The global response and unmet actions for HIV and sex workers

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Lancet 2018; 392: 698–710

Published Online July 20, 2018 http://dx.doi.org/10.1016/S0140-6736(18)31439-9

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Female, male, and transgender sex workers continue to have disproportionately high burdens of HIV infection in low-income, middle-income, and high-income countries in 2018. 4 years since our *Lancet* Series on HIV and sex work, our updated analysis of the global HIV burden among female sex workers shows that HIV prevalence is unacceptably high at 10·4% (95% CI 9·5–11·5) and is largely unchanged. Comprehensive epidemiological data on HIV and antiretroviral therapy (ART) coverage are scarce, particularly among transgender women. Sustained coverage of treatment is markedly uneven and challenged by lack of progress on stigma and criminalisation, and sustained human rights violations. Although important progress has been made in biomedical interventions with pre-exposure prophylaxis and early ART feasibility and demonstration projects, limited coverage and retention suggest that sustained investment in community and structural interventions is required for sex workers to benefit from the preventive interventions and treatments that other key populations have. Evidence-based progress on full decriminalisation grounded in health and human rights—a key recommendation in our *Lancet* Series—has stalled, with South Africa a notable exception. Additionally, several countries have rolled back rights to sex workers further. Removal of legal barriers through the decriminalisation of sex work, alongside political and funding investments to support community and structural interventions, is urgently needed to reverse the HIV trajectory and ensure health and human rights for all sex workers.

Introduction

In July, 2014, *The Lancet* published a Series on HIV and sex workers, launched at the International AIDS Conference in Melbourne, VIC, Australia. The Series of reviews of global epidemiology and structural determinants, prevention science, community empowerment, human rights abuses, and HIV disparities among men and transgender women who sell sex highlighted the heavy HIV burden and suboptimal coverage of HIV prevention and treatment for sex workers across low-income, middle-income, and high-income countries for both concentrated and generalised epidemics. Despite substantial advances in the development of global HIV prevention and treatment tools, progress with scaling up programmes and sustaining coverage is hampered by a lack of funding and political will, insufficient data on HIV burden and antiretroviral therapy (ART) coverage, and ongoing human rights abuses, criminalisation, stigma, and discrimination. The final paper[1] in the Series was a call to action that laid out an ambitious agenda for programmatic and policy change, research investment, and sustained community engagement and empowerment.

Search strategy and selection criteria

We updated the search done up to 2013 for the *Lancet* Series on sex work and HIV to include reports and manuscripts published from Jan 1, 2006, to Sept 6, 2017, focusing on biological estimates of HIV prevalence. We developed search strategies on the basis of a combination of controlled vocabulary including medical subject headings (MeSH) and other keyword searches with terms associated with sex work, including "sex work", "sex worker", "prostitute", "male sex workers", "banthas", "fletes", "hijra", "khotkis", "khusras", or "money boys". MeSH terms used included "HIV", "Acquired Immunodeficiency Syndrome", "HIV Infections", "human immunodeficiency virus", and "acquired immunodeficiency syndrome", and keywords used included "HIV", "AIDS", "HIV1", and "HIV2".

Since the 2014 *Lancet* Series, the HIV burden among sex workers remains high and, according to the few countries with available data, ART coverage remains limited. Some notable exceptions in the prevention science literature exist including the SAPPH-IRe trial[2] in Zimbabwe that is specifically measuring the feasibility and effect of combination prevention services, including pre-exposure prophylaxis (PrEP). However, low PrEP retention and limited ART coverage suggest that there are still key barriers to scaling up these services, especially in settings with repressive regimes in which addressing community empowerment is challenging, and in which human rights abuses and structural inequities among sex workers persist. The pace of expansion of community empowerment efforts outside of south Asia has been slow and remains underfunded.[3]

In the months after our 2014 *Lancet* Series, UNAIDS/WHO launched ambitious 90-90-90 targets to mobilise the political and financial response to HIV. Bilateral and multilateral funding agencies, including the US President's Emergency Plan for AIDS Relief (PEPFAR), The Global Fund to fight AIDS, Tuberculosis and Malaria commitment to the UNAIDS 90-90-90 targets, and fast tracking the end of AIDS by 2030, have led to ambitious target setting that has potential to support the rapid scale-up of HIV prevention and treatment, and through infectious disease modelling contribute to measurability of

	Achieved?	Comments
For governments		
Increased number of countries or regions decriminalising sex work	No	Increasing move to end-demand criminalisation models; one notable exception is South Africa
Increased number of countries or regions ending impunity for crimes and abuses against sex workers	No	..
Evidence of advanced evidence-based policies and practices in partnership with sex worker-led organisations	No	Number of countries adopting SWIT rights-based health and HIV programming is limited
Evidence of countries ending discriminatory laws, policies, and practices against female, male, and transgender sex workers	Partially (progress very slow)	African National Congress moves to decriminalise sex work after substantial advocacy
Evidence of increased inclusion of sex workers in HIV epidemiological surveillance; results should be made available to the public	No	..
Recognising sex work as work and developing occupational health and safety standards, and mechanisms to redress violence and other labour and rights violations	No	..
For donors		
Evidence of increased funding for HIV response among sex workers	Partially	Funding from the US President's Emergency Plan for AIDS Relief and the Global Fund
Raising support for the research agenda for combination HIV prevention and care services for sex workers	Yes	Increased demonstration and feasibility studies
Investigation of novel and enhanced combination prevention	Partially	..
Support of sex work-led organisations at global, regional, and country levels	Partially (progress slow)	In November, 2015, the US Agency for International Development and UNAIDS gave a 4-day workshop on SWIT in west Francophone Africa to national representatives who work with sex workers
Funding of empowerment models to community-led organisations	Partially	..
Collection of reliable data for HIV and sex work, including ART and condom coverage, comprehensive sexual and reproductive health services, migration, trafficking in persons, gender-based violence, and human rights violations towards sex workers	Partially	Some progress on violence and other structural measures in settings with a heavy HIV burden; lack of adequate denominators limit HIV burden and ART coverage estimates; no integration of violence or rights-based measures in global funding indicators (eg, UNAIDS fast track 90-90-90)
For research		
Increased number of HIV seroprevalence and testing surveys	Yes	HIV burden data now available for 70% of countries for female sex workers; HIV data still scarce for male and transgender women sex workers
Increased HIV incidence data in sex workers	No	..
Evidence of increased research into HIV prevention and treatment for male sex workers and transgender sex workers	Partially (progress very slow)	Few PrEP studies include transgender sex workers
Increased HIV data for transgender women sex workers (in 2014, HIV data for transgender women sex workers were only available from 15 countries)	Partially (progress slow)	In 2017, HIV data for transgender women sex workers were available in 18 countries
Phase 1 and 2 trials (eg, for oral and injectable PrEP, and vaginal and rectal microbicides) should include sex workers of all genders in sufficient numbers for stratified results	Partially	..
Test feasibility and acceptability of prevention packages and trials of efficacy	Yes	Widespread roll-out of feasibility and acceptability studies of PrEP with sex workers
Increased studies on the continuum of HIV care for sex workers	Partially (progress very slow)	..
Increased implementation science, community empowerment, and stigma reduction studies for sex workers	Partially (progress slow)	Most community empowerment interventions are still from south Asia (eg, the Avahan project), with only three new studies from outside the region
Increased studies of structural measures (risks or protective) of HIV	Partially (progress slow)	Increased studies of structural measures of HIV in Africa, largely cross-sectional
Increased integration of violence, discrimination, and other human rights measures into sex work and HIV studies	No	Violence, discrimination, and human rights measures still not included in most biomedical and implementation science studies
New studies on effect of decriminalisation on health outcomes, police violence prevention, and community empowerment interventions	Partially	Two ecological studies[9,10] of decriminalisation and legalisation on violence, HIV, and sexually transmitted infection outcomes; no new modelling studies

