0.9	–	0.2	–	2013
Ecuador	77.5	–	–	–	–	2014
El Salvador	25.0	22.3	–	28.2	–	2013
Grenada	198.1	249.3	–	147.7	–	2013
Guatemala	7.6	9.6	9.3	5.7	5.6	2014
Guyana	5.1	7.5	–	2.4	–	2014
Haiti	563.1	677.4	–	442.9	–	2013
Honduras	9.1	6.1	–	12.4	–	2014
Mexico	4.3	3.6	–	5.1	–	2014
Nicaragua	5.8	4.6	–	7.2	–	2014
Panama	66.6	59.7	–	73.5	–	2014
Paraguay	127.1	–	–	–	–	2014
Peru	19.7	18.4	–	21.1	–	2014
Saint Vincent and the Grenadines	227.7	231.0	–	223.7	–	2014
Trinidad and Tobago	25.7	16.9	2.9	34.8	16.9	2014
Uruguay	78.6	–	–	–	–	2014
Eastern Mediterranean Region						
Afghanistan	135.6	56.1	–	205.3	–	2014
Bahrain	16.0	12.4	–	17.9	–	2013
Iran	0.2	–	0.3	–	0.0	2014
Jordan	0.0	0.0	–	0.0	–	2012
Oman	2.8	4.8	0.1	1.9	0.0	2014
Saudi Arabia	0.2	0.2	–	0.1	–	2014
Somalia	10.2	–	–	–	–	2012
Tunisia	0.3	70.8	–	30.1	–	2013
United Arab Emirates	5.2	11.3	–	3.3	–	2014

Country	Total rate	Female rate	Female primary rate	Male rate	Male primary rate	Year*
European Region						
Albania	5.6	3.1	3.1	8.2	8.2	2014
Armenia	2.3	–	–	–	–	2013
Belarus	10.0	8.4	–	12.0	–	2014
Georgia	37.7	35.1	5.1	40.7	7.2	2014
Kazakhstan	48.6	44.2	–	53.7	–	2013
Kyrgyzstan	26.9	31.2	30.5	22.4	21.8	2014
Montenegro	1.4	0.4	–	2.5	–	2014
Republic of Moldova	58.7	49.7	15.7	68.8	30.3	2014
Serbia	1.6	0.5	–	2.8	–	2014
Switzerland	7.6	–	–	–	–	2013
Tajikistan	6.2	4.7	–	7.7	–	2014
The former Yugoslav Republic of Macedonia	0.1	0.0	0.0	0.1	0.1	2014
Turkey	0.7	0.6	–	0.8	–	2013
Ukraine	10.1	8.5	–	12.0	–	2014
South-East Asia Region						
Indonesia	4.8	4.2	–	5.3	–	2014
Myanmar	6.0	5.7	0.9	6.4	0.9	2014
Sri Lanka	9.3	6.2	0.9	12.7	2.4	2014
Thailand	5.7	4.5	–	7.0	–	2014
Western Pacific Region						
Australia	15.7	6.1	–	25.4	–	2012
China	39.4	42.4	14.3	36.6	13.4	2014
Cook Islands	30.4	30.2	30.2	30.6	30.6	2015
Kiribati	97.8	–	–	–	–	2014
Malaysia	7.4	10.6	–	4.4	–	2014
Micronesia (Federated States of)	273.9	308.8	5.9	217.1	17.1	2014
Mongolia	323.6	417.5	185.3	222.7	122.8	2014
Nauru	438.5	–	–	–	–	2014
Papua New Guinea	88.2	119.5	–	57.6	–	2014
Singapore	35.7	21.3	0.5	51.6	9.2	2014
Solomon Islands	609.5	995.4	–	232.8	–	2014
Tuvalu	120.5	–	–	–	–	2013
Vanuatu	238.1	–	–	–	–	2013

* Year of data collection

Annex 4: Cascade of indicators for elimination of mother-to-child transmission (EMTCT) of syphilis using most recent data reported through the Global AIDS Response Progress Reporting (GARPR) system, 2008–2014*

