

**13TH INTERNATIONAL CONFERENCE ON HIV TREATMENT,
PATHOGENESIS, AND PREVENTION RESEARCH
(INTEREST)**

**Accra, Ghana
14-17 May 2019**

MEETING REPORT

JULY 2019



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Report from the 13th International Conference on HIV Treatment, Pathogenesis, and Prevention Research (INTEREST)

Accra, Ghana
May 14-17, 2019



1. About INTEREST 2019

In 2019, the 13th International Conference on HIV Treatment, Pathogenesis, and Prevention Research (the INTEREST conference) was held in Accra, Ghana from May 14 to 17, bringing together a record 657 participants from 42 countries, mainly in Africa, of whom 47 per cent were women.

The INTEREST conference aims to:

- Provide cutting-edge knowledge in the fields of treatment, pathogenesis, and prevention of HIV-1 and related infections and chronic conditions;
- Exchange ideas on how to provide and support HIV testing services and clinical care to adults, adolescents, and children living with HIV in Africa to achieve 90-90-90 goals;
- Foster new research interactions among leading investigators and those who represent the future scientific leadership of health care and research on the African continent; and
- Include a focus on capacity building and implementation science.

INTEREST is distinctive for its all-plenary format, which enables active engagement by participants in all sessions, including in-depth symposia on major current issues, as well as abstract-driven sessions. Six hundred and thirteen abstracts were submitted in 2019, of which 435 were accepted. Of those accepted, 43 per cent were submitted by women and 47 per cent of the 38 top-scoring abstracts selected for oral or mini-oral presentation were presented by

women. The meeting also featured 397 poster presentations and three of the highly popular “Oxford-style” debates that test participants’ views on emerging innovations and controversies in the HIV response.

As in past years, many INTEREST delegates rose early in the morning to participate in thematic discussions on selected poster presentations, attend the Joep Lange early career mentorship sessions, and seek grantpersonship advice in sessions led by three granting agencies: US National Institutes of Health-Fogarty International Center, France’s Recherche Nord & Sud Sida-hiv Hépatites (I’ANRS), and the European and Developing Countries Clinical Trials Partnership (EDCTP).

For the first time at an INTEREST conference, journalist scholars attended the conference and participated in two pre-conference media training programs. The training sponsored by the International AIDS Society, included journalists from Ghana, Uganda, Congo Brazzaville, the UK, and the USA, while the one sponsored by AVAC included journalists from Ghana, Nigeria, Cameroon, and the Democratic Republic of Congo. They wrote stories and made broadcasts, interviewing plenary speakers and conference participants.

In honour of the late conference co-founder, the Joep Lange Award was presented by INTEREST Scientific Chair Cate Hankins to the African researcher with the highest scoring conference abstract. The 2019 award was won by Sylvia Mwanza from Zambia for her study on *The role of executive functioning in medical adherence: Evidence from the HIV-associated Neuro-cognitive Disorders Study in Zambia* (See Section 4.4). The Jacqueline van Tongeren Artist-in-Residence Award recognizing a second late INTEREST co-founder was presented to the Ghanaian sculptor and painter Naa Ashirifia Mettle-Nunoo, who in turn presented a painting to the Joep Lange Institute. Local handcrafted products by Annabel Mensah, a beadmaker and HIV peer educator from the West African Program to Combat AIDS, were also available, as were crafts from The Almond Tree, a group of men and women living with HIV from the West Africa AIDS Foundation’s International Health Care Clinic.

INTEREST co-sponsors included Gilead, Johnson & Johnson, Roche, Abbvie, GlaxoSmithKline/ViiV Healthcare, Mylan, USA National Institutes of Health - Fogarty International Center, the USA President’s Emergency Plan for AIDS Relief, Abbott, l’Agence nationale de recherches sur le sida et les hépatites virales (I’ANRS), the International AIDS Society, the Joep Lange Institute, Laboratory Infrastructure Solutions, Sysmex, and the USA National Institute of Allergy and Infectious Diseases.

The 2019 INTEREST conference was endorsed by the University of Ghana, Ghana Health Services, the Ministry of Health of Ghana, the African Society of Laboratory Medicine, the Southern African HIV Clinicians Society, the Society for AIDS in Africa, and Youth Against AIDS.

Key themes emerging at INTEREST 2019 included:

- The region of west and central Africa continues to lag behind in access to antiretroviral treatment;
- Attention to the HIV prevention needs of adolescent girls and young women is increasing, but more programs need to be brought to scale, and AIDS remains the leading cause of death of adolescents in Africa;
- Many lessons are being drawn from the ongoing rollout of pre-exposure prophylaxis across Africa;
- Three pivotal HIV vaccine trials currently underway will set the direction of HIV vaccine research for the next decade;
- Long-acting technologies for HIV prevention and treatment are set to revolutionize the HIV response over the next decade;
- The world now has definitive answers on the use of hormonal contraception and HIV risk;
- Innovative strategies are needed to bring men into HIV testing and care;
- Many countries in Africa are shifting to dolutegravir-based first-line antiretroviral treatment (ART) regimens;
- Children continue to face barriers to accessing HIV treatment and care;
- Despite some progress over the last year, many Africans living with HIV still do not have access to viral load testing;
- Differentiated service delivery is critical for maintaining people on ART and reducing the burden on health workers and systems;
- Tuberculosis continues to take a toll on people with HIV, but there are some promising research developments; and
- Hepatitis and non-communicable diseases are growing challenges across the region.

2. Setting the scene: HIV in the region

2.1 Welcoming remarks

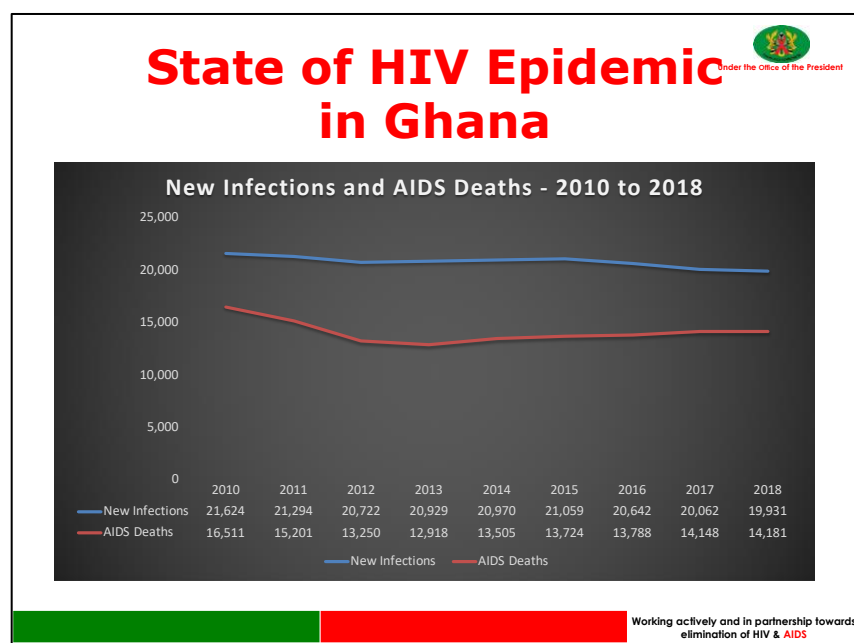
In opening remarks, INTEREST Local Chair Professor Kwasi Torpey from the University of Ghana welcomed participants to the first INTEREST meeting to be held in anglophone West Africa. Co-Chair and conference co-founder Professor Elly Katabira from Makerere University in Uganda emphasized that the long-standing goal of the meeting is to inspire and provide young researchers and leaders of tomorrow with the skills and knowledge to take the fight against HIV forward in the future. INTEREST Scientific Chair Professor Cate Hankins from the Amsterdam Institute for Global Health and Development and McGill University in Canada noted that the number of abstracts submitted had increased by 60 per cent compared to 2018, and highlighted a new program to bring trainee journalism fellows to the meeting to strengthen their skills in reporting about HIV, undertaken in partnership with the International AIDS Society and Global Advocacy for HIV Prevention (AVAC).

Formally opening the 13th INTEREST conference and welcoming participants from across the continent, the Minister of Health of Ghana, the Honourable Kwaku Agyeman Manu, noted that despite progress made in the HIV response over the last 30 years, the disease remains a significant challenge in Ghana and the region, and called upon Africa and the international community to accelerate their efforts to achieve the 95-95-95 goals by 2030.

2.2 HIV in Ghana: A persistent epidemic requiring an accelerated response

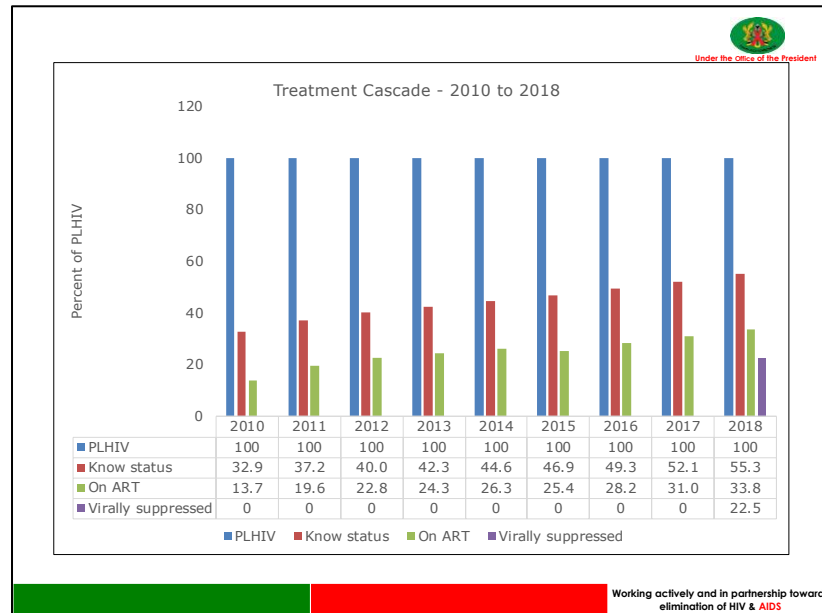
[Kyereme Atuahene](#), Acting Director General of the Ghana AIDS Commission, presented an overview of HIV in Ghana and the national response (1). With a population of nearly 30 million people, Ghana had an HIV prevalence rate of 1.7% in the general population in 2018, with HIV prevalence reaching 7 per cent among female sex workers (FSW) and 18 per cent among men who have sex with men (MSM). In all age groups, the numbers of new HIV infections and AIDS deaths have remained high in Ghana over the last nine years, at around 20,000 and 14,000 respectively, with no significant decline since 2012 (Fig. 1). Since 2009, the proportion of new infections occurring among heterosexuals has increased significantly, from 59 per cent to 72 per cent. There has been some decline in the number of new infections among key populations.

Fig. 1: New infections and AIDS deaths in Ghana 2010-2018



Of the 344,000 people living with HIV in Ghana, only around 55 per cent (184,000) knew their HIV status in 2018, 34 per cent (113,000) were accessing antiretroviral treatment (ART), and under 23 per cent (75,000) were virally suppressed (Fig. 2).

Fig. 2: HIV treatment cascade in Ghana, 2018



Ghana needs to accelerate its HIV response significantly to achieve 90-90-90 and 95-95-95 targets by 2020 and 2030, respectively. To do so, the country aims to focus its HIV testing strategies on family testing, partner notification, population-location testing, routine testing in outpatient facilities, and the introduction of self-testing in 2019. To increase access to ART, the government aims to expand access in 400 antenatal care (ANC) sites and is introducing a differentiated care model that includes same-day ART initiation, 3-6 monthly clinic visits, and multi-month prescriptions filled in community settings. To improve viral load monitoring and suppression rates, clinical management will be strengthened by expansion and decentralization of viral load testing with GenXpert and point-of-care technology. Combination HIV prevention approaches will be focused on key populations, adolescents, youth, and women. From 2019, pre-exposure prophylaxis (PrEP) will be made available to key populations and serodiscordant couples. With many of the right policies and programs in place, the challenge for Ghana now is to further scale up its programs to achieve greater coverage and impact.

Presenting a community perspective on the HIV response in Ghana, [Cecilia Senoo](#) from Hope for Future Generations and Non-State Actors for Health Ghana highlighted the important role played by civil society organizations since the beginning of the HIV epidemic (2). She noted that communities continue to play essential roles in advocacy, delivering services that reach everyone in need, tackling HIV- and TB-related discrimination, monitoring programs and providing feedback, developing the research agenda, ensuring the engagement of key populations, and contributing to the sustainability of public health and other services. She described several current trends in Ghana as “worrying and unacceptable”, including slow progress against the 90-90-90 targets, lack of progress in reducing the number of new infections and AIDS deaths, high numbers of missing TB cases, the 7 per cent rate of mother-to-child HIV transmission in the country, failure to meet Global Fund and PEPFAR co-financing obligations, and slow progress in

establishing a National AIDS Fund to increase domestic financing commitments. She emphasized that the goals of ending the AIDS and TB epidemics by 2030 depend on transformed health systems that include significantly scaled-up community responses accompanied by the funding and sustained support needed to make these responses possible.

