HIV Epidemiological Review
Republic of the Union of Myanmar
2019

National AIDS Program
Ministry of Health and Sports of Myanmar
2019

UNAIDS

World Health Organization
Myanmar

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FOREWORD

Myanmar is one of the high HIV/AIDS burden countries in the world. As one of the 35 fast track countries that contributed to 90% new HIV infection globally, the epidemic is considered seriously by the disease control authorities in the country. Infection is concentrated among key population such as people who inject drugs, men who have sex with men, and female sex workers. In several states and region, such as Kachin, Shan, Yangon, Mandalay, and Sagaing, HIV infection is much higher than other areas. The number of PLHIV has been estimated to be 220 000 (200 000-260 000) with overall adult prevalence of 0.7% (0.6-0.9%)

The Ministry of Health and Sports of Myanmar is leading the HIV response, supported by the national and international partners and organizations. The country has made tremendous progress in increasing the number of people tested and initiated on ART to 146 826 in 2017 from only 2 527 in 2005. The surveillance system has been able to track the HIV epidemic among KPs with appropriate methods and tools.

The HIV epidemiological review is important to understand the level and trend of HIV incidence, prevalence, mortality, and risk behaviour and also the HIV prevention and care cascade. We invited this comprehensive review to understand the current situation and challenges and to recommend actions for the future strategies. The epidemiological review laid the groundwork for the program review. From the reviews we understand that the level of infection among key population remains high in several area, though the general trend is declining. Myanmar is improving the estimation of the population at risk. In our country, the new infection is mainly from key populations and their sexual partners.

To response to the epidemic, we need to improve significantly our surveillance system. The system needs to report STI and HIV deaths and enable linkage with other disease surveillance such as TB, hepatitis, and other programs. A system to ensure comprehensive follow up of prevention, care, and treatment to each key population is crucial. The system should prevent double counting and be applied by the most organization providing the service in the country. When it works, it will allow accurate size estimation of key population. We realize that we still need to work hard to improve our coverage of viral load, linkage with different programs, reduce stigma and discrimination to key population. This hard work, in collaboration with national and international partners and organization, has been showing good results and will continue to serve better our population.

I would like to express grateful appreciation to all MoHS officials, national and international partners and organizations that contribute their best efforts to eliminate HIV in Myanmar.

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Table of Contents

Acronyms and abbreviations

AEM	Asian Epidemic Model
ANC	antenatal care
ART	antiretroviral therapy
ARV	antiretroviral
BSS	behavioural surveillance survey
CI	confidence interval
CR	capture–recapture
DHS	Demographic and Health Survey
EWI	early warning indicator
FSW	female sex worker
GAM	Global AIDS Monitoring
GARPR	Global AIDS Response Progress Reporting
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HCV	hepatitis C virus
HIV	human immunodeficiency virus infection
HSS	HIV sentinel surveillance
IBBS	integrated biobehavioural survey
KP	key population at elevated risk for HIV
LAg	limiting antigen (assay)
M&E	monitoring and evaluation
MICS	Multiple Indicator Cluster Survey
MoHS	Ministry of Health and Sports
MoT	modes of transmission
MSM	men who have sex with men
NAP	National AIDS Program
NGO	nongovernmental organization
NNRTI	non-nucleoside reverse transcriptase inhibitor
NSP	National Strategic Plan
PDR	pre-treatment drug resistance
PMTCT	prevention of mother-to-child transmission
PMSE	programmatic mapping size estimate
PrEP	pre-exposure prophylaxis
PSE	population size estimate
PLHIV	people living with HIV
PW	pregnant women
PWID	people who inject drugs
RDS	respondent-driven sampling
RPR	rapid plasma reagent test
SS	successive sampling (population size estimate)
STI	sexually transmitted infection
TB	tuberculosis
UNAIDS	the Joint United Nations Programme on HIV and AIDS
VDRL	Venereal Disease Research Laboratory
WHO	World Health Organization
WOC	wisdom of the crowds

Executive summary

Myanmar has undertaken several previous reviews since 2006. Annual reviews were also recently conducted in 2017 and 2018. All previous reviews have underscored the concentrated nature of HIV in Myanmar among key populations (KPs) and specific geographical areas. The aims of this epidemiological review were: (1) **to review the HIV information system** and its components, in the context of global recommendations for second generation surveillance; (2) **to review the level of, and trends in, HIV** incidence, prevalence, mortality and risk behaviours; and (3) **to review the HIV prevention and care cascade** to provide information on country progress in the response to the HIV epidemic.

The review drew from a variety of data sources, including desk review, secondary analysis and triangulation of available data. The desk review included biological and behavioural survey reports, National Strategic Action Plan on HIV 2015–2019 and other relevant data. It was conducted in two phases, consisting of an initial desk review based on documents and data made available by the National AIDS Program (NAP) and WHO Country Office. During the second phase, a workshop and meetings were held between 27 and 31 May 2019 in Yangon and Nay Pyi Taw with a wide range of stakeholders.

As in many countries in Asia, heterogeneity of the epidemic in the context as well as in the level of HIV prevalence among KPs is present in Myanmar. There are states and regions with a relatively low level of HIV, and others with much higher epidemics. The more affected populations are in very well identified KPs. In the context of these kinds of epidemics, three main determining factors contribute to HIV infection. First, the level of infection among KPs. The HIV surveillance system (HSS) has shown that prevalence levels in some provinces and in some populations are well above 20%. Second is the population size of these KPs. Myanmar has continued to improve the estimation of the populations most at risk and those more vulnerable to HIV infection and at more risk, as not all members of KPs are at the same level of risk. The methods for surveillance and strategic information measurement have been improved over the years. Third is the interaction between KPs and other population groups. The integrated biobehavioural surveillance (IBBS) studies conducted in Myanmar have shown the interactions and the level of contact between different population groups, and the level of protection that these populations have adopted. In the case of Myanmar, most new infections are coming from KPs and their sexual partners. However, the risk of having an explosive HIV epidemic in the general population is very low. Nevertheless, programmatic mapping for interventions should be also a priority, so districts can improve planning and implementation of prevention, care and treatment activities.

Overall the estimated number of people living with HIV (PLHIV) has been estimated to be 220 000 (200 000–260 000) with an overall adult prevalence of 0.7% (0.6–0.9%) with a higher prevalence among men (0.9%) than women (0.5%). These variations are also present in the geographical distribution of HIV where five states/regions account for 75% of the total PLHIV according to the latest national estimates (2017).

The number of new infections has been declining since 2010. The reduction is estimated to be about 29% compared to the figure in 2010 with new infections estimated to be 0.36 (0.31–0.42) per 1000 population, or 11 000 (9900–12 000) per year, with 70% of them being men.

Myanmar has made tremendous progress in increasing the number of people tested and initiated on antiretroviral therapy (ART) with more than 100 000 from a few thousands in early 2011. Therefore, impact should be measured at a more local level and for each KP, as well as taking into account the scale up of interventions in place. This increase in the number of people on ART has translated into a reduction of HIV-related deaths by 49% since 2010, with an estimated number of 6700 (5100–9300) AIDS deaths in 2017.

The Joint United Nations Programme on HIV/AIDS (UNAIDS) has selected an epidemic transition benchmark for the incidence:prevalence ratio of 0.03, which corresponds to an average life expectancy after infection of 30 years. At this average life expectancy, the total population of PLHIV will gradually fall if the number of new HIV infections is less than three per 100 per year. In the case of Myanmar this metric was 0.05 in 2017.

The prevention, care and treatment cascade for all populations and treatment services (tuberculosis [TB], prevention of mother-to-child transmission [PMTCT] and ART) have shown some gaps that should be addressed. At a time of scale up ART and the fact that KP are very mobile and stigma is still very common, a quick epidemiological analysis at the national level is not straightforward.

The second generation surveillance system in Myanmar has been able to track the HIV epidemic among KPs with appropriate methods and tools. Detailed recommendations are listed after the Conclusions and were developed with the consensus of international and national experts in the workshop.

Introduction

Under the leadership of the National AIDS Program (NAP), Myanmar committed in 2010 to the goal of ending the HIV epidemic by 2030 with "zero new infections, zero discrimination and zero AIDS-related deaths". Myanmar is one of 35 Joint United Nations Programme on HIV/AIDS (UNAIDS) Fast-Track Priority countries worldwide.

In preparation for development of the fourth National Strategic Plan for the period 2021–2025 (NSP IV), which will define the priorities and strategies that will shape Myanmar's response to HIV for the next five years, a national programme review is planned for July 2019. The epidemiological review described in this report was conducted to lay the groundwork for the programme review, by bringing together diverse sources of available data and information to describe the trends and patterns in the epidemic and key indicators of the response. The epidemiological review also sought to describe the surveillance and information systems in place for tracking the epidemic and the effectiveness of interventions.

Myanmar has undertaken several previous reviews. In 2006, a review of the NAP focused on the health sector response, noted progress in many areas, and called attention to expanding programmes and developing a more robust subnational response sensitive to local needs. The progress of the HIV response in Myanmar during 2016–2017 were also internally analysed in annual national meetings. It should be noted that all previous reviews have underscored the concentrated nature of HIV in Myanmar among key populations (KPs) and in specific geographical areas, as well as highlighted evolving progress and gaps in the prevention-to-treatment cascade.

The aims of this epidemiological review were as follows:

1. **To review the HIV information system** and its components in the context of global recommendations for second generation surveillance, such as: HIV and AIDS case reporting; surveys and systems to track levels of HIV prevalence and risk behaviours across high- and low-risk population subgroups; size estimation of KPs at elevated risk; prevalence and case reporting of other sexually transmitted infections (STIs); and estimates and projections of the number of new infections, persons living with HIV (PLHIV) and HIV deaths.

2. **To review the level of, and trends in, HIV** incidence, prevalence, mortality and risk behaviours, and distribution across populations and geographical areas.

3. **To review the HIV prevention and care cascade** and provide information on country progress in the response to the HIV epidemic.

The report is structured according to these three objectives. An introductory section presents a brief profile of the country, highlighting contextual factors that may influence the dynamics of HIV transmission in the country. In the second section, the HIV infection system is reviewed and potential improvements identified that would strengthen the

strategic information available to guide the programmatic response. The third section describes the HIV epidemic and factors driving transmission, and its health impact, with a focus on distribution across populations and geographical areas. Finally, the report reviews progress on prevention, care and treatment, and highlights gaps primarily with respect to coverage and indicators of outcomes.

Methods

The review drew from a variety of data sources, including desk review, secondary analysis and triangulation of available data. The desk review included biological and behavioural survey reports, National Strategic Action Plan on HIV 2015–2019 and other relevant data. It was conducted in two phases, consisting of an initial desk review by international epidemiologists based on documents and data made available by the NAP and country WHO office, including the following:

- Reports from HIV sentinel surveillance (HSS);
- Reports from integrated biological and behavioural surveys (IBBS), size estimates, and behavioural surveillance surveys (BSS) in KPs at elevated risk;
- Reports from general population surveys: 2015 Demographic and Health Survey (DHS), and 2000 and 2009–2010 Multiple Indicator Cluster Surveys (MICS);
- Spreadsheets of estimates and projections of HIV;
- Programme monitoring spreadsheets and reports
- NSP 2016–2021 and operational plans at national and state/regional levels;
- NAP Progress Reports;
- Global AIDS Monitoring (GAM) reports
- Prospective Country Evaluation reports;
- Reports of previous reviews (NAP, 2006);
- Selected recent peer-reviewed literature.

During the second phase, a workshop and meetings were held between 27 and 31 May, 2019 in Yangon and Nay Pyi Taw with a wide range of stakeholders, including government staff, implementing agencies and national and international partners in the HIV response. Each component of the HIV programme, including surveillance, case reporting, prevention, harm reduction, care and treatment, prevention of mother-to-child transmission (PMTCT), and tuberculosis (TB)/HIV and hepatitis C virus (HCV)/HIV coinfection were reviewed and deliberated upon to provide initial feedback to finalize the report.

Country profile

The Republic of the Union of Myanmar is the largest mainland country within South-East Asia, occupying 676 578 sq. km and with a total perimeter of 5876 km. It borders India and Bangladesh to the north-west, Thailand and Lao People's Democratic Republic to the east and China to the north and north-east. It has an extensive coast along the Bay of Bengal and Andaman Sea to the south. The population of Myanmar was about 54 million in 2018. Life expectancy at birth improved between 2000 and 2016 from 62 years to 67 years and under-five mortality declined from 82 deaths to 51 deaths per 1000 live births. In the same period, the maternal mortality ratio declined from 308 to 178 deaths per 100 000 live births. Birth registration coverage was 81% in 2015–2016.

Together with the transition to democratization in 2011, Myanmar joined many other WHO Member countries in committing to achieve universal health care by 2030, and set a national goal of ensuring a basic essential package of health services by 2020. Health expenditure per capita increased dramatically from US$ 24.595 to US$ 62.109 between 2013 and 2016, and is now similar to the average of US$ 58.502 for South Asia, according to World Bank statistics. This followed the trend of increasing overall government expenditure. Domestic expenditure accounted for 20% of total health expenditure in 2016. Health sector decentralization has been introduced with the formation of regional health departments since 1965;[1] however, financial and human resources are still centrally managed. According to the 2014 WHO health system review, there were 0.6 hospital beds available per capita, the second-lowest in South-east Asia. Although government health services continue to expand, out-of-pocket payments still accounted for 51% of health financing in 2014.[2] Access to health services is characterized by significant geographical, ethnic and socioeconomic differences. The Human Development Index ranked it 145 out of 188 countries in 2016.

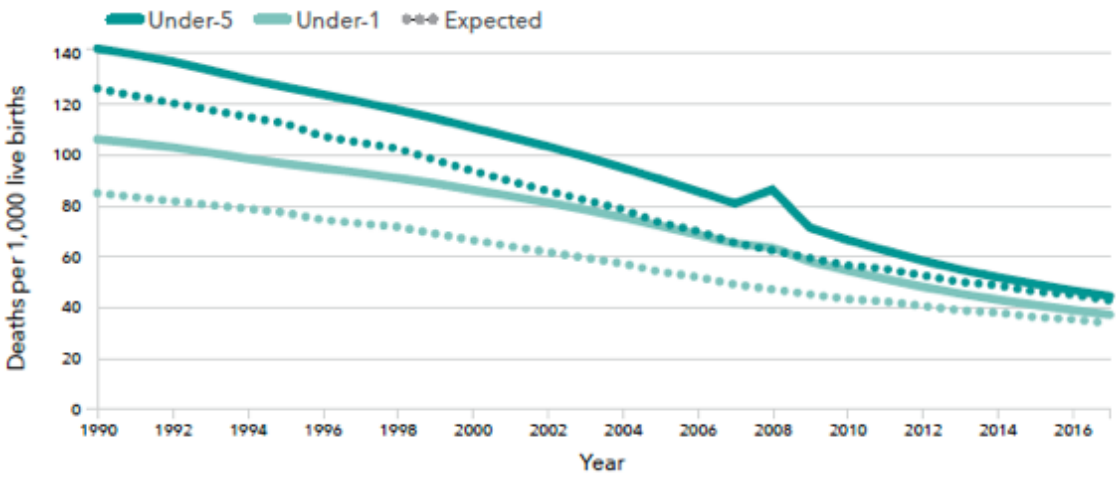
The country has been progressing in the global health indicators. Life expectancy has increased. The average for women was 61.0 years in 1990 and 72.2 years in 2017 and for men it was 57.9 years in 1990 and 64.9 years in 2017.[3] Similarly, the trends in under-five mortality have been progressing as represented in Graph 1.

Graph 1: Trends in mortality in children under 5 years and under 1 year

[1] The Republic of the Union of Myanmar. Health system review. Ministry of Health and Sports: Nay Pyi Taw.

[2] Han SM, Rahman MM, Rahman MS, Swe KT, Palmer M, Sakamoto H et al. Progress towards universal health coverage in Myanmar: a national and subnational assessment. Lancet Glob Health. 2018; 6:e989–e997.

[3] Institute for Health Metrics and Evaluation (online database) (healthdata.org/Myanmar, accessed 30 August 2019).



Source: Institute for Health Metrics and Evaluation (healthdata.org/Myanmar).

Administratively, the country is divided into nine states and eight regions, each divided into districts, townships, wards and villages. There are 330 townships nationally. Approximately 30% of the population resides in urban areas. The most populous states/regions are Yangon (14.3%), Ayeyawady (12.0%) and Mandalay (12.0%), according to the 2014 Census. Cities with a population of more than one million include Yangon and Mandalay.

Health policies, strategies and monitoring are the responsibility of the central level of the Ministry of Health and Sports (MoHS), while state/regional and district authorities are fully responsible for implementation in the field with the support of local authorities.

The MoHS is the major organization responsible for raising the health status of the people and accomplishes this through provision of comprehensive health services, namely, promotive, preventive, curative and rehabilitative measures. The MoHS is responsible for planning, financing, administrating, regulating and providing health care. It is headed by the Minister assisted by one deputy minister and two permanent secretaries. The Department of Health is the main service provider and also handles the regulatory functions of the Ministry in protecting the health of the people. The network of hospitals and health centres, expanding down to village level, provide curative services ranging from primary to tertiary health care. Township health departments, managing the township health system, are the backbone of primary health care and provide comprehensive health services at the local level. At the regional administrative level, regional and state health departments provide supervisory and technical support, while at the same time manage the provision of tertiary care and referral services.

Regarding the HIV programme, as part of the national HIV strategy, townships are prioritized as high- (85 townships), medium- (151), and low- (94) priority based on the estimated sizes of KPs, number of individuals on antiretroviral therapy (ART), with HIV and TB coinfection and HIV-positive pregnant women. High- and medium-priority townships covered 96% of adult PLHIV and 82% of the total population based on the 2014 Census. Five priority interventions are defined by the current NSP III (2016–2020):

1. to reduce HIV transmission, with a focus on prevention, testing and ART in priority populations and eliminating mother-to-child transmission;

2. to improve HIV health outcomes, with a focus on ART, monitoring viral suppression, TB integration and positive prevention;

3. to strengthen integration of community and health systems and promote human rights;

4. to strengthen the availability and use of strategic information;

5. to promote accountable leadership at national and subnational levels, and cross-country collaboration.

Myanmar is among the 30 high TB burden countries globally, with an incidence of TB of 358 per 100 000 population in 2017, a modest decline from 376 in 2012, according to the 2017 Global Tuberculosis Report. TB mortality was reported to be 60.2 per 100 000 population in 2017 (this includes 9.2 per 100 000 among people with both TB and diagnosed HIV). Myanmar has a higher prevalence of hepatitis B among children under 5 years relative to the regional average (2.03% vs 0.7% in 2015).

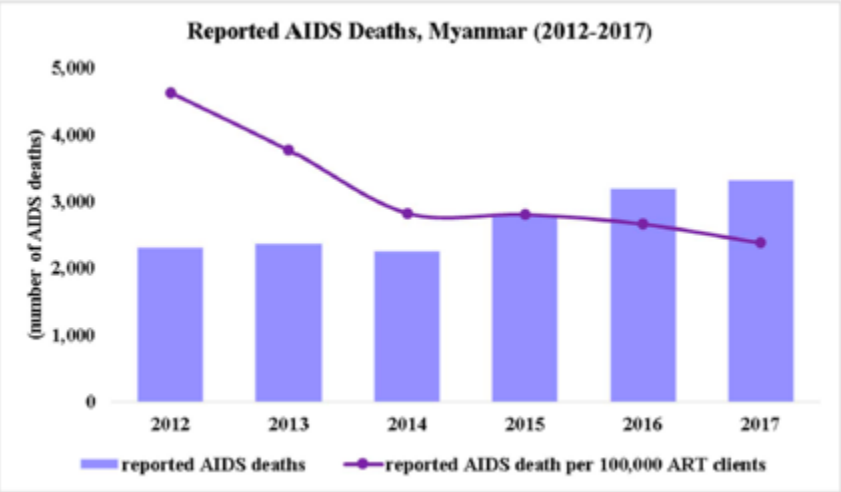
HIV/AIDS health information systems to assess trends in HIV and STI

Overall HIV information system

Myanmar, under the leadership of the NAP, has developed a strong surveillance system for tracking trends in HIV, based to a large degree on the principles of second generation surveillance, including sentinel surveys and IBBS, KP size estimates, and routine data from programmes and services. These data are used to develop regular reports with very effective analysis, making it possible to track the levels of HIV and STI, the risk behaviours and conditions of vulnerability that underlie HIV transmission, and the coverage levels of prevention, care and treatment programmes. Myanmar has used these surveillance data to produce estimates and projections of the HIV epidemic and its impact across geographical areas and population subgroups, using the recommended tools and models developed by the World Health Organization (WHO) and UNAIDS. The surveillance system has also supported the strategic prioritization of programmes through the classification of townships into low-, middle- and high-burden areas. The involvement of regional and township technical staff in implementation and use of the data to guide local decision-making is a key strength of the HIV surveillance system.