Country	% of pregnant women with at least 1 ANC visit	Year	% of ANC attendees tested for syphilis**	Year	% of ANC attendees positive for syphilis	Year	% of infected ANC attendees treated	Year	Congenital syphilis rate (cases per 100 000 live births)	Year
African Region										
Algeria	92.9	2012	64.1	2014	0.2	2014	100.0	2014	–	–
Benin	83.5	2012	2.8	2014	0.1	2014	100.0	2014	–	–
Botswana	93.6	2007	92.3	2011	1.3	2011	–	–	–	–
Burkina Faso	94.9	2010	100.0	2013-4	1.2	2014	00.0	2014	–	–
Burundi	98.9	2010	0.7	2014	0.0	2014	–	–	–	–
Côte d'Ivoire	88.9	2012	92.1	2008	0.2	2010	–	–	–	–
Cabo Verde	90.9	2011	94.1	2014	0.7	2014	100.0	2012	9.9	2014
Cameroon	84.7	2011	–	–	0.6	2010			–	–
Central African Republic	54.6	2010	35.8	2013	3.3	2013	97.8	2011	–	–
Chad	42.6	2010	100.0	2014	3.4	2013	100.0	2013	–	–
Comoros	92.1	2012	29.0	2014	0.2	2014	–	–	–	–
Congo	89.7	2012	0.3	2012	–	–	–	–	–	–
Democratic Republic of the Congo	89.2	2014	72.8	2014	4.0	2014	6.1	2014	–	–
Equatorial Guinea	91.3	2011	26.7	2014	5.6	2014	98.9	2014	1233.5	2014
Eritrea	–	–	0.0	2010	1.1	2008	–	–	–	–
Ethiopia	33.9	2011	28.1	2014	0.9	2012	–	–	–	–
Gabon	94.7	2012	29.2	2014	0.2	2014	66.9	2014	0.0	2014
Gambia	86.2	2013	41.5	2012	–	–			–	–
Ghana	96.4	2011	33.9	2014	2.5	2014	90.3	2014	–	–
Guinea	85.2	2012	–	–	1.5	2009	–	–	–	–
Guinea-Bissau	92.6	2010	8.9	2014	2.2	2014	–	–	–	–
Kenya	91.5	2009	70.3	2014	1.4	2014	–	–	–	–
Lesotho	–	–	84.3	2014	1.5	2014	62.2	2014	–	–
Liberia	95.9	2013	11.1	2014	11.3	2014	100.0	2013	–	–
Madagascar	82.1	2013	30.4	2014	4.3	2014	65.1	2014	–	–
Malawi	96.1	2014	7.4	2014	3.7	2014	100.0	2014	–	–
Mali	74.2	2013	26.7	2014	9.5	2014	–	–	–	–
Mauritania	84.2	2011	50.9	2013	3.8	2013	87.5	2013	–	–
Mauritius	–	–	100.0	2014	0.8	2014	100.0	2014	0.0	2014
Mozambique	90.6	2011	46.3	2014	4.1	2014	72.4	2014	417.5	2014
Namibia	96.6	2013	78.2	2014	1.9	2014	–	–	–	–
Niger	82.8	2012	8.2	2014	0.2	2014	9.2	2014	–	–
Nigeria	60.6	2013	14.9	2014	1.6	2014	72.3	2014	–	–
Rwanda	98.0	2010	84.3	2014	0.9	2014	–	–	–	–
Sao Tome and Principe	97.5	2009	100.0	2014	1.5	2014	100.0	2014	–	–
Senegal	94.5	2013	11.1	2014	0.1	2014	–	–	–	–
Seychelles	–	–	100.0	2014	0.1	2014	100.0	2014	0.0	2014
Sierra Leone	97.1	2013	0.0	2010	1.4	2010	–	–	–	–
South Africa	97.1	2008	74.5	2010	1.6	2011	–	–	–	–
South Sudan	40.3	2010	0.3	2013	5.6	2013	–	–	–	–