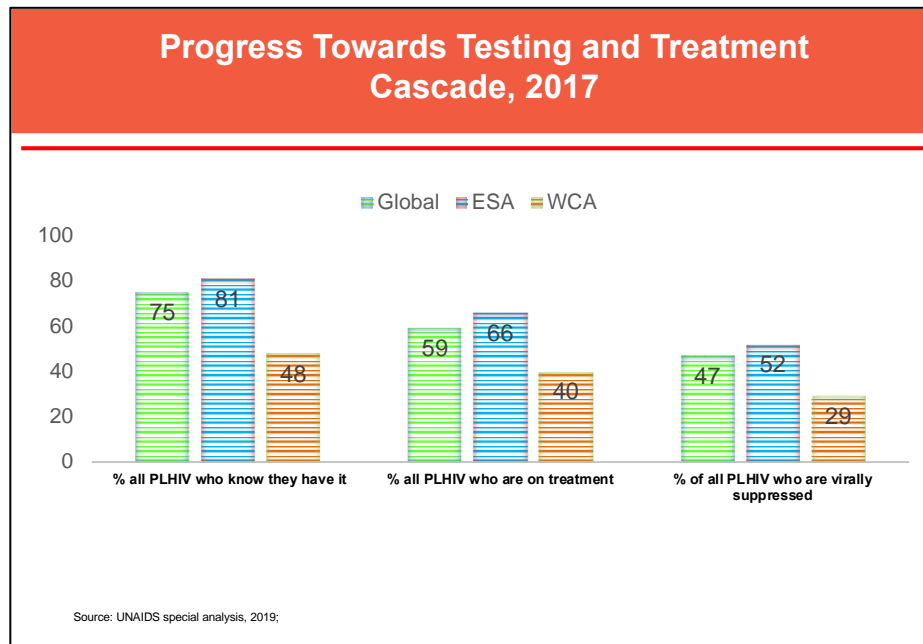
In her opening keynote address, the First Lady of Ghana, Her Excellency Mrs Rebecca Akufo-Addo, described challenges in the prevention of mother-to-child HIV transmission (MTCT) in Ghana, noting that despite 97 per cent of Ghanaian women having access to antenatal care and a 42 per cent reduction in MTCT rates since 2005, 3,400 new infections still occurred in children under 14 years of age in the country in 2017 (3). She called on Ghana to do better, emphasizing the importance of HIV testing and offering antiretroviral (ARV) drugs to all pregnant women living with HIV, as well as education, family planning, and economic empowerment for adolescent girls and young women. She also called for an intensified effort to ensure that all children born to women living with HIV are tested within six weeks of birth, consistent with Ghana's National Acceleration Plan for Pediatric HIV Services, which includes the goal of providing ART to 90 per cent of children living with HIV in Ghana by 2020.

2.3 HIV in sub-Saharan Africa: A tale of two sub-regions

[Karusa Kiragu](#), UNAIDS Country Director for Uganda, presented an overview of HIV in sub-Saharan Africa, including regional and sub-regional progress towards the 90-90-90 targets (4). With nearly 26 million people living with HIV, the region has 70 per cent of the global disease burden. Of the 940,000 AIDS-related deaths globally in 2017, 380,000 were in east and southern Africa and 280,000 in west and central Africa. East and southern Africa accounted for 800,000 of the 1.8 million people who acquired HIV globally, with more than half of these occurring in South Africa, Mozambique, and Kenya. Among the 370,000 new infections in west and central Africa in 2017, Côte d'Ivoire, Cameroon, Ghana, and the Democratic Republic of Congo reported the highest numbers of cases.

Gains against HIV in the two sub-regions have been uneven over the last decade. Since 2010, AIDS deaths and new infections in east and southern Africa have declined by 42 per cent and 30 per cent respectively, while in west and Central Africa they fell by only 24 per cent and 8 per cent, respectively, in the same period. The testing and treatment cascade (Fig. 3) shows that the east and southern Africa sub-region has made impressive progress against the 90-90-90 targets, with more than 80 per cent of people with HIV aware of their status and two-thirds now accessing ART. In west and central Africa, less than half of people with HIV are aware of their status and only 40 per cent are on treatment. Although accessing viral load remains a challenge globally, retention in treatment and achieving viral suppression has been even significantly poorer in west and central Africa. Poorer progress in this sub-region is attributed to inadequate domestic funding commitments, weak health systems, user fees for health care, humanitarian and human rights challenges, and high levels of stigma and discrimination. In recent years, these and other barriers to progress in the sub-region have been the subject of the Western and Central Africa Catch-up Plan: Putting HIV Treatment on the Fast Track by 2018.

Fig. 3: Progress towards 90-90-90 targets, global, East and southern Africa, West and central Africa, 2017



Additional challenges facing sub-Saharan Africa as a whole include the need to improve HIV diagnosis among children and increase access to ART for children, who persistently lag behind adult diagnosis and treatment; sustain funding for and commitment to HIV prevention, including condom programming; and ensure that people living with HIV and incident TB receive treatment for both diseases. The global flatlining of international HIV funding is a particular concern, highlighting the need for increased domestic funding commitments. Innovations such as dolutegravir-based ART regimens, HIV self-testing, social network testing, point-of-care infant diagnosis, PrEP, and the “U=U” message are beginning to scale up in the region and offer potential for accelerated progress and increased impact in the coming years.

3. Africa innovates for HIV prevention

3.1 Adolescent lives matter!

In a detailed presentation on the health challenges and needs of adolescents (people 10-24 years of age), Dr Linda-Gail Becker from the Desmond Tutu HIV Foundation in South Africa emphasized that the world’s population is getting younger (5). Half the global population is under 30 years of age, and Africa is experiencing a “youth bulge”: by 2030, one in four youth will live in Africa. Recent surveys show that 85 per cent of youth globally experience only low to moderate well-being as measured by factors such as gender equality, health, education, economic opportunity, safety, and citizen participation.

Adolescents face a particular set of health challenges, largely due to high prevalence of HIV and other preventable communicable diseases; in 2015, more than 2 million adolescents died from

preventable causes. More than half of adolescents globally are in “multi-burden” countries characterized by all types of health problems, including HIV, sexual and reproductive health issues, vaccine preventable diseases, and under-nutrition, as well as injuries, violence, and mental health and substance use disorders. Adolescents face wide discrepancies between their sexual and psychosocial maturity, with research increasingly showing that adolescents’ propensity to take risks may be based in part on factors related to brain development.

AIDS is the leading cause of death among adolescents in Africa, and the second leading cause of adolescent death worldwide. Around 85 per cent of young people living with HIV are in sub-Saharan Africa, and young women and adolescent girls account for 75 per cent of new HIV infections in the region. HIV disproportionately affects adolescent girls and young women because of structural and behavioural vulnerabilities, such as poverty, lack of access to education and employment, early sexual debut and marriage, age-disparate partnerships and power imbalances, low condom use, substance use, mental health issues, and gender-based-violence, as well as biological factors, including sexually-transmitted infections and genital inflammation.

Combatting HIV in adolescent girls and young women requires a combination of HIV prevention and social protection measures to achieve a so-called “triple dividend” in the health of adolescents now and as future adults and as future parents. Key HIV prevention interventions for female adolescents include PrEP, condoms and lubricant, information and education, and a broad range of approaches to promoting resilience and empowerment. Male adolescents have many of the same needs as girls and young women but tend to have fewer entry points into health and social services: voluntary medical male circumcision (VMMC) provides a key opportunity to provide them a range of related health and social services.

Making further progress on “the first 90” among adolescents in Africa requires improved linkage of newly diagnosed adolescents to HIV treatment, attention to improving access and uptake of HIV testing services for adolescents from key populations, consent policies and practices that facilitate access and uptake of HIV testing services, and more attention to the potential of self-testing among adolescents.

Progress on “the second 90” requires innovative approaches to improve adherence, including the potential of novel drug delivery systems, such as long-acting ART; prevention and clinical management of co-infections, particularly TB; optimal sequencing of ART; and a focus on the impact of HIV infection and ART on short- and long-term health outcomes, including non-communicable diseases.

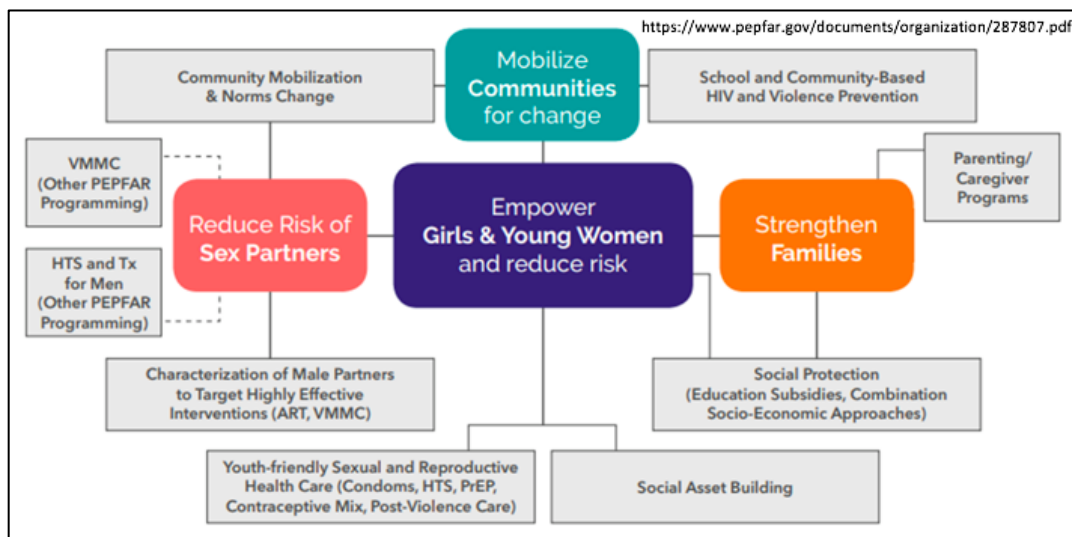
As noted in an oral abstract presentation from Ethiopia, although adolescents and young adults may self-report good adherence to treatment, rates of viral suppression among this population are often much lower than among older adults, highlighting the need for focused interventions. (6). Progress on “the third 90” among adolescents therefore requires improving retention in care; attention to sexual and reproductive health; particular support for pregnant adolescents living with HIV; and addressing barriers to services through differentiated service delivery models and adolescent-friendly services. These services need to be peer-driven, community-based,

flexible, and tailored to adolescent schedules and needs, with close attention to protecting privacy and confidentiality and to addressing behavioural, structural, and biomedical risks in a comprehensive manner, including through psychosocial support and integrated sexual and reproductive health services.

3.2 Will DREAMS come true?

The PEPFAR DREAMS initiative is focused on preventing HIV acquisition among adolescent girls in sub-Saharan Africa. DREAMS-supported CORE interventions include support for reduction in the number of sexual partners, empowerment to reduce risk, and social protection, including education subsidies to keep girls in school (Fig. 4). Nadia Sam-Agudu, from the Institute of Human Virology in the United States and Nigeria, reported that the impact of DREAMS to date includes significantly increased uptake of PrEP and continuing declines in numbers of new infections among adolescent girls and young women (7). A [presentation](#) of data collected among adolescent girls participating in DREAMS-funded programs in Kenya revealed increased uptake of HIV testing and reductions in sexual violence, along with increased transactional relationships and sex, but further study is needed to identify the factors associated with these changes (8).

Fig. 4: DREAMS core package



A [study](#) undertaken in Western Cape Province, South Africa, explored typologies of risky sexual behaviours among adolescent girls and young women (mainly 15-19 years) recruited from public schools, and their association with substance use and mental health (9). Notably, substance use and mental health issues are not addressed in the DREAMS initiative designed for this population. High levels of unprotected sex and early sexual debut were reported in the cohort and one in five participants reported higher-risk sexual behaviours. More than 60 per cent and 70 per cent reported medium-to-high risk mental health problems and aggressive behaviours, respectively. High-risk sexual behaviours were associated with mental health status, aggressive behaviours,

and alcohol use. The findings highlight the need to include alcohol use and mental health interventions in HIV and sexual behaviour initiatives for adolescent girls and young women.

3.3 The challenges of involving adolescents in HIV prevention research

Ann Strode from the University of Kwazulu-Natal in South Africa described three main challenges in involving adolescents in HIV prevention research (10). The first is an advocacy challenge to address the fact that adolescents are not adequately engaged in HIV prevention trials and as a result face significant delays – sometimes five years or more – in accessing innovations. This is the case even though their participation in research is legally and ethically justified, including on grounds of beneficence (striving for the greater good), justice (the right to equal treatment), and the fact that adolescents share the universal human rights to health and to benefit from the advances of science.

The second challenge involves addressing the legal and ethical complexities of enrolling adolescents in studies to ensure a balance between facilitating research, protecting children, and promoting child participation. Two specific complexities were highlighted. Firstly, children are considered minors and may lack legal capacity to consent to participate in research without parental consent. At the same time, some adolescents are discouraged from enrolling in trials if parental consent is required. Some countries in the region have made special legal provision to enable adolescents to consent to HIV testing at the age of 16, and to medical care at 18 years, which may support participation in research. Parental consent waivers may also be possible, although ethics committees usually agree to them only for older adolescents and in low-risk studies that are acceptable to the community. The second complexity is that adolescents engage in behaviours that are often criminalized, including underage sex, substance use, sex work, and same-sex behaviours, giving rise to requirements for mandatory reporting by health care providers and researchers in some jurisdictions. Study designers seeking to involve adolescents must be sure to address these challenges.

The third challenge is action by researchers and ethics committees to strike the right balance between protecting vulnerable people and ensuring that adolescents benefit from scientific research. Although WHO has produced various guidelines on involvement of adolescents in health research, national frameworks and approaches are needed. INTEREST participants were urged not to see enrolment of adolescents in HIV prevention trials in a simplistic way, and to commit to tackling these challenges and complexities.

3.4 The newest frontier: Evolving use of oral pre-exposure prophylaxis (PrEP)

[Sinéad Delany-Moretlwe](#) from the Wits Reproductive Health and HIV Institute at the University of Witwatersrand in South Africa presented an overview of progress in the global rollout of PrEP and development of other prevention technologies (11).