A limitation of the HIV surveillance system, when compared to international guidance for second generation surveillance, is the absence of reporting systems for HIV and STI cases and HIV deaths. While models provide valuable projections of annual new cases and mortality, the limitations of mortality data from health facilities makes it difficult to track progress toward eliminating HIV and the actual health impact of care and treatment. However, the trends of reported AIDS deaths from 2012 to 2017 segregated by the states and regions clearly shows that the total AIDS deaths were contributed mainly by Yangon, Mandalay, Shan, Sagaing and Kachin, which accounted for about 75% of overall AIDS deaths (Fig. 1). These states and regions have comparatively more case load and reporting coverage has been much improved. However, according to the 2017 report, Sagaing, Mandalay, Shan, Rakhine and Chin show comparatively higher AIDS case death rates, which is more than 300 per 10 000 ART clients (NAP data, 2019).

Fig. 1: Reported AIDS deaths, Myanmar, 2012–2017



HIV surveillance and surveys

HIV sentinel surveillance

Myanmar has conducted regular HIV sentinel surveillance since 1992 in high-risk populations and other groups that serve as proxies for the general population. Through a standard protocol, including blood testing and a brief data collection form, HSS primarily tracks trends in HIV and syphilis prevalence over time and place, by age and across the included subgroups. These include people who inject drugs (PWID), female sex workers (FSW), male STI patients, and men who have sex with men (MSM) (beginning in 2007); proxies for the general population include new military recruits, pregnant women and blood donors. TB patients were added in 2005, with data collection by the National TB Program. Because syphilis is tested by Venereal Disease Research Laboratory (VDRL) testing (antibodies) only, the prevalence may reflect some previously treated infections.

As a facility-based survey, HSS participants are enrolled using consecutive sampling at facilities that provide services to the target populations. The number of HSS sites has expanded from nine cities/townships in 1992 to 35 in 2016. The planned sample size is 150–250 participants per site per group; however, in some instances, sample sizes are not able to be met. HSS has been conducted biannually since 1992, with annual rounds from 2000 to 2014. Therefore, it is a very strong resource for understanding HIV trends in different populations that access services. In addition, trends among the 15–24 years age group serve as a proxy for HIV incidence. The latest round was in 2018.

Table 1: Sample size achieved for sentinel groups by sentinel site (HSS 2016)

S. no.	Sentinel site	Sentinel groups						Total
		FSW	MSM	PWID	TB	Pregnant women	STI	
1	Yangon	100	121	160	149	397	140	1,067
2	Mandalay	120	99	159	145	398	100	1,021
3	Meikhtila	120	100	.	150	400	150	920
4	Taunggyi	100	53	28	149	390	98	818
5	Lashio	120	98	161	149	401	100	1,029
6	Tachileik	92	58	110	89	393	46	788
7	Myitkyina	118	99	159	150	319	41	886
8	Mawlamyine	120	100	.	150	394	75	839
9	Pathein	120	100	.	149	391	100	860
10	Bago	117	100	.	140	400	99	856
11	Pyay	119	101	.	150	397	89	856
12	Magway	120	100	.	149	11	96	476
13	Sittwe	113	100	.	150	400	150	913
14	Monywa	120	100	45	150	400	100	915
15	Hinthada	167	148	.	149	397	100	961
16	Maubin	120	100	.	150	400	100	870
17	Myeik	117	98	.	149	399	.	763
18	Myingyan	114	109	.	149	399	65	836
19	Pakkoku	121	100	.	127	397	84	829
20	Kengtung	28	15	.	68	158	6	275
21	Myawady	121	45	.	149	398	99	812
22	Taungoo	180	150	.	143	400	100	973
23	Pyinoolwin	111	.	85	102	397	91	786
24	Kalay	30	100	151	100	398	11	790
25	Dawei	.	100	.	89	400	70	659
26	Muse	.	.	160	52	400	100	712
27	Bhamo	.	.	160	150	400	100	810
28	Kawthoung	.	.	.	116	390	15	521
29	Hpa-an	.	.	.	150	399	150	699
30	Loikaw	.	.	.	99	399	99	597
31	Shwebo	.	.	.	105	398	73	576
32	Nyaung-U	.	.	.	127	382	13	522
33	Myaungmya	.	.	.	150	398	99	647
34	Pyinmana	.	.	.	126	400	82	608
35	Haka	.	.	.	.	392	146	538
	Total	2708	2294	1378	4469	13 192	2987	27 028

HIV sentinel surveillance in Myanmar

- 1992–2018; currently biennial
- Facility-based recruitment at 34 sentinel sites, by consecutive sampling
- High-risk populations: PWID, FSW, MSM, male STI patients; TB patients
- General population proxies: new military recruits, pregnant women, blood donors
- HIV and syphilis (VDRL) prevalence through blood testing
- Brief form on demographics and risk behaviours
- Sample size: 150–400 per population per site

Integrated biological and behavioural surveys in key populations

IBBS is an important part of HIV surveillance for assessing trends in KPs at elevated risk. KPs often face barriers to accessing services, and therefore may not be measured accurately by facility-based surveys such as HSS. Myanmar has conducted IBBS in PWID, MSM and FSW using respondent-driven sampling (RDS), which is designed for hard-to-reach populations and recommended by WHO and UNAIDS.

The second key difference with HSS is that IBBS includes an extensive questionnaire on risk behaviours and programme coverage; because blood test results and the survey are anonymously linked, Myanmar has also been able to determine risk factors for HIV. The surveys therefore provide valuable strategic information to improve interventions and track the epidemic.

A third difference with HSS is that IBBS is used to produce estimates of the size of KPs. Size estimation is challenging for KPs, many of whom are not easy to reach or identify. Myanmar uses the IBBS to produce several different size estimates using different methods (*see* the following section on population size estimates for details).

IBBS fulfils several surveillance functions in KPs:

- estimates HIV and STI prevalence
- measures levels of HIV-related risk behaviours
- determines levels of HIV-related knowledge
- assesses uptake of HIV-related prevention services
- estimates the size of KPs (in combination with other data sources)
- monitors changes over time in all of the above.

Table 2: Characteristics of the most recent IBBS in key populations in Myanmar

	PWID IBBS	FSW IBBS	MSM IBBS
Survey years	2007, 2014, 2017–2018	2008, 2015	2009, 2015
Sample size	6200 total 250–850 per site	1996 total 381–419 per site	1979 total 371–414 per site
Recruitment and sampling method	RDS	RDS	RDS
Biological testing	HIV, syphilis, hep B, hep C	HIV, syphilis	HIV, syphilis
Eligibility criteria	• Male or female • Age ≥15 years • Injected drugs for non-medical purposes in the past one month • Lived ≥1 year in the survey township/city	• Biological female • Aged 15–49 years • Sold sex for cash or kind in the last 12 months • Currently living or working in the survey city	• Biological male • Aged ≥15 years • Anal sex with another male in the last 6 months • Currently living in the survey city
Sites	Yangon, Mandalay, Lashio, Muse, Kukkhai, Myitkyina, Waimaw, Bamaw, Kalay, Tamu, Hpakant, Mohnyin, Indaw	Yangon, Mandalay, Monywa, Pathein, Pyay	Yangon, Mandalay, Monywa, Pathein, Pyay
Language	Myanmar and local languages	Myanmar	Myanmar
Size estimation methods	• Service multipliers • Unique object multiplier • RDS successive sampling • Best guesses of key informants & service providers	• Service multipliers • Unique object multiplier • RDS successive sampling • Best guesses of key informants & service providers • Wisdom of the crowds	• Service multipliers • Unique object multiplier • RDS successive sampling • Best guesses of key informants & service providers • Wisdom of the crowds
Analysis of risk factors for HIV	Included in report (bivariate)	Not included	Not included

Defining the population is an important first step of IBBS, as in all surveillance methods. The eligibility criteria and other characteristics of the most recent IBBS rounds are shown in

Gender identities of biological males who have sex with other males in Myanmar

Apwint (open)
Their public and private gender identity is generally feminine, but they may dress as men or dress and act as females. Apwint are generally more "open" MSM and some could be considered "transgender", but this term is not widely used in Myanmar.

Apone (open or hidden)
Their gender identity may be masculine or feminine. They may or may not express themselves femininely. They can be "open" or "hidden" MSM.

Tha nge (hidden)
Their gender identity is masculine with a sexual preference for *apwint*, *apone* and women.

Table 2. KPs are defined with respect to biological sex, age (adults), risk behaviour and survey location. In MSM, the focus on males who engage in anal intercourse (the form of sexual contact with the greatest probability of transmission) is a good strategy for directing resources on monitoring the subgroup of the population at highest risk. Similarly, the criterion for PWID focuses on high-frequency (past-month) injectors. Myanmar has also been able to include younger members of KPs at risk ages of 15–17 years, which is sometimes difficult in other countries.

Males who have sex with other males may have different gender identities. In Myanmar, there are three main gender identities among MSM (*see* box). All three gender identity subgroups are included in the IBBS proactively by initiating recruitment with "seeds" in each group. "Transgender" is not a widely used term in Myanmar, while globally many countries now conduct separate IBBS in MSM and transwomen. However, there is an effort to redefine this classification by stakeholders, under request from NAP, to define a national strategy for this segment, and to make it comparable to other countries worldwide.

The NSP notes that there are additional "undisclosed" MSM in Myanmar and research is needed to understand their risk and need for services.

The FSW IBBS recognizes differences between visible, semi-visible and hidden modalities of sex work (*see* Box).

IBBS is often more complicated to implement than conventional surveys. Myanmar has gained much experience with IBBS and has demonstrated good flexibility in introducing changes to strengthen the methods and implementation over time. For example, the NAP expanded the PWID IBBS between the 2014 and 2017–2018 rounds, adding new study sites where there were important injection drug use dynamics (Hpakant, Mohnyin and Indaw), adding questionnaires in the local languages to increase survey participation and representativeness, and increasing the sample size from 110–343 to 250–850 to improve the statistical strength of the estimates.

Classification of female sex workers used in IBBS

Visible
Solicit clients openly from venues, such as brothels and street corners

Semi-visible
Meet clients while working at entertainment establishments

Hidden
Meet clients through brokers, referrals or advertisements, virtual solicitation sites, etc.

Tracking trends using IBBS in Myanmar will become possible once additional surveys are completed using the same methodologies. The most recent IBBS reports do not look at changes since the previous surveys.

An important limitation has been reaching females in the PWID IBBS, an important area where innovation is probably needed to improve the effectiveness of programmes

for female PWID. Globally, reaching female PWID for surveillance and research is challenge.

RDS, which is based on peer-referral chain recruitment, is the best sampling method currently available to achieve estimates that are representative of these populations for surveillance, even though there is still debate about whether RDS should be considered probabilistic sampling. Sample sizes of at least 300–400 participants are usually required to have good sampling properties in RDS surveys, so that the samples in Myanmar appear adequate. Furthermore, the IBBS reports show that the survey teams follow best practices to monitor recruitment and analyse RDS data, such as checking for convergence of the estimates (RDS estimates become more stable over time) and consistency of self-reported network sizes.

The IBBS reports are technically strong and well prepared. A particular strength of the report of the 2017–2018 PWID IBBS is its analysis of HIV risk factors. This is very helpful for determining how to focus prevention efforts. It would be useful to include risk factor analysis in the reports of the other KPs.

IBBS and HSS have produced different findings because HSS is limited to KPs who access services. For example, HSS estimated a lower HIV prevalence among FSW compared to IBBS in 2016. Therefore, caution is needed when using HSS estimates for KPs. It would useful to consider whether the surveillance resources used to assess KPs in HSS could achieve greater information if spent on strengthening and expanding the IBBS.

PLHIV Stigma Index

A strategic goal of the NSP III and of global HIV efforts is to reduce stigma and discrimination directed towards PLHIV. Myanmar gathers data on levels of discrimination using a Stigma Index survey of PLHIV, a framework recommended by UNAIDS. There were two surveys in 2010 and 2016:

- PLHIV Stigma Index survey related to experienced stigma (*N*=540; included 221 KP participants)
- General population (GP) Stigma Index survey to determine general population perspectives on HIV, PLHIV and HIV-related stigma and discrimination (*N*=500).

The surveys were conducted in nine states and the results are described in the NAP's 2016–2017 Progress Report.

The sampling and recruitment methods were not described in the documents available to this review. In many countries, the Stigma Index is a convenience sample and is not representative of the larger population of PLHIV or the general public.

Surveillance in the general population and other population groups

The 2015–2016 Myanmar Demographic and Health Survey (2015–2016 MDHS) was implemented by the MoHS of the Republic of the Union of Myanmar. It was the first DHS conducted in Myanmar and is based on a sample of 12 885 women and 4737 men aged 15–

49 years in 12 500 selected households. The DHS data allow for representative estimates at national and state/regional levels, and of urban and rural areas. These are very valuable for the general population, as they provide levels of HIV knowledge and prevention indicators. The survey findings can be analysed by multiple dimensions, such as by age, sex, educational and income levels. A limitation in concentrated epidemics such as in Myanmar is that KPs are often underrepresented or difficult to identify in a household survey.

The 2015–2016 DHS included data on:

- knowledge of modes of HIV transmission and prevention
- attitudes toward PLHIV
- women's attitudes toward negotiating safer sexual relations with husbands
- attitudes toward condom education
- paying for sex and using a condom with paid sex partners, among males
- coverage of HIV testing
- coverage of HIV testing among pregnant women
- awareness of HIV testing and PMTCT
- prevalence of male circumcision
- self-reported STI symptoms or previous STI diagnosis
- STI treatment-seeking behaviours
- age at first sex
- use of condom at first sex
- source of condoms.

It should be noted that the DHS does not collect data on recent engagement in high-risk behaviours for HIV. It is common for DHS in other countries to collect data on the use of condoms and number of sexual partners, at least among unmarried women.

Population size estimates of key populations

UNAIDS and WHO recommend using several methods and triangulating the results, since estimating the size of KPs is one of the most challenging tasks of HIV surveillance, and all available methods have considerable statistical error and potential for bias. Myanmar has developed a robust approach to population size estimates (PSEs) in line with this guidance to support epidemiology and local planning and targeting of interventions.

The IBBS in each KP incorporates several PSE methods as shown in Table 2. The strongest methods include the following:

- services multipliers, which combine the RDS survey estimates of coverage of services (e.g. HIV testing) with the number of KPs reached by the service, based on programme data. The programme data are reviewed and each provider reports unique people, but it is not clear whether double-counting across different providers can be avoided;

- unique-object multipliers, where the study team distributes a special object (e.g. a bracelet) to KP members who can be easily reached, and then combines survey estimates of the percentage who received the object with the actual number reached.

Other methods that require more theoretical assumptions that might not be met in practice include the following:

- RDS successive sampling estimator, which is based on a theory of how the timing of recruitment patterns might be related to the size of survey participants' social networks;
- the number of individuals reached by nongovernmental organization (NGO) implementing partners, subject to potential double-counting;
- "wisdom of the crowds", which is based on survey participants' best guesses of the population size.

Finally, Myanmar also carries out separate programmatic mapping PSEs, which include:

- mapping at known hotspots where KPs gather;
- more conceptual, social network mapping, to estimate subgroups that do not frequent hotspots.

To develop a consensus point estimate and range at the city/township level, Myanmar holds workshops after each IBBS to review the estimates. This provides a very good opportunity for additional local involvement and a "validity check" drawing on local expertise; however, in practice, often the highest numbers produced by the methods (usually the multipliers) are lowered based on experts' perceptions of smaller population size; this may bias the estimates downward and could reduce motivation for programmes to introduce innovative strategies to reach more hard-to-reach subgroups.

To extrapolate the size estimates from the 5–10 townships where data are collected to all 330 townships in the country, Myanmar uses an elaborate scoring method, which also draws on city-level variables (e.g. drug trafficking). The 5–10 IBBS sites represent over 12–14% of the total population. Then the consensus PSEs are added up for a national size estimate. Adjustments are made to account for KP members who may have been missed by the different methods and for potential double-counting. However, it is important to note that the 5–10 survey sites are selected for IBBS due to the presence of a large number of KPs or high HIV prevalence; therefore, they may not reflect other areas.

The size estimate of 100 000–110 000 people in prison and other closed settings is based on Prison Department data (from the NAP's 2018 Progress Report). There are no official size estimates for mobile and migrant populations.

Myanmar's population size estimates for KPs are within the range of estimates in the Asia and Pacific region:[4] 0.18–2.33% of females aged 15–49 years for FSW; 0.09–4.06% of males ages 15–49 years for MSM; and 0.001–1.04% of males and females aged 15–49 years for PWID.

Model-based estimates and projections

Myanmar uses the Asian Epidemic Model (AEM) and Spectrum package recommended by UNAIDS and WHO. UNAIDS conducts regular updates of these tools, revising the assumptions and parameters as new evidence becomes available. The models produce estimates of the prevalence of HIV, new HIV infections, and estimates of impact such as AIDS deaths, overall and among KPs. AEM also draws on behavioural data (e.g. condom use, number of risk partners). Much of the data used to calibrate the models is from the IBBS and HSS surveys. AEM produces an incidence curve, which is input into Spectrum to produce a set of standard impact indicators. Program data such as number of people on ART and in PMTCT programmes also feed into the impact calculations.

The most recent AEM–Spectrum estimates and projections in Myanmar were conducted in April 2019. Myanmar developed a nationwide model in addition to six state-/regional-level models to fine-tune the estimates to regions with the highest HIV burden and KP populations: Yangon, Mandalay, Kachin, Shan, Sagaing, and all remaining areas. Projections from the models have been used to develop proposals for the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) and operational plans for the NSP III.

The AEM model is structured to develop estimates for different population subgroups in each region, including:

- male and female PWID
- MSM
- FSW
- male clients of FSW
- low-risk males
- low-risk females.

WHO and many countries that use the model have stopped using the label "low-risk" males and females because this category includes (i) people in stable, heterosexual relationships and (ii) spouses of KPs. Yet, spouses of KPs are at greater risk than the general population because of the elevated HIV prevalence among KPs. However, reports in Myanmar continue to use the term "low-risk". The term "other" males and females or "non-KPs" or "KP sexual partners" would be better reflect this category.

Programme data and health information systems

Data from government programmes and implementing partners regarding the number of people reached by prevention and treatment services are not technically surveillance

[4] Quick start guide for Spectrum. Geneva: UNAIDS; 2018:29 (https://www.unaids.org/en/resources/documents/2018/quick_start_guide_for_spectrum, accessed 31 August 2019).

data, but represent a critical input to models of the impact of HIV and estimates of programme coverage. For example, programme data have allowed Myanmar to document the rapid 400% increase in coverage of HIV testing and treatment between 2010 and 2018. Decentralization of HIV testing and treatment makes reporting and analysis of programme data more challenging and therefore a more important achievement.

Myanmar produces regular progress reports based on data compiled from programmes. The reports contain detailed analysis, including the numbers reached and percentage coverage of:

- HIV and STI testing
- ART
- viral load measurement
- HIV prevention overall
- methadone maintenance therapy (MMT)
- condoms
- antenatal care
- ARV prophylaxis for PMTCT
- co-trimoxazole prophylaxis for TB.