SWIT=sex worker implementation tool. ART=antiretroviral therapy. PrEP=pre-exposure prophylaxis.

Table 1: **Progress on calls to action for research on HIV and sex work**

	Number of datapoints	Numbers of countries with data	Sample size by region	Estimated regional HIV prevalence, % (95% CI)	I^2*
Asia and Pacific	183	23	1 825 054	5·7 (4·9–6·6)	99·8%
Eastern Europe and central Asia	20	10	17 266	8·0 (4·9–11·8)	98·4%
Middle East and north Africa	19	9	11 615	1·8 (1·1–2·7)	88·2%
Eastern and southern Africa	81	15	66 256	33·3 (29·2–37·6)	99·2%
West and central Africa	46	14	56 640	20·1 (16·7–23·8)	99·1%
Latin America and Caribbean	56	17	61 196	4·2 (3·4–5·0)	95·1%
Western and central Europe and North America	45	13	63 986	7·4 (4·9–10·4)	99·2%
Overall	451†	101	2 103 380†	10·4 (9·5–11·5)	99·8%

*Heterogeneity was assessed with the I^2 statistic that describes the percentage of variation between studies that is due to heterogeneity rather than chance. †Includes additional papers that report data from three countries and regions (Benin, Uganda, and India).

Table 2: **Global burden of HIV among female sex workers from 101 countries, separated by region, between 2006 and 2017 (n=2 103 380)**

See Online for appendix

economic and social rights.[4] However, a lack of political and financial investment for addressing structural barriers (eg, contextual factors external to the individual) remains a major obstacle to measuring and achieving these goals for sex workers. Without accurate denominators, and with the barriers of stigma and criminalisation in including sex workers in HIV surveillance,[5,6] bringing scientific advancements to scale remains largely out of reach for sex workers.

The *Lancet* Series set out key markers for potential progress in human rights and HIV response, suggesting that effects on violence, safety of work environments, and sexual risks after the decriminalisation of sex work had the potential to avert 33–46% of HIV infections in sex work over the next decade.[7] The Series coincided with the release of the WHO consolidated guidelines on prevention, treatment, and care for key populations, which set out recommendations on creating enabling environments, community empowerment, and decriminalisation. Some policy progress has been made with Amnesty International, an international human rights body, taking a formal policy position in support of full decriminalisation of sex work after careful review of evidence and extensive consultation.[8] However, progress in the protection of the human rights of sex workers in far too many settings has been hindered by the introduction of end-demand criminalisation laws (the so-called Nordic model), despite scientific and evaluation data showing the harmful effects of criminalisation models.

Programmatic and scientific advances

The 2014 call-to-action paper[1] made several recommendations for programmatic and scientific advances. Despite some progress in the reporting of HIV burden, social and structural research, and combination prevention advancements, many actions have not been achieved (table 1).

Global HIV burden among sex workers

Encouragingly, the updated review presented here found increases in data availability for HIV prevalence among female, transgender, and male sex workers, although incidence data remain scarce (appendix pp 3–32). Among female sex workers specifically, the original review[1] identified HIV burden data from 79 countries and 437 025 women, with the updated review identifying 451 HIV burden datapoints covering 101 countries and 2 103 380 women (table 2). New data were identified in North America, Latin America and the Caribbean, Europe, and regions in the east and south of Africa. Several trends were identified, including improved sampling strategies with respondent-driven sampling representing 19% and time-location sampling representing 33% of studies identified. Our updated global meta-analysis estimated HIV prevalence among all female sex workers at 10·4% (95% CI 9·5–11·5), which is similar to the 2014 estimate of 11·8%.[1] However, large variability was seen in the prevalence of HIV among female sex workers across regions (figure 1), and increased HIV burden was observed compared with adult women in all regions (figure 2), with HIV acquisition risks affected by HIV prevalence in male clients and high incidence among female sex workers. Mathematical models of HIV transmission have suggested that even in more generalised HIV epidemics across sub-Saharan Africa, 5–20% of new HIV infections in several sub-Saharan African countries occur in female sex workers.[12] These data show that HIV prevalence will continue to rise among female sex workers in generalised epidemics while epidemics in general populations contract.

In countries in North America, Europe, and Asia, the burden of HIV infection among female sex workers is affected by co-occurring risks related to injecting drug use. Women engaged in substance use are not only at increased risk for HIV acquisition directly via use of contaminated equipment, but also indirectly via other environmental and occupational exposures. Substance use is also associated with increased exposure to violence perpetrated by clients, police, and strangers; increased client loads; polysubstance use; and work in unsafe locations, which could further facilitate HIV acquisition through reduced condom use in these situations.[13,14] However, a study[13] in Russia reported that women who ended drug use more than 6 months before the study had low exposure to such situations, similar to sex workers who never injected drugs.