Country	% of pregnant women with at least 1 ANC visit	Year	% of ANC attendees tested for syphilis**	Year	% of ANC attendees positive for syphilis	Year	% of infected ANC attendees treated	Year	Congenital syphilis rate (cases per 100 000 live births)	Year
Swaziland	96.8	2010	97.8	2014	3.3	2014	98	2014	–	–
Togo	72.7	2013	10.6	2014	0.1	2014	79.6	2014	–	–
Uganda	94.9	2011	17.2	2014	6.7	2014	–	–	–	–
United Republic of Tanzania	87.8	2010	98.0	2014	2.5	2014	40.4	2014	–	–
Zambia	95.7	2014	50.2	2014	4.6	2014	100.0	2014	–	–
Zimbabwe	93.7	2014	91.2	2014	2.1	2014	–	–	–	–
Region of the Americas										
Antigua and Barbuda	100.0	2009	100.0	2014	0.3	2014	100.0	2014	0.0	2011
Argentina	98.1	2012	86.5	2014	1.2	2014	84.7	2014	121.7	2014
Bahamas	86.0	2011	87.5	2014	1.6	2014	100.0	2013	0.0	2014
Barbados	93.4	2012	88.1	2014	0.3	2014	100.0	2014	0.0	2013
Belize	96.3	2011	93.4	2013	0.3	2013	42.9	2013	0.0	2013
Bolivia (Plurinational State of)	85.8	2008	69.1	2014	1.4	2014	92.9	2014	5.5	2012
Brazil	96.0	2012	89.5	2011	0.7	2011	86.3	2013	472.2	2014
Canada	100.0	2007	–	–	–	–	–	–	2.1	2009
Chile	–	–	94.6	2013	0.2	2013	93.6	2014	16.2	2013
Colombia	97.0	2010	82.6	2012	0.6	2012	93.8	2014	164.1	2014
Costa Rica	95.0	2012	87.0	2011	0.3	2010	73.3	2010	133.7	2014
Cuba	100.0	2009	99.4	2014	0.2	2014	97.6	2014	4.9	2014
Dominica	100.0	2009	99.2	2013	1.9	2013	100.0	2013	0.0	2013
Dominican Republic	99.3	2013	16.8	2014	1.9	2014	82.7	2014	8.3	2013
Ecuador	84.1	2007	67.8	2010	0.1	2010	–	–	38.5	2010
El Salvador	94.0	2008	98.1	2014	0.1	2014	29.9	2013	2.5	2014
Grenada	100.0	2009	100.0	2013	1.3	2013	100.0	2013	490.5	2013
Guatemala	93.0	2009	50.9	2012	0.2	2014	100.0	2014	0.3	2014
Guyana	85.7	2009	82.7	2013	0.1	2013	100.0	2010	0.0	2013
Haiti	89.9	2012	61.7	2013	3.1	2014	86.5	2014	–	–
Honduras	94.2	2012	56.6	2014	0.1	2014	100.0	2014	25.6	2014
Jamaica	97.6	2011	89.2	2014	1.7	2013	64.6	2014	11.9	2010
Mexico	98.7	2012	57.3	2014	0.4	2014	–	–	6.3	2014
Nicaragua	94.7	2012	87.9	2014	0.1	2014	100.0	2014	3.5	2014
Panama	92.6	2013	33.1	2013	1.2	2014	9.2	2013	140.9	2013
Paraguay	96.1	2008	66.1	2014	1.1	2014	82.5	2014	424.1	2014
Peru	95.9	2013	78.8	2014	0.6	2014	59.8	2014	42.0	2014
Saint Kitts and Nevis	100.0	2007	87.0	2014	0.0	2014	No cases	2013	0.0	2014
Saint Lucia	96.9	2012	66.5	2013	1.9	2013	50.0	2014	190.7	2014
Saint Vincent and the Grenadines	99.5	2008	100.0	2014	0.7	2011	–	–	0.0	2010
Suriname	90.4	2010	–	–	0.0	2013	–	–	0.0	2010
Trinidad and Tobago	95.3	2006	97.8	2009	0.3	2014	64.3	2014	227.5	2008
Uruguay	97.4	2012	98.9	2014	0.6	2013	98.6	2014	205.6	2013
Venezuela (Bolivarian Republic of)	–	–	96.1	2010	1.9	2010	–	–	4.68	2013
Eastern Mediterranean Region										
Bahrain	100.0	2012	–	–	–	–	–	–	-	–
Djibouti	81.0	2006	5.6	2013	8.1	2010	–	–	–	–
Iran (Islamic Republic of)	96.9	2010	0.0	2010	0.0	2011	–	–	–	–

