



The global response to HIV in men who have sex with men

Chris Beyrer, Stefan D Baral, Chris Collins, Eugene T Richardson, Patrick S Sullivan, Jorge Sanchez, Gift Trapence, Elly Katabira, Michel Kazatchkine, Owen Ryan, Andrea L Wirtz, Kenneth H Mayer

Lancet 2016; 388: 198–206

Center for Public Health and Human Rights, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA (Prof C Beyrer MD, S D Baral MD, E T Richardson MD, A L Wirtz PhD); UNAIDS, Geneva, Switzerland (C Collins MPP); Rollins School of Public Health, Emory University, Atlanta, GA, USA (Prof P S Sullivan PhD); Asociacion Civil Impacta Salud y Educacion, Lima, Peru (J Sanchez MD); Centre for Development of People, Lilongwe, Malawi (G Trapence BA); Makerere University, Kampala, Uganda (E Katabira MD); United Nations Special Envoy for AIDS in Eastern Europe and Central Asia, Geneva, Switzerland (Prof M Kazatchkine PhD); The International AIDS Society, Geneva, Switzerland (O Ryan MPH); and Fenway Health and Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA (Prof K H Mayer MD)

Correspondence to: Prof Chris Beyrer, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205, USA
cbeyrer@jhu.edu

Gay, bisexual, and other men who have sex with men (MSM) continue to have disproportionately high burdens of HIV infection in countries of low, middle, and high income in 2016. 4 years after publication of a *Lancet* Series on MSM and HIV, progress on reducing HIV incidence, expanding sustained access to treatment, and realising human rights gains for MSM remains markedly uneven and fraught with challenges. Incidence densities in MSM are unacceptably high in countries as diverse as China, Kenya, Thailand, the UK, and the USA, with substantial disparities observed in specific communities of MSM including young and minority populations. Although some settings have achieved sufficient coverage of treatment, pre-exposure prophylaxis (PrEP), and human rights protections for sexual and gender minorities to change the trajectory of the HIV epidemic in MSM, these are exceptions. The roll-out of PrEP has been notably slow and coverage nowhere near what will be required for full use of this new preventive approach. Despite progress on issues such as marriage equality and decriminalisation of same-sex behaviour in some countries, there has been a marked increase in anti-gay legislation in many countries, including Nigeria, Russia, and The Gambia. The global epidemic of HIV in MSM is ongoing, and global efforts to address it remain insufficient. This must change if we are ever to truly achieve an AIDS-free generation.

Introduction

In July, 2012, *The Lancet* published a Series on gay, bisexual, and other men who have sex with men (MSM) and HIV, which was released at the XIX International AIDS Conference in 2012. The Series of comprehensive reviews on epidemiology, prevention, clinical care, health disparities in racial and ethnic minority MSM, community responses, and politics, reported on the widespread severity of MSM HIV epidemics worldwide, and on the limited and insufficient responses for this expanding component of the pandemic. The final paper was a call to action,¹ which laid out a research agenda and an ambitious plan for improved programmatic responses for HIV services for MSM. The plan called for action on the areas identified in the Series as essential to curtail HIV epidemics in MSM. Proposed actions ranged from the setting of targets for global funding, policy reform, and operations research, to improvements in effective HIV prevention and treatment services, including expanded access to pre-exposure prophylaxis (PrEP) and increased coverage of antiretroviral treatment (ART). The papers in the Series showed that, because of the increased biological susceptibility to HIV infection of MSM and high burden of infection in MSM, the bar for HIV prevention is set

high.² Accordingly, specific goals in the call to action were ambitious: a 20% increase over 2 years in the number of countries that would repeal laws criminalising same-sex sexual practices; and a 40% increase in the number of countries that would add MSM to ongoing HIV surveillance strategies and to national AIDS strategies, with the ultimate goal of adjusting national funding for HIV to be consistent with domestic HIV epidemiology.

Although the response to AIDS has seen important research advances and continued reduction in incidence and expansion of treatment access for those living with HIV, the global epidemic in gay men and other MSM remains severe and is clearly one of the defining challenges ahead in the effort to control the HIV pandemic. The past several years have seen notable progress in the science of HIV prevention, coverage of prevention and treatment programmes, and characterisation of the epidemiology of HIV in MSM. Now, the task is to bring evidence-based and human-rights affirming interventions to scale, while more effectively addressing the stigma that prevents the uptake of HIV prevention and treatment services.

Advances

Policy and programme advances

The call to action paper made several recommendations for policy change, and although there is some progress to report along with increased attention in donors to MSM and key population issues generally (table), important reforms are still needed.¹ For example, the paper called for major donors to develop a coordinated strategic plan to address HIV and MSM, but coordination in major donors and programmes remains unstructured and informal. However, some major funders have been slower than expected to advance policy and programmes.

The US President's Emergency Plan for AIDS Relief (PEPFAR) and the US Department of State under Secretaries Clinton and Kerry have been vocally

Search strategy and selection criteria

We updated the search done in 2011–12 for the *Lancet* Series on HIV in men who have sex with men (MSM), focusing on estimates of HIV incidence in MSM in the past 5 years. We searched PubMed and Embase with medical subject heading (MESH) terms and related keywords “homosexuality, male” [MeSH], “men who have sex with men” [keyword], and “MSM” [keyword], which were cross-referenced with “HIV” [keyword] or human immunodeficiency virus [MeSH], and “incidence” [MeSH]. Only articles published in English between Jan 1, 2007, and Oct 1, 2015, were included.

supportive of lesbian, gay, bisexual, and transgender (LGBT) rights, as have the former (Eric Goosby) and current (Deborah Birx) ambassadors of the PEPFAR programme. Funding for the HIV response in MSM through PEPFAR is gradually improving. In 2012, PEPFAR created a US\$20 million Key Populations Challenge Fund, though it has only reached six countries. The new Continuum of HIV Services for Key Populations Affected by HIV (LINKAGES) programme funded by United States Agency for International Development (USAID) will provide a base of \$73 million over 5 years to programmes for key populations including MSM.³ In June, 2016, at the UN High Level Meeting on AIDS, Ambassador Birx announced a new \$100 million Key Populations Investment Fund, which will include additional resources for MSM. PEPFAR has called for the targeting of resources to the right places, the right people, at the right time, and PEPFAR guidance to country teams has placed increasing emphasis on activities focused on key populations in annual Country Operating Plans. These activities not only include prevention, care and treatment activities, but also civil society capacity building, stigma and discrimination mitigation activities, and other human rights activities. Further, PEPFAR published Technical Guidance on HIV Prevention for MSM, which addressed many of these key areas.⁴

The Global Fund to Fight AIDS, Tuberculosis, and Malaria's strategy in relation to Sexual Orientation and Gender Identity and the Global Fund's most-at-risk populations (MARPs) Reserve Fund,⁵ have resulted in some increases in funding and programmes addressing MSM, and country dialogues under the new funding model are expected to advance the response in MSM and other key populations. However, as is well documented in countries of eastern Europe, MSM are too often excluded from the country dialogue, Country Coordinating Mechanisms, and from other planning processes.⁶ Even where MSM are represented, the actual extent of their influence is low. As of September, 2015, the Global Fund's Community, Rights and Gender Special Initiative has committed \$7 million to strengthening key population and civil society engagement in Global Fund-related processes through technical assistance and capacity development.