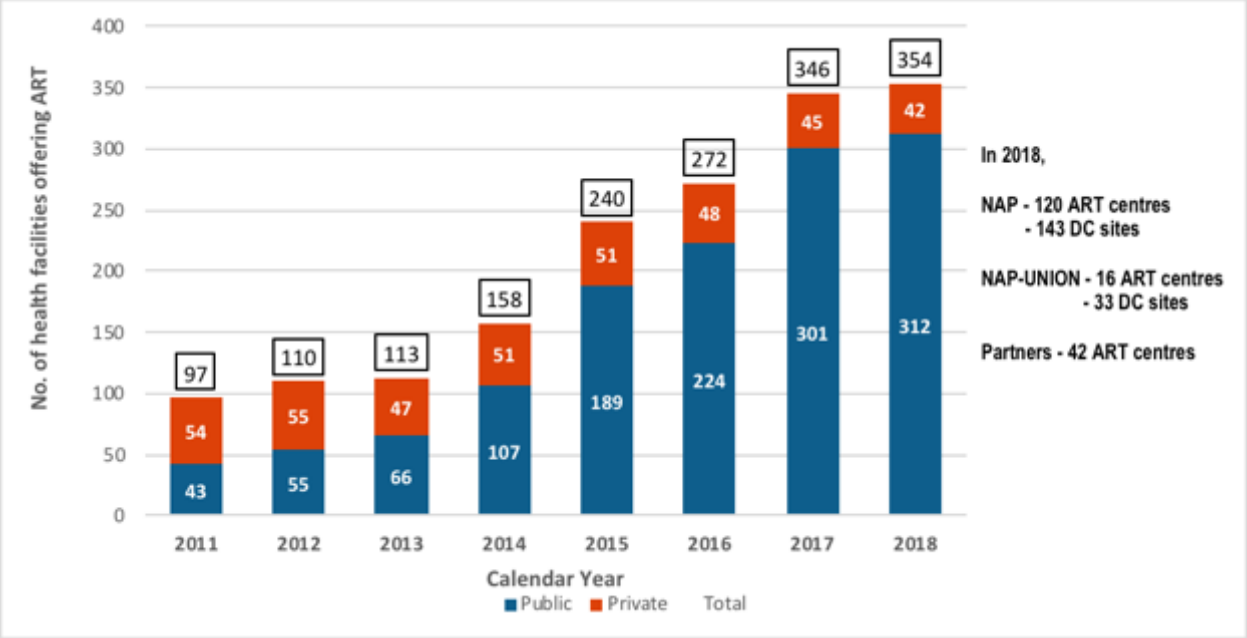
The analysis is presented effectively to help improve national, regional and local programmes by presenting the data by KP subgroup, by implementing partner and by geographical area.

The programme counts of KPs reached are downward-adjusted to account for levels of township-to-township mobility measured by the IBBS, which represents a good use of IBBS data for purposes of programme monitoring.

Maps included in the progress reports display numbers of KPs reached and could be improved by showing the percentage of KPs to more clearly show progress and gaps in programming in each area.

As a primary health information system to support programme data compilation, reporting and analysis at the subnational and national levels, Myanmar recently implemented the District Health Information Software (DHIS) for HIV, malaria and TB (2016–2017), allowing decentralization of monitoring and evaluation (M&E) functions. Myanmar implemented the OpenMRS software to support monitoring of ART, which also supports clinicians in their monitoring of patients. OpenMRS captures and aggregates patients' data and automates reminders to providers and supervisors regarding follow-up visits to reduce loss to follow up. In addition, OpenMRS also covers the component related to laboratory and drug dispensing to patients, which could be a proxy to follow patients' adherence. By May 2019, OpenMRS was operating in 60 out of 312 public ART sites. Note that the number of public ART sites increased to 312 in 2018, not including 42 private health facilities offering ART (Fig. 1).

Fig. 1: Health facilities that offer ART by public and private sector (2011–2018)



Source: Progress Report 2018

Myanmar does not yet have a unique identification code that can be used to link the same individual reached by different programmes. This creates some important limitations for surveillance and monitoring:

- Estimates of coverage of prevention may include double-counting. So far, the kinds of adjustments done to reduce double-counting may lead to other kinds of bias.
- It is not possible to measure the continuum of prevention, care, treatment and the respective cascade.
- A unique ID would also be very useful to improve size estimates in KPs by making it possible to do multiple-source capture–recapture instead of two-source multiplier estimates.

For patient monitoring, a Master Patient Index (MPI) is being developed. For prevention, many implementing partners use their own internal unique ID systems. However, these do not link across partners, and so do not allow for monitoring outcomes (and reducing double-counting) across the cascade.

Research and peer-reviewed publications

Myanmar has produced numerous peer-reviewed papers drawing on its surveillance and programme data, representing an important form of dissemination of strategic information.

It is important to continue to undertake HIV operational research in Myanmar. Just since 2015, analyses shedding light on many key areas have been published, including the following (not an exhaustive list):

- HIV subtypes
- Factors associated with HIV testing among young MSM
- Factors associated with adverse ART outcomes
- Factors associated with ART adherence
- Delays in initiation of ART and retention in the pre-ART stage
- Long-term outcomes of ART, rates of virologic failure
- Prevalence and incidence of TB in PLHIV
- Decrease in TB and TB mortality associated with isoniazid preventive therapy (IPT) among PLHIV
- Trends in survival and mortality among TB-HIV coinfected patients
- Mother-to-child transmission rate of HIV and loss to follow up from PMTCT
- The PMTCT services cascade
- Factors associated with concurrent sexual partnerships among MSM
- Factors associated with forced sexual intercourse among young MSM
- Factors associated with drug use among FSW
- Levels of HIV, hepatitis B and C among PWID on methadone maintenance therapy
- Qualitative data on identity of hidden MSM and transwomen
- Challenges to HIV and STI services for young KPs
- Willingness to use pre-exposure prophylaxis (PrEP) among MSM and transwomen.

Gaps and recommendations

The following are the main gaps and recommendations identified in the sections above with respect to the HIV information system.

1. Implementation of a system to routinely report and analyse HIV, AIDS and HIV deaths is needed as a key component of second generation surveillance, to provide evidence of the geographical burden of HIV throughout the country and track progress toward elimination.
2. Implementation of a unique person-level ID is needed to ensure accurate monitoring of the continuum of prevention, care and treatment.
3. Regarding the IBBS and HSS:
    A. IBBS or HSS should be explored among incarcerated persons and mobile and migrant populations as they are prioritized by the NSP, yet levels of HIV prevalence, risk behaviours, and prevention coverage in these groups are unknown.
    B. Consider incorporating trend analysis in IBBS reports for HIV and STI prevalence and other key indicators.

C. Consider utilizing the IBBS to track indicators of discrimination among KPs, given that reducing discrimination is a strategic direction of the NSP, and since the Stigma Index is not representative of these groups.
D. Formative research should be considered to determine how to reach female PWID.
E. Formative research should be considered to improve the understanding of transwomen.

4. Regarding the size estimation for KPs:
    A. When planning an IBBS, consider selecting survey sites in a way that allows extrapolation of size estimates to the whole country, i.e. stratify regions of the country and ensure data from all major regions; consider including a small number of low-burden/low-PSE sites in addition to high-burden sites.
    B. Consider how to account for potential double-counting of the same people by different providers.
    C. Consider whether PSEs are needed for mobile and migrant populations, as they are prioritized by the NSP.
    D. Consider whether to discontinue gathering data for "wisdom of the crowds", as these are not recommended PSE methods and may introduce error into the consensus estimates.
5. Models and projections may give an inaccurate picture of the epidemic by continuing to use the labels "low-risk" males and females, as initially included in AEM; consider adopting the current WHO nomenclature of "other males and females" or "non-KPs".
6. Regarding progress reports:
    A. Maps included in the progress reports could be improved by presenting the percentage of KPs reached instead of the number reached to more clearly show progress and gaps.
    B. Progress reports could be strengthened by summarizing peer-review research findings on programme limitations.

Epidemiology of HIV and STI

The following sections present selected data from available surveillance and programme reports as of June 2019.

HIV prevalence across populations and geographical areas

HSS findings clearly show an elevated prevalence of HIV among KPs, as shown in the 2016 estimates in Yangon and Mandalay. Other sites follow a similar pattern. Prevalence among pregnant women presenting to antenatal care (ANC) was above 1% at a number of HSS sites in 2018 and some reported data by the MoH presents similar results.

Table 3: PMTCT data

State/Region	HIV testing	Confirmed positive HIV test	Positivity	Known HIV cases	Pregnant women receiving pre-test counselling (which is more than 90% of ANC number)	
Kachin State	38974	303	0.8%	483	42 169	
Yangon Region	133 873	806	0.6%	1 247	137 915	

Source: MoHS, 2018

In HIV surveillance only women who are pregnant and positive should be counted. It is not appropriate to add those known to be HIV positive as they are not pregnant any more at present. HIV surveillance should measure point prevalence estimates rather than cumulative prevalence. In addition, if there are pregnant women who are HIV infected and under antiretrovirals (ARVs) prior to their current pregnancy, they should be excluded since no HIV test is needed for them though they received counselling (Fig. 3).

There are other potential reasons for this high prevalence among pregnant women, including: transmission from MSM and male PWID to their female partners; a higher rate of seeking ANC at hospitals among pregnant women who believe they are infected compared to other women; and increase in the number of pregnant women on ART. Substantial transmission among the general population and among pregnant women is uncharacteristic of a concentrated epidemic. If HSS finds a high HIV prevalence among pregnant women, it requires greater investigation of the participants' characteristics (Fig. 4).

Fig. 2. HIV prevalence from HSS in Yangon, 2016

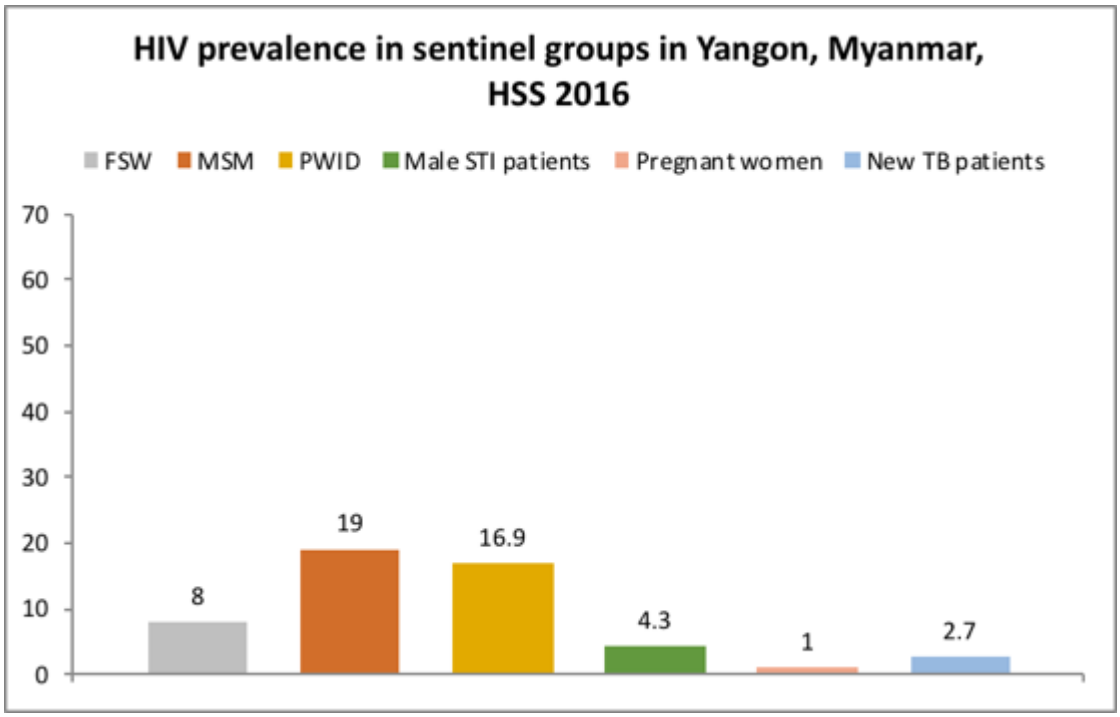
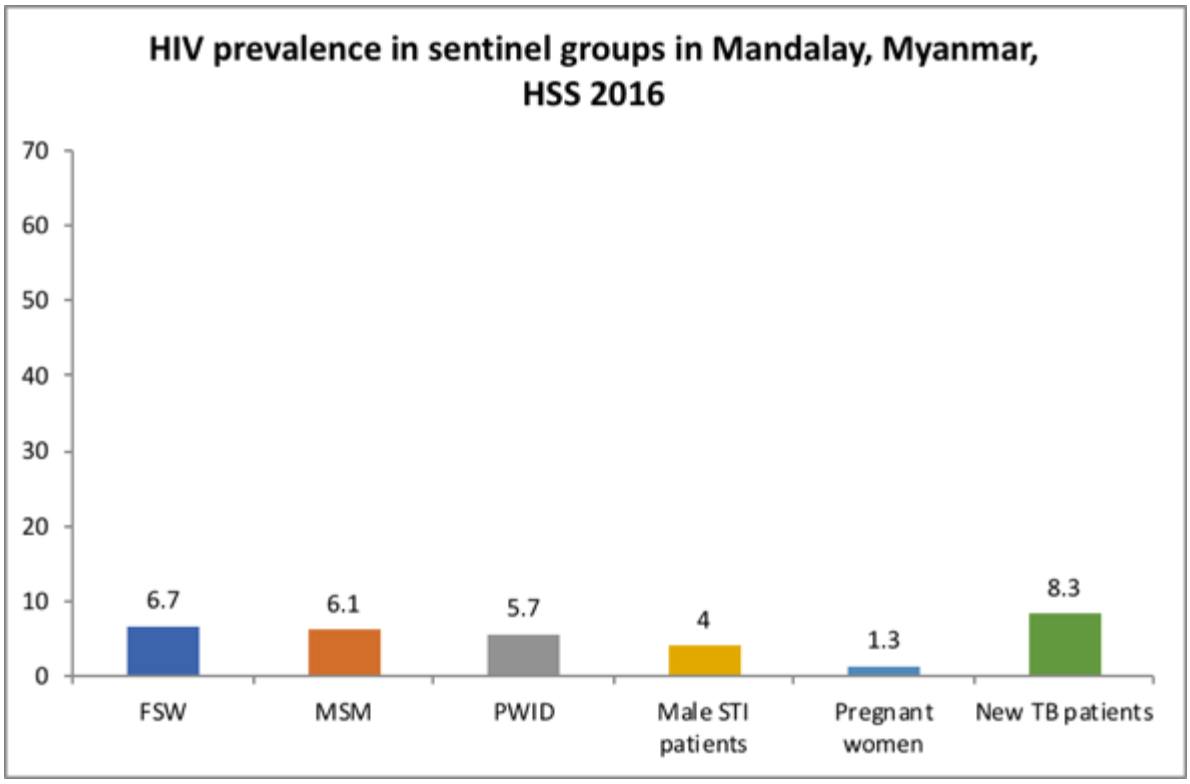


Fig. 3. HIV prevalence from HSS in Mandalay, 2016



The HSS and IBBS both produce estimates of HIV prevalence in KPs; however, they use different sampling methods and this leads to differences in the findings. In addition, the participants' motivations in attending services or in surveys are different, so populations can differ significantly. Fig. 5 and 6 of Yangon and Mandalay show that HSS produces

lower estimates of HIV prevalence than IBBS in all three KPs. The most likely explanation is that the HSS draws on KPs who are accessing prevention services, which will generally not capture people who have already been diagnosed with HIV, whereas the IBBS uses social network sampling (RDS), which should include both HIV-positive and HIV-negative KPs. Thus, the HSS estimate reflects only KPs who are in contact with services, while IBBS reflects the larger KP population.

Fig. 4. Differences between the most recent HSS and IBBS estimates, Yangon

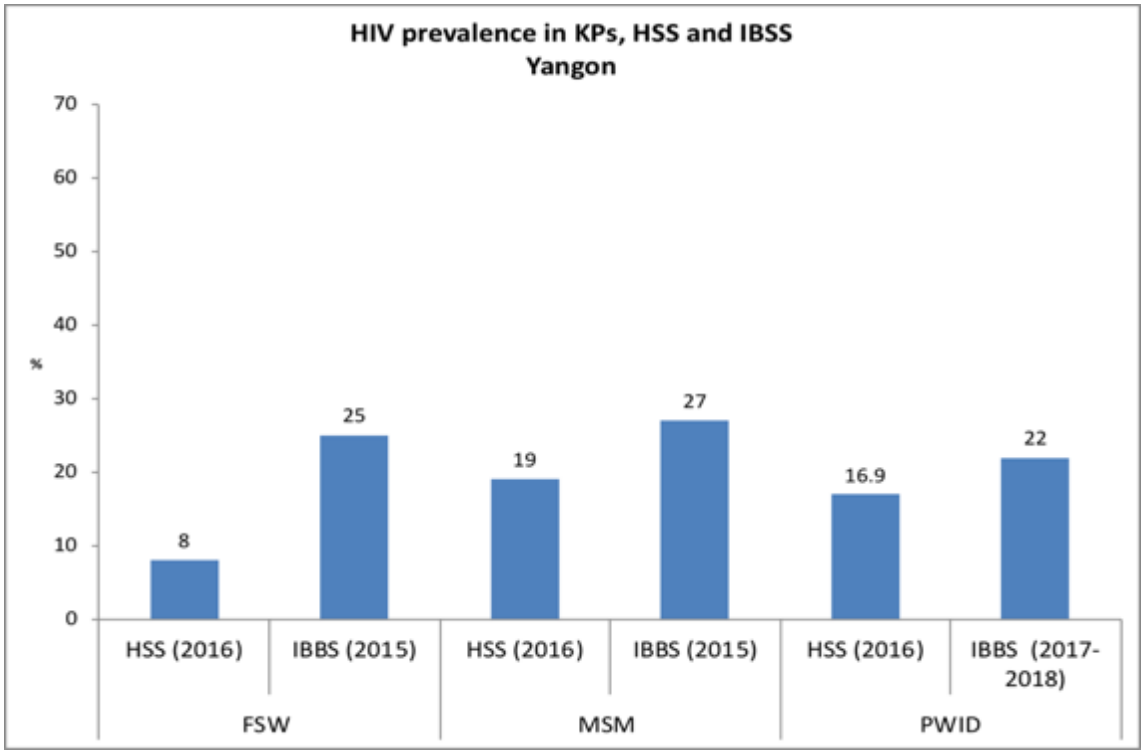
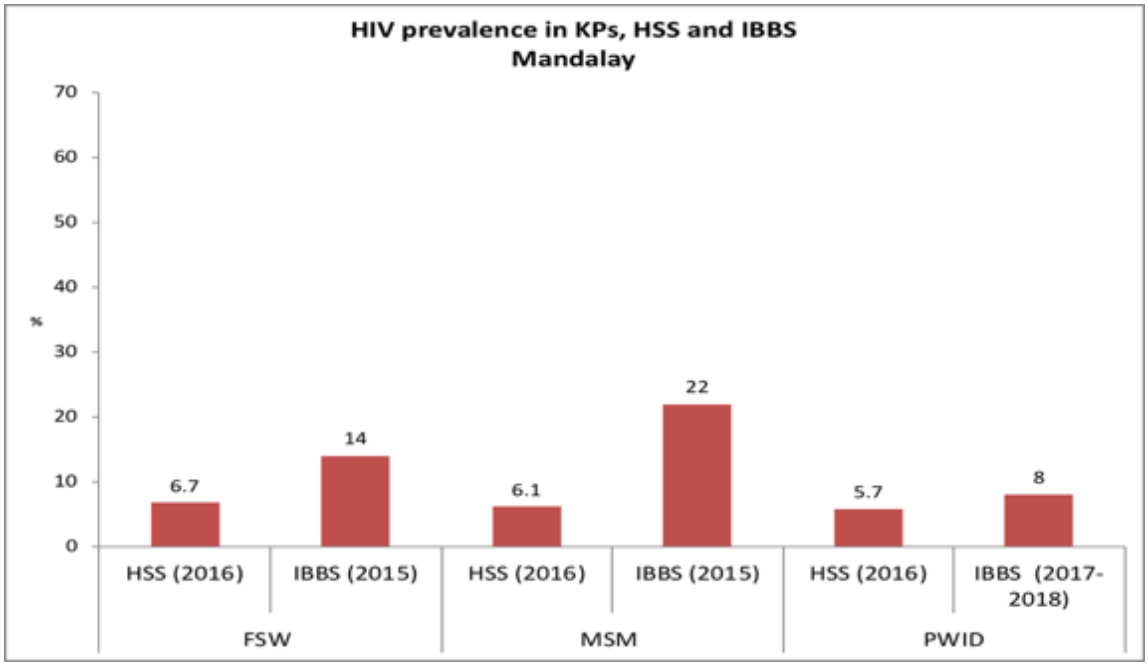


Fig. 5. Differences between the most recent HSS and IBBS estimates, Mandalay



Looking at the two most recent IBBS rounds among PWID, it is clear that a very large proportion of PWID are living with HIV. Estimates show prevalence levels of 50–60% in the northern IBBS sites and around 20% in Yangon. Moreover, the prevalence in the northern sites seem to be increasing. These increases in prevalence are most likely due to two factors: the increase in ART helps PWID and the general population with HIV live longer and healthier lives; and/or an increase in HIV prevalence. ART provision has certainly expanded among PWID and other groups. It is also noted that only around 20% and 30% of HIV-positive PWID are receiving ART in Shan North and Kachin, respectively. However, evidence from HSS trends among younger people aged 15–24 years also suggests increasing incidence among PWID since 2014 (*see* the section on new HIV infections) (Fig. 7).