The call to action recommended separating reporting of HIV burden among transgender women and male sex workers. Research on the health of transgender people, mostly focused on HIV, has increased substantially in the past few years[15–18]—although available data remain relatively scarce. 18 countries now report HIV data on transgender women who are sex workers, only slightly higher than the 15 countries in 2014. Although most HIV research involving transgender women has been done in the USA, a review[19] of HIV epidemiology in transgender

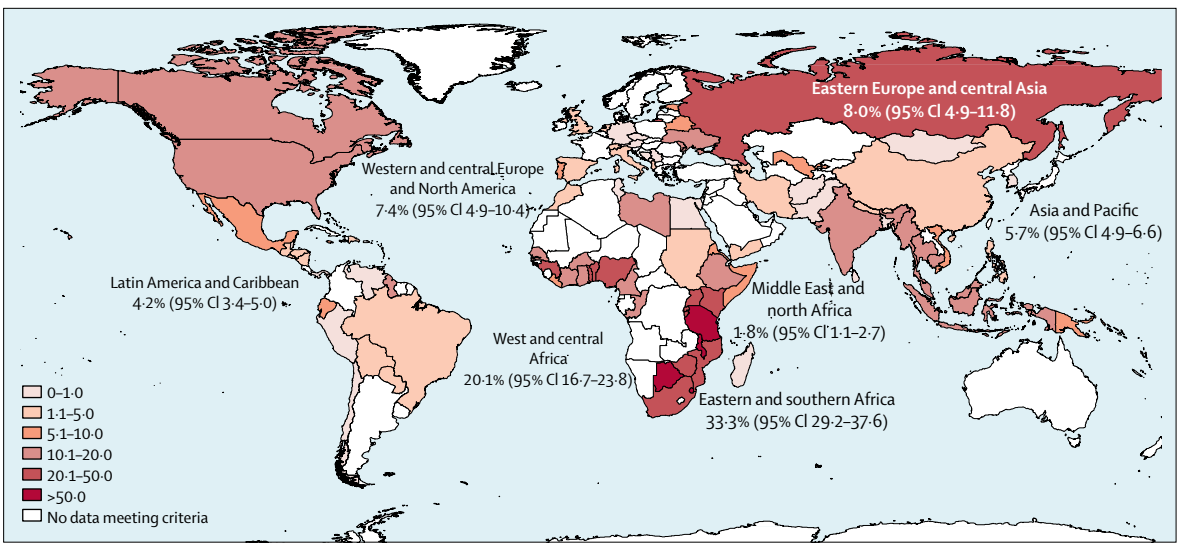

Figure 1: **Global burden of HIV among female sex workers between 2006 and 2017 expressed as HIV prevalence by region**

populations identified 14 studies from Latin America (with the majority from Peru and Brazil); ten studies from Asia, including India, Pakistan, and Thailand; and nine from Europe, including Spain and Portugal. Once again, no data on transgender women were available from eastern Europe or central Asia. Small sample sizes and conflation of transgender women and men who have sex with men (MSM) continue to challenge access to transgender-specific HIV data, particularly in Africa.[20]

By contrast, 22 articles with HIV prevalence data in male sex workers have been published since the publication of the *Lancet* call to action, including 12 from Asia, three from Europe, two from the USA, two from Peru, two from Kenya, and one from Australia (appendix pp 3–32). Studies with male sex workers are affected by heterogeneity of the underlying population being studied, ranging from MSM who have never sold sex to men who sell sex as a primary profession. HIV and sexually transmitted infection (STI) prevalence outcomes vary accordingly, with MSM who sell sex often having a higher burden of HIV than other MSM, and male sex workers who professionally sell sex often having lower or equivalent burdens of HIV than MSM who are not sex workers. Moreover, male sex workers tend to report higher engagement with HIV prevention services including condom use than do MSM who are not sex workers.

Our Series called for increased attention and responses to HIV burden in young people who sell sex. Emergent data suggest that transactional sex among adolescent girls and young women (AGYW) is a determinant of HIV acquisition and transmission.[21] The PEPFAR-funded Determined Resilient Empowered AIDS-free Mentored and Safe initiative launched in 2014 to respond to the increased needs of AGYW in some of the most generalised HIV epidemics across sub-Saharan Africa, including young people who sell sex.[22] Investment in programmes and services for young people of all genders who sell or trade sex is needed given the substantial proportion of young people engaged in transactional sex. Similar to adult sex workers, biological, behavioural, and structural factors increase HIV risks in young people who sell sex. Crucially, early entry into selling sex for AGYW aged 13–17 years has been associated with increased exposure to violence, incarceration, and HIV-related and STI-related risks, reflecting a confluence of biological factors that facilitate STI and HIV acquisition, and age-based and gender-based power disparities that compromise negotiation power for AGYW.[21,23,24] Although sex work is officially designated for people of the age of majority, policy contradictions for individuals under this age drive them further underground, and render them further criminalised and effectively excluded from services. Responding to evidence of exacerbated risk in this population requires harm reduction and rights-based services for young people selling sex rather than punitive restrictions.