Country	% of pregnant women with at least 1 ANC visit	Year	% of ANC attendees tested for syphilis**	Year	% of ANC attendees positive for syphilis	Year	% of infected ANC attendees treated	Year	Congenital syphilis rate (cases per 100 000 live births)	Year
Iraq	77.7	2011	27.3	2010	0.0	2010	–	–	–	–
Jordan	99.1	2012	0.0	2010	0.0	2009	–	–	–	–
Morocco	77.1	2011	–	–	0.9	2012	–	–	–	–
Oman	99.0	2010	100.0	2014	0.0	2014	100.0	2014	0.0	2014
Qatar	91.0	2012	–		–		–		–	
Saudi Arabia	98.0	2011	42.6	2014	0.0	2014	–	–	0.0	2014
Somalia	22.0	2006	8.5	2010	1.5	2014	46.7	2014	–	–
Sudan	74.3	2010	9.3	2014	2.2	2010	–	–	–	–
Tunisia	83.6	2012	–	–	–	–	–	–	0.0	2014
	100.0	2011	100.0	2014	0.3	2014	80.0	2014	0.0	2014
Yemen	59.8	2013	–	–	0.4	2010	–	–	–	–
European Region										
Albania	97.3	2009	–	–	–	–	–	–	0.0	2014
Armenia	99.1	2010	93.4	2013	0.0	2014	–	–	0.0	2013
Azerbaijan	76.6	2006	100.0	2008	0.0	2008	–	–	0.12	2011
Belarus	99.7	2012	85.5	2014	0.0	2014	100.0	2014	0.0	2014
Bosnia and Herzegovina	85.8	2008	–	–	–	–	–	–	0.0	2010
Cyprus	99.2	2007	100.0	2011	0.0	2011	–	–	0.0	2011
Czech Republic	98.2	2012	100.0	2010	0.1	2010	100.0	2010	0.05	2011
Denmark	–	–	98.9	2012	0.0	2012	100.0	2010	0.02	2011
Estonia	98.9	2012	–	–	–	–			0.07	2010
Georgia	97.6	2010	87.5	2014	0.2	2014	91.8	2014	19.8	2014
Germany	–	–	94.9	2012	0.2	2011	–	–	0.0	2011
Hungary	–	–	100.0	2008	–	–	–	–	0.0	2011
Ireland	99.9	2012	–	–	–	–	–	–	0.02	2010
Italy	98.1	2010	–	–	–	–	–	–	0.0	2011
Kazakhstan	97.9	2011	99.9	2013	0.1	2013	–	–	4.4	2013
Kyrgyzstan	98.4	2014	92.8	2014	0.0	2014	100.0	2014	6.9	2014
Latvia	98.4	2012	–	–	–	–	–	–	0.0	2011
Lithuania	100.0	2010	–	–	0.0	2014	–	–	0.0	2011
Malta	100.0	2010	100.0	2013	0.0	2013	100.0	2014	0.0	2011
Monaco	–	–	100.0	2014	–	–	–	–	0.0	2014
Montenegro	91.7	2013	–	–	–	–	–	–	13.4	2014
Netherlands	–	–	100.0	2007	0.1	2008	–	–	–	–
Republic of Moldova	100.0	2011	87.7	2014	0.4	2014	100.0	2014	15.1	2014
Romania	–	–	30.1	2008	1.0	2014	28.8	2014	–	–
Serbia	98.3	2014	–	–					0.0	2014
Slovakia	–	–	100.0	2014	0.0	2013	100.0	2013	0.02	2011
Tajikistan	78.8	2012	97.8	2014	0.0	2014	77.1	2014	0.9	2014
Ukraine	98.6	2012	95.9	2014	0.1	2014	100.0	2014	0.4	2014
United Kingdom	–	–	97.9	2012	0.1	2012	–	–	0.0	2010
Uzbekistan	98.7	2006	–	–	0.0	2009	–	–	–	–
South-East Asia Region										
Bangladesh	58.7	2013	58.3	2014	0.5	2014	100.0	2014	–	–
Bhutan	74.4	2010	97.3	2010	1.0	2010	–	–	5.4	2009
Democratic People's Republic of Korea	100.0	2009	0.3	2012	0.0	2012	–	–	–	–