PrEP was first recommended by WHO in 2015 as part of a comprehensive prevention package for populations with HIV incidence of 3 per cent or higher. The 2016 United Nations Political Declaration on Ending AIDS by 2030 included a global target of providing PrEP to 3 million people by 2020.

By early 2019, TDF/FTC had been licensed for use as PrEP by 40 regulatory agencies globally, and around 70 countries have included PrEP in pilot or national programs. Nearly 500,000 people globally have been initiated on PrEP (12). A meta-analysis presented at the 2018 R4P meeting examining almost 10,000 person-years of real-world PrEP use showed HIV incidence below 1 per cent, comparable to rates observed in earlier clinical trials, reinforcing the understanding that PrEP efficacy is closely associated with adherence (13). Recent PrEP research has grappled with defining long-term adherence goals for PrEP in order to better align PrEP use with people's changing sexual behaviour and support adherence to maximize PrEP effectiveness during periods of high HIV risk.

North America and sub-Saharan Africa currently have the highest overall number of PrEP initiations, accounting for 71 per cent and 15 per cent of the total number of users, respectively. In the United States, where PrEP has been available since 2012, the majority of PrEP users are men who have sex with men (MSM), while in sub-Saharan Africa most users are adolescent girls and young women. Current initiation rates are well below the global target, and sub-Saharan Africa has only achieved 36 per cent of its PrEP target.

Lessons from the introduction of family planning methods show that a narrow focus on promotion of a new technology alone will not increase uptake and use. User preferences, the social context, and innovative service delivery approaches are equally important to the successful introduction of PrEP. PrEP-related stigma based on judgements regarding "promiscuous behaviour" may also discourage uptake and use. However, as in the case of contraception, slow acceptance should not be interpreted as lack of acceptability. Adoption of new technologies takes time, particularly if the new method is a significant departure from existing approaches.

The further scale up of PrEP in Africa will require attention to four key issues. First, effective demand creation is needed to educate and motivate people to consider PrEP and to use it effectively. Demand creation materials and messages are also important for normalizing PrEP use and removing stigma. Materials focused on positive emotions and user empowerment – especially for women – rather than on risk, are likely to be most effective (Fig. 5).

Fig. 5: PrEP campaign aimed at young women in South Africa



Source: myprep.co.za

Secondly, task-shifting and de-medicalized approaches are also needed. Oral PrEP is a first-generation prevention tool that has until now required a prescription and delivery by a healthcare provider, regular resupply, monitoring (including HIV testing), and surveillance systems to detect ART resistance. Instead, future PrEP provision should occur within a prevention - rather than a treatment - framework. There is growing evidence that medical monitoring in PrEP users under 35 years of age is unnecessary for people who do not have co-morbid conditions. Mobile technologies can help create demand for PrEP, support individual decision-making around use, and help people identify clinics where they can access PrEP. Pharmacist-, nurse- and community-managed PrEP delivery will also reduce burdens on both patients and health services.

Thirdly, because PrEP users are sexually active and have other health concerns, PrEP should ideally be delivered as part of a package of sexual and reproductive health services in order to provide ongoing choice in the context of changing risk, and to provide access to other services, such as screening for gender-based violence. An oral abstract from a pilot project in Cape Town provided a compelling example of this. Among a [cohort](#) of adolescent girls and young women offered a package of services through a mobile “Teen Truck” (Fig. 6), the use of contraception was found to facilitate PrEP use women, and vice versa: PrEP initiation also encouraged young women to initiate contraception (14). Finally, differentiated models of adherence support are needed for PrEP. Promising approaches include WhatsApp groups, SMS messages, monthly counselling visits, and drug-level feedback.

Fig. 6: Mobile “Teen Truck” offering comprehensive HIV and sexual and reproductive health services in Cape Town, South Africa



Several oral abstract presentations addressed the evolving use of PrEP in the region. A [study](#) using a risk assessment tool in Uganda – which has a generalized HIV epidemic but where PrEP is offered only to key populations with substantial risk of HIV acquisition – found substantial unmet need for PrEP among the general population (15).

A [study](#) of healthcare providers delivering oral PrEP to adolescent girls and young women in Kenya, South Africa, and Zambia found that, although providers preferred that adolescent girls wait until they are 18 years old to have sex, they acknowledged that many girls engage in sex before this age and could benefit from PrEP. These results are being used to inform PrEP provider training (16).

In eSwatini, where PrEP has recently been made available to the general population, a study found that a higher number of users discontinued PrEP due to side effects after one month, compared to three and six months. Higher numbers of men discontinued PrEP than women. Other reasons for discontinuation included not being able to come to the clinic, experiencing family opposition, and moving to a different area. The results emphasized the need for PrEP education and awareness in communities to increase family support, especially among women, and the importance of adherence counselling before choosing PrEP over other prevention methods, especially for males (17). Another study from Eswatini found that many clients offered PrEP on the first day that they had heard of it did not have adequate time to make an informed decision about whether to initiate, highlighting the need for PrEP education in communities to create understanding and facilitate uptake (18).

In Kenya, where PrEP was introduced in 2017, a [study](#) of different PrEP referral channels found that peer networks and same-facility referrals yielded the highest number of clients initiating PrEP (compared to self-referral and outreach by community volunteers). Peer and outreach

channels attracted people who were younger, female, or engaged in sex work. Investments in all referral channels are needed to reach potential clients (19).

A study from Uganda illustrated how new techniques, notably machine learning technology, can be applied to predict retention on PrEP and other HIV outcomes. Predicting which people are likely to drop out of PrEP other programs could play a valuable role in developing tailored interventions to enhance retention in the future (20).

3.5 On the horizon: The promise and potential pitfalls of long-acting technologies

Long-acting prevention technologies in the form of gels, films, rings, injections, implants, and other methods offer the potential for greater convenience by eliminating the need for daily oral pills, potentially improving adherence and reducing stigma (11). The most advanced of these products, the 30-day dapivirine ring, has been shown in two Phase 3 trials to reduce women's HIV risk by around 30 per cent, with interim data from open-label studies showing higher levels of use and risk reduction of around 50 per cent. The dapivirine ring is currently under review by the European Medicines Authority. Additional studies in adolescents, pregnant women, and breastfeeding women are ongoing, and a 90-day version of the product is in a Phase 1 trial.

User preference studies show strong preferences for PrEP delivered as injections or implants. Data reported from the HPTN 077 trial in 2017 established the safety, tolerability, acceptability, and pharmacokinetic profile of the long-acting injectable integrase inhibitor cabotegravir (CAB-LA) injected every eight weeks. Two Phase 3 efficacy trials of CAB-LA as PrEP are currently underway. The non-inferiority trial HPTN 083 is testing CAB-LA among at-risk cisgender men and transgender women who have sex with men in 43 sites in the US, Argentina, Brazil, Peru, South Africa, Thailand, and Vietnam. Concurrently, HPTN 084 is testing the efficacy of CAB-LA among at-risk women in 20 sites in sub-Saharan Africa. This trial is designed to show the superiority of CAB-LA over oral PrEP. Both HPTN 083 and HPTN 084 currently include a four-week oral cabotegravir induction phase to exclude adverse reactions before the long-acting injectable product is given. Results from both trials are anticipated by 2022. The manufacturer, ViiV Healthcare, has also endorsed a bridging study to test the product in adolescents. The long pharmacokinetic tail of cabotegravir has given rise to concerns about potential drug resistance when use of the drug is terminated.

MK-8591 is another long-acting product currently in pre-clinical development. This drug belongs to a new investigational class of ARVs known as nucleoside reverse transcriptase translocation inhibitors. The product has been shown to be effective in non-human primates at a very low dose. The developer, Merck, considers that this drug has potential for both treatment and prevention either as a long-acting oral pill or as a subcutaneous implant. Several other companies active in the HIV field are also exploring the potential of long-acting implant technology, which may have duration of six months or longer.

Monoclonal antibodies also show promise for both HIV prevention and treatment. Two Phase 2b HIV prevention trials of the monoclonal antibodies VRC01mAb (known as the Antibody-Mediated

Prevention or AMP trials) are currently underway in 47 sites in 11 countries. The trials focus on cisgender men and transgender women who have sex with men in North and South America, and women in southern Africa. This product is given every eight weeks as an infusion.

In addition to emerging new drugs, new delivery methods are likely to be ready for clinical trials in the next few years. These include long-acting oral formulations, microneedle (or microarray) patches, various types of implants, and antiretrovirals combined with long-acting hormonal contraception. If efficacious, each of these approaches is likely to have advantages and drawbacks in terms of cost, convenience, side effects, and acceptability. However, taken together, long-acting ARVs herald a potentially exciting new era in which a wide range of choices could become available in the field of HIV prevention over the next decade.

3.6 The full deal: Studying the impact of comprehensive combination prevention

[Albertus Schaap](#) from the London School of Hygiene and Tropical Medicine presented findings from the PopART study (HPTN071), a cluster randomised trial conducted between 2014 and 2018. It was designed to find out how well a combination prevention package that includes home-based HIV testing and linkage to HIV care works to reduce new HIV cases in large communities, and whether delivering the package is feasible and affordable (21).

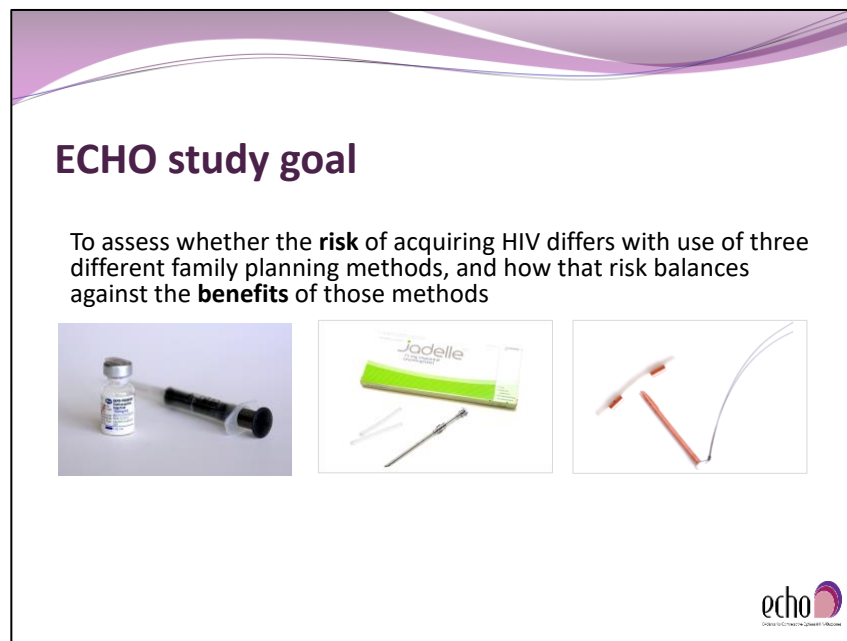
The trial was conducted in 21 urban communities in South Africa and Zambia, with 7 communities each placed in three arms receiving different interventions. The 12,500 people in Arm A received a full package including VMMC, PMTCT, behaviour interventions, and access to testing, as well immediate access to ART regardless of CD4 count. The 13,200 people in Arm B received the same package except that ART was initiated according to local ART guidelines. The 12,200 people in Arm C received the current standard of care in those settings with ART initiated according to local guidelines. In Arms B and C, immediate ART regardless of CD4 count was included mid-way through the study, as guidelines changed.

The intervention package was delivered annually, door-to-door by community care providers, and included home-based testing and counselling, STI and TB screening, condoms, and referral to VMMC. Blood samples were taken at enrolment and then once every three years. The primary objective was to measure the impact of the interventions on new HIV cases, with viral suppression a secondary objective. In Arms A and B, HIV incidence fell by 7 per cent and 30 per cent respectively compared to the control group, Arm C. In Arms A and B, there was a 16 per cent and 8 per cent increase in people achieving viral suppression, compared to the control group. Despite these encouraging results, the lower decline in HIV incidence in the group receiving the full package, Arm A, was surprising and not explained by viral suppression rates but could be attributable to the way the interventions were delivered, different sexual networks, or other factors. Phylogenetic analysis and qualitative research underway are expected to throw more light on this finding.

3.7 Answers at last on hormonal contraception and HIV risk

Twenty-five years of epidemiological and biological studies have tried to determine whether the use of hormonal contraception increases a woman's risk of HIV acquisition. The main concerns relate to progestogen-only injectables, particularly DPMA-IM, which has been linked to increased HIV risk in some studies. Available data for other hormonal contraception products, including NET-EN, DPMA-SC, hormonal implants, and hormonal or non-hormonal intra-uterine devices (IUDs) are limited or far less conclusive. In 2017 guidance, WHO recommends that while women can use progestogen-only injectables, they should be advised about possible concerns regarding increased HIV risk, including the uncertainty about the causal relationship, and how to minimize their risk. WHO also called for randomised trials to examine this question.