Social and structural research

The call-to-action paper made several recommendations for increased integration of social and structural measures in HIV and sex work research. Although some promising developments have occurred, including increased reporting of structural risks and violence measures in epidemiological research and some emergent innovation in modelling, the scope and pace of progress has been slow. Our 2014 *Lancet* paper[7] reported that less than half of global epidemiological studies with HIV and HIV-related outcomes among sex workers considered one or more macrostructural, community, or work-environment upstream factors, despite the importance of structural determinants of HIV.[7] Few studies considered one or more structural determinants in the heaviest or emerging

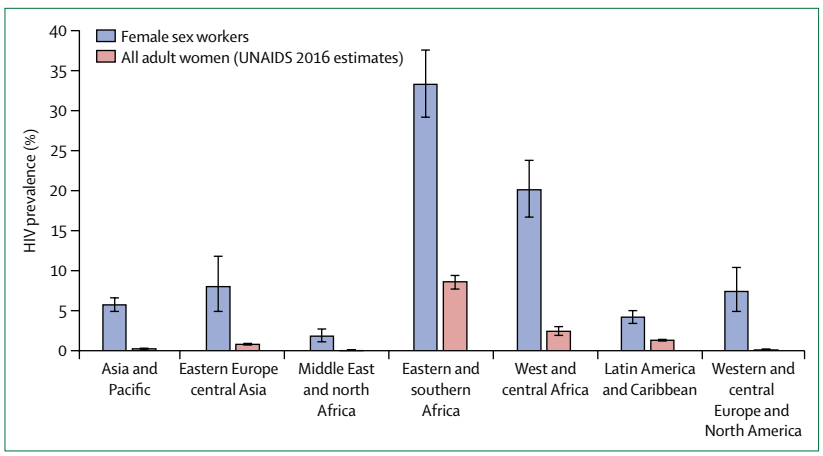

Figure 2: **Regional HIV prevalence estimates among female sex workers and all adult women[11]**
Error bars show 95% CIs.

HIV epidemic settings of sub-Saharan Africa, Russia, or eastern Europe. Since 2014, several key studies have documented the effects of macrostructural factors on HIV outcomes and access to care among sex workers, including stigma,[25,26] migration,[27,28] and effects of laws and policies such as policing[27] and violence,[29–32] with a small number of studies also from Russia and eastern Europe.[13] Many of the published studies were done in western Africa, central Africa, and South Africa,[21–28] reinforcing the importance of these associations by use of a combination of quantitative and qualitative methods. Taken together, this work highlights the need for effective responses to address HIV-related risks secondary to high-order determinants (such as violence and stigma) of HIV acquisition and transmission. Research progress has also been slow on detailed measures of types and exposures of violence, contextual factors shaping violence, and other structural exposures including work environments, policing, and migration in relation to HIV.

Our call to action set out key targets for scaled up methods and modelling. We updated our search from 2014 onwards to identify new mathematical modelling studies of the influence of structural factors not limited to criminalisation and violence on any STI (including HIV) first, among female sex workers only and second, among sex workers. We identified 2691 studies among female sex workers of which 34 were mathematical modelling studies and only two assessed the population-level effects of structural interventions. These two studies[33,34] suggested that community empowerment and community mobilisation interventions could reduce new infections by 17–40% and be cost-effective. Research has been slow on the development of longitudinal and dynamic models crucial to further disentangle pathways to HIV on which to intervene, both in high and emerging epidemics, and low and medium prevalence settings.[35] No new mathematical modelling studies focused on violence, stigma, decriminalisation, or any other structural factors affecting HIV in sex work have been published.

Encouragingly, two large-scale ecological studies[9,10] provide important data that support our *Lancet* 2014 modelling showing that the removal of criminal laws targeting sex work drastically reduces HIV risks through reduced violence and police harassment, and access to safe indoor work spaces. Reeves and colleagues' ecological analysis[9] of 27 European countries found that countries in which aspects of sex work are fully or partly legalised have a lower burden of HIV among female sex workers than countries that criminalise it (after adjusting for prevalence of sex workers who inject drugs, gross domestic product, HIV prevalence, and ART coverage among adults of reproductive age). In investigating the effect of enforcement by use of the World Bank Rule of Law (a measure of confidence in effective and fair judiciary and policing) on HIV prevalence, the authors suggest that fair and effective judiciary could be a mediating pathway. Indeed, legalisation (including explicit regulation of where and how the industry can operate), unlike decriminalisation (in which the industry follows regulations of other businesses), can remove barriers and can also create a two-tier system that pushes more vulnerable sex workers to the margins.[36] In Rhode Island, USA, a legal loophole decriminalised indoor sex work for 6 years, reducing sexual violence by 30% and STI incidence by 40%, not just among sex workers, but in the general female population.[10]

Antiretroviral therapy and combination prevention

Despite launch of global markers by WHO/UNAIDS in 2014 to fast track the HIV response, data on HIV care continuum have been slow to emerge and specific data on early ART initiation and test and treat models among sex workers remain incomplete. Challenges in accurately estimating size of sex work populations in the absence of accurate denominators, and structural barriers to engagement in ART programmes and research persist. Qualitative data in sub-Saharan Africa suggest that profound structural barriers of stigma and discrimination impede progress in the HIV care continuum.[37] Importantly, studies[38,39] confirm that successful HIV treatment trajectories are impeded by violence and displacement due to policing.

The SAPPH-IRe trial[2] in Zimbabwe found high prevalence (78%) of viral load suppression among sex workers taking ART (68% of women who were aware of their HIV-positive status), but only 50% of all female sex workers living with HIV had suppressed viral load. No significant difference in viral load suppression was reported between the SAPPH-IRe arm and the standard sister clinic arm, but with adequate support in the SAPPH-IRe arm, female sex workers achieved 90-90-90 targets (90% were recieving ART and 90% had viral load suppression). Similarly, in Cambodia, initiation of ART among female sex workers was high (83% of sex workers living with HIV); however, only 39% of sex workers were still on ART at 12 months and only 23% had viral load suppression.[40] In Uganda, sex

workers were most likely to have delayed initiation relative to the general population during the roll-out of early ART initiation.[41] Higher ART retention was observed in South Africa, with only 30% loss to follow-up at 12 months, similar to the current standard of care.[42]

Since 2014, combination HIV prevention among sex workers has been catalysed by global plans to roll out PrEP and HIV self-testing, while exploring the acceptability of vaginal and rectal microbicides. Our Series called for tailored combination HIV prevention, especially the integration of PrEP in different global settings.[43] The call to action noted the paucity of evidence of these interventions in sex workers due to the exclusion of involvement of sex workers in clinical trials. Since then, feasibility and acceptability studies among sex workers have indicated acceptability within groups, while also identifying implementation challenges.[42,44–46]

Interest in oral PrEP and microbicide rings among female sex workers and transgender women sex workers was high across diverse global settings, and acceptability of HIV self-testing was also high in two large-scale randomised controlled trials in Uganda[47] and Zambia.[48] Additionally, a small survey[49] (n=12) among young men and transgender women sex workers in Puerto Rico found rectal microbicide gels to be acceptable; a similar result was reported in a study[45] involving female sex workers done in the USA. However, challenges around the fear of breaching confidentially or confronting violent situations, and side-effects, were associated with reduced HIV self-testing and PrEP acceptability.[49]