The AEM/Spectrum projections suggest elevated HIV prevalence in all sub-regions of Myanmar, with Kachin, Shan, Yangon and Sagaing the most impacted. Yet there are differences in the prevalence curve across states, suggesting differences in incidence or expansion of ART (Fig. 8).

Fig. 6. HIV prevalence among PWID, 2014 and 2017 IBBS

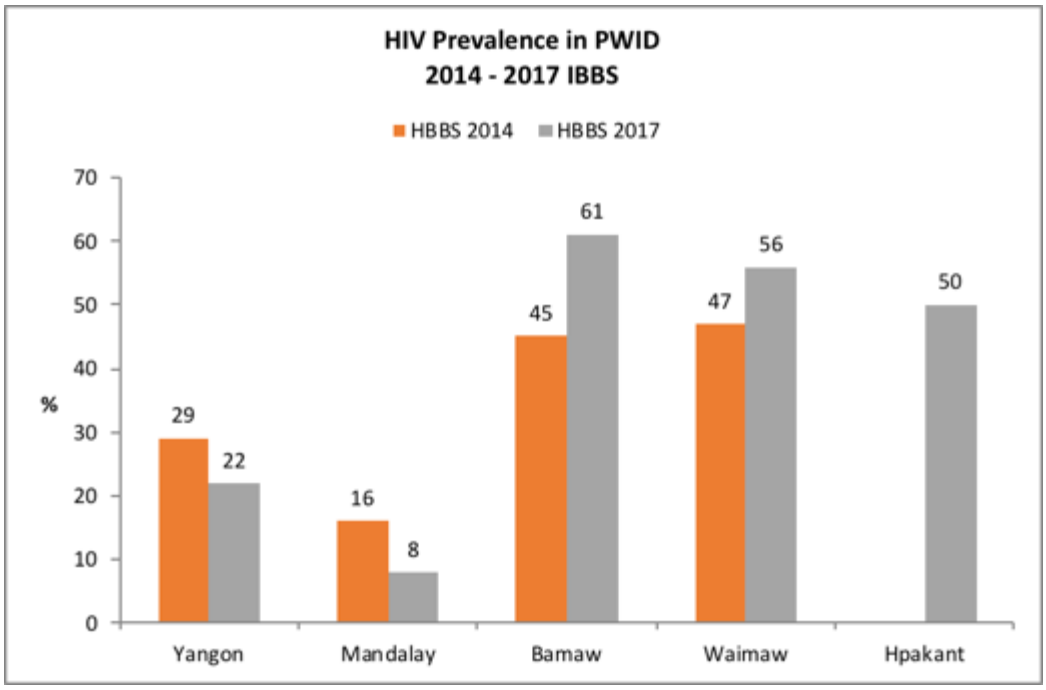
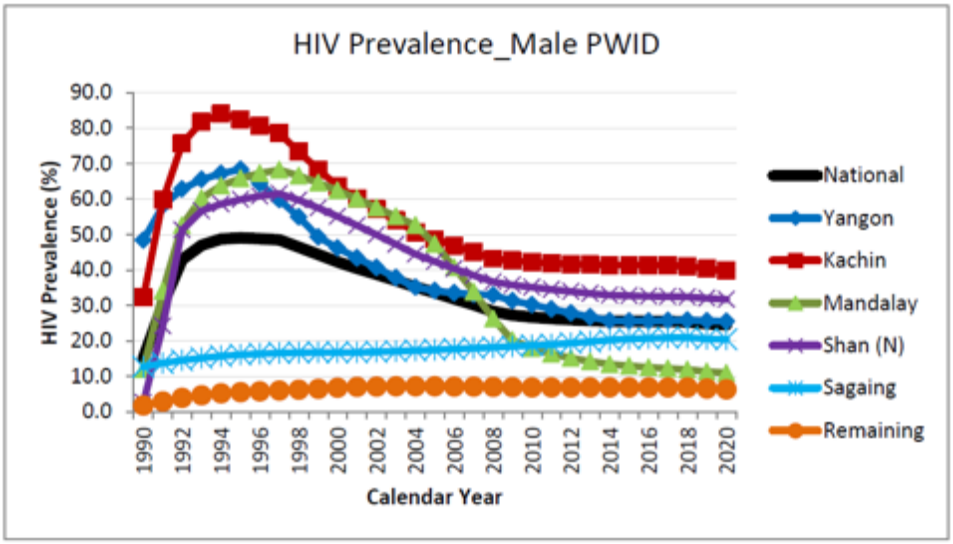


Fig. 7. HIV prevalence trends among PWID from the April 2019 AEM/Spectrum



Among MSM, results from the 2015 IBBS show that the highest HIV prevalence is in Yangon and Mandalay (22–27%) and 6–7% in other sites. At all sites, the prevalence of past-year STI symptoms (by self-report) shows that the rates of condomless sex are likely to be high. STIs, especially when there is an active ulcer or discharge, also increase the risk of HIV transmission during sexual intercourse (Fig. 9).

Estimates also highlight *apwint*, followed by *apone,* as the most affected subgroups across sites. *Apwint* are considered a rough approximation of transwomen; however, they are not exactly the same. There is no operational definition of "transwomen" in the country. The estimated 62% HIV prevalence for *apwint* in Yangon is exceptionally high compared with MSM and transwomen globally (Fig. 10).

The AEM/Spectrum projections based on IBBS, HSS, ART coverage, PSE and other programmatic data reflect the different HIV prevalence trends among these states and regions. Yangon does not have only the highest prevalence, but also shows an increasing trend. Kachin also shows an increasing trend in HIV prevalence, pointing to the rising trends among both MSM and PWID there (Fig. 11).

Fig. 8. HIV prevalence among MSM, 2015 IBBS

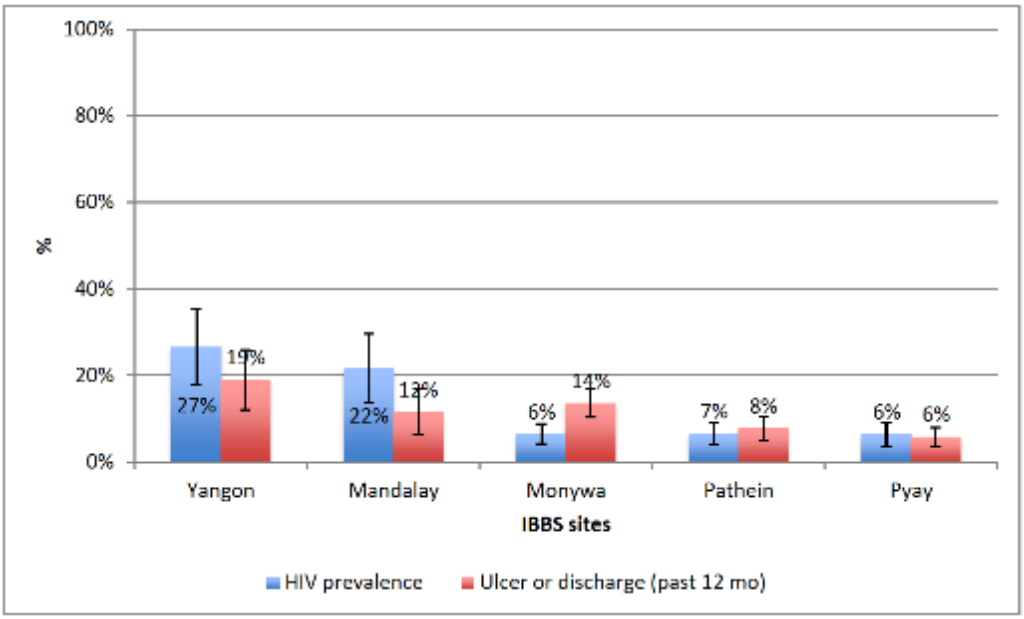


Fig. 9. HIV prevalence among MSM subgroups, 2015 IBBS

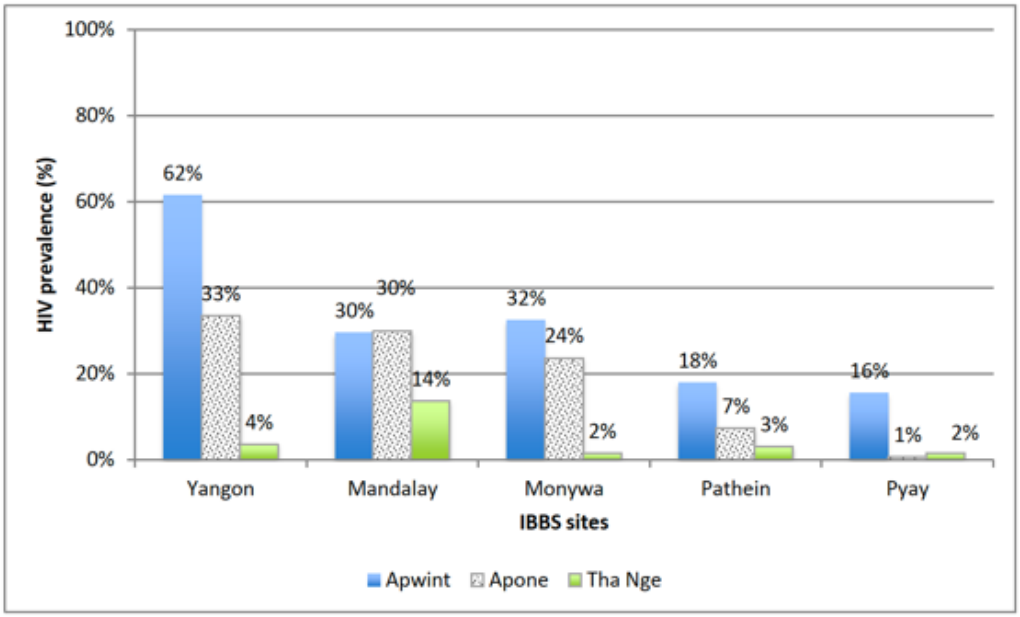
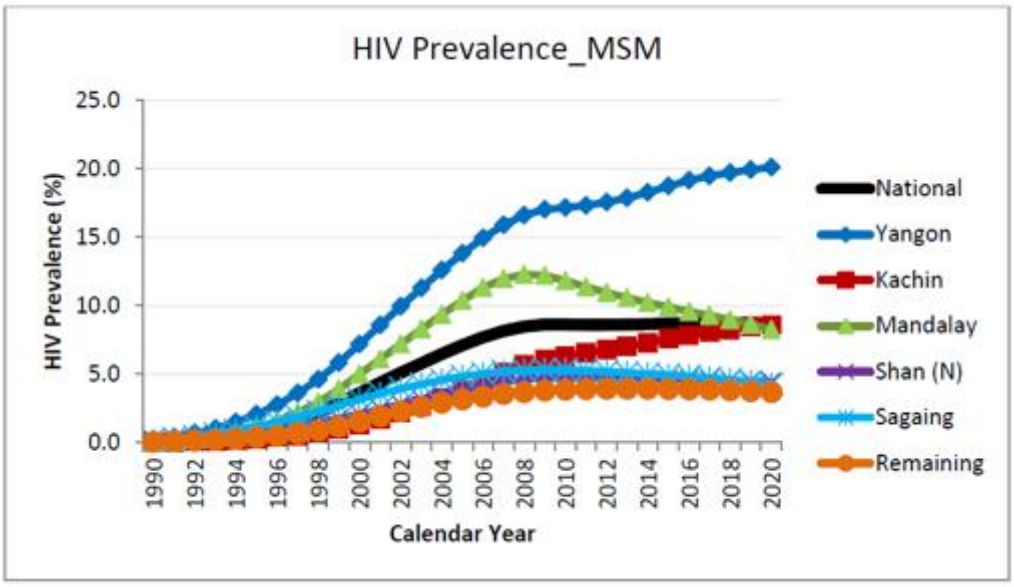
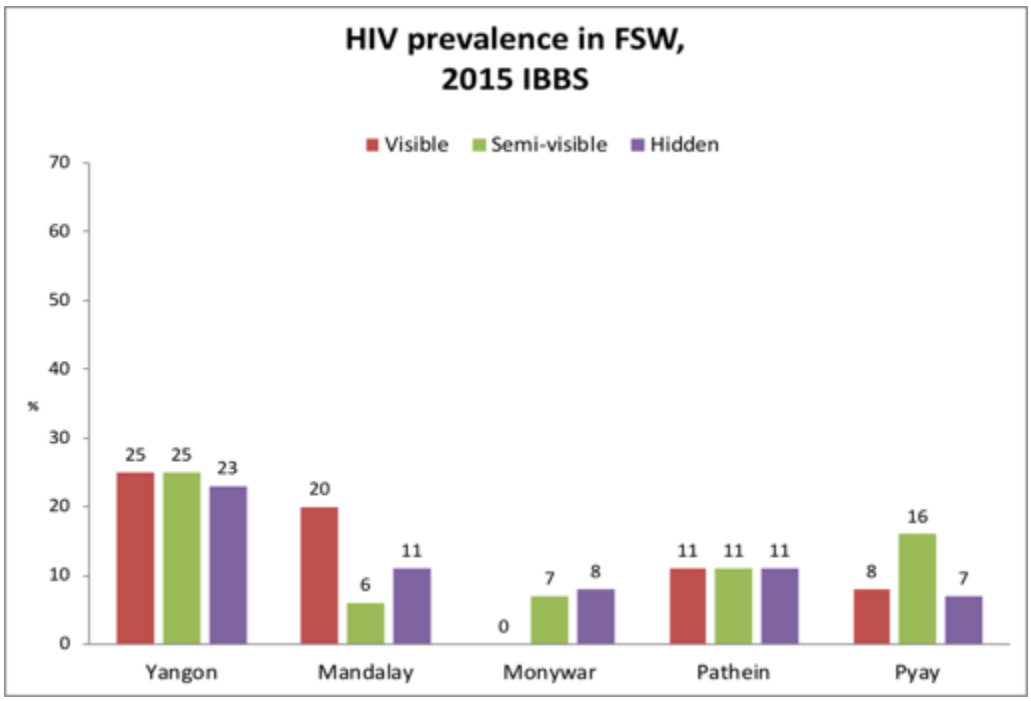


Fig. 10. HIV prevalence trends among MSM from the April 2019 AEM



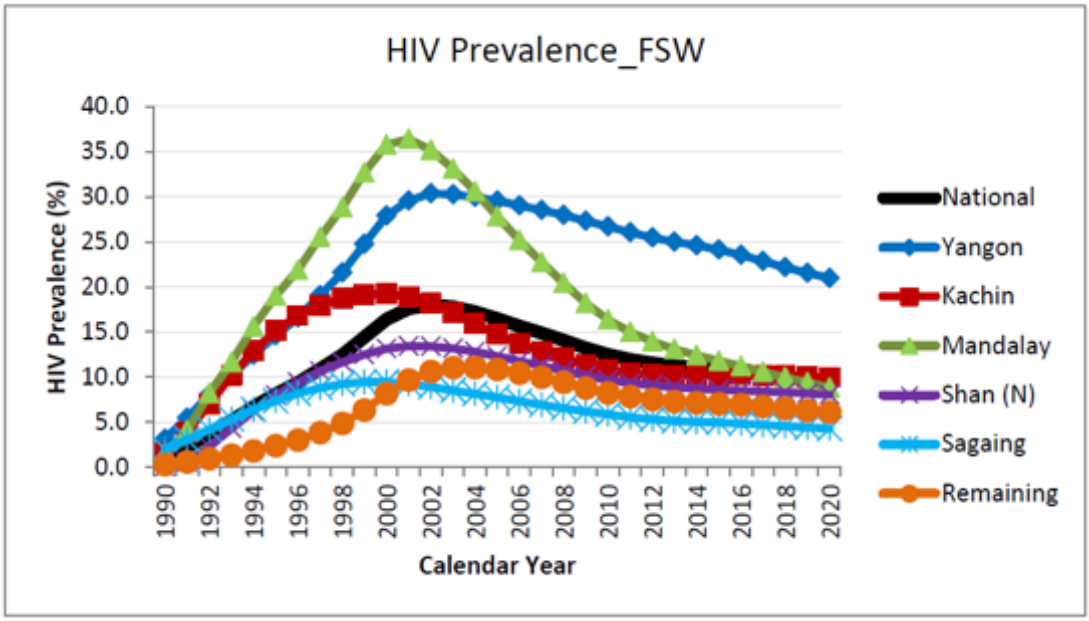
In 2015, the levels of HIV prevalence among FSW in Yangon were similar to those of MSM at 25%. There is no clear pattern in how prevalence varies by modality of sex work. According to definitions in the IBBS report, visible FSW solicit sex openly such as at brothels and on the street; semi-visible are those at entertainment venues; while hidden FSW connect with clients virtually, by phone, or through third parties. In Mandalay, HIV prevalence appears highest among visible FSW.

Fig. 13. HIV prevalence among FSW subgroups, 2015 IBBS



In contrast to MSM, the projections show stable or declining prevalence among FSW across sub-regions, still at around 5–10% and highest in Yangon at around 20%. Kachin again has the most elevated figure outside of Yangon (Fig. 13).

Fig. 14. HIV prevalence trends among FSW and clients from the April 2019 AEM



National-level estimates and projections show that PWID is the group most impacted by HIV overall, followed by FSW, MSM and male clients of FSW. The prevalence of HIV in all groups has been relatively stable over time, yet this masks important sub-regional differences as shown above (Fig. 14 and 15).

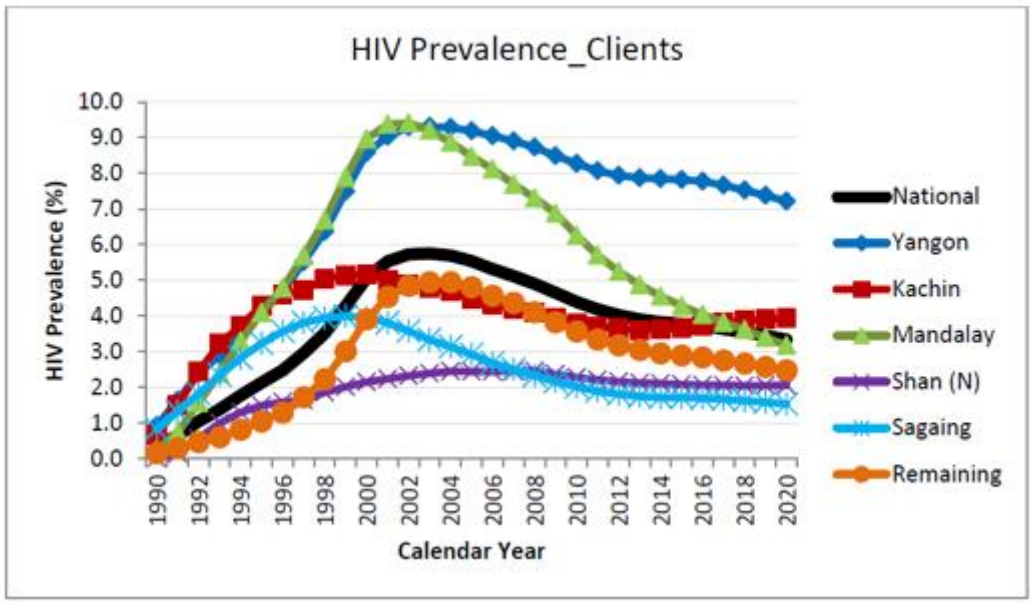
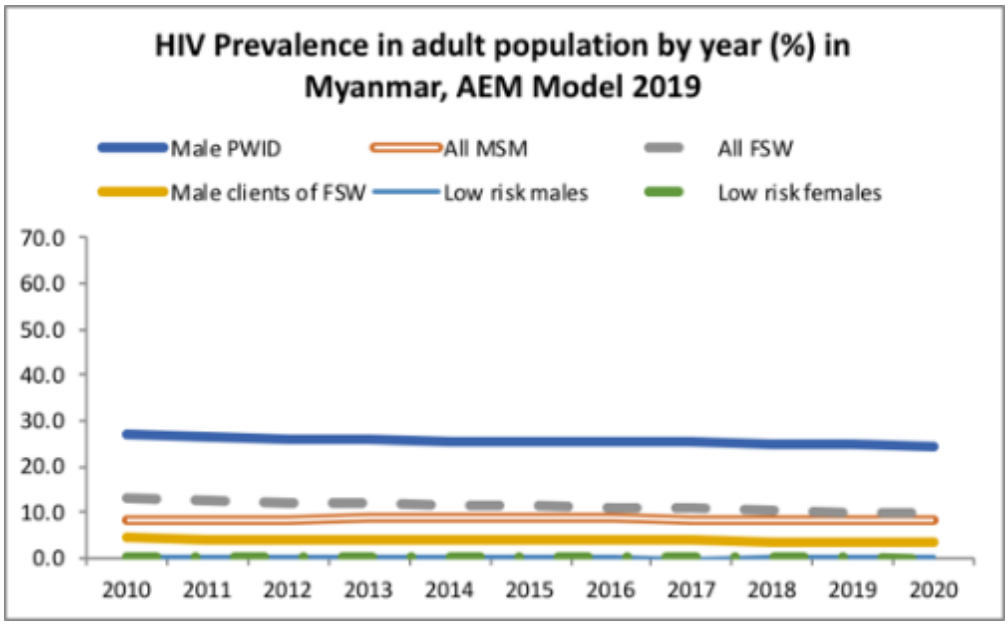


Fig. 154. HIV prevalence trends nationally from April 2019 AEM



HIV incidence

Incidence provides a much clearer picture of the epidemic situation because it describes new infections whereas prevalence is influenced both by new infections and mortality.