Country	% of pregnant women with at least 1 ANC visit	Year	% of ANC attendees tested for syphilis**	Year	% of ANC attendees positive for syphilis	Year	% of infected ANC attendees treated	Year	Congenital syphilis rate (cases per 100 000 live births)	Year
India	75.1	2008	65.1	2014	0.2	2014	20.9	2014	–	–
Indonesia	95.7	2012	1.2	2014	1.7	2014	50.37	2014	–	–
Maldives	99.2	2009	66.0	2014	0.1	2014	100.0	2014	–	–
Myanmar	83.1	2010	10.0	2014	0.7	2014	85.8	2012	–	–
Sri Lanka	99.4	2007	86.2	2013	0.1	2012	82.1	2014	2.3	2014
Thailand	98.1	2012	96.8	2014	0.1	2014	97.79	2014	–	–
Timor-Leste	84.4	2010	55.6	2014	0.5	2014	–	–	–	–
Western Pacific Region										
Australia	96.1	2010	–	–	–	–	–	–	2.3	2013
Brunei Darussalam	93.2	2012	100.0	2013	0.2	2013	–	–	–	–
Cambodia	89.1	2010	44.9	2014	0.0	2014	97.3	2014	–	–
China	95.0	2012	99.5	2014	0.2	2013	68.1	2014	61.6	2014
Cook Islands	–	–	100.0	2014	0.0	2014	No cases	2014	0.0	2014
Fiji	98.3	2013	100.0	2013	0.9	2012	–	–	235.0	2014
Japan	–	–	–	–	–	–	–	–	22.2	2013
Kiribati	88.4	2009	100.0	2014	6.4	2014	100.0	2014	–	–
Lao People's Democratic Republic	52.5	2012	–	–	0.8	2009	–	–	–	–
Malaysia	96.5	2012	98.9	2014	0.1	2014	100.0	2014	6.6	2014
Marshall Islands	92.4	2011	100.0	2014	5.1	2014	100.0	2014	–	–
Micronesia (Federated States of)	80.0	2008	97.2	2014	2.8	2014	63.5	2014	300.0	2013
Mongolia	98.7	2013	97.2	2014	2.6	2014	89.3	2012	36.9	2014
Nauru	94.1	2007	100.0	2014	4.6	2014	–	–	0.0	2014
Palau	90.3	2010	100.0	2014	0.9	2014	100.0	2014	–	–
Papua New Guinea	66.0	2012	8.9	2011	6.7	2011	–	–	–	–
Philippines	95.4	2013	–	–	0.1	2011	43.3	2011	–	–
Republic of Korea	100.0	2009	–	–	–	–	–	–	1.7	2011
Samoa	93.0	2009	47.9	2014	0.1	2014	100.0	2014	–	–
Solomon Islands	90.6	2009	100.0	2014	13.5	2014	63.8	2014	–	–
Tonga	99.0	2012	77.4	2014	0.1	2014	100.0	2014	0.0	2014
Tuvalu	93.3	2007	100.0	2013	1.8	2014	100.0	2013	0.0	2013
Vanuatu	75.6	2013	100.0	2014	0.2	2013	93.5	2013	–	–
Viet Nam	95.8	2014	–	–	0.3	2013	–	–	–	–

* Year of data collection

** ANC 1st visit data is from Global Health Observatory data (2015). http://apps.who.int/gho/data/view.main.1610?lang=en

Annex 5. Syphilis prevalence reported for female sex workers and MSM using most recent data reported through Global AIDS Response Progress Reporting (GARPR) system, 2008–2014