In 2016 and 2017, the South African and Kenyan Governments proposed National Sex Worker HIV Plans that included access to PrEP and early ART for female sex workers. In South Africa, free PrEP uptake among sex workers was initially slow. Uptake was higher among younger females (aged 21–30 years) than older females (aged >30 years).[2] The Kenyan PrEP roll-out included sex workers, discordant couples, and young women and girls, and is beginning to gather momentum in a few high-burden districts. The Treatment And Prevention for female Sex workers (TAPS) demonstration project[42] in South Africa reported that PrEP can be implemented within female sex workers' routine services in urban settings with a high prevalence of HIV. However, although initiation on PrEP was high, and despite high adherence (70–85%), only 22% of participants were retained over 12 months.[42] Kenya's Bridge to Scale project[50] enrolled 1143 female sex workers on PrEP by February, 2017, but also reported retention as their biggest challenge. Zimbabwe's SAPPH-IRe trial[2] similarly reported a low average PrEP retention period of only 4 months. Investment in community mobilisation and follow-up promotion of regular HIV testing at clinics led to a doubling of HIV testing and diagnosis, suggesting the need for additional adherence support. The TAPS study reported that retention of sex workers who are HIV-positive on ART was high,[42] suggesting that adherence models and lessons from ART need to be applied to people who use PrEP, or that new adherence mechanisms need to be developed for sex workers who are HIV negative.

Although PrEP has emerged as a potentially powerful tool for reducing HIV incidence among key populations, data on uptake and efficacy among transgender women, including those who sell sex, remain limited. The only published study[51] of PrEP efficacy among transgender women (n=339) reported a lack of efficacy for tenofovir disoproxil fumarate-based oral PrEP among transgender women (hazard ratio 1·1, 95% CI 0·5–2·7). However, adherence was only 18% and tenofovir disoproxil fumarate was detected in none of the transgender women at the seroconversion visit, suggesting that barriers to adherence could have been the main cause of low efficacy. A small study[49] suggests that barriers to uptake include concerns about side-effects, lack of transgender-inclusive PrEP promotion, medical mistrust, and prioritisation of hormone use. Transgender women have noted that PrEP could be empowering in sex work situations in which they have reduced power to negotiate safe sex. Two studies[52,53] have documented high willingness to take PrEP among transgender women sex workers—84% in Argentina and 61% in Shenyang, China.

Community empowerment

Our 2014 call to action included recommendations for scale-up and increased funding in community empowerment and sex worker-led programming in the HIV response. Despite recognition in the UNAIDS 2015 Report on the Global AIDS Epidemic of the global evidence for rights-based health programming with sex workers based on principles of community empowerment, the adoption of the Sex Worker Implementation Tool[54] (developed by WHO, UNAIDS, UN Development Programme, UN Population Fund, and Global Network of Sex Work Projects in 2012) by governments and non-governmental organisations has been slow.

In 2014, a systematic review and meta-analysis[55] documented the effectiveness of community empowerment responses to HIV among female sex workers in low-income and middle-income countries, including a more than three-times increase in the odds of consistent condom use with clients and a 32% reduction in the odds of HIV infection. Our 2014 call to action documented several key gaps in the literature, including lack of evidence on the effect of community empowerment approaches on HIV care and treatment outcomes, scarcity of data on the role of community empowerment along the causal pathway between programme exposure and behavioural and biological HIV outcomes, and lack of rigorous evaluations of community empowerment approaches among female sex workers in sub-Saharan Africa. Since 2014, important advances have occurred in each of these three areas. Yet, the level and pace of progress have been limited in scope and scale.

We updated our 2014 search on community empowerment and HIV-related outcomes among female sex workers for the period 2013–17 and found an additional ten articles that met our original search criteria.[55] Similar to our 2014 review, most of these studies (seven [70%] of ten) were done in south Asia as part of the Avahan project and most focused on behaviour outcomes (eg, condom use or STI incidence),[56,57] with one on HIV prevalence.[58] In terms of examining the effectiveness of community empowerment on HIV care outcomes, a longitudinal evaluation of the Abriendo Puertas (Opening Doors) model in the Dominican Republic found that a community-driven, multilevel intervention among female sex workers living with HIV was associated with improved engagement and adherence to ART.[59]

In Swaziland, Fonner and colleagues[60] documented the role of social cohesion and participation on HIV outcomes among female sex workers in terms of their positive influence on condom use with clients and HIV testing, showing that intervening on these factors could play a key part in the HIV response among sex workers in Africa. However, the need for rigorous assessments of community empowerment-based responses to HIV among female sex workers in sub-Saharan Africa continues to be great given the regional burden of HIV.

Our previous review also highlighted challenges in the implementation and sustainability of community empowerment-based HIV prevention initiatives, including both internal (eg, lack of trust and competition between workers) and external (eg, stigma and legal constraints)

Panel 1: **Amnesty International policy on decriminalisation of sex work**

Resolution on state obligations to respect, protect, and fulfil the human rights of sex workers

In August, 2015, the Amnesty International Board voted to formally adopt a policy[8] for full decriminalisation of adult sex work, including laws that prohibit associated activities such as bans on buying, solicitation, and general organisation of sex work. The policy is consistent with international health policy bodies including WHO, UNAIDS, UNDP, UN Population Fund, Human Rights Watch, and the Global Commission on HIV. The policy has the following features and details:

- A starting point for preventing and redressing human rights violations against sex workers, and the need for states to not only review and repeal laws that make sex workers vulnerable to human rights violations, but also refrain from enacting such laws.
- Amnesty International's overarching commitment to advancing gender equality and women's rights.
- The obligation of states to protect every individual in their jurisdiction from discriminatory policies, laws, and practices, given that the status and experience of being discriminated against are often key factors in leading people to engage in sex work, as well as in increasing vulnerability to human rights violations while engaged in sex work, and in limiting options for voluntarily ceasing involvement in sex work.
- The harm reduction principle.
- States have an obligation to prevent and combat trafficking for the purposes of sexual exploitation and to protect the human rights of victims of trafficking.
- States have an obligation to ensure that sex workers are protected from exploitation and can use criminal law to address acts of exploitation.
- Any act related to the sexual exploitation of a child must be criminalised. Recognising that a child involved in a commercial sex act is a victim of sexual exploitation, entitled to support, reparations, and remedies, in line with international human rights law, and that states must take all appropriate measures to prevent sexual exploitation and abuse of children.
- Evidence indicates that people engage in sex work as a result of marginalisation and limited choices. Therefore, Amnesty International will urge states to take appropriate measures to realise the economic, social, and cultural rights of all people so that no person enters sex work against their will or is compelled to rely on it as their only means of survival, and to ensure that people can stop sex work if they choose.
- Ensuring that the policy maximises protection of the full range of human rights—in addition to gender equality, women's rights, and non-discrimination—related to sex work, including personal security, the rights of children, access to justice, the right to health, the rights of indigenous peoples, and the right to a livelihood.
- Recognising and respecting the agency of sex workers to articulate their own experiences and define the most appropriate solutions to ensure their own welfare and safety, and complying with broad, relevant international human rights principles regarding participation in decision making, such as the principle of free and informed consent obtained before consultation with respect to indigenous peoples.
- The evidence from Amnesty International's and external research on the lived experiences of sex workers and on the effects on human rights of various criminal law and regulatory approaches to sex work.
- The policy will be fully consistent with Amnesty International's positions with respect to consent to sexual activity, including in contexts that involve abuse of power or positions of authority.
- Amnesty International does not take a position on whether sex work should be formally recognised as work for the purposes of regulation. States can impose legitimate restrictions on the sale of sexual services if such restrictions comply with international human rights law; restrictions should be for a legitimate purpose, provided by law, necessary for, and proportionate to, the legitimate aim sought to be achieved, and not discriminatory.

challenges in the sex worker community. Addressing these challenges requires sustainable funding invested not only in HIV-related aspects of community empowerment, but also the organisational capacity of sex worker rights groups to mobilise their collective resources. The latter should generate solidarity within the community, as well as stimulate and sustain strategic partnerships with allies that can assist in enacting structural change.

Policy advancements and challenges

Perhaps the most important policy advance since our 2014 *Lancet* Series is Amnesty International's high-profile decision to call for full decriminalisation of sex work on the basis of human rights and health evidence (panel 1).[8] Although Amnesty International does not set policy, it has tremendous influence in shaping policy frameworks globally and the importance of this recommendation cannot be overstated. In 2016, an expert group convened by UN Women published recommendations regarding sex work, including the suggested decriminalisation of sex work on human rights grounds. UN Women is developing a policy on sex work and sex worker groups are challenging them to meaningfully involve sex workers in the process.[61]

Our call to action made several recommendations for policy change, including increasing the number of countries and regions that decriminalise sex work and ending impunity for crimes and abuses against sex workers. Since our 2014 *Lancet* paper showing the potential to avert HIV infections through decriminalisation and downstream effects on violence, sexual risk behaviour, and the safety of work environments,[7] meaningful policy change has yet to be achieved in most settings and the harms of criminalisation continue to be articulated in reports to the Convention on the Elimination of All Forms of Discrimination against Women. In criminalised environments, sex workers report a profound lack of police protection, exacerbated by experiences of violence.[30] One notable exception is South Africa, in which on Dec 20, 2017, the African National Congress, after huge efforts by the sex worker rights movement, resolved to decriminalise sex work and reject proposals from its delegates to move to an end-demand criminalisation model of criminalising clients but not sex workers.

Since 2014, Canada, Ireland, and France have implemented versions of criminalisation under an end-demand model. Large-scale anticlient raids have been reported alongside raids on sex workers in Tanzania. In 2016, a bill was introduced in Uganda to criminalise clients of sex workers.[62] Although data on end-demand criminalisation approaches are only just becoming available, data suggest similar outcomes to full criminalisation models. In Vancouver, BC, Canada, local enforcement guidelines in 2013 to cease targeting sex workers while continuing to target clients and third parties showed similar amounts of violence, police harassment, and rushed negotiations, including reduced ability to negotiate safe sex, compared with 2012 when sex workers remained targets for arrest.[63] Unfortunately, despite these data being shared with Canada's federal Government, and a landmark human rights ruling by the highest court that struck down previous criminal laws, new end-demand laws were rolled out in late 2014. Analysis of arrests on brothel-keeping offences in Ireland found that of 141 people charged, "91% of the people convicted were sex workers, not owners or managers of brothels who have others working for them".[64]

The conflation of trafficking with sex work persistently shapes sex work policy, often with important human rights implications for sex workers. Research continues to document the effect of criminalisation on severe violence and other human rights abuses against sex workers globally. The scholarly literature increasingly offers direction on how to craft policy, including decriminalisation, that upholds the necessary distinction and human rights of sex workers and those trafficked.[65] However, Germany's 2017 law introduced new regulations inclusive of mandatory medical examinations and compulsory registration at the local level, adding additional layers of regulation over the legalisation policy enacted in 2002.

Research gaps and agenda

Substantial gaps in knowledge need to be addressed if we are to truly realise health and human rights for sex workers and optimise the benefits of new and emerging HIV prevention and treatment tools (panel 2). Structural determinants and socioecological models[66,67] can guide complex epidemiological analyses of HIV epidemic structures and intervention science in sex work, but progress in research has been slow, and structural and contextual factors that confound accurate HIV reporting remain under-reported for many of the same reasons: lack of funding and political will, criminalisation and stigma, and the invisibility of sex work and HIV. Collecting reliable, ethical, and community-engaged data to measure epidemic structures remains a major challenge for HIV programming and policy making for sex work. Criminalisation, stigma, violence, and migration are major structural barriers to counting sex workers for surveillance, engagement in HIV services, and accurate reporting. Accurate surveillance estimates of female, male, and transgender sex workers are crucial for assessment of the effects of programmes and structural interventions. In our updated meta-analysis, only 11% of HIV prevalence data were from the integrated biological and behavioural surveillance survey or country-level surveillance system data. Because UNAIDS global AIDS monitoring tracks 90-90-90 targets and service coverage,[68] the lack of denominators and limited inclusion of sex workers in country-level surveillance remain major barriers to fast-tracking the end of AIDS.