The call to action suggested that donor funds to address HIV in MSM be tracked and the information made public, but such information remains restricted.¹ PEPFAR has required countries to disaggregate funds and targets for MSM, transgender people, and female sex workers under the budget code for prevention services (prevention in people who inject drugs has a separate budget code). Guided by the Key Populations Action Plan 2014–17, the Global Fund has prioritised an improved response in key populations.⁷ An investment analysis on the Global Fund's MSM and other key populations programmes for HIV grants signed under the New Funding Model is underway.

	Achieved	Comments
Major donors develop coordinated strategic plan to address HIV in MSM	No	..
Report from major donors on their coordinated efforts	No	..
Donor funds to MSM and HIV work tracked and information made public	No	..
First report of accountability system	No	..
Key populations, including MSM, prioritised in new funding announcements	Yes	CDC, NIH, PEPFAR, USAID, GFATM, and amfAR
Worldwide targets set for expanding service delivery and overcoming legal and policy barriers to health services with external validation	No	..
Targets met for expansion of service coverage and overcoming of legal and policy barriers	No	..
Accountability system in place to track MSM-related or HIV-related legal and policy change and service delivery	No	..
Evidence of increased funding to address HIV in MSM	Yes	CDC, NIH, PEPFAR, USAID, GFATM, and amfAR
Operational research on MSM and HIV services launched	Yes	PEPFAR, USAID SOAR Operations Research
Demonstration projects on MSM use of PrEP and comprehensive prevention (including treatment as prevention) launched	Yes	Many PrEP demonstration projects underway
MSM representatives on all country HIV planning bodies, including Global Fund Country Coordinating Mechanisms	No	However, there is evidence of increased MSM organisation participation on HIV planning bodies
Evidence of increased support to civil society for work to repeal laws and policies that inhibit access to care and enable stigma and discrimination, and to provide needed services and advocacy	Yes	Notably, amfAR and the Robert Carr Civil Society Networks Fund are providing financial and technical support to community organisations working with gay men, other men who have sex with men, and transgender individuals
20% more countries announce removal or repeal of laws that criminalise same-sex sexual behaviour	No	3% increase in the number of countries which criminalise same-sex sexual behaviour (India, Nigeria, Russia, The Gambia, and Uganda)
40% more countries include MSM in HIV epidemiological tracking	No	73 countries did not report data on HIV prevalence in MSM in 2013
40% more countries adjust funding allocations to be consistent with domestic epidemiology and MSM	No	..
40% more countries include MSM in their national AIDS strategies	No	..

MSM=men who have sex with men. CDC=Centers for Disease Control. NIH=National Institutes of Health. PEPFAR=The US President's Emergency Plan for AIDS Relief. USAID=US Agency for International Development. GFATM=Global Fund to Fight AIDS, Tuberculosis and Malaria. amfAR=The Foundation for AIDS Research. SOAR=Supporting Operational AIDS Research. PrEP=pre-exposure prophylaxis.

Table: Goals and progress in the HIV response for MSM

Public and private sector donors continue to play a crucial role in supporting MSM programmes in low-income and middle-income countries. Notable government donors include Denmark, France, Germany, Ireland, Norway, Sweden, the UK, and the USA. Of concern, several of these countries with progressive approaches to key populations, including Denmark, Norway, and Sweden, have recently reduced their investment in global AIDS. Active foundation donors include the Bill & Melinda Gates Foundation, Elton John AIDS Foundation, the MAC AIDS Fund, ViiV, AIDS

Fonds, and The Foundation for AIDS Research (amfAR). The Robert Carr Civil Society Networks Fund has emerged as an important funder of worldwide and regional networks working to advance the response in inadequately addressed populations, including gay men and other MSM.⁸ Since 2013, the fund has invested more than \$18 million in civil society organisations and the networks that facilitate their coordination.

Scientific advances

The greatest scientific advances since 2012 have been in prevention methods involving antiretroviral drugs. Consistent findings of the high efficacy and effectiveness of oral PrEP with tenofovir and emtricitabine for primary prevention of HIV infection in MSM have altered the prevention landscape for gay and other MSM. The PROUD effectiveness study,⁹ done in sexually transmitted infection (STI) clinics in the UK was particularly important because it was the first open-label PrEP study to show high efficacy, 86% (90% CI 64–96%) in a real-world setting. This put to rest the concerns that MSM at greatest risk who accessed PrEP would be insufficiently adherent to make it an effective public health intervention. Given the open-label status of the study, it provided evidence that STI incidence did not increase in people using PrEP; rates of STIs were similarly high both in men randomly assigned to immediate and in those assigned delayed access to PrEP. Subsequent implementation studies of PrEP use in MSM have yielded consistently impressive results, notably the report from Volk and colleagues,¹⁰ which presented clinical findings from over 675 MSM prescribed PrEP through the Kaiser-Permanente programme in San Francisco. Not a single incident HIV infection occurred in these men in 2·5 years of follow-up, despite high and sustained prevalence of other STIs; these findings show that real-world effectiveness of PrEP for MSM is substantially higher than the efficacy reported from intention-to-treat analyses in early trials.¹⁰ The PROUD and Volk and colleagues' studies also emphasise the importance of using PrEP as part of a comprehensive sexual health package (ie, engaging otherwise healthy MSM to come in for routine clinical assessments, adherence monitoring, and STI screening). The increased frequency of STI screening might initially be associated with increased infection detection, but in the long run, could have a beneficial effect of identifying prevalent infections sooner. If implemented, this treatment approach is a potential major change in the ongoing epidemics of HIV in MSM worldwide. The French IperGay trial of coitally dependent use of PrEP also showed impressive efficacy,¹¹ suggesting an alternative dosing approach to PrEP for MSM that deserves further assessment. But the PrEP access era cannot truly be said to have begun anywhere except in the USA, where prescription numbers remain quite low relative to the large number of potential users. Australia,

Brazil, Canada, France, Israel, Kenya, Malaysia, South Africa, Thailand, and the USA have either approved PrEP use or initiated PrEP projects to facilitate approval of its use by MSM. The failure of the UK to implement PrEP to date, despite the PROUD results, is particularly worrying. The slow and markedly uneven roll-out of the first new antiretroviral-based prevention methods with proven efficacy and effectiveness for prevention of HIV transmission between men must be seen as a failure of the HIV response since 2012.