Fig 7: ECHO trial goal



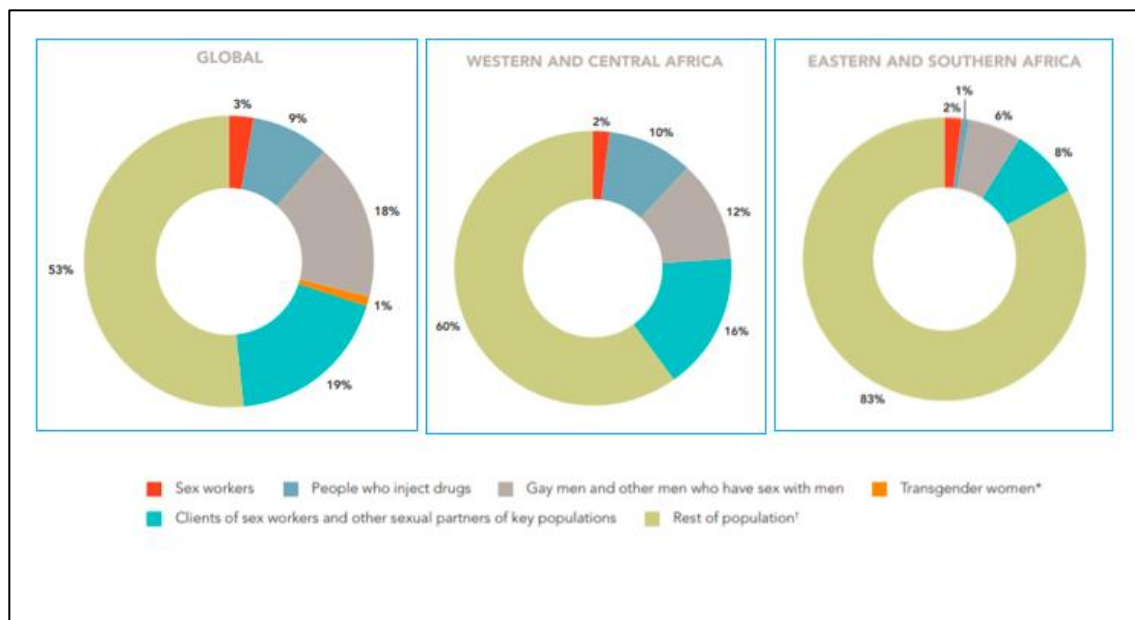
[Elizabeth Bukusi](#) of the Kenya Medical Research Institute presented an update on the Evidence for Contraceptive Options and HIV Outcomes (ECHO) trial, a multi-centre, open-label, randomised clinical trial comparing HIV incidence and contraceptive benefits in women using DMPA-IM, the levonorgestrel (LNG) implant, or copper IUD (Fig. 7) (22). The trial is assessing whether the risk of acquiring HIV differs with use of the three different methods, and how that risk balances against their benefits. The trial has enrolled 7,000 women at 12 sites in Kenya, Zambia, South Africa, and eSwatini, with the primary endpoint being HIV acquisition and secondary endpoints being safety and method continuation. Participants receive a comprehensive package of contraception and HIV prevention, including counselling, condoms, offer of partner HIV testing, STI screening and treatment, and PrEP. Study results are expected in mid-2019. The trial will provide the highest-quality evidence to date to enable women to make fully informed choices, inform counselling messages for clinicians, and provide guidance for policymakers and programs. Ancillary studies are examining possible biological mechanisms of any increased risk found to be associated with use of the contraceptive methods being studied.

Update: ECHO trial results were published in [The Lancet](#) in mid-June, a month after the INTEREST meeting. The study found *no* substantial difference in HIV risk among women using DMPA-IM, the LNG implant, or the copper IUD. However, as reported by [AVAC](#), “the data sound an alarm about rates of HIV infection among women in East and Southern Africa. Overall, HIV infection rates among the study population were almost 4 percent – underscoring the need to integrate HIV and sexual and reproductive health programs and to dramatically and quickly expand HIV prevention information and services.”

3.8 Key populations

In 2017, key populations accounted for 17 per cent of new infections in east and southern Africa and 40 per cent in west and central Africa (Fig. 8). Across the African continent, HIV prevalence is consistently far higher among men who have sex with men, sex workers, transgender people, and people who inject drugs, compared to the general population.

Fig. 8: Distribution of new HIV infections by population group, global and sub-regional, 2017 (UNAIDS)



[Christopher Akolo](#) from FHI360 in the United States presented an overview of progress in engaging key populations in Africa through the PEPFAR/USAID LINKAGES program, led by FHI360 with other partners (23). The program currently has 72 active sub-awards in PEPFAR countries in Africa, including 29 to key population-led groups. In general, the supported programs are peer-led and client-centred, and they involve key population groups in all aspects of design, implementation, and decision-making. They aim to target HIV testing to populations at high risk through peer outreach for index testing and “risk network referral”; link those who test positive to care and treatment services in public sector and community settings; and ensure sustained viral suppression through differentiated service delivery, community-based support, and “peer

navigation” services. LINKAGES also supports structural interventions, including violence prevention and stigma reduction.

A [study](#) conducted in Cote d’Ivoire, Mali, Togo, and Burkina Faso reported on the impact of a quarterly intervention to diagnose and treat sexually transmitted infections (STI) among men who have sex with men. Although high rates of STIs were reported among this population, they decreased following the intervention. The data are being used as a baseline for further research following PrEP implementation in the same sites (24).

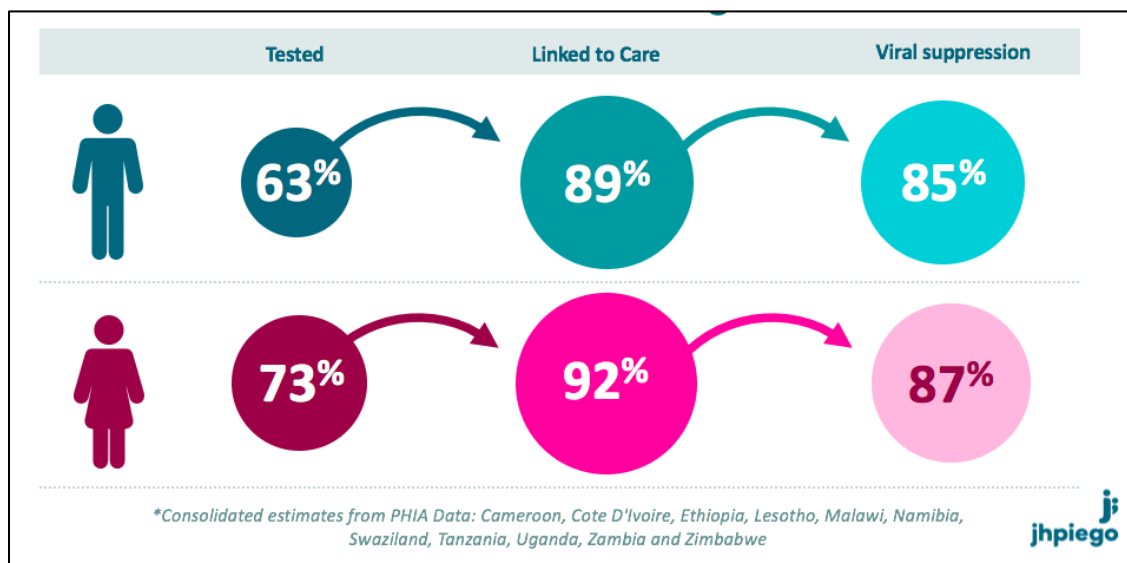
In the TRANSFORM study in Nairobi, Kenya, transgender people were reported to have significantly higher burdens of STI, depression, and harmful alcohol use than gay, bisexual, and other men who have sex with men. The study raised concerns about the appropriateness of service models that frequently direct trans people to services designed for MSM, highlighting the need for distinct approaches to HIV prevention in this population (25).

3.9 Reaching the missing men

Targeting HIV prevention to men

Although HIV prevalence in Africa is higher among women than men, men account for 48 per cent of HIV globally, are consistently less likely to know their HIV status than women, underutilize HIV prevention and treatment services, and are more likely than women to die of AIDS-related illnesses. [Daniel Were](#) from Jhpiego gave the first-ever presentation at an INTEREST meeting on the specific challenges of HIV prevention among men (26).

Fig. 9: Progress on 90-90-90 targets in men and women in 11 African countries



Although multiple HIV prevention tools exist for men, including VMMC, STI treatment, condoms, behaviour change, and PrEP, uptake is frequently lower than for women. Uptake of testing is particularly low for men, but data from African countries suggest that once tested, men have comparable rates of linkage to care and viral suppression (Fig. 9). Barriers to testing and other HIV services for men include fear of stigma, lost income when seeking services, and denial of HIV risk.

Bettering understanding of male clients' enablers and barriers is key to increasing uptake of services by men. Jhpiego has used approaches such as human-centred design, market segmentation, and behavioural economics to help develop male-friendly services. "Blended" services should also be offered to address men's multiple health needs. Examples of innovative and high-yield programming designed specifically to reach men in Africa include a digital media and events-based strategy to increase PrEP uptake among MSM, and promotion of HIV self-testing among men through the "Be Self Sure" campaign in Kenya; HIV testing targeted at high-risk men through the Sauti Project in Tanzania; recruitment of men who have been circumcised as community mobilizers and "buddies" to promote and support men undergoing VMMC in Malawi and Zambia; and the "Khotla" Men's Clinic, which offers integrated services for men only in a public hospital in Lesotho.

Engaging men in HIV services through novel approaches

Several oral abstract presentations provided further encouraging evidence of successful efforts to engage male partners in HIV testing and other interventions, including PrEP.

[Research](#) among serodiscordant couples in Zambézia Province in Mozambique highlighted the benefits of engaging male partners in HIV prevention through a service package that included couples testing, adherence counselling, and PrEP, which has been available to serodiscordant couples in the country since 2018 (27). Index case testing of partners of patients either newly diagnosed with HIV or already on ART was [shown](#) to be more effective than other testing strategies in identifying people with HIV in 170 health facilities across Nigeria (28). Index testing and social network testing have also been [shown](#) to be effective strategies to improve HIV positivity yield in Zambia, particularly among men (29), as has a process known as "assisted partner notification" in [Uganda](#) (30). In South Africa, HIV self-testing delivered to male partners by women attending antenatal care clinics has been [shown](#) to be highly acceptable and has led to high yield of people with HIV and high rates of entry into care (31).

A [study](#) presented from Nigeria showcased how a successful intervention in 380 PMTCT Option B+ centres in that country was able to engage male spouses of pregnant women (as well as non-pregnant woman and children) by offering "family-centred" PMTCT services. Rates of HIV testing and linkage to ART among male spouses, non-pregnant women, and children increased dramatically using this approach, without negative effects on linkage to ART for pregnant women, highlighting the potential to leverage PMTCT services more effectively (32).

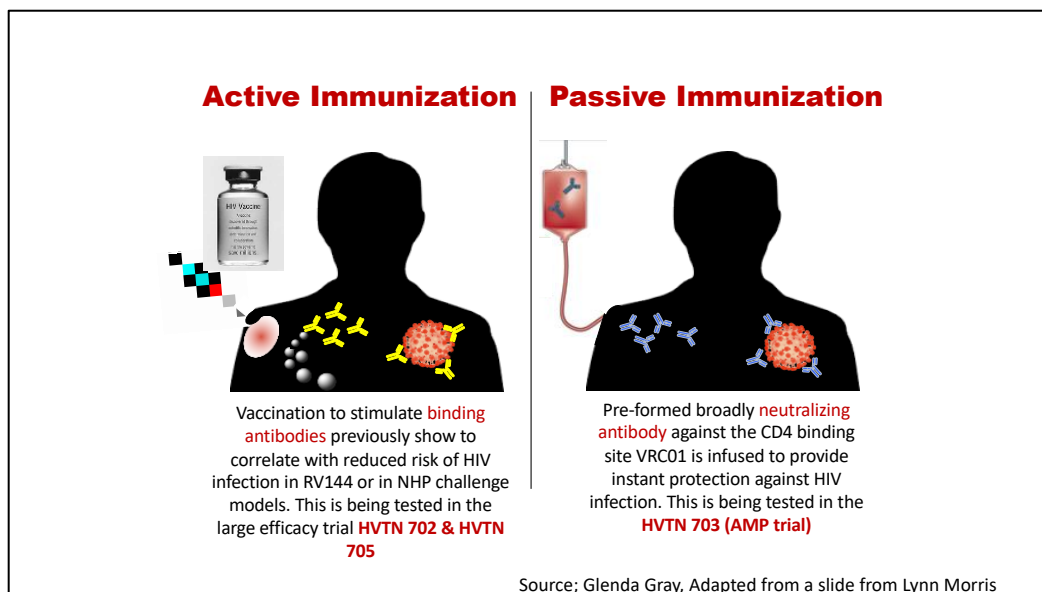
3.10 An “exciting time” for HIV vaccine development

Presenting an update on progress in HIV vaccine development, [Glenda Gray](#) of the South African Medical Research Council, described current vaccine efficacy trials as “an exciting time to be in the HIV vaccine finding business” (33). She discussed three pivotal Phase 2b/3 vaccine efficacy trials currently underway in east and southern Africa, which between them have now enrolled 20,000 men and women across multiple sites and countries and are testing active and passive immunization approaches (Fig. 10).

Two of the trials (HVTN 702 or “Uhambo” and HVTN 705 or “Imbokodo”) are testing active immunization approaches to stimulate binding antibodies. The approach being studied in HVTN 702 is based on the pox-protein heterologous prime boost strategy that showed 60 per cent efficacy, but low durability, in a trial in Thailand. HVTN 702 has adapted the Thai approach to Clade C HIV – the most common in eastern and southern Africa – and uses a new protein and adjuvants that aim to boost durability and magnitude of the immune response. HVTN 705 is testing a mosaic vaccine in a As26-Ad26/protein heterologous double prime/double boost strategy based on pre-clinical studies showing protection in non-human primates. Together, the two trials will help to determine whether non-neutralizing antibodies stimulated by these vaccines can be potent enough to achieve efficacy of greater than 50 per cent for at least two years.

The third trial (HVTN 703/704, or the Antibody Mediated Prevention – AMP) is testing a passive immunization approach in women in the region based on a broadly neutralizing antibody against the CD4 binding site VRC01 that has shown efficacy in animal studies. This study will help to determine whether a neutralization strategy is associated with protection and whether this holds more promise than other approaches.