Crucial implementation science questions regarding the progress and effect of community-led initiatives as they incorporate novel biomedical approaches, including ART-based prevention strategies such as PrEP

Panel 2: **Research gaps and priorities**

Epidemiology of HIV

- Develop methodological innovations to better estimate size of sex work populations; contextual and structural features of HIV and antiretrovial therapy coverage are crucial to estimating priorities, reach, and targets for programmes and policies.
- Address structural barriers to including female, male, and transgender sex workers in HIV surveillance, including criminalisation, stigma, and lack of political will and donor investment.
- Increase the number of countries measuring and reporting transgender HIV data, including stigma and discrimination.

Social and structural

- Expand research of social and structural measures, including more complex multilevel data such as longitudinal data, in dialogue with qualitative research, particularly in regions with a heavy HIV burden such as sub-Saharan Africa and emerging HIV endemic settings of Russia and eastern Europe in which repressive regimes and discrimination continue to slow the roll-out of biomedical interventions.
- Carefully monitor regional and local enforcement and arrest data alongside violence and sex worker-level evidence to disentangle how various policies and enforcement strategies shape violence, stigma, and access to health services and the HIV care continuum.
- Anchor mathematical models in solid empirical evidence in collaboration with social scientists and the sex work community to disentangle the influence of structural interventions and policing approaches on violence, HIV and sexually transmitted infection burden, and access and retention in biomedical interventions.

Biomedical and implementation science

- Integrate and consider human rights and structural risk measures in biomedical interventions from the outset to ensure uptake of scientific advancements of pre-exposure prophylaxis, early initiation of antiretroviral therapy, and self-HIV testing.
- Include and integrate structural and community empowerment within and alongside biomedical interventions.
- Increase community-led and sex worker-tailored implementation science and biomedical interventions.
- Increase resource investment in structural and community empowerment implementation research (beyond the Avahan project), particularly in sub-Saharan Africa.

Policy evaluation and human rights monitoring

- Integrate evidence on human rights of health into global funding indicators (eg, UNAIDS and the Global Fund).
- Considering that many countries are reviewing legislation around sex work and that community-based randomised trials are unlikely to be possible in most settings, researchers should plan rigorous monitoring and evaluation of the effect of these changes on sex workers' health, safety, and human rights in advance.

and treatment as prevention (TasP), need immediate attention given their ongoing expansion. Important scientific advancements in biomedical interventions have been made with a cascade of feasibility and acceptability studies for PrEP and TasP among sex workers; however, data suggest very low retention of PrEP and TasP among sex workers. From a broad health and human rights perspective, key operational research questions also include how to better integrate HIV with other relevant health services (eg, reproductive health and substance use) and how to increase access to social and economic services to improve overall health and wellbeing. Implementation science is urgently needed to reduce and monitor changes in societal stigma regarding sex work at the community level and to ensure that sex workers are appropriately screened and referred to tailored violence prevention and care services. Immediate and sustained political and funding investment in community empowerment and rights-based intervention approaches to HIV in sex work are necessary.

In these implementation science efforts, sex worker organisations can play a key part by documenting their experiences and efforts to respond to HIV and protect the human rights of sex workers, and ensure that the community is providing leadership (panel 3). Community-driven monitoring tools such as the Community Ownership and Preparedness Index[70] are important examples of how sex worker organisations can engage in implementation science to document changes in community-led and sustained efforts. Several south-south cooperation initiatives (including partnerships between low-income and middle-income countries) are also ongoing to document and share community-led, programmatic lessons learned between low-income or middle-income countries.[71]

Conclusions

The HIV pandemic among sex workers remains under-addressed and under-resourced, with glaring gaps in comprehensive measures of HIV prevalence, incidence, and ART coverage; slow and stalled retention of PrEP; and repressive policy climates and ubiquitous human rights violations against sex workers in far too many settings. Achieving 90-90-90 targets and shifting the HIV landscape cannot be achieved without addressing the human rights of sex workers. Some progress has been made on recording structural measures of violence, stigma, and discrimination, particularly in settings with a heavy HIV burden such as sub-Saharan Africa in which these measures were absent 4 years ago. However, the pace of

Panel 3: **Human rights monitoring by sex workers**

Criminalisation and violence against sex worker human rights defenders

The criminalisation of sex work continues to provide cover and sanction to state-sponsored human rights abuses against sex workers and sex worker human rights defenders.

- In Zimbabwe, courts have denied sex workers the right to peaceful assembly to protest violence against them by citing sex workers' illegality.
- 44 sex workers were arrested and jailed for 2 weeks in Uganda for participating in an emergency meeting to respond to the murders of 20 women—most of whom were sex workers.
- Sex workers attending a vigil for two transgender sex workers who were murdered in Guyana faced harassment and threats from police. The head of the Guyana Sex Worker Coalition reported a police officer cranked his gun at her.
- Angelica Miriam Quintanilla, Director of LIQUIDAMBAR—a sex worker-led organisation in El Salvador—was shot to death in the sex worker area of San Salvador in which women face systematic harassment from police and gangs. According to a fellow sex worker activist, Karina Bravo of Ecuador, "this tireless warrior was foully murdered for denouncing the violence that female sex workers face".
- Transgender sex workers face very high amounts of violence in Turkey; 43 transgender people were murdered between 2008 and 2016, including sex workers. According to a mapping of violence against transgender sex workers, 75% had experienced violence and half the perpetrators were identified as police.