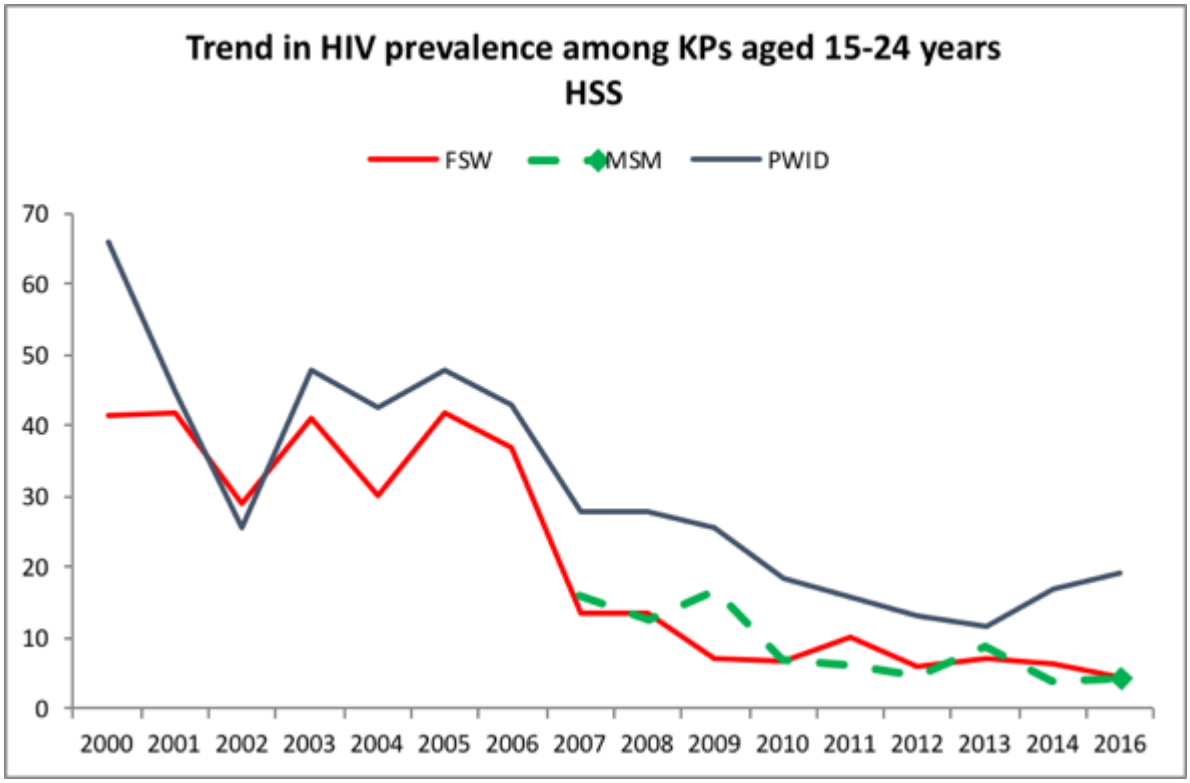
A good and comprehensive HIV case reporting system can provide a rough approximation of new infections and is useful to understand the gender and geographical distribution and trends. In Myanmar, there was HIV and STI reporting until several years ago; however, the system is not functioning currently. DHIS2 records data on HIV test results but these data are not included in the progress reports produced by NAP or in other documents available for this review. The NAP confirmed that the data on new diagnosed cases is not examined or analysed by the NAP or partners. There are no data on new HIV-diagnosed cases from private providers. Some large private hospitals in the country conduct HIV testing and do not provide the data to the NAP.

Laboratory tests for incidence are not used in the country. In some countries, incidence tests such as the limiting antigen (LAg) assay used to be included in biobehavioural surveys but they could only estimate incidence at the population level and there are known biases. Currently, there is a reagent test for incidence at the individual level. However, it is not prequalified by WHO, so it is not used in Myanmar in clinical settings.

Myanmar could still pilot the rapid reagent test, for example, as part of the IBBS, but has not done so yet (*see* footnote for more information on this). [5,6]

A proxy for incidence is the trend of HIV prevalence in youth aged 15–24 years. These data are available from HSS and show a sustained decline in KPs since the mid-2000s at the national level. However, there is an uptick among PWID since 2014, which suggests increasing HIV incidence (Fig. 15).

Fig. 165. HIV prevalence trends in young KPs from HSS, as a proxy for incidence



Source: Analysis based on estimates presented in HSS reports

Projections from AEM/Spectrum also show declining incidence nationally in all subgroups since roughly the year 2000. Currently, new infections are primarily in male PWID and in the "low-risk females" category. This category reflects all females who are not FSW, including female partners of MSM, male PWID and other women.

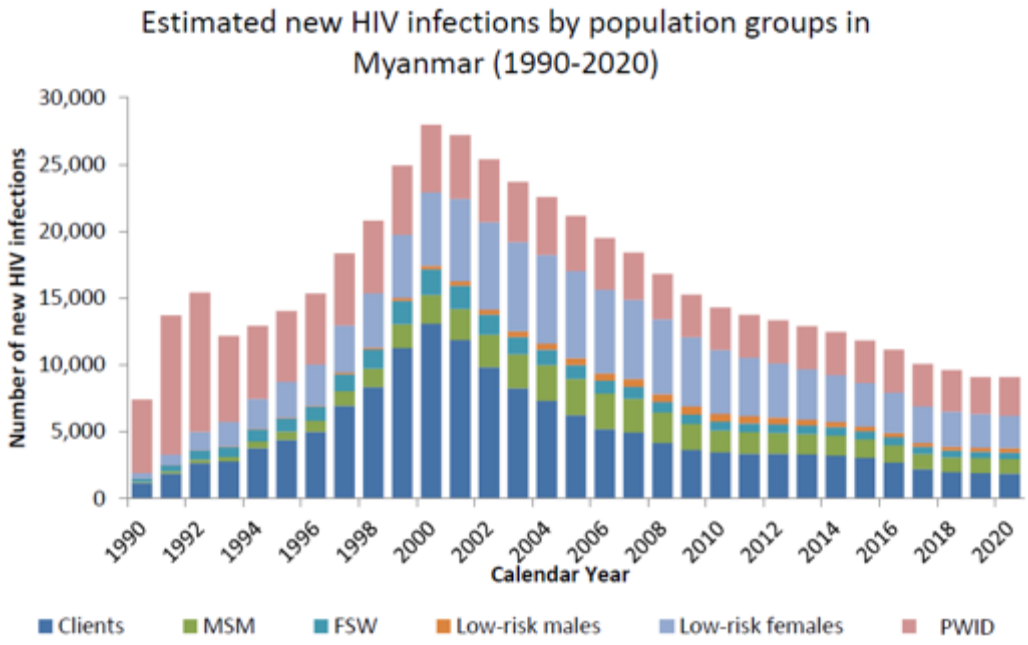
One of the strengths of modelling in Myanmar is the development of sub-regional models. The models clearly show different profiles of new HIV infections across regions. In Yangon, most new infections occur among MSM, clients of FSW and low-risk females. In Kachin, the vast majority are among male PWID. In Mandalay, the profile is more

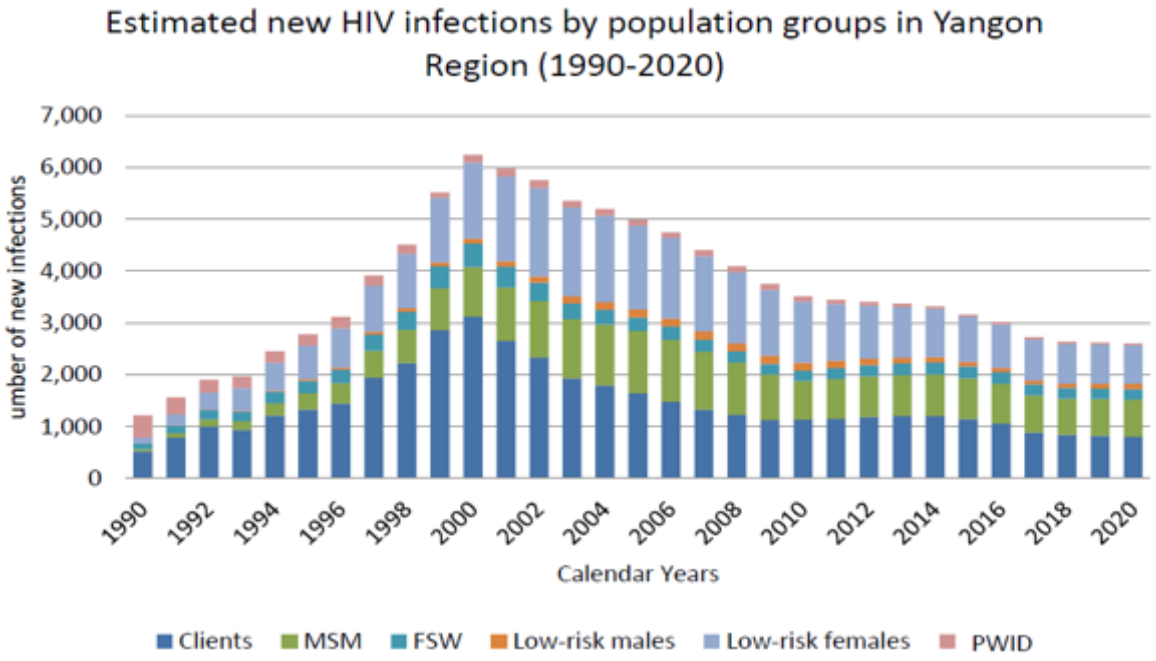
[5] WHO Working Group on HIV incidence measurement and data use. Meeting report. 3–4 March 2018, Boston, MA, USA (https://www.who.int/diagnostics_laboratory/links/180622_boston_meeting_report.pdf?ua=1, accessed 31 August 2019).

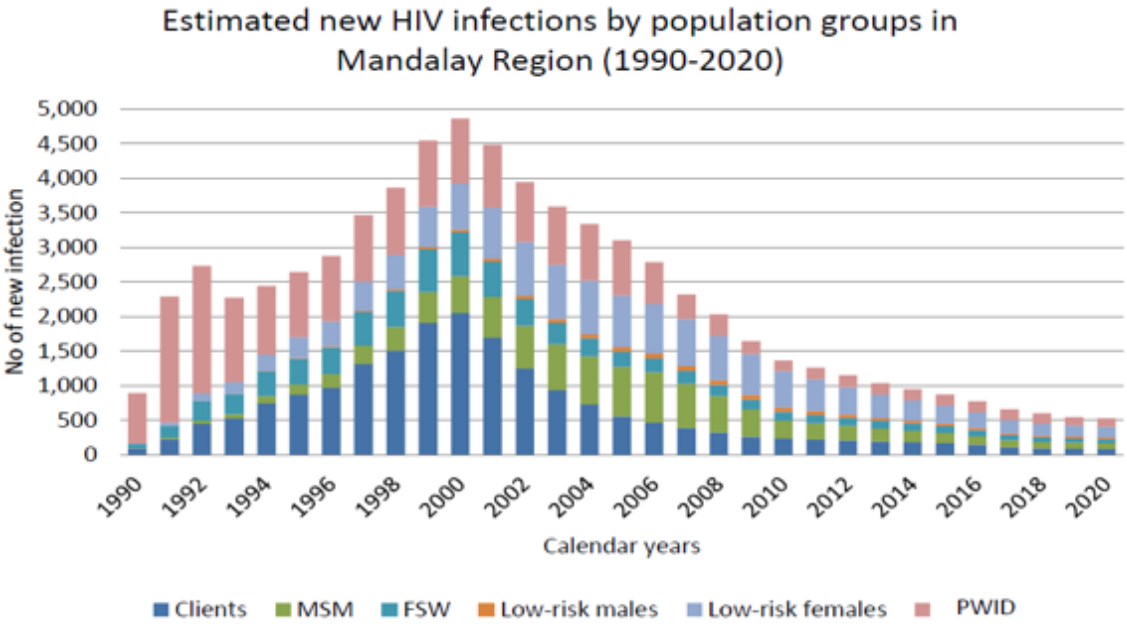
[6] Northbrook S. Using rapid HIV recency assay to rapidly detect, monitor, and respond to recent infections in Central America. PEPFAR; 2018 (https://www.pepfar.gov/documents/organization/285520.pdf, accessed 31 August 2019).

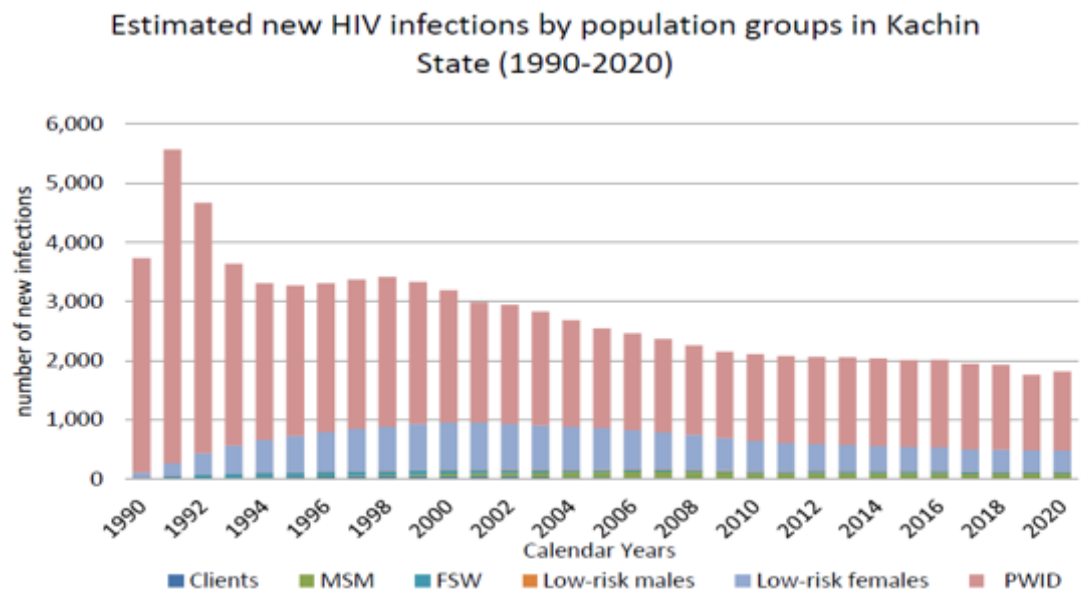
mixed. Mandalay shows a large decline in incidence while incidence is declining more slowly in Yangon. Incidence in Kachin has remained virtually unchanged since roughly 2010 in Kachin (Fig. 16).

Fig. 176. Projected new HIV infections, from April 2019 AEM









Source: 2016 HIV estimates and projections (national and subnational levels) National AIDS Program, MoHS, 2018

Prevalence of STIs and hepatitis

The focus of this review was HIV but as STI and hepatitis B and C are closely related to the HIV epidemic, the participants in the workshop looked at these data as well.
The STI case reporting system in place is integrated through routine reporting via DHIS2, but is only syndromic reporting. Therefore, it is not possible to characterize the patterns of STI across the country. However, HSS and IBBS include testing for syphilis in all groups, and hepatitis B and C among PWID as part of the IBBS. IBBS data from 2014 and 2017 show that hepatitis C is quite prevalent, with 54% prevalence in Yangon and 27% in Myitkina as examples. Hepatitis B is less common (4–6%). There is considerable

prevalence of hepatitis C across IBBS sites, ranging roughly from 20% to 85%. There have been large declines in Myitkyina and Muse but elsewhere changes are minimal from 2014 to 2017–2018 (Fig. 17 and 18).

Fig. 187. HIV and hepatitis prevalence among PWID from the 2017–2018 IBBS

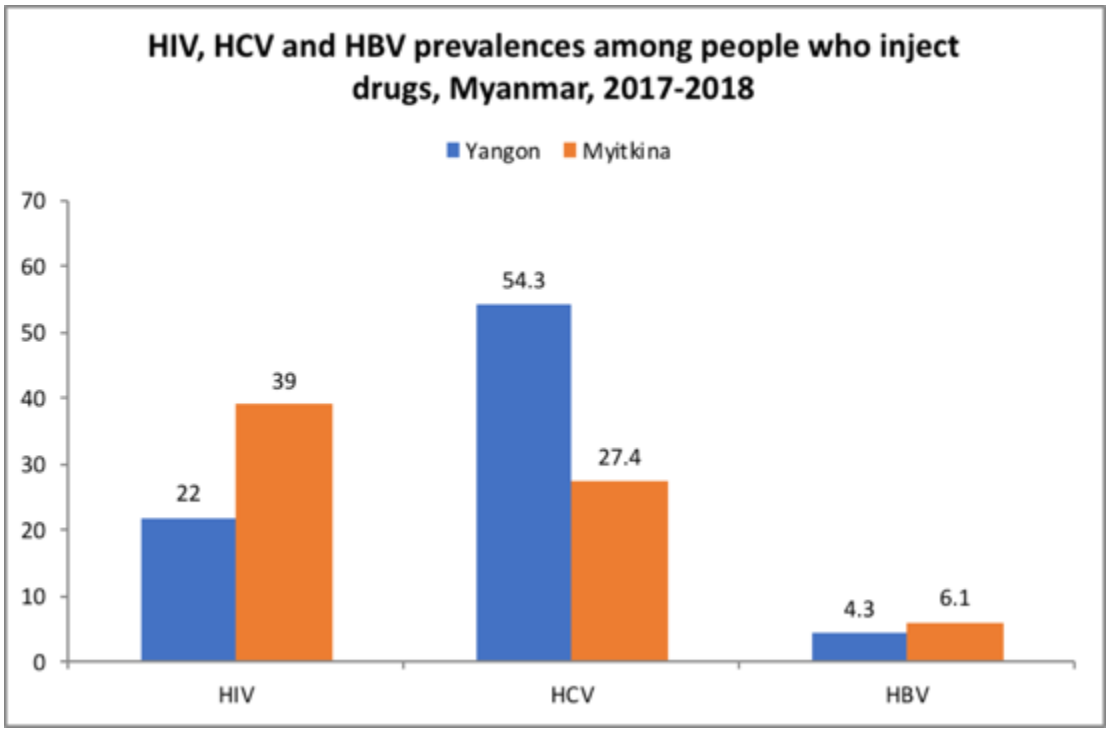
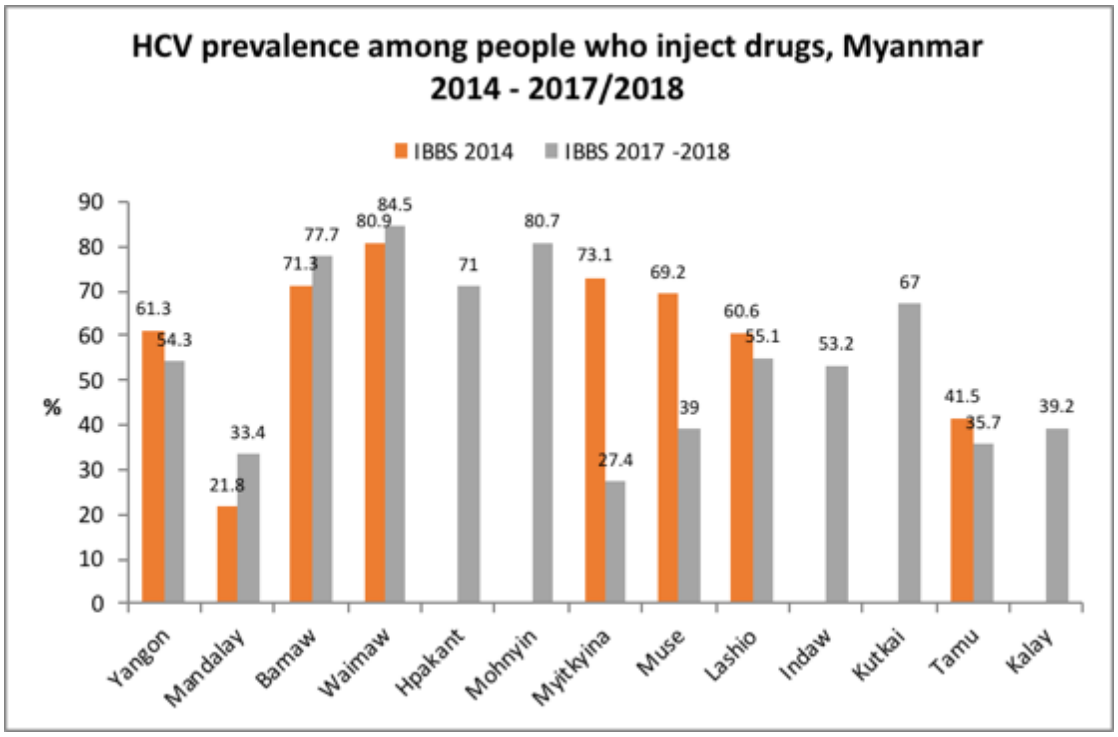


Fig. 18. Hepatitis C prevalence among PWID across sites from 2014 and 2017–2018 IBBS



A recent cross-sectional national survey in 2015 in Myanmar among the general population of 18 townships found that the average prevalence of hepatitis B and C viral infections was 6.5% and 2.7%, respectively. The highest prevalence of hepatitis B infection was 12.3% in the Yangon Region and the lowest was 3.3% in Magway Region. Regarding hepatitis C prevalence, the highest was 10.3% in Mon State and the lowest was 0.3% in Bago Region and Chin State.