Encouragingly, data suggest that comprehensive strategies of broad access to medical care and early HIV treatment for those living with HIV, integrated STI and HIV programmes, and PrEP access can reduce HIV transmission in MSM at community levels. In San Francisco, a reduction in new HIV diagnoses in MSM has been sustained since 2008; in Boston, new diagnoses of HIV in MSM have been declining since 2005; and in Seattle, new diagnoses of HIV in MSM have been declining since at least 2004. Each of these cities are located in states that have enacted health reform, provide ready access to clinical care and affordable medications, and have passed anti-discrimination legislation. Despite these encouraging results, success stories are, sadly, rare. Elsewhere, reports of ongoing high levels of HIV diagnoses in MSM and high HIV incidence in MSM research studies are consistent—particularly in adolescent and young adult MSM, and in ethnic minorities. This finding was true in the 2012 *Lancet* Review² of the epidemiology of HIV in MSM, but more reports show even higher incidence densities from settings as diverse as China, Kenya, Thailand, the UK, and the USA (figure).^{9,12,13,14,15} Overall, HIV incidence in MSM is higher in low-income and middle-income countries than in high-income settings (figure). The men in the deferred treatment group of the PROUD study in the UK, however, had an incidence of nine cases per 100 person-years despite almost a third accessing post-exposure prophylaxis, free STI treatment, regular HIV testing and counselling, and legal protections for gay men, including marriage equality.¹⁶ Observed HIV incidence in a cohort of black MSM in Atlanta (GA, USA) was nearly 11%, despite free urethral and rectal STI screening treatment and regular HIV testing and counselling.¹⁷ The US Centers for Disease Control (CDC) estimated that a 20-year-old black MSM had a 50% chance of becoming HIV infected over the course of his lifetime.¹⁸

Although the landmark HPTN 052 study¹⁹ contained an insufficient number of MSM couples to definitively show that treatment is prevention for MSM, two subsequent observational studies, the Partner cohort,²⁰ and Opposites Attract,²¹ did not detect any HIV transmissions in MSM HIV discordant couples who engaged in condomless anal intercourse, when the HIV-infected partner was virologically suppressed by combination therapy. Viral suppression for people living with HIV will also have important benefits for reducing HIV transmission in casual relationships. But gay men

and other MSM continue to face barriers to HIV testing and treatment worldwide. For example, a study²² in India found that only 30% of a cohort of 1146 MSM living with HIV reported being aware of their HIV-positive status, 23% were linked to care, 16% had started ART, 16% were receiving ART at the time, and only 10% had suppressed viral loads.

Taken together, these realities provide exciting new opportunities to address the HIV epidemic in gay men and other MSM alongside major coverage challenges that must be overcome. According to data in the 2012 *Lancet* Series and subsequent modelling studies,¹⁶ decreasing HIV incidence will require countries to achieve 40–50% coverage of multiple HIV prevention interventions, including PrEP, condom and condom compatible lubricant promotion and effective distribution, and increased HIV testing frequency by using new methods such as self-testing and couples testing for HIV. PrEP and early initiation of treatment provide new prevention approaches with ever expanding evidence for effectiveness. But PrEP is only being implemented in six countries as of June, 2016, and we have stable or growing HIV epidemics in MSM, which shows the failure of prevention programmes in implementing PrEP and getting sufficient HIV-infected MSM into stable care. **The barriers to MSM receiving PrEP are importantly related to the challenges of poor access to effective ART for MSM living with HIV in settings where MSM are stigmatised, criminalised, or both.** In both cases, improving prevention and treatment outcomes for MSM will require increased availability of culturally competent care, improvement of retention in HIV or PrEP care, support of men living with HIV to achieve viral suppression, and support of men on PrEP to achieve suitable adherence to PrEP.

The implementation of PrEP, of early ART for MSM living with HIV, and of combination approaches including these crucial methods in addition to condom availability and increased HIV testing clearly requires supportive environments for MSM, specifically environments in which men can access prevention services safely. Such environments can be promoted through policy and programme changes by government at multiple levels and by programme implementers. Global normative bodies, such as WHO, and donors need to insist on and incentivise safe environments for delivery of health services to MSM. We will consider challenges with respect to criminalisation, other discriminatory laws and policies, and perpetuation of stereotypes of gay and bisexual men that are hindering epidemic control.

Implementation advances

The expansion of research on approaches to HIV prevention, treatment, and care in MSM has been a high point of the past 2 years. In July, 2012, PEPFAR announced the creation of a \$15 million Key Populations