Fig 10: Approaches to HIV vaccine design in trials underway in east and southern Africa



A range of other broadly neutralizing antibody (bnAB)-based approaches are in earlier, pre-clinical development, including CAP256.25, which was developed in South Africa and has been shown to neutralize 72 per cent of Clade C-type virus in animal studies at a low dose and with high potency. This product is likely to be studied in humans in combination with other monoclonal antibodies.

Zaza Ndhlovu from the Africa Health Institute in South Africa presented an update on research related to acute HIV infection and the search for an HIV cure. It focused on understanding initial events in HIV acquisition that contribute to immune dysfunction and disease progression (34).

Debate 1: Undetectable = Untransmittable: The U=U message is not appropriate for Africa

In the first of three spirited Oxford-style debates, INTEREST participants tackled whether U=U – an HIV prevention and de-stigmatization message based on a person living with HIV having undetectable viral load – is not an appropriate message for the HIV response in Africa. The debate was chaired by Peter Kilmarx who called for the opening vote on the proposition. Prior to the debate, the audience was 34 per cent in favour of the proposition, 53 per cent opposed, and 13 per cent were undecided.

Arguing for the proposition, [François Venter](#) of the Wits Reproductive Health and HIV Institute in South Africa and Tapiwanashe Kujinga from the Pan-African Treatment Access Movement in Zimbabwe noted that, while they did not dispute the science underpinning U=U and agreed that Africa needs to optimize the prevention impact of treatment, “the first U” – a confirmed, undetectable viral load result – is still not available to many Africans living with HIV. Although scale-up of viral load is improving in some countries, such as Botswana, Kenya, and South Africa, access in many other countries is still poor. Even where viral load testing is available, treatment interruptions caused by factors such as patient attrition and drug stockouts may lead to viral rebound, and health care providers too often do not communicate or act on detectable viral load results. Until these systemic failures are addressed, it is premature to widely promote U=U as a public health message in Africa.

Arguing against the proposition and in favour of the U=U message in Africa, [Linda-Gail Bekker](#) from the Desmond Tutu HIV Foundation in South Africa and Lucy Wanjiku Njenga from Positive Young Women Voices in Kenya noted that slogans have been shown to be very effective in driving the HIV response forward, as shown by the examples of “3 by 5” and “90-90-90”. AIDS cannot be ended without finding and treating the “missing millions” of people with HIV, and U=U will help to destigmatize people with HIV and encourage them to be tested and to access treatment. They noted that there is much to be gained from strong and empowering public health messages in a region with the highest disease burden and potential for impact, and that U=U may particularly resonate with youth and men by making the benefits of testing and treatment more

tangible, helping them to overcome fears around disclosure, and boosting motivation for adherence.

Most participants in the audience agreed with the potential advantages of the U=U message, including its strong potential to destigmatize people living with HIV and promote adherence to treatment. However, many also felt that the pace of scaling up viral load testing needed to accelerate and expressed similar concerns about patient attrition and poor follow-up. Some audience members felt that U=U offered potential as an advocacy message to support the further scale-up of viral load testing and that it provided an important vision for the region to work towards. Overall, significant concerns were expressed about whether health systems are presently adequate to support the U=U message. At the end of the debate, 43 per cent now were in favour of the proposition judging that U=U was not an appropriate message for Africa, while 54 per cent of participants were opposed and were in favour of promoting U=U in Africa, and just 3 per cent were undecided. Having received the biggest swing in opinion (9 per cent) to their side, those in favour of the proposition won the debate. Nevertheless, U=U is likely to receive much more attention in Africa in the coming years.

4. Optimizing HIV treatment and care

4.1 The shift to dolutegravir (DTG)-based regimens

An interactive [symposium](#) sponsored by Johnson & Johnson explored clinical approaches to optimizing ART for HIV management. Local Chair Kwasi Torpey set the scene with a recap of the WHO 2016 ART guidelines, which recommended a preferred EFV (600 mg)-based first-line regimen for adults, with DTG- or EFV (400 mg)-based regimens as alternatives. In light of new evidence about the superior effectiveness of DTG, WHO's 2018 technical update recommended a preferred first-line regimen for adults based on DTG, with caveats for use in women based on informed choice in light of evidence of neural tube defects in some children born to women taking this drug. The 2018 update also recommended that people failing a DTG-based first-line regimen should switch to the second-line combination of two NRTIs plus the protease inhibitors ATV/r or LPV/r; those failing the EFV-based regimen should swap it for DTG. The recommended alternative second-line regimen is DRV/r with or without DTG plus one or two NRTIs, based on optimization using genotyping, where possible.

An oral abstract [presented](#) at the meeting updated participants on mid-point (48-week) data from the ADVANCE Phase 3 trial, which is comparing pregnancy outcomes between women living with HIV who are taking either a DTG-based or an EFV-based ART regimen (35). All women in the study were on ART before conception, and women on DTG were switched to alternative regimens if the gestational period was eight weeks or less, consistent with WHO guidance. Encouragingly, the data showed that women who initiated DTG-based regimens before conception did not have higher rates of adverse pregnancy outcomes. The researchers noted that because data on the safety of DTG in pregnancy are still limited, data on stillbirths and infant deaths should be pooled

across similar trials. There is also an urgent need for prospective pharmacovigilance studies during pregnancy and breastfeeding in African settings.

4.2 Selecting the right ART regimen in adults

Most audience members surveyed on the role of protease inhibitors in Africa concurred with the WHO guidelines. The majority of national guidelines recommend reserving these drugs for second- and third-line adult regimens, however, because NNRTIs such as EFV are ineffective against HIV-2, protease inhibitors may be used in first-line regimens in settings where HIV-2 is prevalent, such as West Africa, and DTG is not available.

Lloyd Mulenga from the University of Zambia led a case study on switching an adolescent patient on a failing adult regimen to second-line ART, as well as the role of genotyping in first-line treatment failure. Many audience members agreed that resistance testing does not add significant value in patients failing EFV-based first-line regimens, who can be safely switched to a second-line protease inhibitor-based regimen. However, genotyping may play a more important role following first-line treatment failure as DTG-based first-line regimens are rolled out in more countries in the coming years.

An interactive session led by Michelle Moorhouse of the University of Witwatersrand in South Africa explored clinical practice in selecting third-line regimens following failure of second-line ART. Although many countries do not have access to third-line options and the number of people taking third-line regimens is currently small, it is increasing. If available, genotyping is recommended to guide selection of third-line regimens. Fafa Addo Bateng from Johnson & Johnson concluded the symposium with an overview of the company's New Horizons program which aims to boost access to second- and third-line ART for children in 11 countries in sub-Saharan Africa.

[Meg Doherty](#), Coordinator of HIV Treatment and Care at WHO headquarters, gave an overview of WHO's public health approach to HIV treatment, which has evolved from "treat the sickest" in 2003 to "treat all" in 2016, including the introduction of rapid treatment initiation; a single, harmonized regimen for adult treatment and prevention of mother-to-child transmission; viral load as the key monitoring tool; and differentiated care models, including increased community-based dispensing of ART. Nearly all countries have now implemented the "treat all" approach, and DTG is increasingly being introduced for first-line regimens. WHO continues to pursue a "treatment optimization" agenda which includes efforts to ensure that clinical trials of new ARVs include data on use in all populations, including women who are pregnant or of childbearing age, and to strengthen research and development in paediatric HIV treatment. The organization is now applying many of the lessons of the public health approach to HIV to current efforts to scale up access to treatment for hepatitis B and C. The next update to the WHO guidelines on using antiretroviral drugs for HIV prevention and treatment will be published later in 2019.

Evidence to support very early initiation of ART continues to grow. A [study](#) of more than 1100 people on ART in Tanzania found that people who initiated ART on the same day as diagnosis had

better retention in care after 6 and 12 months compared to those who initiated ART 1-14 days after diagnosis, however both groups achieved high viral suppression at those endpoints (36).

A [study](#) from Uganda on the links between engagement and health outcomes reminded attendees about the importance of meaningful involvement of people living with HIV in all aspects of program design, delivery, and governance, and reported that viral suppression rates in Uganda had increased since the introduction of MIPA (Meaningful Involvement of People with AIDS) forums at district, provincial, and national levels (37).

4.3 HIV drug resistance: “The ultimate evasion”

Ineffective treatment due to HIV drug resistance (HIVDR) increases the number of AIDS deaths and new infections, as well as the costs of providing ART. [Raquel Viana](#) from Lancet Laboratories explained that resistance occurs because of the high replication rate of HIV and the lack of “proof reading” ability of HIV’s reverse transcriptase, which contribute to the development of resistant mutations at or around the gene targeted by antiretroviral drugs (38). Causes of therapy failure due to resistance may result from drug toxicities, drug-drug interactions, or other factors that impact adherence, as well as insufficiently potent drugs.

There are three types of resistance: pre-treatment, transmitted, and acquired. Pre-treatment drug resistance refers to resistance mutations detected in people before starting ART, either because of previous exposure to ARVs or because, in the case of ART-naïve individuals, they have been infected with HIV that already has resistant mutations (also known as transmitted drug resistance). WHO has reported prevalence of pre-treatment resistance to NNRTIs of 10-11 per cent in east and southern Africa, and 7 per cent in west Africa; in total, around 10 countries have resistance to NNRTIs at or close to the rate of 10 per cent that WHO deems to be of critical concern. These rates are increasing over time. Rates of transmitted drug resistance are twice as high in women as in men, with the result that women starting NNRTIs have higher risk of treatment failure.

By comparison, acquired HIVDR refers to resistance that develops when people are taking ART, leading to treatment failure. Studies show that rates of acquired resistance to NNRTIs and NRTIs are increasing in the region, although around 30 per cent of reported first-line treatment failures occur in the absence of resistant mutations, suggesting other causes, such as treatment interruption. Overall, the level of emerging NNRTI resistance has prompted the shift to a new first-line regimen using DTG.

Studies of resistance patterns and viral suppression outcomes in second-line therapy have important implications for regimen selection following first-line treatment failure. The SECOND-LINE, EARNEST, and SELECT studies have all shown that integrase inhibitor-based regimens using Raltegravir (RAL) are non-inferior to a second-line protease inhibitor-based regimen. Other studies show significant rates of viral failure in second-line regimens based on boosted protease-inhibitors where rates of resistance to NRTIs and NNRTIs are high. However, second-line resistance study data suggest that the majority of people failing second-line regimens are not

resistant to regimens with at least two active drugs, and that adherence remains the main factor in second-line treatment failure. Resistance to protease inhibitors is nevertheless increasing. Because of the variation in accumulated resistance mutations, third-line regimens still need to be individualized to the patient, using genotyping where possible.

Oral abstracts presented at the meeting confirmed these assertions. One [study](#) from Mali found high levels of multi-class drug resistance in patients failing both first-and second-line ART, with the researchers arguing for increased access to genotyping in Africa to inform decision-making after treatment failure (39). Another [study](#) from Kenya reported on the effect of providing three months of adherence counselling, followed by a repeat viral load test, for patients failing second-line protease inhibitor-based, second-line ART with viral loads higher than 1000 copies/mm³ (WHO definition of treatment failure). Following the repeat test result, only half of patients were found to require a change from a protease inhibitor-based regimen, vastly reducing the cost of switching to third-line ART (40).

4.4 Improving progress towards 90-90-90 for children

In a presentation on innovations in paediatric HIV programming, [Nadia Sam-Agudu](#) from the Institute of Human Virology in the United States and Nigeria urged INTEREST participants to “step on the accelerator” to reduce new infections among children and keep them alive (7). There were 169,000 new HIV infections in children 0-14 years of age in sub-Saharan Africa in 2015, overwhelmingly among adolescent girls. Rates of ART coverage for children are consistently lower than for adults both in the region and globally and are lower in west and central Africa than in east and southern Africa. Because west and central Africa have consistently lagged behind in meeting the needs of adolescents and children living with HIV, the 2015 Dakar Call to Action called for accelerated efforts in the sub-region to eliminate mother-to-child HIV transmission and treat children living with HIV. These priorities were also reflected in the 2016 sub-regional ART catch-up plan and highlighted at a further high-level meeting that took place in Dakar in early 2019.

Research presented at INTEREST 2019 underscored the generally poor health outcomes for children living with HIV and significant opportunities for improvement. Of the 7,000 HIV infections in infants in Uganda in 2017, only 64 per cent were diagnosed through PMTCT programs, and only half of HIV-exposed infants were tested by the recommended age of two months. In a [study](#) investigating the clinical impact of offering routine, point-of-care early infant diagnosis to all children under two years of age in 32 “alternative” health system entry points - nutrition clinics, paediatric inpatient clinics, outpatient departments, and mother-baby care points – the number of babies testing positive tripled over six months. Rates of return of results increased from less than 1 per cent to 86 per cent, and the rate of ART initiation within one month of diagnosis increased from 31 per cent to 70 per cent. The researchers concluded that although point-of-care infant diagnosis remains expensive per test, this approach can be cost-effective by increasing timely ART initiation (41).

A [study](#) from Senegal of more than 300 children (0-19 years) living with HIV and on ART in 23 sites found that a remarkable 68 per cent had viral loads higher than 1000 copies/mm³, apparently without appropriate action to prevent or address treatment failure. The researchers recommended strengthening of regional viral load testing networks, establishment of therapeutic committees to increase attention to and improve training in paediatric HIV treatment, and closer follow-up of children living with HIV on ART (42). As noted by Nadia Sam-Agudu (7), ensuring that young children achieve viral suppression requires approaches that focus on supporting and educating the caregiver, in addition to age-appropriate ART formulations and doses.