The MoHS has set up a national hepatitis control program within the Division of Communicable Diseases with four similar strategic directions.

In contrast, the prevalence of syphilis by VDRL is moderate, around 3–7% in KPs. The prevalence of syphilis declined from 2% to 0.3% among ANC clients nationally and increased from 1.1% to 3% among military recruits, perhaps due to higher risk behaviours among younger males, yet there are no general population data on risk behaviours to confirm this (Fig. 19).

IBBS data show similar levels of up to about 6% among PWID. The review did not identify estimates of syphilis in the MSM and FSW IBBS, although testing was conducted (Fig. 20).

Fig. 19. Syphilis (VDRL) prevalence across groups, from 2008, 2014 and 2016 HSS

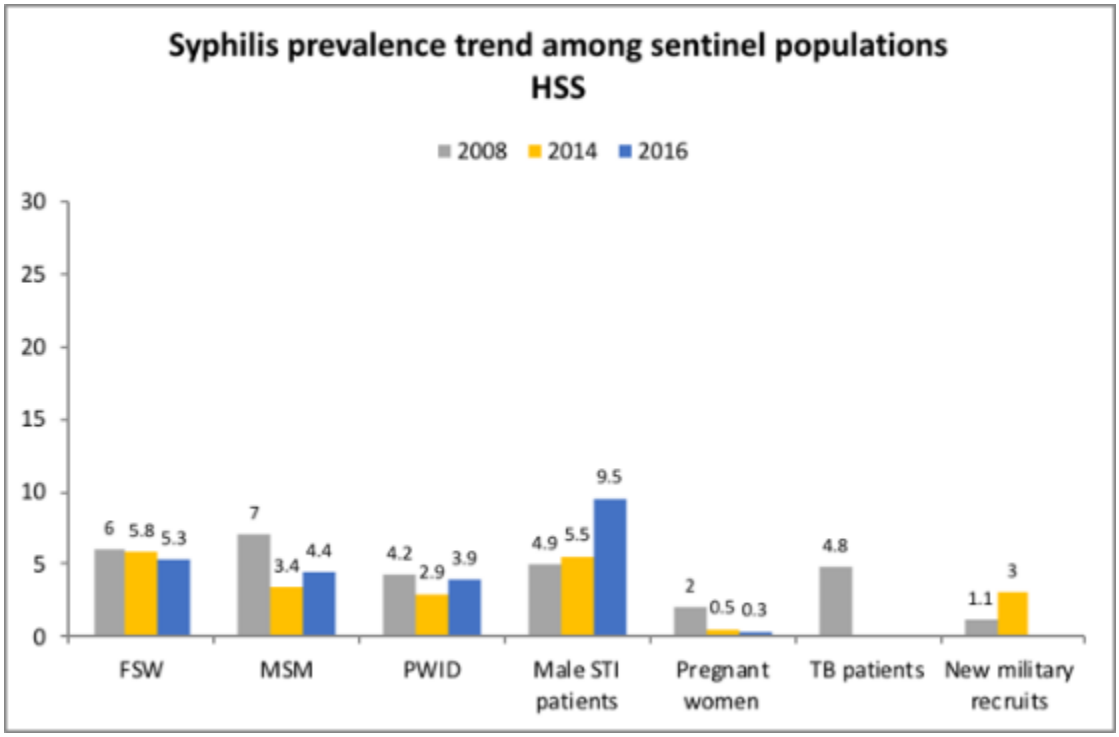
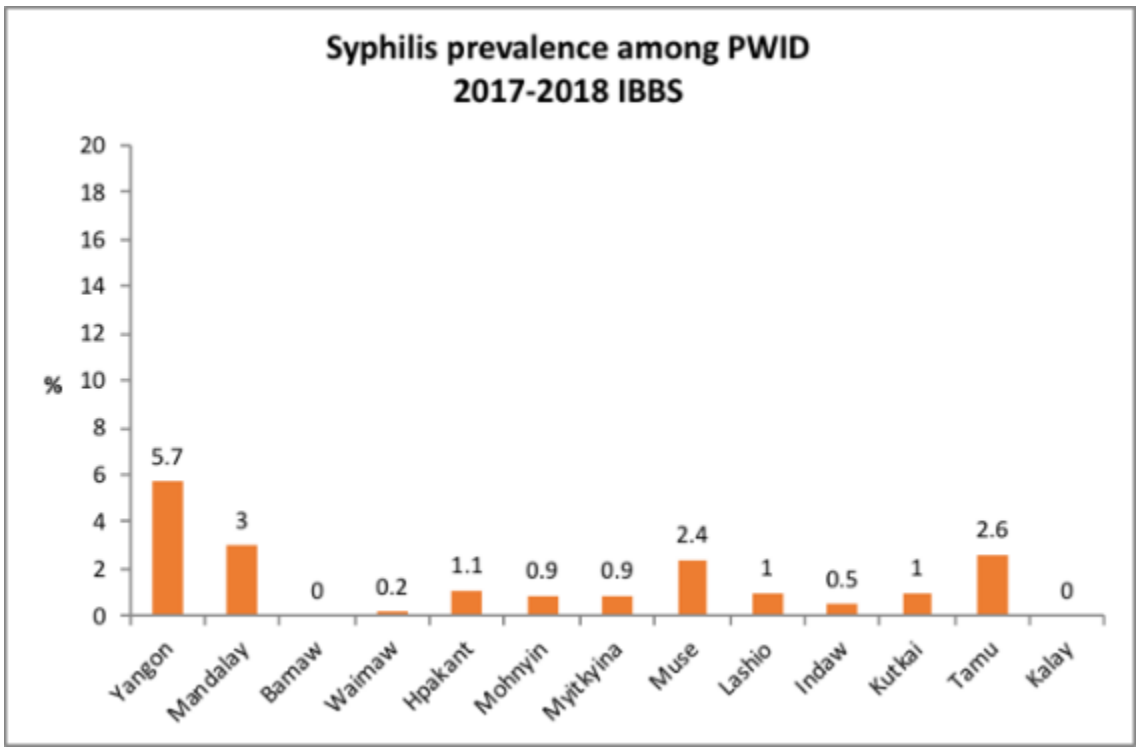
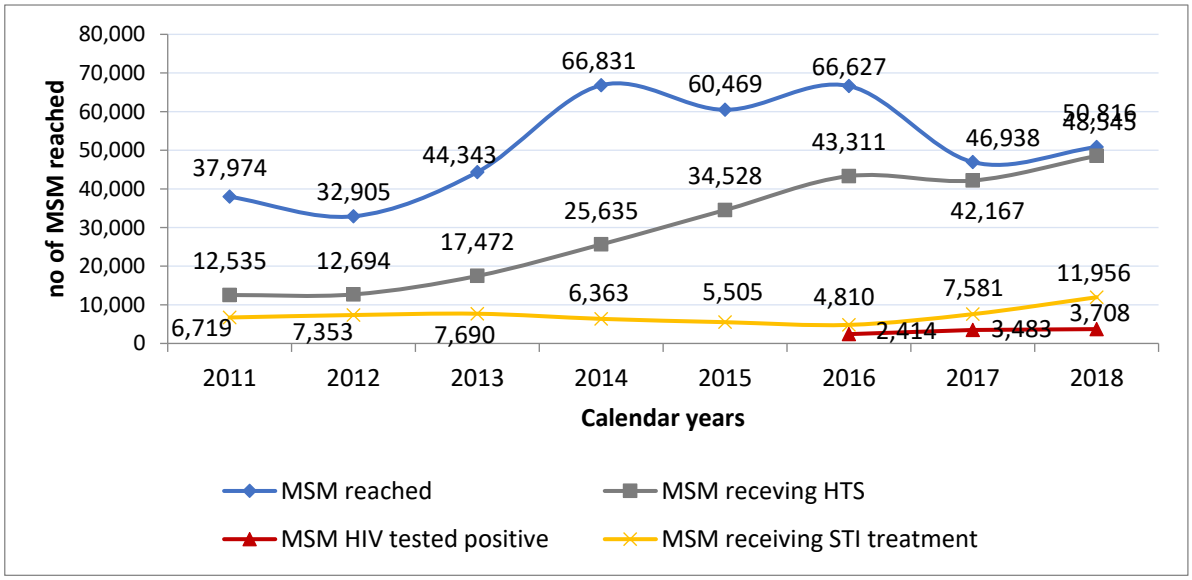


Fig.20. Syphilis prevalence among PWID across sites from 2017–2018 IBBS



In addition, specific programmes for KPs do report STI treatment as presented in the yearly progress report in Fig. 21 as an example for MSM. Tracking STI treatments is an important indicator of the prevention programs impact.

Fig. 21: Men who have sex with men reached with prevention, HTS and STI treatment (2011–2018)

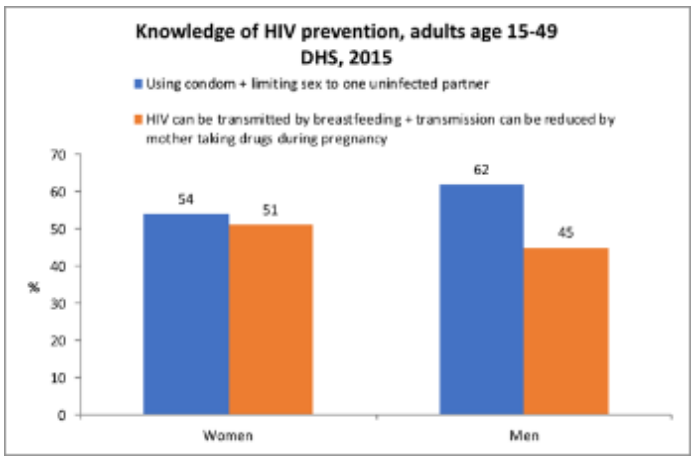


It is important to continue close collaboration in this strategic direction among these three communicable diseases as they are directly interwoven.

Awareness and understanding of HIV

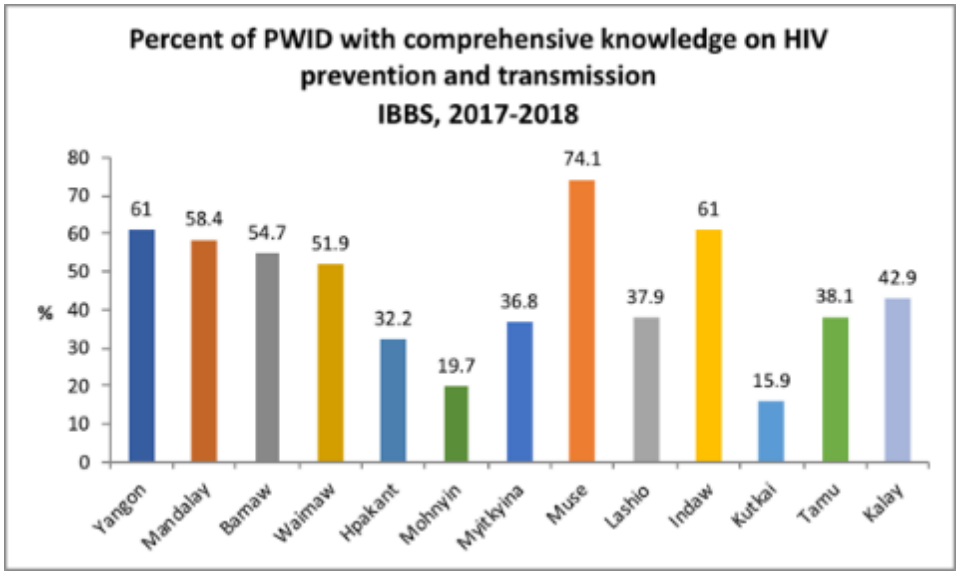
In the general household population as of 2015, 54% of women and 62% of men aged 15–49 years understand that condom use and limiting sex to one uninfected partner are ways to prevent HIV. Fewer understand PMTCT. Thus, about half of the population is aware of HIV transmission and prevention, so that an important gap remains (Fig. 22).

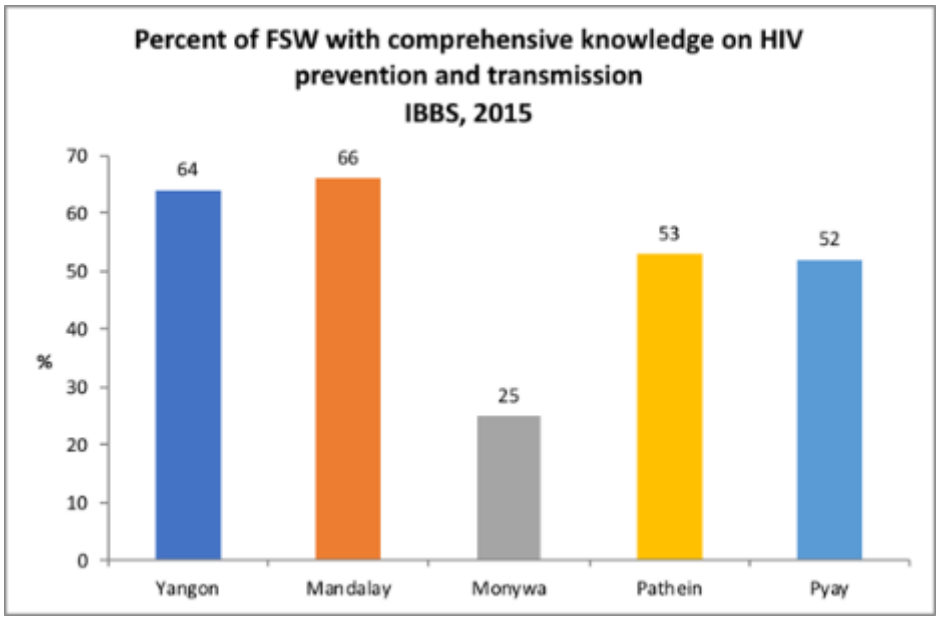
Fig. 192. HIV knowledge in the general population, from the 2015 DHS

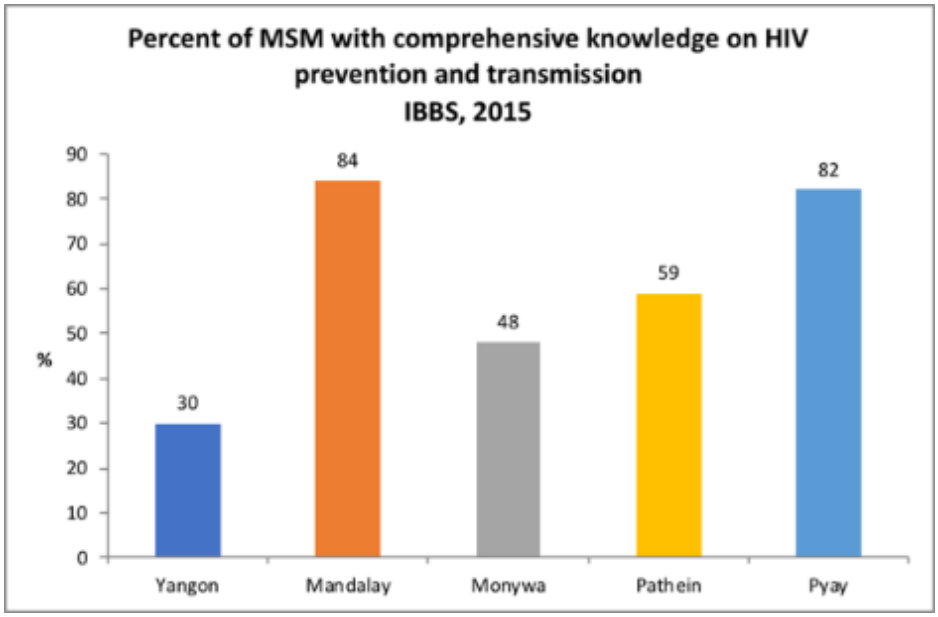


Levels of knowledge among PWID, FSW and MSM are generally similar, although with important variation across sites. Among individuals in high-risk populations, 16% to 84% were able to demonstrate comprehensive knowledge according to a standard six-question index used in the Global AIDS Response and Progress Reporting (GARPR). The low prevalence of comprehensive knowledge among MSM in Yangon (30%) is of particular concern given the severity of the epidemic there (Fig. 23).

Fig. 23. HIV knowledge among KPs from the most recent IBBS rounds







Risk behaviours

Monitoring risk behaviours through surveys such as the IBBS and DHS provides a context for understanding the changes in incidence and prevalence. High levels of risk behaviour point to continuing vulnerability for continuing transmission.

Injection drug use in Myanmar is nearly exclusively heroin according to the 2017–2018 IBBS. At the same time, half of people who inject heroin also use amphetamines and many use heroin and opium through other routes of administration.

Table 4: ***Types of illicit drugs used in past 12 months by PWID, IBBS 2017–2018***

Injected drugs	Non-injected drugs		
Heroin %	Heroin %	Amphetamines %	Opium %
99.0	65.5	51.1	35.6

Approximately 10% or fewer PWID reported injecting with a needle or syringe that had been used by someone else (“receptive sharing”) in the past month. This is a moderate level of injection risk behaviour given the high levels of HIV prevalence among PWID (Fig. 24).

Sexual transmission by male PWID is also likely, since the vast majority have regular sexual partners and between 3% and 30% across sites paid for sex, making them FSW clients. Fewer male PWID had engaged in sex with other males, with the highest level in Mandalay. By this measure, there seems to be minimal overlap between PWID and MSM. Were it present, such overlap could act to accelerate HIV transmission through the population (Fig. 25).