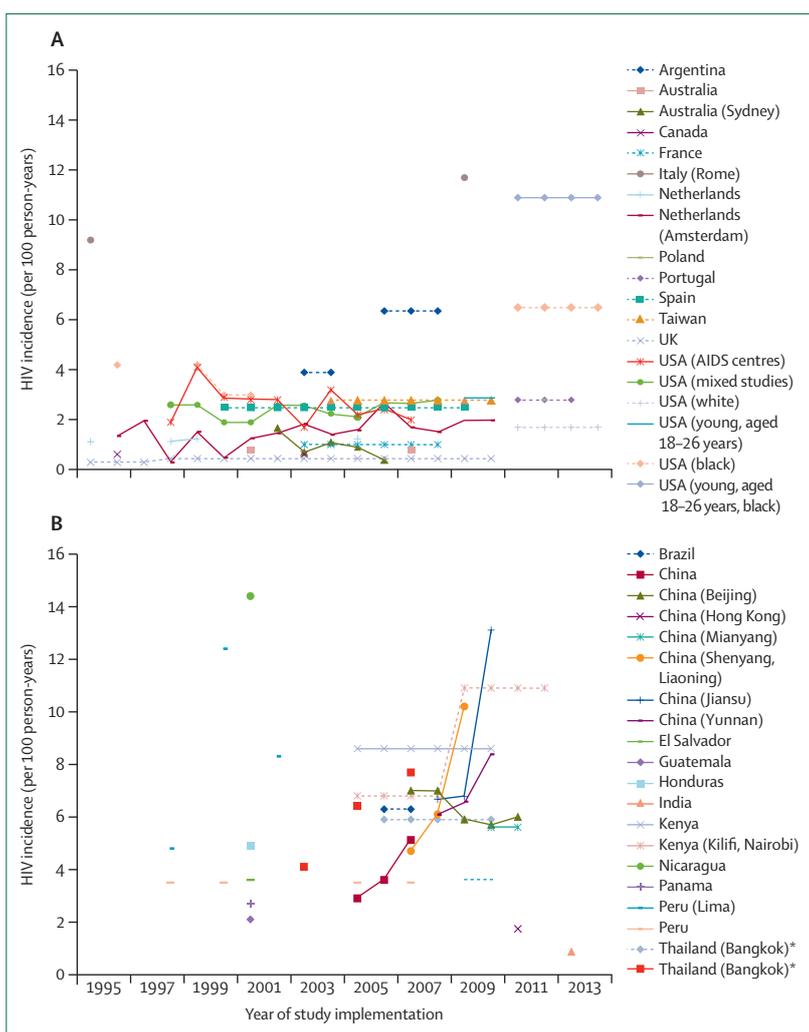


Figure 2: Global estimates of HIV incidence in men who have sex with men by country in 1995–2015
(A) High-income countries. (B) Low-income and middle-income countries. Country income classification based on World Bank Country Classifications; dashed lines represent incidence data that are not disaggregated by year.
*Two estimates for Thailand were from the same study, but were estimated with different analyses.

Implementation Science Fund,²³ and these funds are now supporting studies in key populations (including MSM) in 12 countries. The new USAID Supporting Operational AIDS Research (SOAR) Operations Research programme will make substantial new funds available, including for research in MSM.²⁴ The Global Fund supports operational research to address programmatic issues in grant implementation, including for key populations.⁷ However, the Global Fund Secretariat does not have a mechanism to systematically track and monitor its investment in this area. The new US National Institutes of Health (NIH) priority research areas for HIV include implementation research methods, which are especially relevant to the study of new opportunities to improve coverage of antiretroviral-based HIV prevention and treatment methods.²⁵ amfAR redesigned its gay men, other men who have sex with men, and

transgender individuals (GMT) initiative in 2014 to focus on MSM-related implementation science research.²⁶ Treatment as prevention for MSM has also been implemented slowly in low-income and middle-income countries; as of March, 2014, only seven studies were investigating test-and-treat approaches in MSM.

Challenges

Political successes and challenges

Stigma and discrimination are not merely broad cultural forces, but are operationalised through discriminatory policy and political actions, which are modifiable and should be modified. The period 2012–14 has been a watershed period for LGBT rights in several countries, notably Argentina, France, Finland, Spain, the UK, and the USA, with historic advances in marriage equality and civil rights.²⁷ In 2015, Mozambique decriminalised same-sex sexual behaviour.²⁸ The UN, led by Secretary General Ban Ki-moon, continued to be a worldwide leader in LGBT equality. However, the worldwide status of laws and policies criminalising same-sex behaviour or furthering discrimination and social exclusion has been broadly discouraging. In 2013, the Indian Supreme Court reversed an earlier New Delhi High Court decision and reinstated the colonial era statute 377, again criminalising same-sex behaviour between consenting adults in India.²⁹ This decision was immediately condemned by India's LGBT community as a setback for HIV programmes and for sexual and gender minority rights.³⁰ Also in 2013, the Russian Government passed, and President Putin signed into law, a highly discriminatory anti-homosexuality propaganda law, which led to the closure of HIV information websites for gay men and sharply restricted non-governmental organisation activities and services.^{31,32} The Russian Government has been pressing its views on other governments it seeks to influence, and a wave of similar repressive laws have been passed or are being debated in former Soviet Union states.³³

In early 2014, Goodluck Jonathan, then President of Nigeria, signed a law criminalising same-sex marriage, which has provisions that will restrict access to services and freedom of assembly, and will take a range of rights guaranteed to all citizens under the Nigerian Constitution from Nigerian LGBT people and anyone working with them.³⁴ Arrests of LGBT activists were reportedly underway in Nigeria within days of the passing of the law. During the same time, the Ugandan President signed an anti-homosexuality bill (same-sex behaviour was already criminalised in Uganda), which would make provision of information and services to MSM in Uganda a crime.³⁵ In April, 2014, Ugandan Government forces raided the Makerere University Walter Reed Project, which provides HIV treatment and sponsors HIV research. One government official said the raid occurred because the site was “training youths in homosexuality”.³⁶ The Ugandan law was suspended on technical grounds in 2014, but could be reinstated. The Gambia passed

legislation imposing life sentences for some homosexual acts.³⁷ All five countries mentioned above have substantial HIV epidemics in MSM, and these policies must be counted as highly noteworthy setbacks to global AIDS control and research.³⁸

Although India, Nigeria, Russia, and The Gambia are highly diverse countries with different cultural histories, Russia and Uganda share at least one common theme in their embrace of discriminatory laws and policies toward LGBT citizens: the active engagement of US evangelical conservatives in repressive policy development.³⁹ Among them is the Reverend Scott Lively, a US evangelical activist, who has been indicted for crimes against humanity for these activities by a court in Massachusetts, in a case filed by Sexual Minorities Uganda (SMUG).⁴⁰

Elsewhere, governments and scientists perpetuate outdated and inaccurate stereotypes about MSM, which divert attention from needed conversations about how to make the best use of advances in prevention technologies, such as PrEP. For example, China's National Centre for AIDS/STD Control and Prevention suggested that the rise in HIV in young MSM (aged 18–26 years), which has also been observed in several other countries, is related to older MSM (older than 26 years) seeking students as sex partners.⁴¹ The president of a large US HIV health-care service organisation characterised PrEP as a “party drug”.⁴² In a letter to *The Lancet HIV*⁴³ Dutch academics argue that PrEP implementation should be delayed to allow for discussion of issues, such as personal responsibility for condom use. We recall no such delays for debate of personal responsibility for condoms use in the implementation of medical male circumcision which, after the third randomised study showing its efficacy, had achieved broad consensus and substantial funding, international standards, and programme assessment for scale-up.⁴⁴ Although groups of very high-risk MSM have specialised prevention needs,⁴⁵ the 2012 *Lancet* Series highlighted that persistent epidemics of HIV in MSM are not, overall, driven by promiscuity or an absence of personal responsibility.^{2,46} Blaming MSM for their biological susceptibility to HIV infection and transmission serves only as a distraction from the discussion of societal responsibility to make effective prevention methods available to people who would benefit most from these methods.