A [study](#) from Cameroon examining mortality and virologic outcomes in children five years after ART initiation in infancy found that viral load was suppressed in 66 per cent of children. The only factor associated with viral suppression after five years was viral suppression after two years. The researchers speculated that the predominant factor in suboptimal viral suppression rates was the difficulty for parents to administer daily medication to babies. They emphasized the need for increased adherence support for caregivers, routine viral load monitoring in children, and continued work to optimize paediatric drug formulations (43).

Although liver injury has become increasingly prevalent among people living with HIV in sub-Saharan Africa, liver function tests are not routinely performed in some countries, and there are few published studies addressing liver injuries among children and adolescents. Data presented from a paediatric HIV clinic in Uganda showed that liver injuries were more common in children 0-5 years of age than those in 6-13- and 14-17-year age groups. Other factors associated with liver injury were viral load above 75 copies/mm³ and first-line ART regimens (44).

A [study](#) from Zambia examined the role of “executive functioning” in treatment adherence among children (45). Executive functions are a suite of cognitive skills including attention, working memory, cognitive flexibility, and planning and problem-solving abilities which are critical for the performance of daily activities, and can therefore affect adherence. Although increased levels of executive dysfunction have been reported in adults living with HIV, few data are available on this issue for children and adolescents. The study subjected children with HIV aged 8-17 years and on ART to a variety of tests. Compared to HIV-negative children, children with HIV performed worse on both parental ratings and objective neuropsychological measures of executive function, such as cognitive flexibility, attention, and inhibition. Children with the lowest ratings of executive function tended to receive the most parental supervision. The study found that executive function is impaired in children living with HIV on ART and it is a risk factor for poor adherence, but that parental supervision is able to correct for this in many children and adolescents. Nevertheless, the study raises concerns about the impact of poor executive functioning on adherence as children become more independent and transition to adulthood. Longer-term follow up and further study are needed to evaluate potential interventions to improve executive functioning and adherence in this population.

Stigma can have a seriously negative effect on uptake of and engagement in HIV treatment services, and therefore treatment outcomes. Young people living with HIV and their adult

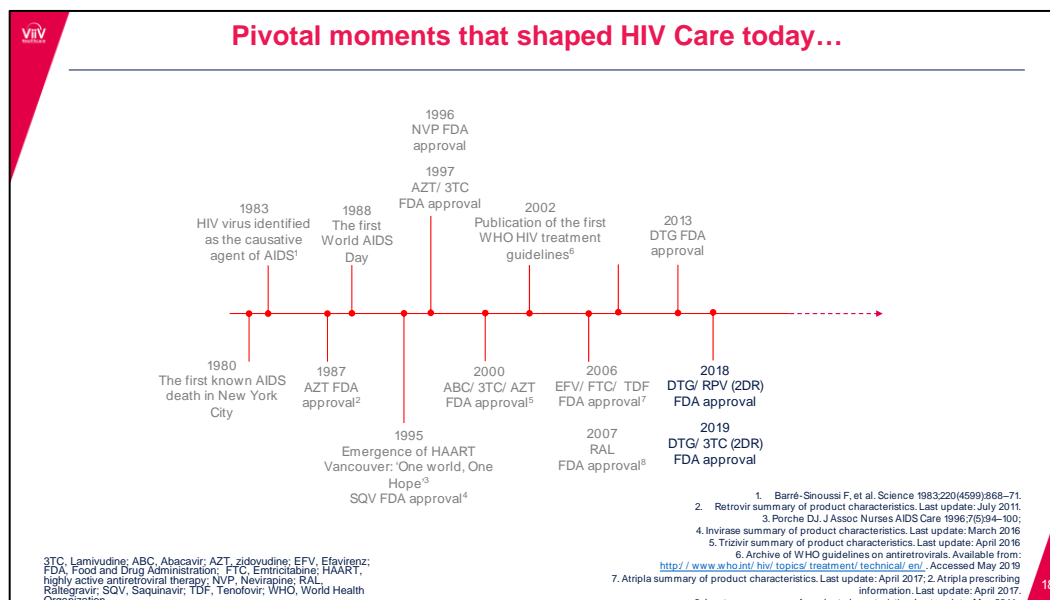
caregivers are particularly vulnerable to stigma in schools, health facilities, and other community settings. A [study](#) from Zambia reported that stigma experienced by young people and their adult caregivers was significant in food-insecure and socially vulnerable households, and where the young person was older, potentially leading to suboptimal treatment outcomes in children and highlighting the need for stigma reduction approaches tailored for households, rather than just for individuals (46).

Several studies over the last 10 years have highlighted the potential of mobile technology to contribute to the HIV response. At the 2018 INTEREST conference, mobile health technology featured prominently. In 2019, a [study](#) from Kenya - where the number of mobile phone subscriptions now exceeds the number of Kenyans – reported encouraging improvements in viral suppression and retention in care among nearly 100,000 people on ART enrolled in *Ushauri*, a web- and SMS-based appointment platform. The pilot project, which initially targeted 105 ART sites with poor viral suppression outcomes, will now be expanded nationally (47).

Debate 2: Two-drug combinations are the next frontier in HIV treatment

Triple-drug combinations have been the gold standard in ART since 1995 (Fig. 11). An interactive symposium sponsored by ViiV Healthcare featured a scientific debate on the future potential of dual combinations, two of which (DTG//RPV) and (DTG/3TC) have been approved by the FDA in the last 12 months. The debate was chaired by Michael Aboud who called for the opening vote on the proposition. Prior to the debate, more than 60 per cent of the audience agreed either fully or somewhat with the proposition that dual therapy is a promising approach, while only 9 per cent disagreed somewhat or completely, and 27 per cent were undecided.

Fig 11: Evolution of antiretroviral therapy



Arguing in favour of dual therapy as an option in HIV treatment, François Venter of the University of Witwatersrand and Frank Post of King's College Hospital in the United Kingdom noted that it is important to differentiate between people initiating therapy and those on maintenance therapy, with two-drug combinations likely to be more suitable in the latter case. Acknowledging concerns about suitability of the approach in cases of high viral load, the team dismissed perceptions that DTG/3TC is effectively DTG monotherapy plus a "weak" NRTI. Studies have shown that such two-drug regimens are efficacious and offer significant benefits in terms of lower toxicity and reduced renal failure caused by TDF. Studies of CAB/RPV also show significant potential for long-acting, injectable ART, with high patient satisfaction. Double dosing of DTG/3TC is also emerging as a possible approach for people with HIV/TB co-infection.

Arguing against the proposition that dual therapy is an inevitable next step in HIV treatment, Michelle Moorhouse from the University of Witwatersrand in South Africa and Joseph Oliver-Commey of the Ghana Health Service recognized that the benefits of dual therapy include potentially lower toxicities, smaller pill sizes, and cost savings. However, approved dual therapies have shown no clinical advantages in terms of adverse events. Moreover, the two-drug trials involved small sample sizes, short duration of follow-up, regular viral load monitoring, and excluded people with viral load over 500,000 copies/mm³. This suggests that this approach is not optimized for low- and middle-income country settings or for all populations, including pregnant women, people with HBV, and people with previous viral failure or baseline resistance.

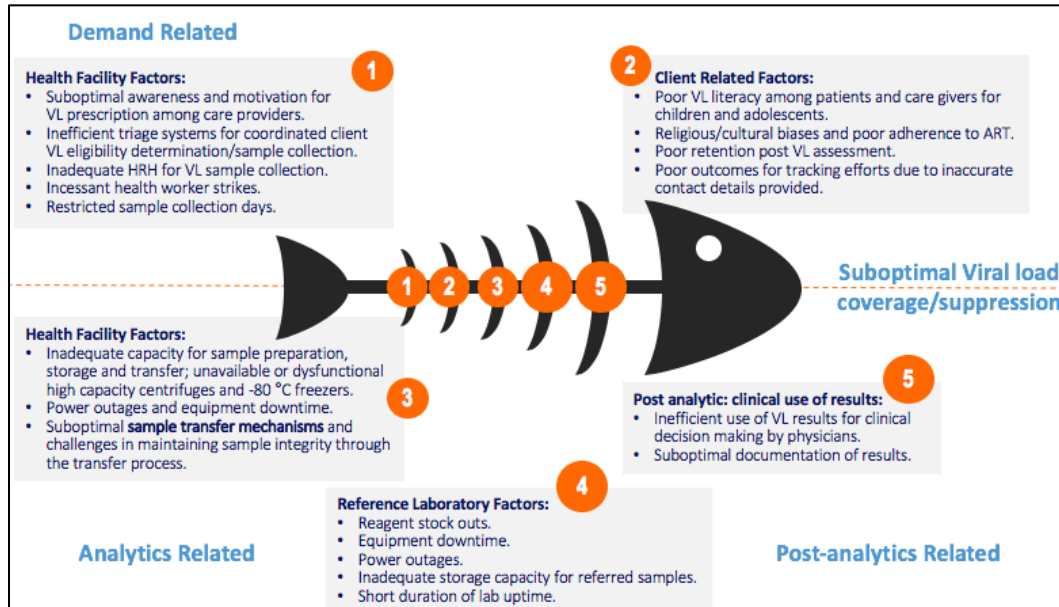
Following the debate, the number of people who were undecided dropped to just 2 per cent, while the number of people disagreeing with the proposition jumped to 34 per cent, showing that opponents to the proposition had won the debate by persuading more people in the audience who initially had been in favour or undecided that a cautious approach to dual therapy is warranted. Nevertheless, 65 per cent viewed dual therapy very or somewhat favourably at the conclusion of the debate.

5. Achieving the "third 90": Viral load testing and viral suppression in Africa

5.1 Progress and challenges in scaling up viral load testing

Although access is increasing, many Africans living with HIV still lack optimal access to routine viral load testing. Access is particularly poor in west and central Africa. A [symposium](#) sponsored by Abbvie addressed successes and ongoing challenges in scaling up viral load testing in three high burden countries each with more than a million people taking ART (Fig 12).

Fig. 12: Challenges in scaling up viral load testing in countries with high HIV burden in Africa



Lloyd Mulenga from the University of Zambia described how Zambia has worked to implement its Viral Load and Early Infant Diagnosis Scale up Implementation Plan for 2016-2020. In 2016, Zambia introduced a differentiated care algorithm for viral load testing based on testing at six months after initiating ART and then every 12 months for those who are fully suppressed. More frequent testing, adherence support and, if necessary, switch to second-line therapy are recommended for those who do not achieve viral suppression. In 2017, coverage of viral load testing stood at just 19 per cent due to inadequate capacity, poorly coordinated referral of blood samples, and lack of action on test results. To address these challenges, a national viral load task force was established, and a review of the procurement and supply chain led to new testing equipment being leased instead of purchased. Monitoring and distribution of reagents and data systems were also strengthened, and national regulatory requirements for new platforms, assays, and sample types were fast-tracked. At the same time, specimen transport was strengthened through introduction of a more decentralized “hub and spoke” model, including GPS mapping of health facilities to enable more strategic placement of testing machines based on local demand. Higher throughput machines were introduced in reference laboratories and near-point-of-care machines were scaled up in more remote settings. As a result of these efforts, coverage of viral load testing in Zambia had increased to 58 per cent by early 2019. With an estimated 1.1 million viral load tests to be conducted this year, the country is on track to achieve its target of providing viral load testing to 80 per cent of people on ART by 2020.

Maureen Kimani from Kenya’s National AIDS and STI Control Program described how Kenya has employed a similar approach to expand access to viral load testing, with the result that the number of tests performed has doubled to more than 1.2 million annually since 2015. Transmission of test results to health facilities by SMS is one strategy being employed in Kenya

to reduce the turnaround time for test results. A [review](#) of data from five counties in the Kenyan viral load database found that missing samples, improperly packaged samples, and missing requisition forms were the main causes of viral load sample rejection by testing laboratories (48).

Hadiza Khamofu from FH!360 reported that Nigeria has also made significant progress in scaling up viral load testing. In 2016, the country established a nationwide pooled system to manage viral load laboratory equipment and reagents, and in 2018 developed a national integrated sample referral network for laboratories (now numbering 26) that perform viral load testing. High throughput “superlabs” and increased use of dried blood spot samples have increased the efficiency and volume of tests performed. Other innovations employed in Nigeria include colour coding of patient files to expedite provision of test results, and integration of the national laboratory information management system with electronic medical records at facility level. Although viral load coverage stood at 53 per cent in 2018, achieving 90 per cent coverage in the next two years may be feasible given recent progress. Ongoing challenges in Nigeria include addressing the need for patient and health care provider education to improve their knowledge about viral load testing, with special attention to support for unsuppressed patients; reaching and supporting children and adolescents; and continuing to improve the use of viral load data for clinical and programmatic decision-making.

5.2 Laboratory quality performance

In a talk on quality assurance for HIV testing and patient monitoring, [Pascale Ondo](#) from the African Society for Laboratory Medicine emphasized the importance of quality assurance as part of overall laboratory quality management systems to ensure that HIV infections do not go undetected, that treatment failure is recognized in a timely manner, and that the 90-90-90 targets are achieved (49). Quality assurance refers specifically to measures to prevent errors in laboratory testing and to identify what is not working within a laboratory system. External quality assessment (EQA) by an independent agency or facility that compares a laboratory’s performance to a peer group of laboratories or a reference laboratory should be the minimum standard for medical laboratories conducting HIV testing. Among other advantages, EQA provides early warning about systematic problems and increases confidence in the quality of a laboratory’s performance, while demonstrating employee competency. To advance quality assurance for laboratories globally, more regional centres of excellence are required; further innovations are needed to support sample transport and delivery; and quality assurance must be addressed within national policies and accreditation and regulatory frameworks.