Country	Sex workers		MSM	
	%	year	%	year
African Region				
Algeria	18.4	2008	0.3	2011
Angola	3.7	2010	–	–
Botswana	3.5	2012	2.9	2012
Burundi	28.1	2008	1.1	2013
Burkina Faso	1.4	2014	1.1	2014
Cameroon	17.5	2010	0.4	2011
Cabo Verde	0.9	2013	–	–
Central African Republic	5.0	2013	10.5	2013
Comoros	0.8	2014	–	–
Côte d'Ivoire	0.9	2015	–	–
Eritrea	1.3	2008	–	–
Gabon	2.1	2010	–	–
Ghana	6.3	2011	3.8	2011
Guinea-Bissau	19.6	2010	2.0	2010
Kenya	0.9	2011	1.2	2010
Lesotho	27.2	2014	5.1	2014
Liberia	–	–	1.0	2013
Madagascar	16.7	2013	5.1	2010
Malawi	20.0	2014	9.4	2014
Mali	0.0	2010	–	–
Mauritania	2.5	2014	8.6	2014
Mauritius	4.4	2010	5.8	2010
Niger	2.3	2010	–	–
Nigeria	1.4	2008	0.0	2008
Sao Tome and Principe	4.7	2012	–	–
Senegal	19.6	2014	2.7	2014
Seychelles	6.9	2013	6.8	2013
Uganda	20.4	2008	9.7	2008
United Republic of Tanzania	7.8	2014	–	–
Zimbabwe	12.3	2012	–	–
Region of the Americas				
Antigua and Barbuda	–	–	10.0	2012
Argentina	22.4	2010	17.7	2014
Bahamas	0.0	2010	44.1	2010
Barbados	–	–	13.6	2014
Belize	0.5	2012	0.0	2012
Bolivia (Plurinational State of)	3.0	2014	29.0	2014
Brazil	2.5	2010	8.3	2009
Chile	11.1	2013	–	–
Colombia	18.0	2008	3.3	2010
Costa Rica	4.5	2013	13.7	2010
Dominican Republic	9.5	2012	12.9	2012
Ecuador	–	–	6.2	2011
El Salvador	1.0	2014	3.8	2014
Guatemala	0.5	2014	1.4	2014
Guyana	1.6	2014	1.0	2014
Honduras	2.3	2014	4.5	2014
Jamaica	1.2	2010	15.0	2010
Mexico	3.5	2012	10.0	2012

Country	Sex workers		MSM	
	%	year	%	year
Nicaragua	2.3	2014	5.5	2014
Panama	53.0	2013	32.2	2014
Paraguay	7.9	2012	14.1	2014
Peru	6.1	2014	11.1	2014
Trinidad and Tobago	10.8	2011	8.9	2011
Uruguay	0.7	2013	–	–
Eastern Mediterranean Region				
Afghanistan	1.0	2012	10.1	2012
Armenia	0.8	2014	–	–
Djibouti	5.0	2014	–	–
Iran	0.0	2011	–	–
Jordan	6.7	2008	1.8	2008
Morocco	17.7	2011	8.3	2011
Somalia	3.4	2008	–	–
Sudan	4.4	2011	2.5	2011
Yemen	4.9	2008	–	–
European Region				
Armenia	4.0	2012	1.8	2014
Belarus	1.6	2013	2.0	2013
Belgium	0.7	2013	7.7	2010
Bosnia and Herzegovina	4.0	2011	0.6	2011
Bulgaria	15.3	2012	3.0	2012
Czech Republic	2.1	2010	9.6	2010
Estonia	0.9	2011	6.8	2014
Georgia	–	–	–	–
Germany	0.8	2011	8.1	2010
Hungary	–	–	4.4	2010
Italy	–	–	9.1	2010
Kazakhstan	17.7	2008	4.1	2008
Kyrgyzstan	10.4	2010	5.7	2010
Kosovo	3.5	2011	2.7	2014
Latvia	–	–	1.6	2008
Lithuania	5.7	2008	0.3	2014
Netherlands	0.2	2010	2.3	2010
Republic of Moldova	10.1	2013	5.4	2013
Switzerland	–	–	7.0	2008
Tajikistan	9.6	2010	5.1	2011
The former Yugoslav Republic of Macedonia	1.1	2011	0.5	2011
Turkey	2.9	2010	–	–
Ukraine	4.4	2009	1.9	2010
United Kingdom	–	–	2.5	2010
Uzbekistan	5.4	2011	1.3	2011
South-East Asia Region				
Bangladesh	3.8	2011	1.2	2014
India	0.3	2014	0.3	2014
Indonesia	4.1	2014	16.4	2014
Maldives	0.0	2008	0.0	2008
Myanmar	8.7	2014	4.4	2014
Nepal	0.7	2011	0.8	2012
Sri Lanka	0.6	2014	0.8	2014
Thailand	0.7	2013	21.6	2008
Timor-Leste	9.8	2011	8.3	2014