Data findings and gaps

A major part of the problem is that data crucial to understanding HIV epidemics in MSM, and the programmatic response to these epidemics, are insufficient. The call to action identified the need for more countries to include MSM in their HIV epidemiological surveys and to adjust funding allocations to be more consistent with domestic HIV epidemiology, including for MSM.¹ Inclusion of MSM in epidemiology has improved substantially in the past 5 years, but work remains to improve data and use it effectively in the design of programmes along the HIV care continuum.

The Global Fund tracks HIV prevalence, behaviour, and service coverage with reports of core indicators in its performance framework. As part of its corporate key performance indicators, the Global Fund reports the number of countries with nationally adequate size estimation for key populations. In 2014, 38 countries had nationally adequate estimates for all key populations with an estimated 81 countries having estimates for MSM, based on the joint Global Fund–UNAIDS–WHO review of all existing data.⁴⁷ Data from these 81 countries are not representative of all other countries; data from eight countries include data only from the capital city, and data from 17 countries include data from other major cities.⁴⁸

A 2015 assessment of the availability and quality of size estimations of key population groups found that 41 of 140 countries assessed have not reported any estimates since 2010. The analysis concluded that size estimates for female sex workers, MSM, people who inject drugs, and transgender women are increasingly available, but are insufficient for design, implementation, and evaluation of programmes for these groups in 50% of the countries assessed. Although new methods for the estimation of population size for key populations are emerging, population size estimation faces operational challenges because size estimation methods are logistically difficult to use and often need implementation of multiple methods to improve the precision of estimates.⁴⁹

UNAIDS tracks HIV prevalence in MSM worldwide through the Global AIDS Response Progress Reports (GARPR) system. In July, 2015, UNAIDS reported that, “globally, HIV prevalence in men who have sex with men appears to be stable, with small peaks reported from the Caribbean and eastern Europe and central Asia”.

Progress has also been made on epidemiology in some key countries. The US CDC is supporting epidemiological assessments in several countries, and the Bill & Melinda Gates Foundation is funding extensive epidemiology in China, including in MSM. Notable published epidemiological work over the past 2 years includes a pilot cohort study of MSM in Dakar, Senegal, in which a cumulative HIV prevalence of 47·2% and an annual HIV incidence of 16% were reported.⁵⁰ A mixed methods research study in Malawi identified HIV prevalence among MSM at 15·4%, with 91% of those living with HIV unaware of their status.⁵¹ The prevalence of HIV in MSM in sub-Saharan Africa is estimated to be 18%.² Results from drug resistance testing in a cohort of MSM in Jamaica showed that the prevalence of HIV drug resistance was 28%, which emphasises the importance of genotyping methods to enable effective delivery of HIV treatment.

A 2014 survey of HIV epidemiological data related to MSM observed that HIV surveillance in generalised HIV epidemics has generally focused on average-risk, reproductive-age adults with little attention paid to key population groups, such as MSM. The survey found a

Panel 1: High priority research topics for support in the 2015 National Institutes of Health Office of AIDS Research guidelines²⁵

Reducing incidence of HIV/AIDS

- Development and testing of promising vaccines, microbicide, and PrEP candidates and methods of delivery, especially those that mitigate adherence issues
- Development, testing, and implementation of strategies to improve HIV testing and patient entry into prevention services

Next generation of HIV therapies with better safety profile and ease of use

- Development and testing of HIV treatments that are less toxic, and longer acting, have fewer side-effects and complications, and are easier to take and adhere to than available regimens
- Implementation research to ensure initiation of treatment as soon as a diagnosis has been made, retention and engagement in these services, and achievement and maintenance of optimum prevention and treatment responses

Research toward a cure

- Development of new approaches and strategies to identify and eliminate viral reservoirs that could lead toward a cure or lifelong remission of HIV infection, including studies of viral persistence, latency, reactivation, and eradication

HIV-associated comorbidities, co-infections, and complications

- Address the effect of HIV-associated comorbidities, including tuberculosis; malignancies; and cardiovascular, neurological, and metabolic complications; and premature ageing associated with long-term HIV disease and antiretroviral therapy

Cross-cutting areas

- Basic research, health disparities, and training

Basic research

- Understanding of the basic biology of HIV transmission and pathogenesis, immune dysfunction and chronic inflammation, host microbiome and genetic determinants, and other fundamental issues that underpin the development of high priority HIV prevention, cure, comorbidities, and treatment strategies

Research to reduce health disparities in the incidence of new HIV infections or in treatment outcomes of those living with HIV/AIDS

Training of researchers for high priority HIV/AIDS or HIV/AIDS-related research

high incidence of HIV in MSM in many countries, even as the incidence seems to be decreasing in general population groups in many parts of the world. Similarly, re-emergence of other sexually transmitted infections in MSM has been reported, which suggests ongoing vulnerability to HIV and that co-infections potentially increase susceptibility to HIV infections.^{52–56}

Research gaps and agenda

In August, 2015, the US NIH released new HIV/AIDS research priorities and guidelines for the allocation of AIDS research investments. These new priorities will guide the future of NIH-funded HIV research, including research in MSM. Research topics were prioritised into high, medium, and low priority areas (panel 1). Gaps in knowledge specific to HIV prevention in MSM need to be addressed to optimise the potential efficacy of scientific insights from the past 5 years (panel 2).