Although false HIV-positive tests are rare, extrapolation of data on self-reported HIV status from the 2015-2017 [Population-based HIV Impact Surveys](#) in 11 sub-Saharan African countries suggest that a potentially large number of people not infected with HIV misperceive their HIV status and may even be on ART unnecessarily, underscoring the importance of quality assurance in testing, as well as unambiguous post-test counselling and re-testing prior to ART initiation (50).

6. Differentiated service delivery in west and central Africa: Moving from pilots to policy

Differentiated service delivery (DSD) is a key approach recommended by WHO in 2016 to ensure the quality and sustainability of ART programs in resource-limited settings by minimizing laboratory monitoring and clinical visits for patients who are doing well on treatment. Drugs for these patients can be dispensed for longer periods (“multi-month dispensing”) in community settings, reducing the burden on health facilities and ensuring that health care providers’ time and attention can be devoted to the neediest patients. Although DSD is now being widely adopted in east and southern Africa, uptake of the approach has been slower in west and central Africa. A symposium sponsored by the International AIDS Society (IAS) explored the efforts of four countries in the sub-region to adopt DSD, including challenges and opportunities for broader implementation.

Of the four countries presenting in this symposium, implementation of DSD in Ghana is furthest advanced. [Nyonuku Akosua Badoo](#) of the Ghana Health Service and National AIDS Control Program noted that an operational manual for DSD was initially developed in 2017 (51). Patients who are stable on ART receive 3- or 6-monthly drug refills in health facilities, community pharmacies, through group refills, or by home delivery from a community health nurse. Clinical assessments occur every six months. Implementation began in late 2018; to relieve pressure on larger facilities, DSD was initially prioritized in those with more than 200 clients. To date, around 60 per cent of the 488 ART sites in Ghana have implemented multi-month dispensing and six-monthly clinic visits, and 30 per cent of facilities provide community-based dispensing. Lessons learned in implementation include the need for wide stakeholder engagement, especially of health care providers; adequate provider and community training; and effective procurement planning to enable decentralized ART refills.

The Central African Republic (CAR) has begun piloting the DSD model. [Charles Ssonko](#) of Médecins sans Frontières (MSF) UK noted that the country has experienced an increase in conflict and insecurity since 2017, leading to dysfunctional institutions, large scale displacement, and increased humanitarian needs (52). HIV prevalence is 4 per cent in a population of 5 million, only a third of people with HIV are accessing ART, and access to viral load testing is limited. MSF has piloted two DSD approaches: 6-monthly drug refills and yearly appointments at health facilities for stable patients on ART and community ART groups providing monthly group refills and psychosocial support for people living in the same geographical area. Initial results from the pilot show good viral suppression among patients in community ART groups, with sup-optimal viral suppression among those who access refills from pharmacies. Continuing instability, lack of viral load monitoring at national scale, interrupted drug supply, and suboptimal integration of relevant data into the national electronic database all present challenges for future scale-up of the model. However, DSD has been shown to be feasible and acceptable in a conflict-affected setting.

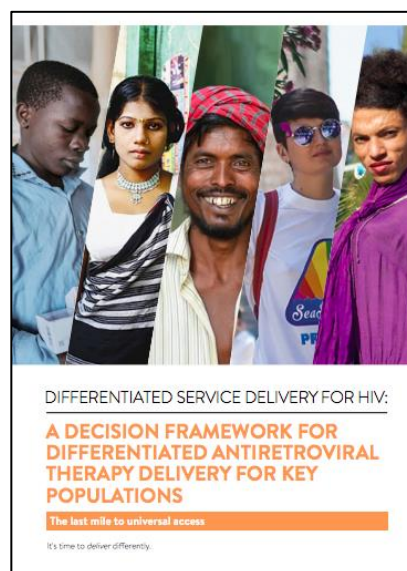
Guinea has 130,000 people living with HIV, of whom just under half are on ART. The 2014 Ebola epidemic posed significant challenges to the country’s health system, and increased stigma and

fear associated with disease and the health system. [Foromo Guilavogui](#) from the Guinean Ministry of Health explained that, as in other countries, DSD has been implemented for patients who are stable on ART, with six-monthly clinic visits and drug-refills in health facilities (53). MSF is providing support for the pilot in eight districts, reaching nearly 13,000 patients. Planning is underway to expand to additional districts and national scale. Key lessons in the progress to date include the importance of patient education, training of providers, and an effective system of follow-up to avoid patient attrition.

Around 40 per cent of the 500,000 people living with HIV in the Democratic Republic of Congo (DRC) are on ART. According to [Didier Kamerhe](#) of PATH, the implementation of “test and treat” in the country in 2017 led to increased volumes of patients in health facilities and overwhelmed health care providers (54). DSD introduced in the PEPFAR-USAID funded Integrated HIV/AIDS Project in two provinces features community-based points of ART distribution known as PODi+, fast-track refills in health facilities, and ART distribution during community-based support group meetings. Clinic visits take place every six months for stable patients.

Concluding the session and launching [new advocacy materials from the IAS](#) to support the uptake of differentiated ART delivery in west and central Africa (Fig. 13), Dr Linda-Gail Bekker from the Desmond Tutu HIV Foundation in South Africa emphasised the five priority policy actions for countries in the sub-region. These are: 1) Endorse differentiated ART delivery for clinically stable clients; 2) Engage people living with HIV in the design and delivery of ART services; 3) Extend ART refills for those who are adherent to treatment; 4) Emphasize that adherent clients can collect ART refills without seeing a clinician; and 5) Enable the distribution of ART refills and psychosocial support by peers and lay providers, particularly for key populations. Audience discussion following the session focused particularly on how DSD can help in reaching key populations more effectively.

Fig. 13: IAS policy guidance on differentiated service delivery for key populations



Further supporting the case for differentiated service delivery, an oral abstract presented from Nigeria highlighted the economic burden associated with accessing HIV treatment and recommended that HIV programs should adopt strategies to economically empower people with HIV, including by reducing the frequency of clinic visits and drug refills (55). A study examining HIV testing among female sex workers in Ghana noted that the concept of differentiated service delivery models may also be applied to HIV testing strategies and reported that community-based approaches had the highest HIV-positive yield in this population (56).

7. Addressing other major health challenges in the context of the HIV response

7.1 Tuberculosis

Kogieleum Naidoo from the Centre for the AIDS Program of Research in South Africa reported that despite substantial progress in reducing TB mortality and morbidity over the last 20 years, TB is now the leading infectious killer worldwide, with southern Africa and southeast Asia disproportionately affected (57). More than 10 million new TB cases occurred globally in 2017, two-thirds of which were in just six countries: India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh and South Africa. One million new TB cases were among people living with HIV. Multi-drug resistant TB (MDR-TB) is a growing crisis, with only one in four people in need of treatment accessing it. There is also an annual global shortfall of over \$3.5 billion required to implement TB programming and undertake needed research.

Despite these challenges, recent TB research has shown some promising trends, notably towards shorter regimens for drug-resistant and drug-sensitive TB (58). Trials of combinations of multiple new and existing drugs for TB treatment are underway, and results from 2018 showed the efficacy, safety, and non-inferiority of a one-month combination of rifapentine plus isoniazid (so-called 1HP) for TB prevention in people living with HIV compared to nine months of isoniazid alone (59). The DOLPHIN study results reported at CROI in 2019 resolved concerns about interactions between DTG and rifapentine for people with HIV/TB co-infection, showing that although DTG levels dropped, HIV viral suppression was sustained and DTG can be safely co-administered with rifapentine/isoniazid without dose adjustment (60). Further information about the TB drug pipeline is available [here](#).

In 2018, two trials in southern Africa showed efficacy signals for potential TB vaccines. The first study among HIV-negative adolescents in South Africa suggested that BCG re-vaccination has potential to prevent latent TB infection (61), while a Phase 2b trial of the M72/AS01E vaccine in Kenya, South Africa, and Zambia showed 54 per cent efficacy in preventing progression of latent TB infection to TB disease (62). Large phase 3 trials of both products are now being planned.

Dr Naidoo also reported on outcomes of the United Nations General Assembly High Level Meeting on Tuberculosis, held in New York in September 2018. The 53-point political declaration from the meeting included renewed commitments to ending TB by 2030, mobilizing additional investments in the TB response, and ensuring political leadership to accelerate national and

global efforts. Key follow-up items from the meeting will include funding (alignment of the Global Fund investment case with the meeting's political declaration, and increasing national implementation budgets); action to find missing TB cases, improve quality of TB care and increase access to tools, drugs and diagnostics; and a mandate given to the WHO Director General to develop an accountability mechanism for the global TB response, which is due by the end of 2019. In 2022, WHO will review progress in implementing the political declaration. Overall, the high-level meeting was an important opportunity to review progress and help sustain momentum in the fight against TB.

7.2 Hepatitis C: Confronting another major epidemic

A symposium sponsored by Gilead explored viral hepatitis C (HCV) in Africa and progress towards elimination goals. Introducing the session, Mark Sonderup from the University of Cape Town noted the many challenges in tackling this epidemic, including poor understanding of disease burden and the need for greater political will to address this epidemic (63). Of an estimated 70 million people living with HCV globally, 19 million are in Africa, with nearly 6 million people with HCV or 6 per cent prevalence in Egypt alone, and 10 million in sub-Saharan Africa, including higher prevalence in west and central Africa and among key populations across the continent, especially in South Africa. Globally, most new HCV infections are among people who inject drugs (PWID) and men who have sex with men (MSM), while in Africa unsafe traditional circumcision or scarification practices, blood transfusions, and medical procedures also contribute to transmission. HIV/HCV co-infection is also common. HCV-related mortality is largely due to cirrhosis and hepatocellular carcinoma.

Although HCV is now curable in more than 95 per cent of patients, coverage of direct-acting antivirals (DAAs) is low across sub-Saharan Africa as a whole. South Africa has an estimated 600,000 people with HCV and is currently developing a national plan to introduce HCV treatment, beginning with people who inject drugs.

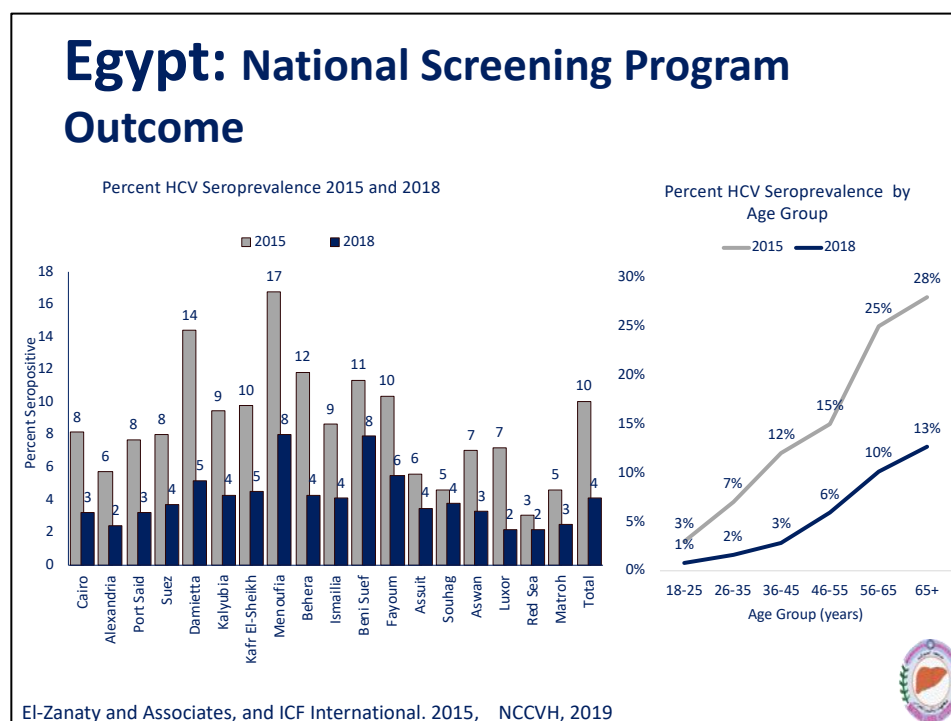
Emmanuel Musabeyeza of the King Faisal Hospital in Kigali presented an overview of Rwanda's pioneering work, beginning with the country's first HCV program in 2011 and the introduction of DAAs in 2015 (64). HCV prevalence in Rwanda is currently around 4 per cent and it is estimated that there are around 120,000 people with HCV infection in the country. Since 2016, testing and treatment have been progressively scaled up and all people living with HIV are now screened for HCV. In 2017, Rwanda held a mass screening campaign that tested around 700,000 people for HCV. In 2018, rapid diagnostic tests were introduced, and 9,000 people received DAAs, with a cure rate above 90 per cent. Rwanda's new HCV elimination plan aims to screen 4 million people and treat 110,000 with DAAs by 2023, thereby reducing HCV incidence to around 1 per cent. Financing for the elimination plan and case-finding are ongoing challenges.