Country	Sex workers		MSM	
	%	year	%	year
Western Pacific Region				
Cambodia	0.1	2014	0.9	2012
China	2.3	2014	6.0	2014
Fiji	28.0	2012	26.5	2010
Kiribati	0.0	2014	–	–
Lao People's Democratic Republic	0.5	2011	–	–
Malaysia	0.7	2012	0.0	2011
Mongolia	29.6	2014	7.1	2014
Papua New Guinea	21.1	2010	–	–
Philippines	1.3	2009	2.1	2010
Singapore	0.6	2014	15.1	2014
Viet Nam	1.3	2014	4.2	2014

* Year of data collection

Annex 6. Reported percentage of gonoccocal isolates with resistance to azithromycin and ciprofloxacin/quinolones and elevated minimum inhibitory concentrations (MICs) of cefixime (> 0.25µg/ml) or ceftriaxone (> 0.125 µg/ml), 2012 and 2013

Region and country	Ceftriaxone				Cefixime				Azithromycin				Quinolones/Ciprofloxacin			
	2012		2013		2012		2013		2012		2013		2012		2013	
	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%
African Region																
Côte d'Ivoire			36	0.0							36	13.6			36	0.9
Region of the Americas																
Argentina	404	0.0	606	0.0							606	0.5	404	49.0	606	54.0
Chile	767	0.0	891	0.0					767	8.0			767	30.9	891	41.0
Columbia	65		61	0.0									65	40.0	61	14.8
Cuba	60	0.0	60	0.0									60	46.7	60	46.7
El Salvador	21	0.0	20	0.0									21	0.0	20	20.0
Panama	5	0.0											5	0.0		
Paraguay	18	0.0	46	0.0									18	66.7	46	58.7
Venezuela	14	0.0											14	42.9		
Dominican Republic													4	0.0	2	0.0
Regional total	**1354**	**0.0**	**1684**	**0.0**					**767**	**8.0**	**606**	**0.5**	**1358**	**37.3**	**1686**	**45.1**
Canada	3036	5.5	3195	3.5	3036	2.2	3195	1.8	3036	0.9	3195	1.2	3036	28.5	3195	29.3
USA	5495	0.3	5945	0.1	5495	1.0	5495	0.4	5495	0.3	5945	0.6	5495	14.7	5945	16.1
Eatern Mediterranean Region																
Morrocco			35	0.0												
European Region																
Austria	107	0.0	109	0.0	107	4.7	109	6.4	107	2.8	109	5.5	107	73.8	109	71.6
Belarus	75	0.0	40	0.0	75	0.0	40	2.5	75	1.3	40	0.0	75	21.0	40	28.0
Belgium	107	0.0	110	0.0	107	0.9	110	6.4	107	1.9	110	1.8	107	56.1	110	56.4
Cyprus	3	0.0	9	0.0	3	0.0	9	0.0	3	0.0	9	33.3	3	100.0	9	88.9
Denmark	114	0.0	110	0.0	114	12.3	110	11.8	114	13.2	110	9.1	114	58.8	110	58.2
France	110	0.0	112	0.0	110	1.8	112	3.6	110	0.0	112	0.0	110	39.1	112	44.6
Germany	106	0.9	101	1.0	106	5.7	101	12.9	106	1.9	101	4.0	106	73.6	101	63.4
Greece	68	0.0	75	0.0	68	5.9	75	14.7	68	5.9	66	22.7	68	69.1	75	72.0