Panel 2: Gaps in prevention research regarding MSM**Epidemiological**

- New technologies to assess HIV incidence to detect rapidly changing patterns of spread
- Assessments of emerging epidemics in key subpopulations (eg, male sex workers)
- Refined understanding of social and sexual networks
- Improved understanding of the use of respondent driven sampling to map networks and obtain improvement assessments of patterns of HIV spread
- Use of phylogenetic analyses to detect patterns of HIV spread
- Improved understanding of the roles of assortative mixing in generating concentrated epidemics

Social or structural

- Improved understanding of the role of poverty in HIV transmission in MSM
- Improved understanding of the role of social and structural homophobia in HIV transmission in MSM
- Development and assessment of interventions that address poverty, food insecurity, and housing instability in MSM
- Development and assessment of interventions that address social and structural homophobia experienced by MSM
- Assessment of the role of economic and other incentives in decreasing HIV transmission in at-risk and HIV-infected MSM

Biobehavioural

- Improved interventions to address the role of depression and other emotional challenges in HIV risk-taking behaviours
- Integration of counselling-oriented and pharmacotherapy interventions to address the role of substance use disorders in HIV risk-taking
- Increased understanding of best practices to support MSM couples' relationships, and to enhance serostatus disclosure and protected sex (eg, condoms, PrEP, or both)
- Improved interventions to enable MSM to understand their HIV risks and to take appropriate actions to decrease transmission or acquisition risk
- Development of innovative web-based platforms (eg, websites, mobile apps, games) that enhance health-promoting behaviour in MSM
- Improved real-time drug monitoring tests to assess PrEP adherence
- Improved understanding of the role of genital tract milieu factors (eg, sexually transmitted infections, sexual trauma, and other causes of inflammation on HIV transmission and acquisition)
- Assessment of new chemoprophylactic approaches, including injectable antiretrovirals, infusible monoclonal antibodies, and topical lubricants and douches

Implementation science

- Development of best practice guidance for HIV testing of MSM, including self-testing, testing in high-risk venues (eg, bars, saunas), and couples testing
- Development of best practice guidance for the provision of clinical care for HIV-infected MSM
- Development of best practice guidance for the provision of PrEP for at-risk, HIV-uninfected MSM
- Assessment of best practices for training clinicians and health-care systems in the provision of culturally appropriate services for MSM
- Assessment of the impact of interventions to decrease structural and social homophobia on local health-care systems, communities, and key affected populations

MSM=men who have sex with men. PrEP=pre-exposure prophylaxis.

Although all of these topical areas are relevant, several are of particular importance.

Because MSM have the highest HIV incidence in the USA, and high incidence was seen in many MSM epidemics worldwide in 2015, the first research priority, reducing incidence, must clearly be among the highest priorities for the HIV response overall. With daily oral PrEP showing such consistent effectiveness, the implementation of this new intervention is an urgent public health priority. New dosing regimens, new agents and formulations, such as longer-acting and injectable PrEP, and leveraging digital approaches to support adherence are all active areas of research.

Universal access to HIV treatment, including couples-based strategies for discordant couples and seek, test, treat strategies are an important research area for MSM epidemics, because the data on the effectiveness of treatment for prevention in high transmission MSM networks is quite scarce.¹⁶ The landmark HPTN 052 trial¹⁹ had too few same-sex male couples for evaluation of efficacy, although data from the Partners and Opposites Attract studies²¹ are promising. However, many new HIV infections occur in the setting of casual relationships and high-risk sexualised settings (eg, in bath houses or meetings arranged online or through mobile phone applications), so new research regarding the best ways to increase testing uptake and linkage to care for MSM are important research priorities.

Testing innovations are an important area of implementation research for MSM. In highly stigmatising environments and settings where homosexuality is still criminalised, self-testing and other decentralised testing approaches could help MSM ascertain their HIV status in safety and dignity. Because PrEP and treatment as prevention are HIV status-dependent interventions, these advances have only heightened the need for regular HIV testing in MSM. Cost-effectiveness analyses done in the USA have found that regular HIV testing (every 6 months or quarterly) for MSM was cost-effective and could be cost-saving, which provides justification for increased HIV testing. Additionally, because of the high level of infectiousness associated with acute HIV infection, which is often asymptomatic, studies of new assays and testing algorithms are needed.

There are also areas of HIV research that are now arguably of lower priority. Stand-alone behavioural interventions focused on behaviour change, reducing numbers of partners, or raising awareness of the risks of HIV infection have shown little efficacy in reducing rates of new HIV infections, and will not be fundable, by the USA at least, in the new NIH priorities (panel 1). Social, behavioural, and structural research efforts that support new antiretroviral based prevention methods (eg, implementation research approaches aimed at improving clinical and prevention outcomes for MSM

in real-world settings) are clearly high priority research areas.¹⁶

Conclusions

Research reported in the *Lancet* Series and subsequent studies provide hope that with a strategic combination of scaled up ART, PrEP, condom and condom-compatible lubricant availability, HIV testing, and other interventions, the HIV epidemics in MSM can be slowed and eventually turned around. Yet, even with substantial advances in the past 5 years, the world is still failing to implement a comprehensive plan of action to use available interventions at scale to address the serious and growing HIV epidemics in MSM. The call to action from 2012 suggested creation of global and national targets for HIV service delivery to MSM in other key population groups.¹ UNAIDS' new global targets include 90% coverage of tailored prevention interventions to key populations worldwide by 2020. In September, 2015, PEPFAR set global targets for treatment, voluntary medical male circumcision, and reduction of incidence in adolescent girls and young women, but targets for key population groups were not included. The new \$100 million PEPFAR key populations initiative is an important and welcome opportunity to expand access to services, but to reach the scale necessary to have an impact on public health in MSM epidemics will require markedly increased investments in overall national programmes.

Greater investment in civil society groups to provide services and advocate better policy was identified as a priority in the call to action and should remain so. The UNAIDS–*Lancet* Commission Defeating AIDS—advancing global health also called for investment in activism as a worldwide public good.⁵⁷ Since our original paper,¹ the Robert Carr Civil Society Networks Fund has started to provide much needed resources to civil society groups,⁸ but resources in this area remain inadequate. Increased attention and investment in supporting removal of discriminatory laws and establishment of safer and more equitable environments for gay men and other MSM must also be a priority.

MSM are overburdened and under-resourced in the global HIV response. Despite overwhelming scientific evidence supporting the need for expanded funding, access to services, and policy reform, insufficient progress is being made in the prevention and treatment of HIV in these men and their communities. We can do better, and we must if we are to have any hope of success in controlling HIV spread worldwide.

Contributors

CB conceptualised the overall manuscript and wrote the introduction and discussion. ALW reviewed and analysed the epidemiological data and wrote the epidemiology section. CC, SDB, ETR, KHM, PSS, and ALW all contributed to sections of the manuscript. EK, MK, GT, JS, and OR contributed to the policy sections and revised the manuscript.

Declaration of interests

We declare no competing interests.