Fig. 204. Receptive needle/syringe sharing among PWID, 2017–2018 IBBS

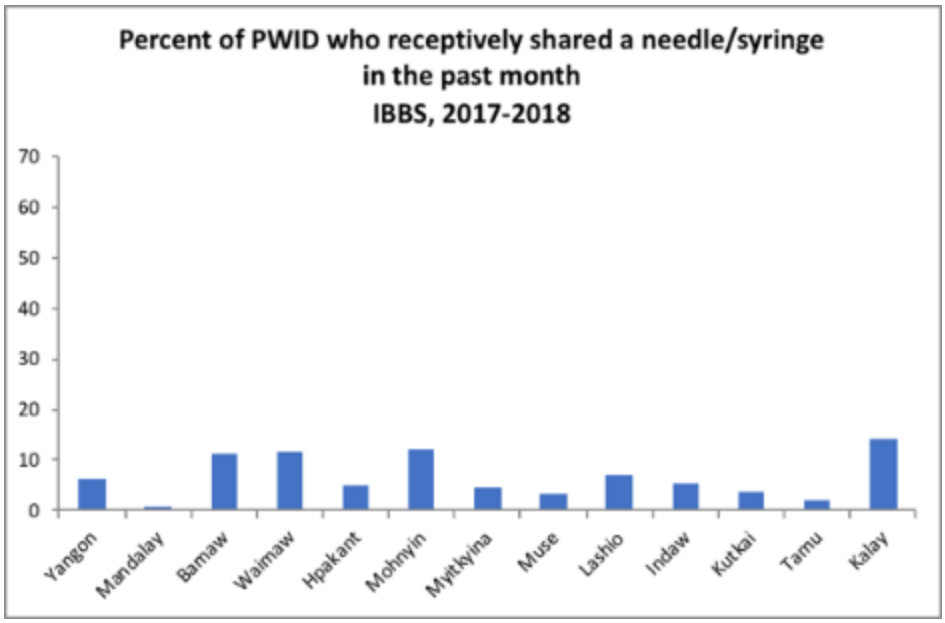
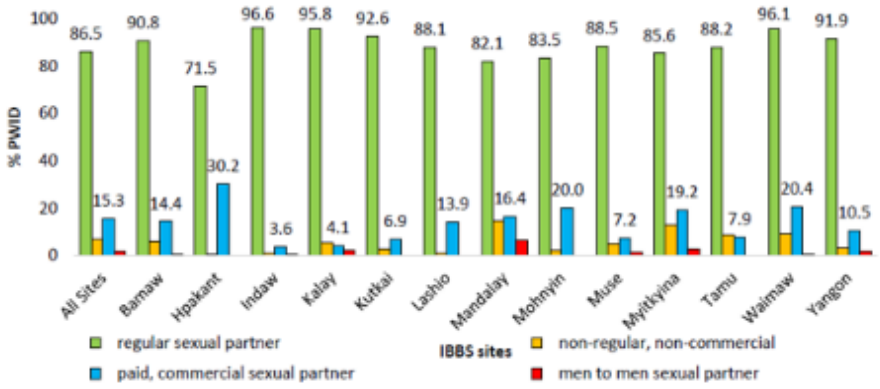
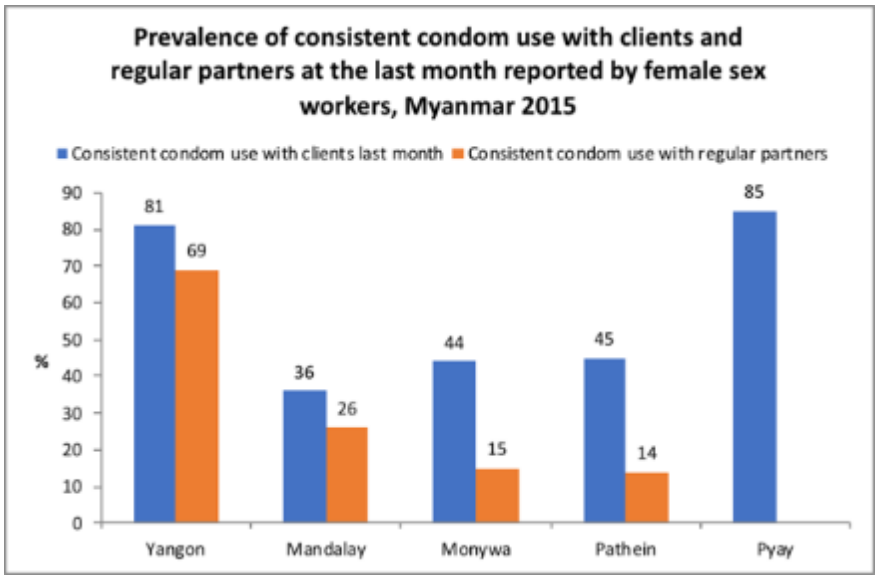


Fig. 215. Prevalence of commercial and non-commercial sexual partnerships among PWID, 2017–2018 IBBS



Among FSW, the proportion who consistently use condoms with clients was moderately high in Yangon and Pyay (>80%) yet below 50% in other sites. Condom use was lower with non-commercial sex partners. These figures appear to be at odds with the projected decline in HIV incidence; perhaps ART use has expanded quickly enough to offset high-risk behaviour (Fig. 26).

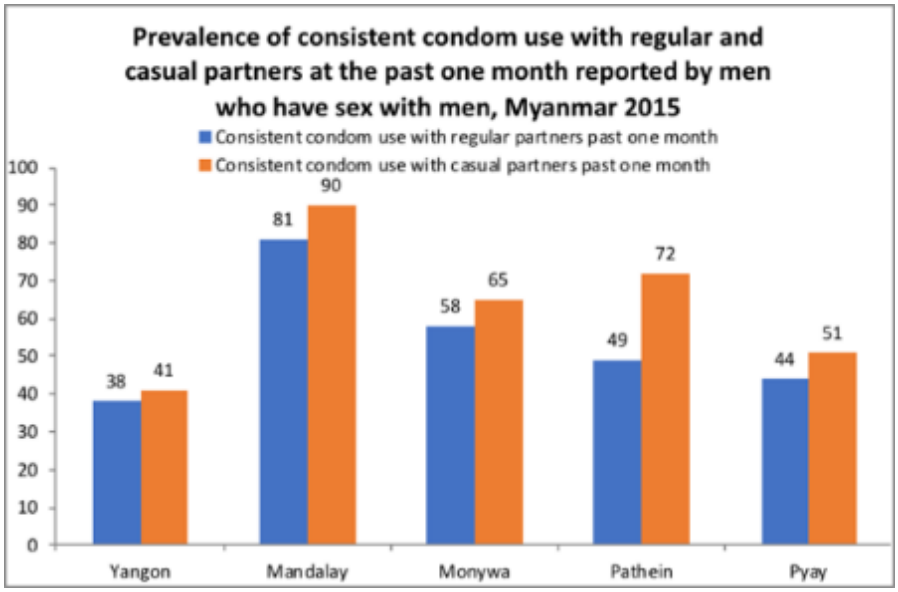
Fig. 226. Consistent condom use among FSW, 2015 IBBS



Source: IBBS 2015

Among MSM, consistent condom use with regular partners was highest in Mandalay (81%) yet very low in Yangon (38%) and only slightly higher at other IBBS sites (44–58%). Condom use was not much higher with casual partners, except in Pathein. These important gaps reflect past-month condom use and would be even greater when examining a longer time window (e.g. past 6 months) (Fig. 27).

Fig. 237. Consistent condom use among MSM, 2015 IBBS



There are also important levels of male sex work and sex with female partners. Across sites, the highest levels of sex work were in Yangon at 25% of MSM and 15% in

Mandalay. Condom use with male sex clients ranged from 65% to 86% and could not be estimated at other sites. Most MSM (48–77%) had a female partner in the past month and most had more than one: the median number ranged from 3 to 6 in the past month. Consistent condom use with female partners could only be estimated for one site, Pathein, where it was minimal (18% of MSM).

MSM – Commercial partners

MSM	Sex work in the past 12 months	Consistent condom use during anal sex with male commercial sex partners last month
Yangon	25	
Mandalay	15	86
Monywa	4	
Pathein	3	68
Pyay	11	65

Source: IBBS 2015

MSM – Female partners

MSM	Had female sex partners last month %	Median female sex partners (25^{th}–75th percentile)	Consistent condom use female sex partners last month %
Yangon	63	6 (2–15)	n/a
Mandalay	48	3 (1–5)	n/a
Monywa	64	7 (3–18)	n/a
Pathein	68	4 (2–6)	18
Pyay	77	4 (3–15)	n/a

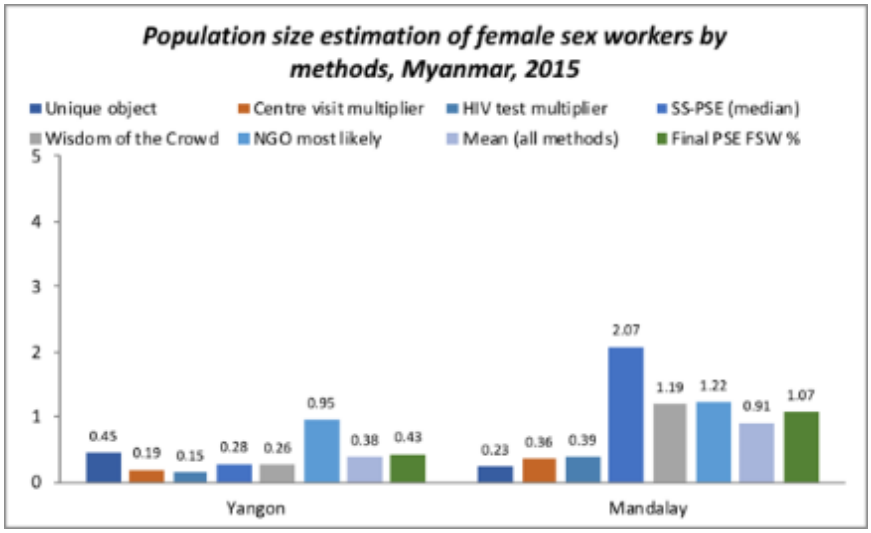
Source: IBBS 2015

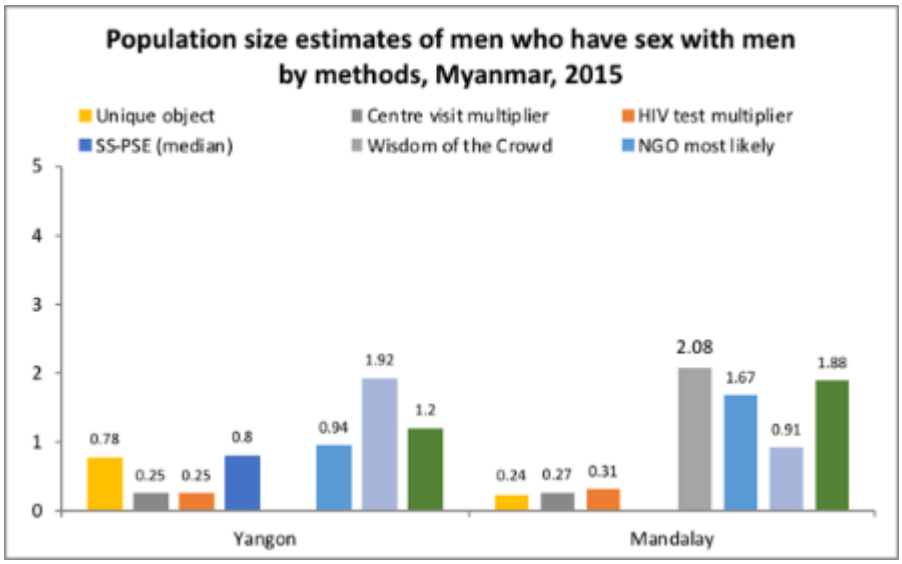
Population size estimates of KP

PSEs are produced in the context of IBBS using multiplier methods (unique objects and services multipliers), the RDS successive sampling estimator (SS), wisdom of the crowds (WOC), and NGO programme data on number of KPs reached. Following each IBBS, a workshop has led to a final consensus PSE, which has been set near the mean of the estimates from the different methods. Fig. 248 shows the 2015 estimates for Yangon and Mandalay.

Many of the multiplier estimates are below the NGOs' programme data on number of KPs reached. This would suggest that these multipliers underestimate true PSE. However, the programme data are likely to include double-counting, so they may be too high. Even though the workshops applied a correction for mobility across programmes, this cannot correct for double-counting within programmes. A second issue is that the WOC estimate is often much higher than several other estimates (e.g. MSM and FSW in Mandalay). Thus, the WOC estimate, which is not a recommended method, may be pushing the final PSE upward.

Fig. 248. Population size estimates for FSW and MSM, based on the 2015 IBBS





Cascade of prevention, treatment and care

Monitoring service cascades is important to identify gaps in programmes and services and is a key part of M&E and strategic information. In Myanmar, this is difficult due to the lack of a unique identifier as well as stronger data on new HIV diagnoses. Nonetheless, Myanmar has undertaken analysis to construct several cascades both at the national level and by sub-region. This is valuable information that hopefully will improve as the use of DHIS2 becomes more routine and once a unique ID is introduced.

Continuum of treatment and care

The 2018 Progress Report presents a cascade for PLHIV from testing to viral suppression. The cascade is based on several assumptions because some key items were only partially available (testing, viral suppression and mortality). It suggests that 80% of PLHIV know their HIV status and 36% of PLHIV who received the viral load test have attained viral suppression. It should be noted that viral load was just recently made available countrywide and the data are still from the last year.
A cascade for Kachin State shows that about 77% of PLHIV know their status and 15% of PLHIV who received the viral load test are virally suppressed. Similar cascades for other states and regions have been included in sub-regional operational plans. Township-level cascades are also presented.

UNAIDS recommends the use of two alternatives to construct the cascade. The first approach is to use all PLHIV and the second to use the numerator of the previous pillar as denominator. Both results represent different interpretations. Another limitation is that there are no specific cascades for KP (Fig. 29, 30, 31).

Fig. 29. PLHIV cascade from the 2018 Progress Report

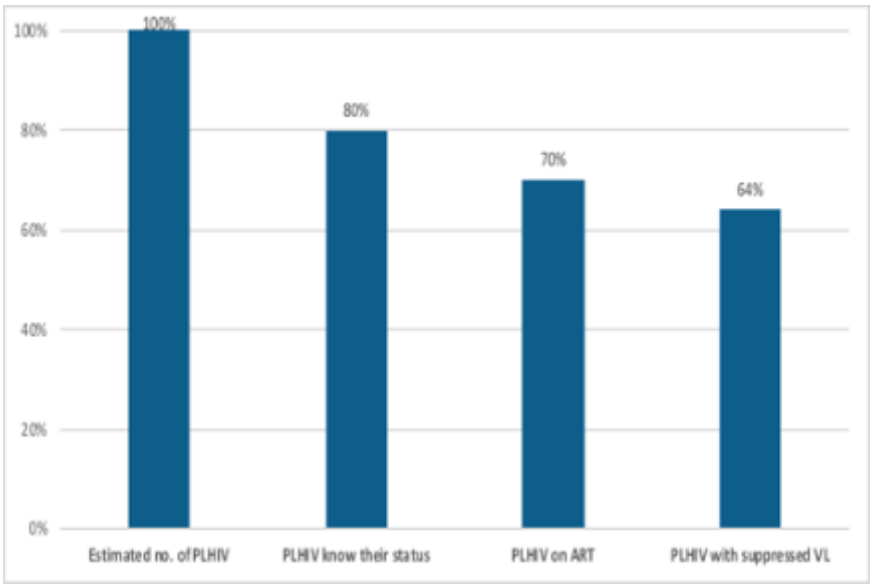
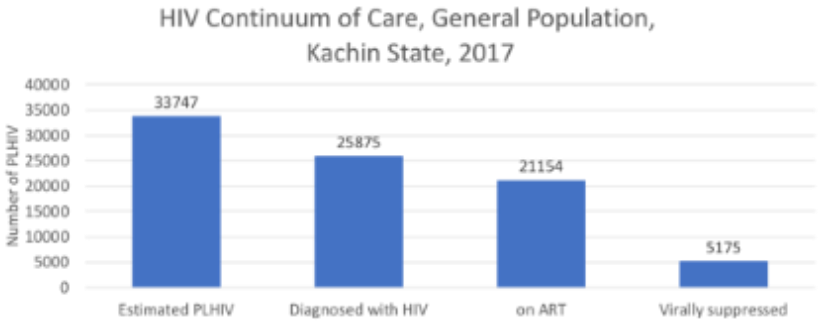
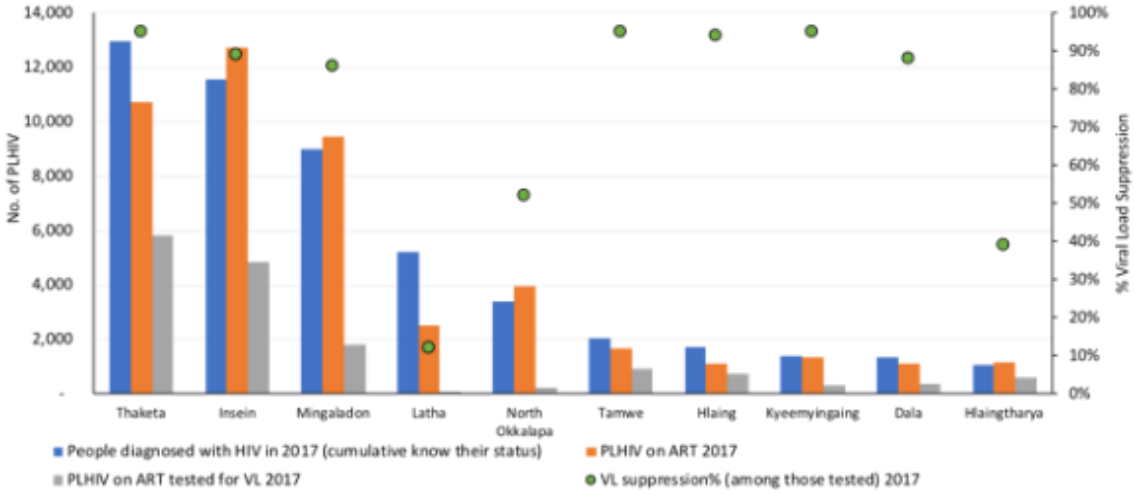


Fig. 30. PLHIV cascades for Kachin State, 2017

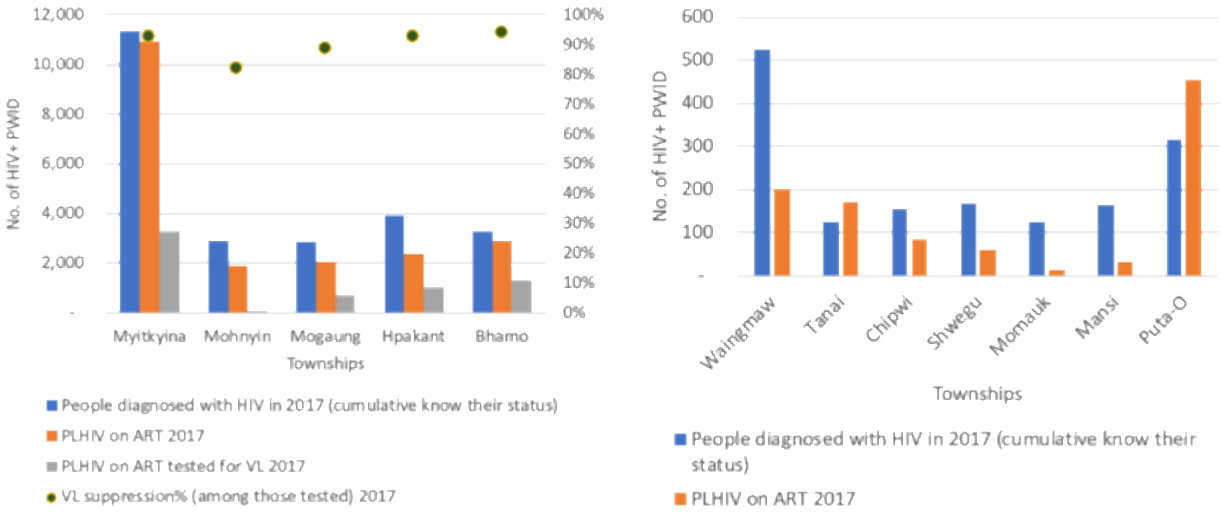


* Viral suppression rate is among those who have accessed VL testing only.