Region and country	Ceftriaxone				Cefixime				Azithromycin				Quinolones/Ciprofloxacin			
	2012		2013		2012		2013		2012		2013		2012		2013	
	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%
Hungary	79	0.0	88	0.0	79	6.3	88	6.8	79	0.0	88	2.3	79	65.8	88	68.2
Iceland			5	0.0			5	0.0			5	0.0			5	40.0
Ireland	80	1.3	103	0.0	80	3.8	103	0.0	80	8.8	103	2.9	80	22.5	103	26.2
Italy	100	0.0	100	0.0	100	6.0	100	0.0	100	2.0	100	1.0	100	65.0	100	63.0
Latvia	39	0.0	38	0.0	39	2.6	38	2.6	39	5.1	38	15.8	39	38.5	38	26.3
Malta	16	0.0	31	0.0	16	0.0	31	0.0	16	0.0	31	0.0	16	56.3	31	35.5
The Netherlands	146	0.0	139	0.0	146	0.0	139	0.0	146	0.7	139	1.4	146	34.2	139	34.5
Poland	108	0.0			108	0.0			108	10.2			108	68.5		
Norway	110	0.0	112	0.0	110	5.5	112	4.5	110	12.7	112	10.7	110	55.5	112	79.5
Portugal	110	0.0	110	0.0	110	0.0	110	0.0	110	1.8	110	18.2	110	40.9	110	47.3
Russia	106	0.0							106	17.0			106	25.5		
Slovakia	108	0.0	110	0.0	108	3.7	110	4.5	108	2.8	110	1.8	108	53.7	110	47.3
Slovenia	47	2.1	73	0.0	47	4.3	73	1.4	47	14.9	73	0.0	47	40.4	73	63.0
Spain	105	0.0	119	5.0	105	15.2	119	15.1	105	9.5	119	8.4	105	58.1	119	65.5
Sweden	110	0.0	100	0.0	110	0.0	100	0.0	110	6.4	100	9.0	110	57.3	100	60.0
United Kingdom	262	0.0	240	0.0	262	0.0	240	0.8	262	1.9	240	0.4	262	27.9	240	32.1
Regional total	**2216**	**0.1**	**2034**	**0.3**	**2110**	**3.6**	**2034**	**0.9**	**2216**	**5.2**	**2025**	**5.3**	**2216**	**48.9**	**2034**	**52.4**
South-East Asia Region																
Bhutan									142	0.0	215	0.0	187	88.2	215	93.0
India	88	0.0	50	0.0					55	3.6	50	2.0	88	97.7	50	96.0
Pakistan													71	94.3		
Sri Lanka											113	1.8	48	95.8	113	97.3
Thailand	748	0.4	496	0.4					749	0.4	464	0.9	722	86.9	510	92.2
Regional total	**836**	**0.4**	**546**	**0.4**					**946**	**0.5**	**842**	**4.7**	**1116**	**88.9**	**888**	**93.2**
Western Pacific Region																
Australia (Urban)	4394	0.3	4658	0.6					4394	1.4	4658	2.2	4394	32.2	4658	35.8
Australia (Remote)	324	0.0	239	0.8					324	0.3	239	0.0	324	2.8	239	2.1

Region and country	Ceftriaxone				Cefixime				Azithromycin				Quinolones/Ciprofloxacin			
	2012		2013		2012		2013		2012		2013		2012		2013	
	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%	No. of isolates	%
Brunei													204	83.8	102	70.6
Cambodia															7	100.0
China	1236	12.8											1236	99.6		
Fiji													168	0.0	120	0.0
Hong Kong	1149	5.5	1134	4.5					1149	4.2	1134	4.7	1149	96.1	1134	93.7
Japan	371	0.5	391	21.9					371	10.8	391	13.8	98	72.4	391	70.8
Korea			12	8.3					91	0.0			91	96.7	82	93.9
Mongolia			444	0.2							444	4.1	517	43.7	444	19.8
New Caledonia			140	0.0									150	0.7	140	0.7
New Zealand	401	0.3	384	1.0							74	0.0	345	41.7	384	35.4
Philippines	23	0.0	129	0.0							89	0.0	23	95.7	127	93.7
Singapore	160	0.0	55	1.8									160	71.9	160	83.1
Viet Nam			44	2.3					90	1.1	44	2.3	90	100.0	44	93.2
Regional total	**8058**	**3.0**	**7630**	**2.3**					**6419**	**2.4**	**7073**	**3.3**	**8949**	**52.4**	**8032**	**45.9**

Source: WHO/GASP (2015)

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