Acknowledgments

CB has received grants from Centre for AIDS Research, Johns Hopkins University, and US National Institutes of Health (NIH) and National Institute of Allergy and Infectious Diseases (NIAID; P30AI094189). KHM has received grants from Harvard University Center for AIDS Research. The views or opinions expressed in this paper are those of the authors and not of UNAIDS.

References

- 1 Beyrer C, Sullivan PS, Sanchez J, et al. A call to action for comprehensive HIV services for men who have sex with men. *Lancet* 2012; **380**: 424–38.
- 2 Beyrer C, Baral SD, van Griensven F, et al. Global epidemiology of HIV infection in men who have sex with men. *Lancet* 2012; **380**: 367–77.
- 3 FHI 360. Linkages across the Continuum of HIV Services for Key Populations Affected by HIV (LINKAGES). 2015. <http://www.fhi360.org/projects/linkages-across-continuum-hiv-services-key-populations-affected-hiv-linkages> (accessed March 22, 2016).
- 4 The U.S. President's Emergency Plan for AIDS Relief (PEPFAR). Technical Guidance on Combination HIV Prevention for Men who Have Sex with Men. May, 2011. <http://www.pepfar.gov/documents/organization/164010.pdf> (accessed Oct 4, 2012).
- 5 The Global Fund. Global Fund Strategy in relation to sexual orientation and gender identities. May 6, 2009. <http://www.icaso.org/media/files/12600-GFB19420ReportOfPolicyAndStrategyCommittee.pdf> (accessed March 22, 2016).
- 6 Eurasian Coalition on Male Health. The Global Fund new funding model and country dialogue: involvement of MSM and transgender people in eastern Europe and central Asia. 2015. <http://www.globalfundadvocatesnetwork.org/wp-content/uploads/2015/03/ECOM.Country-Dialogue-Report.pdf> (accessed March 22, 2016).
- 7 The Global Fund. Key populations action plan 2014–2017. 2013. http://www.theglobalfund.org/documents/publications/other/Publication_KeyPopulations_ActionPlan_en/ (accessed March 22, 2016).
- 8 Robert Carr Civil Society Networks Fund. Grant portfolio. 2014. <http://www.robertcarrfund.org/grantees/gay-men-men-sex-men/> (accessed March 22, 2016).
- 9 McCormack S, Dunn DT, Desai M, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet* 2016; **387**: 53–60.
- 10 Volk JE, Marcus JL, Phengrasamy T, et al. No new HIV infections with increasing use of HIV preexposure prophylaxis in a clinical practice setting. *Clin Infect Dis* 2015; **61**: 1601–03.
- 11 Molina JM, Capitant C, Spire B, et al. On-Demand preexposure prophylaxis in men at high risk for HIV-1 infection. *N Engl J Med* 2015; **373**: 2237–46.
- 12 Liu G, Lu H, Wang J, et al. Incidence of HIV and syphilis among men who have sex with men (MSM) in Beijing: an open cohort study. *PLoS One* 2015; **10**: e0138232.
- 13 Wang Y, Huang Y, Chen H, et al. Incidence and correlates of HIV and syphilis in a prospective cohort of men who have sex with men in Mianyang, China, over a 36-month period. *Sex Health* 2015; **12**: 546–55.
- 14 Price MA, Rida W, Mwangome M, et al. Identifying at-risk populations in Kenya and South Africa: HIV incidence in cohorts of men who report sex with men, sex workers, and youth. *J Acquir Immune Defic Syndr* 2012; **59**: 185–93.
- 15 van Griensven F, Holtz TH, Thienkrue W, et al. Temporal trends in HIV-1 incidence and risk behaviours in men who have sex with men in Bangkok, Thailand, 2006–13: an observational study. *Lancet HIV* 2015; **2**: e64–70.
- 16 Sullivan PS, Carballo-Dieguez A, Coates T, et al. Successes and challenges of HIV prevention in men who have sex with men. *Lancet* 2012; **380**: 388–99.
- 17 Sullivan PS, Rosenberg ES, Sanchez TH, et al. Explaining racial disparities in HIV incidence in black and white men who have sex with men in Atlanta, GA: a prospective observational cohort study. *Ann Epidemiol* 2015; **25**: 445–54.
- 18 Hess K, Hu X, Lansky A, Mermin J, Hall HI. Estimating the lifetime risk of a diagnosis of HIV infection in the United States. Conference on Retroviruses and Opportunistic Infections; Boston, MA; Feb 22–25, 2016. 52.