Fig. 251. PLHIV cascades for Kachin State by township, 2017



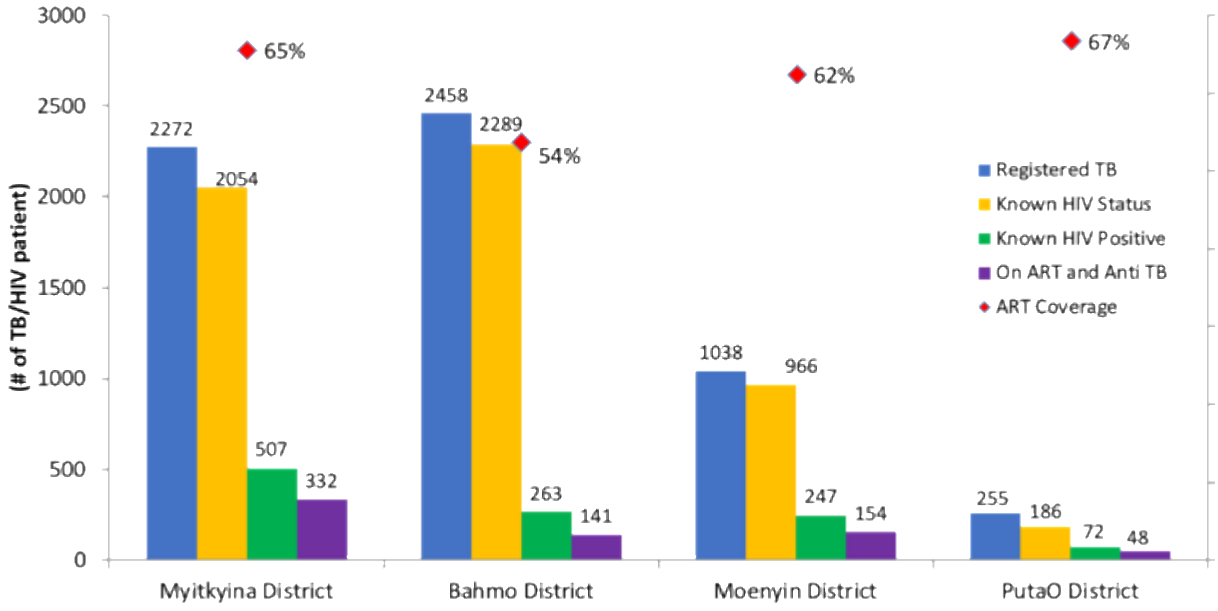
HIV continuum of care by township, Kachin State, 2017



TB–HIV

A 2016–2017 mortality survey by verbal autopsy identified TB as the tenth leading cause of death in Myanmar. However, statistics are not available regarding TB mortality among PLHIV. In 2018, the National TB Program conducted a nationally representative general population survey of TB with 66 480 participants. The survey identified 322 bacteriologically confirmed cases and 806 who had initiated TB treatment. Of these 806 TB patients in treatment, HIV prevalence was about 1%. By comparison, HIV prevalence in routine TB programme data was 9%. This suggests that PLHIV with TB may be more likely to be sick and access the TB centre so the number of TB–HIV cases which still stay in the general population is much lower. The TB service is not integrated with the HIV service and linkage is poor in many places. Continuum-of-care cascades for TB are included in the NAP's subregional operational plans. The example below, again for Kachin State, illustrates the gap in treatment among registered TB patients who have tested positive for HIV (Fig. 32).

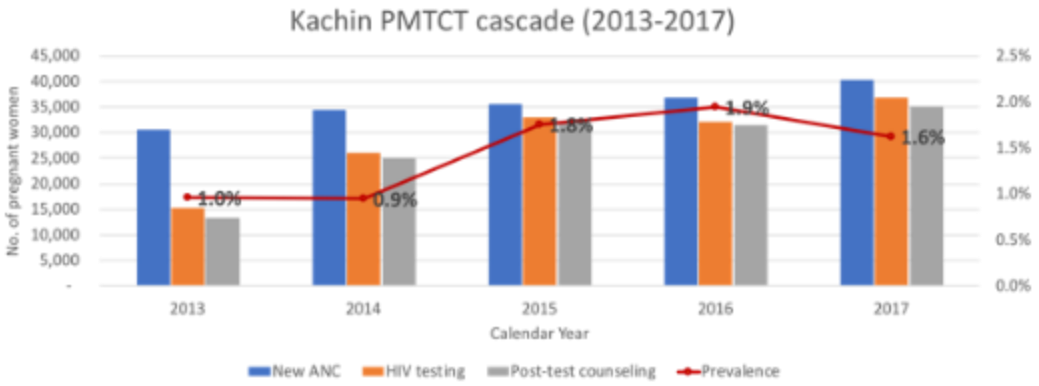
Fig. 262. Cascade of TB–HIV patients in Kachin State



Elimination of mother-to-child transmission of HIV

Regarding PMTCT, cascades constructed by the NAP and partners follow women from presentation at ANC to HIV testing, and post-test counselling. However, they do not extend to initiation on ART, test results for newborns, or follow up for confirmatory testing of infants. Fig. 33 for Kachin State, as an example, shows that the gap in HIV testing improved dramatically from 2013 to 2017, while HIV positivity also increased from 1.0% to 1.6%.

Fig. 273. PMTCT testing and counselling outcomes for Kachin State, 2013–2017



Transmitted drug resistance

Monitoring the development of drug resistance is increasingly important as the use of ARVs expands as a part of treatment and prevention. A WHO guideline recommends several methods, including surveys and tracking early warning indicators (EWI) at ART facilities over time. These activities are part of NSP III.

EWIs were tracked in Myanmar in 2014 and 2015, including: on-time pill pick-up; retention on ART at 12 months; and drug stock-outs. However, the EWIs have not been followed up since then. According to the global *HIV drug resistance report* in 2017, in that year, Myanmar was the only country reporting pre-treatment drug resistance (PDR) survey data in the South-east Asia region: non-nucleoside reverse transcriptase (NNRTI) resistance was low at 3.9%. PDR surveys measure resistance in people starting ART.

Conclusions and Recommendations

The HIV epidemic is complex and dynamic in this large country with multiple ethnic groups and recent political, sociodemographic and economic changes. Therefore, it presents heterogeneity of the epidemic in the context as well as in the level of HIV prevalence among KPs. There are states and regions with a relatively low level of HIV, others with much higher epidemics. The populations more affected are in very well identified KPs. In the context of these kinds of epidemics, three main determinant factors contribute to HIV infection. First is the level of infection among KPs. HSS surveys have shown that prevalence levels in some provinces and in some populations are well above 20%. Second is the population size of these KPs.

Myanmar has continued to improve the estimation of the populations most at risk for and more vulnerable to HIV infection and are more at risk, as not all members of KPs are at the same level of risk. The methods have improved over the years. Third is the interaction between KPs and other population groups. The IBBS studies conducted in Myanmar have shown the interactions and the level of contact between different population groups, and the level of protection that these populations have adopted. In the case of Myanmar, most of the new infections are coming from KPs and their sexual partners. However, the risk of having an explosive HIV epidemic in the general population is very low.

The epidemic in Myanmar is mostly concentrated and extremely important in KPs such as PWID, MSM and FSW with clear levels and trends in many of states regions, as presented in the report.

HIV/AIDS case reporting has proved its value in the 1990s and should be revitalized. It is not necessary to develop a new system but rather link existing information systems, such as HIV testing and care.

Myanmar has acquired long and large experience in conducting IBBS with different methods and populations, and has tried to be consistent over time in terms of location and populations. The use of this information is critical to plan interventions with KPs in the right places.

Programmatic mapping for interventions should be also a priority, so that districts can improve planning and implementation of prevention, care and treatment activities.

DHS provide very useful information among the general population and for other indicators. The next DHS is planned for 2020. The questionnaire used should be revised accordingly, taking into account the latest developments and expanded.

The prevention, care and treatment cascade for all population and treatment services (TB, PMTCT and ART) have shown some gaps that should be addressed. In this time of scaling up of ART and the fact that KPs are very mobile and stigma is still highly prevalent, a quick epidemiological analysis at the national level is not straightforward.

Much more pertinent is measuring new infections, HIV incidence among KPs and morality trends, but these indicators are hard to measure in concentrated epidemics. The fact also that KPs are very unevenly distributed makes it harder to evaluate the impact of interventions at the national level.

Myanmar has made tremendous progress in increasing the number of people tested and initiated on ART, with more than 100 000 from a few thousands in early 2011. Therefore, measuring impact should be done at a more local level and for each KP, as well as looking at the scale up of interventions put in place.

The second generation surveillance system in Myanmar has been able to track the HIV epidemic among KPs with appropriate methods and tools. Further recommendations listed below were arrived at during the workshop with international and national experts.

Recommendations on routine data

1. **HIV and STI case reporting: need to be revitalized by:**
   - including it in the agenda of the Strategic Information Technical Working Group
   - revitalizing existing policy on HIV case reporting
   - determining how to incorporate case reporting into HIV-DHIS2 and the M&E system
   - making a clear plan to speed up the process of development of the Master Patient Index and the unique identification code as part of revitalization of the HIV and STI case reporting system.

2. **HIV mortality: could be improved through:**
   - coordination with the Central Statistics Office and the Bloomberg Institute in their verbal autopsy programme to request breakdowns of HIV death data (age, sex, geography, etc.)
   - improving the reporting system for defaulter tracing
   - examining the data available from hospital inpatients
   - annually triangulating mortality data from available sources and tracking trends, including the vital statistics, inpatient deaths, modelling output, and programme data.

3. **HIV coinfection with viral hepatitis and TB**
   - Improve understanding of the relationship between TB and HIV, compare the geographical, age and gender distributions of burden of disease (mapping routine and survey data).
   - Strengthen interaction/discussion/regular meetings between the TB and HIV programme focal points to improve collaboration.
   - Increase/strengthen the referral system (through innovative tools, the Internet, SMS, etc.).
   - Draw on isoniazid prophylaxis therapy (IPT) data from registers and OpenMRS at tertiary/specialist hospitals to track coverage.

- Review service models as coverage of coinfection is better at the operational level (integration of services does increase reporting at the township level).
- Strengthen training on definition of IPT indicator among ART staff to improve the reporting system.
- Establish a reporting system for HIV/viral hepatitis coinfection.
- Incorporate viral hepatitis testing into the IBBS of the three KPs to measure trends in coinfection prevalence.

4. STI surveillance

- Monitoring of syphilis among KPs should be continued.
- Include STI monitoring through HSS and/or IBBS (syphilis, chlamydia, gonorrhoea) in KPs.

5. PMTCT

- Strengthen the tracking system to monitor HIV-positive pregnant women and exposed babies until confirmation of HIV status or up to 18 months.
- Conduct operational research periodically regarding the use of contraception among HIV-positive women.
- Reinforce the information system to monitor the criteria needed to monitor elimination of MTCT (ANC coverage, HIV testing among women attending ANC >95%, ART coverage >95%, MTCT <5%).

6. Care and treatment

- For unique ID: secure information technology (IT) support and identify sources of technical assistance to assess interoperability of providers' different systems and develop an approach to link the IDs across platforms.
- Develop a policy enhancing private ART providers to report data to NAP on care and treatment.
- Conduct a review of the information systems for prevention, testing, care and treatment to improve tracking of the cascade, e.g. flow of data, regular data quality assurance, supervision and training.
- Improve quality assurance and M&E components of referral/linkage using the information technology platform.
- Expand viral load testing to 100% of people who are on ART.
- Increase accessibility to ART among KPs, especially PWID with HIV infection.
- Continue collection of the EWIs and, in particular, follow up with facilities.
- Develop a plan for toxicity monitoring as a part of ART (e.g. through sentinel sites).

7. Prevention

- Implement a unique ID across the continuum of services: outreach/prevention, testing, care and treatment.
- Provide clear policy guidance re: confidentiality and security of information (i.e. identity management).
- Explore learning experience interchange with countries that have functional unique ID systems.

- Consider shorter-term reporting (quarterly) to reduce potential double-counting due to mobility.
- Improve programme coverage through internal regular assessments by STI/HIV teams at the local level.
- In routine data collected by KP programmes, incorporate data to allow tracking of multiple risk behaviours by the same person (e.g. PWID-FSW, PWID-MSM, male sex worker, combinations with mobile and migrant populations).
- Plan to conduct operational research on innovative prevention activities (self-testing , PrEP, index testing, social media-based interventions).
- Pilot online BBS surveys for young KPs.

8. Harm reduction

- Engage the Harm Reduction Technical Working Group to review the manual and M&E tools (high level of indicators only).
- Develop standard operating procedures for methadone maintenance treatment (MMT) and needle–syringe programmes (NSP) (e.g. safe needle/syringe disposal).

Recommendations on HSS and other surveys

1. Continuation of HSS and IBBS

- Incorporate analysis by age group and geographical location.
- Consider expanding coverage of HSS to additional townships to detect HIV among KPs (especially PWID) outside of current focus regions/states.
- Develop a clearer roadmap for HSS and IBBS for the next 5 years.
- Continue triangulation of programme data, HSS and IBBS at lower levels.
- Consider adding incidence testing to IBBS: pilot rapid reagent tests through HSS and IBBS or conduct reagent testing among newly diagnosed HIV cases once the test is certified by WHO.
- Improve the understanding of female PWID, and whether there is a need for more targeted surveillance:
    - analyse IBBS data to understand more about female PWID captured ;
    - conduct qualitative research on how to reach female PWID (e.g. by recruiting IBBS participants and their partners for focus group discussions and interviews).
- Improve the understanding of transwomen, and whether there is a need for more targeted surveillance:
    - conduct disaggregated analysis in the upcoming IBBS of MSM who are *apwint*;
    - develop an operational definition of transwomen appropriate to the context of Myanmar.
- Conduct rapid assessment on mobile and migrant populations (especially cross-border), as they are prioritized by the NSP.
- Incorporate questions related to innovative prevention strategies into the IBBS (social media; self-testing; etc.).

- Pilot-test online surveys using social media (dating apps, Facebook, especially among MSM).
- Conduct some KP size estimates in some areas outside of the IBBS.
- Advocate for inclusion of more HIV-related risk behaviour questions in the DHS.
- Consider incorporating network scale up for size estimation in the DHS.

2. Key population size estimations

- Incorporate uncertainty ranges into PSEs.
- Conduct programmatic mapping (hotspot identification and targeting – programme-making and special events [PMSE]) and investigate the mobility of KPs.
- In 2019, conduct PMSE in lowest-burden townships to improve extrapolation of PSEs from a few sites to the national level.

3. Surveillance of drug resistance

- Obtain quality data on HIV drug resistance (HIVDR) from periodic surveys (3–5 years) , while expanding the coverage and quality of routine viral load testing to inform continuous HIVDR surveillance; monitor the quality of service delivery.
- Incorporate toxicity monitoring in the two main tertiary hospitals (WHO toxicity guidelines).

4. Use of HSS and IBBS for estimation and projections

- Enter data into the AEM on overlapping risk behaviours (MSM-PWID and FSW-PWID) as it becomes available, in order to understand the impact on projections.
- Disaggregate new HIV infections among “low-risk” females from the AEM output worksheet to understand the routes of transmission to them (partner of PWID, partner of MSM, partner of client, other).
- Add breakdown to the AEM report to improve understanding of the source of these infections.
- Disaggregate Spectrum projections for Remaining Areas.

5. Plans, reports, evaluations

- Continue annual progress reports incorporating some other topics.
- Continue to undertake programme evaluations of prevention, harm reduction.
- Plan to evaluate the effect of interventions on KPs.

Annexes

Agenda of Consensus workshop on epidemiological review of HIV (28–29/5/2019)

Venue: Tungapuri Hotel, Nay Pyi Taw

Objectives

1. Brainstorming sessions with the NAP to verify and assess the level of and trends in, TB disease burden (incidence, prevalence, mortality) using available surveillance, survey, programmatic and other data
2. Identify gaps in existing data to better understand the status of the HIV epidemic.

Day	Date	Time	Description	Responsible team
1	28-5-2019	9:00 am–12:00 pm	Epi team working exercise Prevention and Harm Reduction	All local and international consultants + NAP
		12:00 pm–1:00 pm	Lunch	
		1:00 pm–5:00 pm	Epi team working exercise: Coinfections TB and viral hepatitis, PMTCT	All local and international consultants + NAP
2	29-5-2019	9:00 am–12:00 pm	Epi team working exercise: Care, support and treatment (highlighting ART)	All local and international consultants + NAP
		12:00 pm–1:00 pm	Lunch	
		1:00 pm–3:00 pm	Strategic information: surveillance and surveys AEM modelling	All local and international consultants + NAP
		3:00 pm–5:00 pm	Team discussion	All local and international consultants + NAP

Participant list for Consensus Workshop on epidemiological review of HIV (28–29/5/2019)

External international consultants

1. Dr Gerald Owen Jacobson
2. Ms Nguyen Thi Minh Thu
3. Dr Jesus Maria Garcia Calleja
4. Dr Amala Reddy

Local consultants

5. Professor Dr Ko Ko Zaw – Epidemiology Unit, University of Public Health
6. Dr Toe Thiri Aung – Deputy Director, CEU
7. Dr Sabe Phyu – UNAIDS
8. Dr Khin Nyein Chan – ICAP

Resource persons/participants from MoHS

1. Dr Thandar Lwin (Deputy Director-General)
2. Dr Si Thu Aung (Director)
3. Dr Htun Nyunt Oo (Deputy Director)
4. Dr San Hone (Deputy Director)
5. Dr Nanda Myo Aung Wan (Deputy Director)
6. Dr Than Than Lwin (Assistant Director)
7. Dr Kay Khine Kaung Nyunt (Assistant Director)
8. Dr Pyae Sone (Assistant Director)
9. Dr Nang Khawn Pan (Medical Officer)
10. Dr Thuya Tun (Medical Officer)
11. Dr Thet Paing Lin (Medical Officer)

Participants from WHO

1. Dr Fabio Mesquita
2. Dr Aye Myat Soe

Dissemination workshop on the findings of the HIV epidemiological review (30–31/5/2019)

Venue: Tungapuri Hotel, Nay Pyi Taw

Objectives

1. Build consensus among the implementing partners on HIV responses and the HIV epidemic, based on existing available data.
2. Provide recommendations to improve the national response towards elimination with focus on the geographical burden of the diseases and specific key populations.

Day 1

Date	Time	Description	Responsible team
30-5-2019	9:00 am–9:30 am	Opening session	
	9:30 am–10:00 am	Opening remarks	Dr Thandar Lwin
	10:00 am–10:15 am	Refreshments	
	10:15 am–11:00 am	Presentation on the country epidemiological situation	Dr Jesus Garcia and epidemiological team
	11:00 am–12:30 am	Group Work	Implementing partners
	12:30 pm–13:30 pm	Lunch	
	13:30 pm–15:00 pm	Feedback from the Group Work and brainstorming session	Implementing partners
	15:00 pm–15:30 pm	Refreshments	
	15:00 pm–15:30 pm	Summary of Day One with partial conclusions and recommendations	Dr Jesus Garcia and epidemiological team
	15:30 pm–16:30 pm	Discussion and end of Day One	Implementing partners

Day 2

Date	Time	Description	Responsible team
31-5-2019	9:00 am–9:45 am	Final presentation on the country HIV epidemiological situation	Dr Jesus Garcia and epidemiological team
	9:45 am–10:30 am	Questions and answers	All participants
	10:30 am–10:45 am	Refreshments	
	10:45 am–11:30 am	Conclusions and Recommendations	
	11:30 am	Meeting adjourned	

Participants' list for dissemination of findings of HIV epidemiological review (30-31/5/2019)

S. no.	Name	Designation	Organization
1	Dr Thandar Lwin	Deputy Director General	DoPH
2	Dr Sithu Aung	Director	Disease Control
3	Professor Dr Sabai Phyu	Head	Waibagi Specialist Hospital
4	Dr Htun Nyunt Oo	Deputy Director	NAP
5	Dr Cho Cho San	Deputy Director	NTP
6	Dr Khin Sanda Aung	Deputy Director	NHCP
7	Dr Nanda Myo Aung Wan	Deputy Director	DDTRU
8	Dr San Hone	Deputy Director	NAP
9	Dr Pyae Sone	Assistant Director	NAP
10	Dr Than Than Lwin	Assistant Director	NAP
11	Dr Zaw Zaw Aung	Assistant Director	NAP
12	Dr Kay Khine Kaung Nyunt	Assistant Director	NAP
13	Dr Nang Khawn Pan	Medical Officer	NAP
14	Dr Thura Tun	Medical Officer	NAP
15	Dr Thet Paing Lin	Medical Officer	NAP
16	Dr Fabio Mesquita	Medical Officer	WHO
17	Dr Aye Myat Soe	National Professional Officer	WHO
18	Dr May Thu Aung Hsan	National Professional Officer	WHO
19	Dr Phyo Wai Htun	National Technical Officer	WHO
20	Dr Sai Oomp Mong	National Technical Officer	WHO
21	Dr Ossama Tawil	Country Director	UNAIDS
22	Dr Myo Kyaw Lwin		UNAIDS
23	Dr Mitesh Desai	Country Director	US CDC
24	Dr Aye Aye Nyein	Public Health Specialist	US CDC
25	Ms Antonia Powell	Director	Save the Children (PR)
26	Dr Myo Set Aung	Deputy Director	Save the Children
27	Dr Eisa Hamid	Regional Strategic Information	UNOPS
28	Dr Thein Zaw Lwin	Program Officer	UNOPS
29	Dr Myat Yi Lwin	M&E Officer	UNOPS
30	Representative		UNODC
31	Representative		UNICEF
32	Representative		UNFPA
33	Representative		PSI

34	Representative		MSI
35	Representative		MSF-H
36	Representative		MSF-Swiss
37	Representative		MDM
38	Representative		PU-AMI
39	Representative		Pyi Gyi Khin
40	Representative		UNION
41	Representative		CHAI
42	Representative		AHRN
43	Representative		MANA
44	Representative		MAM
45	Representative		Alliance
46	Representative		BI
47	Representative		Myanmar Youth Stars
48	Representative		Myanmar Positive Group

External international consultants

1. Dr Gerald Owen Jacobson
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8. Dr Khin Nyein Chan – ICAP

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