Sex workers set precedents in courts: ending impunity and challenging criminalisation

- 19 sex workers from the Dedza district of Malawi successfully challenged their arrest for "living on the avails of prostitution". The Zomba High Court overturned the arrests and deemed them unconstitutional.
- According to Aniz Mitha of the Malawian Sex Workers' Alliance, "the wrongful arrest of sex workers is one of the main issues in the country". She continued, "we hope that this case sends a clear message that sex workers are deserving of rights, and the police should not be arresting us when we are not doing anything illegal".
- Three men were found guilty and sentenced for a violent attack on Kemalita Ördek, a transgender sex worker and the executive director of the Red Umbrella Sexual Health and Human Rights Association. Speaking to the Global Network of Sex Work Projects, Kemalita said "I believe the perpetrators got a just judgment. The court team increased the level of sentences for the perpetrators compared to the demand of the prosecutor. The prosecutor demanded very low sentences. This was a surprise for me." Legal expert Denis Aksoy stated that "because the victim's identity as a sex worker was taken as a basis, this penalty imposed on the ground of sexual assault will be seen as a precedent".
- In 2014, Zimbabwe Lawyers for Human Rights successfully argued that the solicitation-related arrest and conviction of nine women violated rights to personal liberty and equal opportunity stipulated within the newly ratified constitution. The resulting court order in favour of their cases was widely interpreted as effective decriminalisation. Epidemiological data showed substantial decreases in the proportion of sex workers stopped by police after this high-profile case,[69] illustrating the effect of policy interpretation even within criminalised environments.
- Nicaragua is now the third country—after Colombia and Guatemala—to have a sex workers' union recognised by the Ministry of Labour.

progress remains too slow and more complex measures and methods to model structural factors are needed to improve HIV prevalence in sex workers.

In most countries and regions, community movement and policy advocacy have not translated into real and sustained uptake of community empowerment and structural interventions within or alongside biomedical interventions. With growing advances in biomedical tools, sex workers must not be left behind in the HIV response. The fact that adequate global ART coverage data for sex workers in most settings are lacking is unacceptable. Despite relatively strong feasibility and acceptability of PrEP, demonstration projects report limited retention, reinforcing the importance of community engagement and tailored sex worker approaches and concurrent structural interventions to optimise the effect of biomedical interventions.

Civil society has continued to highlight the exclusion of sex workers and other key populations in implementation by major donors, including PEPFAR and the Global Fund. PEPFAR has seen a slow increase in country operational plans investing in female sex workers from US$32 000 000 in 2013 to $38 000 000 in 2017.[72] The actual country expenditures appear relatively stable from 2014 to 2017. In 2016, the Global Fund undertook a review of policies and action plans in relation to key populations and gender. Although substantial progress was noted in investing in engagement of civil society in roll-out of the Global Fund,[73] major concerns were expressed in regards to securing meaningful engagement of sex workers throughout the granting processes, alongside investment and sustainability of engagement.[74] As of May, 2018, the Global Fund board approved revised eligibility criteria to improve flexibility in giving priority to heavy burden settings and key populations, as well as revised eligibility criteria for high-income countries with no HIV prevalence data on key populations.

Political commitment and funding should be put behind the WHO/UNAIDS Sex Worker Implementation Tool[54] to ensure commitment to rights-based

programming and greater investment in civil society groups to lead the HIV response. Integration of evidence and measures of human rights of health within global funding indicators (eg, UNAIDS and the Global Fund) will be key factors in driving this progress. Global funding commitments to the UNAIDS/WHO 90-90-90 targets and the plan to fast track the HIV response by 2030 have set ambitious targets to scale up HIV prevention and treatment; however, key populations of sex workers remain invisible. HIV prevention and treatment tools are available but, without comprehensive HIV epidemiology, a lack of denominators and failure to address structural determinants (including decriminalisation of sex work) means that progress in achieving health and rights for all sex workers will fall short.

Contributors

KS did the original conceptualisation of the manuscript, drafted the outline, led the paper writing team, drafted the introduction, social and structural research gaps, and conclusion sections, and contributed to the global HIV burden and policy sections, table 1, and panels 1–3. A-LC contributed to the policy and research gaps sections, table 1, panel 2, and panel 3. SDB contributed to the global HIV burden of male sex worker and youth and research gaps sections, table 1, and panel 3. L-GB contributed to the antiretroviral therapy and combination prevention section, table 1, and panel 3. DK contributed to the community empowerment and research gaps sections, table 1, and panel 3. MRD contributed to the global burden of youth, policy, and research gaps sections, table 1, panel 2, and panel 3. TP contributed to the global HIV burden among transgender sex workers and research gaps sections, table 1, and panel 3. ALW led the systematic review and analysis for the global burden of HIV among female and male sex workers sections and contributed to the global burden section, the figures, table 2, and the appendix. BW contributed to the introduction and conclusion sections, table 1, and panel 1. M-CB led the modelling updates and contributed to the social and structural determinants and research gaps sections, table 1, and panel 3. JB contributed to the community empowerment and conclusion sections, table 1, and panel 3. SAS contributed to the introduction and research gaps sections, table 1, and panel 3. CB contributed to the conceptualisation of the manuscript and to the overall writing and editing of the manuscript.

Declaration of interests

We declare no competing interests.

Acknowledgments

The 2014 *Lancet* Series on HIV and sex work was supported by grants to the Center for Public Health and Human Rights at Johns Hopkins Bloomberg School of Public Health (JHSPH) from The Bill & Melinda Gates Foundation and the UN Population Fund. The global HIV epidemiology update was supported by the US Agency for International Development (USAID). KS was funded in part by a Canada Research Chair in Global Sexual Health and HIV/AIDS and the US National Institutes of Health (NIH; R01DA028648-09). M-CB is funded in part by the HIV Prevention Trials Network (HPTN) modelling centre (funded by the NIH [UM1 AIO68617]). BW and CB were funded in part by the NIH to the Johns Hopkins Center for AIDS Research (CFAR; P30AI094189). The epidemiological update was supported by Global HIV, which received support from Supporting Operational AIDS Research (cooperative agreement AID-OAA-140060) and was made possible by the generous support of US citizens through the President's Emergency Plan for AIDS Relief and USAID. The contents of this paper are our sole responsibility and do not necessarily reflect the official views of NIH, USAID, or the US Government. The content is solely our responsibility and does not necessarily represent the official views of the NIH. We thank Amrita Rao (JHSPH, USA) for her contributions to the search and data extraction for the analysis of global HIV burden, Caitlin Kennedy and Ping Yeh (JHSPH, USA) for their contributions to the community empowerment review update, and Helen Coupland (Imperial College, London, UK) for her contribution to the modelling search. We thank Ruth Morgan Thomas from the Global Network of Sex Work Projects for her guidance on engagement of sex workers with major global funders.

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