- 19 Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med* 2011; **365**: 493–505.
- 20 Rodger A, Brunn T, Cambiano V, et al. HIV transmission risk through condomless sex if HIV+ partner on suppressive ART: PARTNER Study. Conference on Retroviruses and Opportunistic Infections; Boston, MA; March 3–6, 2014. 153LB.
- 21 Grulich A, Bavinton BR, Jin F, et al. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. Conference on Retroviruses and Opportunistic Infections; Seattle, WA; Feb 23–26, 2015. 1019LB.
- 22 Mehta SH, Lucas GM, Solomon S, et al. HIV Care continuum among men who have sex with men and persons who inject drugs in India: barriers to successful engagement. *Clin Infect Dis* 2015; **61**: 1732–41.
- 23 PEPFAR Scientific Advisory Board and the Key Populations Subcommittee. PEPFAR Scientific Advisory Board recommendation for the Office of the US Global AIDS Coordinator: intensify programmatic activity and implementation science to reduce HIV burden, increase coverage and improve PEPFAR's impact for key populations. <http://www.pepfar.gov/documents/organization/188748.pdf> (accessed March 22, 2016).
- 24 US Agency for International Development. RFA-OAA-14-00026 Project SOAR. March 7, 2014. <http://www.grants.gov/web/grants/view-opportunity.html?oppId=252305> (accessed March 22, 2016).
- 25 US National Institutes of Health. NIH HIV/AIDS Research Priorities and Guidelines for Determining AIDS Funding; Notice Number: NOT-OD-15-137. Aug 12, 2015. <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-137.html> (accessed March 22, 2016).
- 26 amFAR. The GMT Initiative. 2014. <http://www.amfar.org/gmt> (accessed March 22, 2016).
- 27 Masci D, Sciapac E. Gay marriage around the world. <http://www.pewforum.org/2015/06/26/gay-marriage-around-the-world-2013/> (accessed March 22, 2016).
- 28 Cowell F, Milon A. Decriminalisation of Sexual Orientation through the Universal Periodic Review. *Hum Rights Law Rev* 2012; **12**: 341–52.
- 29 Harris, G. India's supreme court restores an 1861 law banning gay sex. *The New York Times* (New York, NY), Dec 11, 2013. http://www.nytimes.com/2013/12/12/world/asia/court-restores-indias-ban-on-gay-sex.html?_r=0 (accessed March 22, 2016).
- 30 Ramasubban R. Political intersections between HIV/AIDS, sexuality and human rights: a history of resistance to the anti-sodomy law in India. *Glob Public Health* 2008; **3** (suppl 2): 22–38.
- 31 Wilkinson C. Putting “traditional values” into practice: The rise and contestation of anti-homopropaganda laws in Russia. *J Hum Rights* 2014; **13**: 363–79.
- 32 Lokshina, T. Russia: international human rights law breached by Russian ban on “homosexual propaganda”. June 29, 2012. <http://www.hrw.org/news/2012/06/29/russia-international-human-rights-law-breached-russian-ban-homosexual-propaganda> (accessed March 22, 2016).
- 33 Beyrer C. Pushback: the current wave of anti-homosexuality laws and impacts on health. *PLoS Med* 2014; **11**: e1001658.
- 34 Gladstone R. Nigerian President signs ban on same-sex relationships. *The New York Times* (New York, NY), Jan 13, 2014: 13.
- 35 Balter M. Science and politics. Science misused to justify Ugandan antigay law. *Science* 2014; **343**: 956.
- 36 Mascolini, M. Uganda HIV center worker detained for “training in homosexuality”. April 8, 2014. http://article.wn.com/view/2014/04/08/Uganda_HIV_Center_Worker_Detained_for_Training_in_Homosexual/ (accessed March 22, 2016).
- 37 Associated Press in Ivory Coast. The Gambia passes bill imposing life sentences for some homosexual acts. *The Guardian* (London), Sept 9, 2014. <http://www.theguardian.com/world/2014/sep/09/gambia-passes-bill-life-imprisonment-homosexual-acts> (accessed March 22, 2016).
- 38 Nordling L. Homophobia and HIV research: under siege. *Nature* 2014; **509**: 274–75.
- 39 Strasser M. From Uganda to Russia, homophobia spreading worldwide. Feb 27, 2014. <http://www.newsweek.com/uganda-russia-homophobia-spreading-worldwide-230358> (accessed March 22, 2016).
- 40 Center for Constitutional Rights. Sexual minorities Uganda v Scott Lively. March 14, 2014. <http://ccrjustice.org/home/what-we-do/our-cases/sexual-minorities-uganda-v-scott-lively> (accessed March 22, 2016).
- 41 Whitley J. Sharp rise in HIV infections among young gay men in China. *Gay Times* (London, UK), 2015. <https://www.gaytimes.co.uk/news/18829/sharp-rise-in-hiv-infections-among-young-gay-men-in-china/> (accessed March 22, 2016).
- 42 Associated Press. Divide over HIV prevention drug Truvada persists. April 6, 2014. <http://www.usatoday.com/story/news/nation/2014/04/06/gay-men-divided-over-use-of-hiv-prevention-drug/7390879/> (accessed March 22, 2016).
- 43 Jansen MPM, Tromp N, Baltussen R. PrEP: why we are waiting. *Lancet HIV*; **3**: e11–12.
- 44 WHO. Progress in scale-up of male circumcision for HIV prevention in eastern and southern Africa: focus on service delivery. 2011. http://apps.who.int/iris/bitstream/10665/44741/1/9789241502511_eng.pdf (accessed March 22, 2016).
- 45 Bourne A, Reid D, Hickson F, Torres-Rueda S, Steinberg P, Weatherburn P. “Chemsex” and harm reduction need among gay men in South London. *Int J Drug Policy* 2015; **26**: 1171–76.
- 46 Mayer KH, Bekker L-G, Stall R, Grulich AE, Colfax G, Lama JR. Comprehensive clinical care for men who have sex with men: an integrated approach. *Lancet* 2012; **380**: 378–87.
- 47 UNAIDS. The Gap Report: gay men and other men who have sex with men. 2014. http://www.unaids.org/sites/default/files/media_asset/07_Gaymenandothermenwhohavesexwithmen.pdf (accessed March 22, 2016).
- 48 Sabin K, Zhao J, Garcia Calleja JM, et al. Availability and quality of size estimations of female sex workers, men who have sex with men, people who inject drugs and transgender women in low- and middle-income countries. *PLoS One* 2016; **11**: e0155150.
- 49 Abdul-Quader AS, Baughman AL, Hladik W. Estimating the size of key populations: current status and future possibilities. *Curr Opin HIV AIDS* 2014; **9**: 107–14.
- 50 Dramé FM, Crawford EE, Diouf D, Beyrer C, Baral SD. A pilot cohort study to assess the feasibility of HIV prevention science research among men who have sex with men in Dakar, Senegal. *J Int AIDS Soc* 2013; **16** (suppl 3): 18753.
- 51 Wirtz AL, Jumbe V, Trapence G, et al. HIV among men who have sex with men in Malawi: elucidating HIV prevalence and correlates of infection to inform HIV prevention. *J Int AIDS Soc* 2013; **16** (suppl 3): 18742.
- 52 Mohammed H, Mitchell H, Sile B, Duffell S, Nardone A, Hughes G. Increase in sexually transmitted infections among men who have sex with men, England, 2014. *Emerg Infect Dis* 2016; **22**: 88.
- 53 Peterman TA, Su J, Bernstein KT, Weinstock H. Syphilis in the United States: on the rise? *Expert Rev Anti Infect Ther* 2015; **13**: 161–68.
- 54 Martí-Pastor M, de Olalla PG, Barberá M-J, et al. Epidemiology of infections by HIV, syphilis, gonorrhoea and lymphogranuloma venereum in Barcelona city: a population-based incidence study. *BMC Public Health* 2015; **15**: 1015.
- 55 Sugishita Y, Yamagishi T, Arima Y, Hori N, Seki N. Increase in primary and secondary syphilis notifications in men in Tokyo, 2007–2013. *Jpn J Infect Dis* 2016; **69**: 154–57.
- 56 Read P, Fairley CK, Chow EP. Increasing trends of syphilis among men who have sex with men in high income countries. *Sex Health* 2015; **12**: 155–63.
- 57 Piot P, Abdool Karim SS, Hecht R, et al. Defeating AIDS—advancing global health. *Lancet* 2015; **386**: 171–218.