Until 2016, Egypt had by far the largest HCV epidemic in the world and prevalence reached 10 per cent in 2015, with higher prevalence among older people. Egypt has since implemented the world's largest screening and treatment program. Imam Waked, from the Egyptian National Liver Institute, described the program's remarkable progress, beginning in 2006 with the use of

interferon-based treatment provided through 26 specialized centres (65). DAAs were first introduced in 2014, with rapid scale-up taking place following the introduction of generic combinations in 2016. By mid-2018, 2.4 million had started treatment in around 220 specialized centres, with high adherence and cure rates. Facing a declining rate of enrolments in 2017 and 2 to 3 million missing HCV cases, the country began one of the largest mass screening programs in history in October 2018, with the aim of testing all Egyptians over the age of 18 years, or 57 million people. Testing has been performed in around 6,000 sites across the country, including hospitals, primary health clinics and mobile units, accompanied by a major media campaign. Around 50 million people had been screened by mid-2019, with a further 3 million sero-positive cases identified, of which 2 million will begin treatment by the end of 2019. The program also screened people for hypertension and diabetes. As a result of this effort, HCV prevalence had fallen to 4 per cent by 2018 (Fig. 14) and Egypt may be one of the first countries in the world to eliminate HCV by 2030. Key factors in Egypt's success include strong political commitment, adequate government financing, the provision of free testing and treatment services to all, effective and real-time data management, mass procurement of generic drugs, simplified rapid diagnostic testing, and simple patient management guidelines.

Modelling undertaken in three countries in western and central Africa presented as a mini-oral abstract showed that sofosbuvir-based regimens for HCV treatment are cost-effective compared to no treatment considering the long-term health benefits of these therapies (66).

Fig. 14: Declines in in HCV seroprevalence in Egypt, 2015-2018

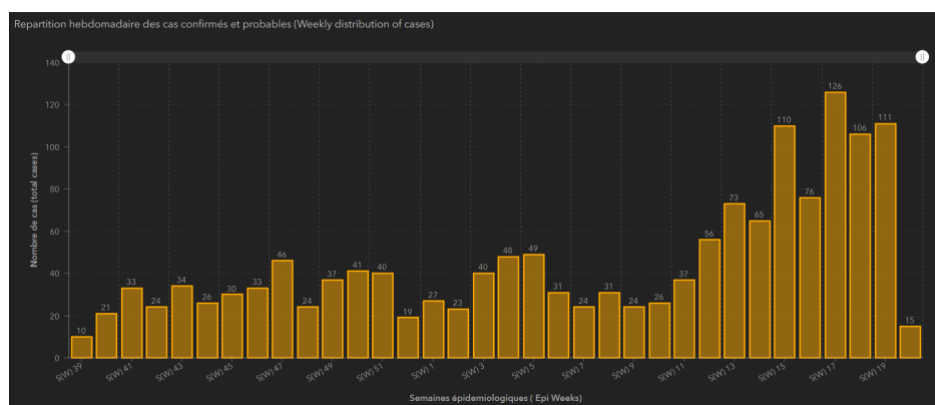


7.3 Emerging and re-emerging pathogens: Ebola and viral haemorrhagic fevers

Peter Kilmarx from the Fogarty International Center in the United States presented an overview of the ongoing Ebola outbreak in the Democratic Republic of Congo and developments in research into Ebola vaccine and treatment (67). Between the beginning of the outbreak in August 2018 and mid-May 2019, over 1600 cases had been confirmed, two-thirds of whom had died. Reported cases have increased considerably since early February this year, indicating that the outbreak is yet to peak (Fig. 15). The response has been severely complicated by security incidents in the context of an ongoing civil war, including attacks on health facilities and health workers delivering vaccines.

Fig. 14: Ebola cases in the Democratic Republic of Congo, September 2018 – May 2019

Ebola Cases by Week, DR Congo September 24, 2018 – May 20, 2019



<https://who.maps.arcgis.com/apps/opsdashboard/index.html#/19003796864241b99d21474025f3867e>

A protocol developed by WHO allowing the use of experimental products in health emergencies and compassionate access given by manufacturers are enabling the use of an experimental vaccine and trials of potential treatments for Ebola in DRC. This demonstrates that scientifically rigorous and ethically sound clinical research can be conducted during a disease outbreak in a war zone, offering lessons for strengthening research preparedness in such circumstances in the future.

Joseph Okeibunor from the World Health Organization Health Emergencies Program joined the conference by video link from Kinshasa to update delegates on the response to the DRC outbreak (68). This has included a major contact tracing effort and deployment of the experimental vaccine rVSV-ZEBOV-GP, with priority given to vaccination of contacts, contacts of contacts, and health care workers, with third-level contacts and others at risk also offered vaccination in some settings. Despite significant security challenges, more than 108,000 people had been vaccinated

in health care facilities and temporary sites by the end of April 2019. The WHO response also includes infection control and community engagement and education.

In a presentation on research preparedness for viral haemorrhagic fevers (VHF), a group of acute illnesses that affect both humans and non-human primates and that damage multiple organ systems, [Adebola Olayinka](#) from the Nigerian Centre for Disease Control noted that zoonotic infections represent 75 per cent of all emerging pathogens in the last decade (69). VHF are caused by four distinct viruses and include yellow fever, Dengue fever, Ebola, and Lassa fever. Although they mainly affect Africa, very little research into these diseases is conducted in the region. She used the example of Lassa fever, which is endemic to several countries in West Africa, to illustrate the importance of research preparedness of the kind being undertaken by Nigeria CDC, in order to plan research in advance of outbreaks and then rapidly undertake it when Lassa fever outbreaks occur. This work is one of the priorities under the WHO R&D Blueprint, a global strategy and preparedness plan that aims to support more rapid activation of research and development activities during epidemics.

7.4 The growing challenge of non-communicable diseases

[Gerald Yonga](#) from the Aga Khan University Hospital in Kenya gave a presentation on the burden of non-communicable diseases (NCDs) and opportunities for service integration in Africa (70). Globally, NCDs – mainly cardiovascular disease, cancers, chronic respiratory disease, diabetes, and mental illness – account for around 75 per cent of all mortality. In Africa, mortality associated with preventable NCDs is increasing faster than anywhere in the world, and will overtake communicable diseases as the biggest killer in the region by 2025. This is largely due to growing risk factors such as tobacco use, poor diet, harmful use of alcohol, physical inactivity, and air pollution.

Among people with HIV in the region, cardiovascular diseases account for the highest proportion of non-AIDS-defining illnesses in both inpatient and outpatient settings, highlighting the need for more integrated health systems that address both communicable and non-communicable diseases. Expanding HIV services so that they also address NCDs is an approach that PEPFAR has begun to explore. Although NCDs and HIV are all preventable, the prevalence of chronic conditions and co-morbidities is likely to increase. Opportunities for closer integration of HIV and NCD services include behaviour change interventions, adherence and retention strategies, multi-disciplinary family-focused care, task-shifting, long-term patient monitoring, linkages and referrals, patient self-management, and partnerships between facility-based and community services. However, far more research is needed to identify optimal approaches, including the important role that primary care and communities can play in effective HIV and NCD health promotion, as well as how HIV programs can be leveraged most effectively to address NCDs in high HIV burden settings without affecting the quality of existing services.

An oral [abstract](#) highlighted progress in Zimbabwe in making human papilloma virus (HPV) vaccination available, including to women living with HIV, to reduce the burden of cervical cancer

in the region, but recommended further research to assess the cross-protectivity of current vaccines against the range of HPV sub-types prevalent in the region (71).

Debate 3: Radical patient self-management will address current health challenges in Africa

The third and final debate of INTEREST 2019, organised by Roche, addressed the issue of whether “radical patient self-management” involving minimal patient interaction with clinicians and health facilities - should play a more central role in addressing major health challenges in Africa. The debate was chaired by Scientific Chair Cate Hankins who called for the opening vote on the proposition. Prior to the debate, 57 per cent of the audience supported the proposition that patient self-management was important for the future of health in Africa, 33 per cent did not, and 10 per cent were undecided.

François Venter of the University of Witwatersrand in South Africa – the perennial provocateur of INTEREST debates – and Tendani Gaolathe from the Ministry of Health in Botswana, pointed to examples in other countries, such as the United States, where it is possible for a person with HIV to go without seeing an HIV doctor in person “for years”. In New York, patients are emailed a barcode for bloodwork every six months that they take to any local phlebotomist, and medications are delivered to their home. Any necessary exchanges with a physician can be conducted by email. They argued that such a system should also be possible in Africa and that differentiated service delivery for HIV is already leading in that direction. Diabetes also provides a compelling example of how patients can be taught to manage their own health. Unnecessary clinic attendance by healthy patients wastes patient and provider time that should be spent on people with opportunistic infections, adherence challenges, weight loss, or co-morbidities, and increases risks of disease transmission in clinical settings. Overall, patient self-management is convenient, economical, and popular among patients and it can be of high quality. It will grow in importance as the continent seeks to address other chronic diseases more effectively.

Arguing against the proposition, Sergio Carmona from the Charlotte Maxeke Academic Hospital and private practitioner Sindisiwe Van Zyl, both from South Africa, conceded that clinics in high HIV prevalence settings were often congested and staff were overwhelmed, but emphasized the importance of clinic visits to ensure continuity of care and to provide patients with support and sometimes, just a hug.

Audience discussion following the debaters’ opening remarks generally supported the concept of patient self-management. One participant noted that “the only time I remember that I have HIV is when I have to sit in the clinic for six hours waiting for my meds”. However, several speakers questioned whether Africa is logistically ready, noting for example, that the postal service is unreliable, and that drones and other new technologies should be actively explored. While some audience members felt that mental health was one area in which more frequent clinical visits might be beneficial, others thought that frequent and long waits in clinics often compounded poor mental health, and that patients could be taught simple self-screening techniques, such as for depression. In general, there was consensus that differentiated service

delivery for HIV was already showing that self-management was possible for a chronic disease in Africa.

Following the debate, the proportions of people who supported the proposition that patient self-management was important for the future of health in Africa changed to 64 per cent, 30 per cent opposed the proposition, and 5 per cent remained undecided, indicating that the debate had increased audience support for expanding this approach.

8. Advancing women in science and research

Helen Rees from the University of Witwatersrand gave a warmly-received keynote talk on what needs to be done to advance the careers of more women in scientific research (72). She described a persistent, vicious cycle in which women are under-represented in science as students and faculty, participate less frequently as peer reviewers and authors of publications, and receive less funding and fewer awards. Linking this state of affairs to the global picture, she noted that 130 million girls between the ages of 6 and 17 years are currently out of school, and 15 million girls of primary school age – half of them in sub-Saharan Africa, will never enter a classroom, according to UNESCO. This is the case despite well-known interventions to keep girls in school and the obvious advantages of education in terms of economic empowerment and both personal health and eventual family health. In global health, just a quarter of health ministers and only two of the six health-related UN agencies are led by women. Advancement in the health academic workforce is even more difficult for women of low economic status, women of colour, non-heterosexual women, and women who are disabled or who belong to other traditionally devalued groups. Data also show that male applicants for jobs and research funding are viewed more favourably than female applicants. Women who do succeed in science face more hurdles to advancement for less pay, and experience tremendous challenges in achieving work-life balance and meeting family responsibilities. In the academic workplace, women's opinions are less valued, gender bias is pervasive and often unconscious, and overt bias, discrimination, and sexual harassment still occur.

Strategies to overcome the gender gap include being strategic and professional when engaging with men, having female mentors, mandatory quotas, intentional programs for promising women scientists, gender diversity training for women and men, and promotion of gender-inclusive language. The [2018 GH50/50 report](#) showed that many organizations who work in the area of gender equality or focus on the health of women and girls still lack comprehensive gender equality policies, strategies, or programming, and do not have gender-balanced governance mechanisms. The report makes a series of recommendations to increase gender equality in the workplace (Fig 16).

Fig. 16

Global Health 50/50 Report 2018: Gender Recommendations

- Commit to gender equality and **incentivize policies & practices** that respond to evidence on impact of gender on health, well-being and careers of women & men
- Put in place **policies and practices required to achieve gender equality**
- **Develop common understanding of gender:** Don't conflate gender with women
- **Embed gender markers** in review of new programmes & initiatives
- Demonstrate and implement **zero tolerance for sexual & gender harassment**
- Time-bound targets for **gender parity in senior management** & governing bodies



9. Winners for Africa: The Lange/Van Tongeren Young Investigators

For the first time, the Joep Lange Institute supported participation at INTEREST by five winners of the new Lange/Van Tongeren Prize for young investigators under 35 years of age who were chosen at the International AIDS Conference in Amsterdam in 2018 based on their submission of high-scoring abstracts. The prize includes a scholarship to participate in and present at INTEREST.

Introducing the speakers, Tobias Rinke de Wit reflected on Joep Lange's vision to make health systems work for the poor, including his belief in the potential of innovations in digital health, such as a digital health wallet to enable third-party payment of health expenses. JLI has recently produced an interactive mobile experience called [Asilla's Journey](#) to demonstrate its ongoing vision of the role that technology can play in healthcare in resource-limited settings.

The first young investigator, [Shaheed Abdullhaq](#), a cellular immunologist from the Oregon Health and Science University in the United States, presented his work exploring the potential of an HIV vaccine that has generated CD8+ T-cell responses in a murine model.

[Jonathan Chang](#) from Brigham and Women's Hospital in Boston described the inflammation associated with HIV among people on ART and its now well-known links to cardiovascular disease and other chronic conditions. He posited that there may also be a link between inflammation and mental health outcomes, such as depression, and suggested potential research pathways to develop interventions.

[Michael Traeger](#) from the Burnet Institute in Australia presented work from the PrEPX study on changes in sexual behaviour among PrEP users and the changing epidemiology of bacterial STIs among PrEP users. High STI incidence was concentrated among men with repeat infections and

STI risk was associated with number of partners and group sex. Increased STI incidence among PrEP users overall was mostly explained by increased frequency of testing; levels of condom use were not associated with STI risk. He also presented work from Kenya showing that less than a third of a cohort of female sex workers in Mombassa were aware of PrEP. PrEP awareness was associated with older age, recently seeking health care services, and completing primary education. PrEP use in the cohort was not associated with inconsistent condom use.

Work presented by [Kalonde Malama](#) from Aix-Marseille University in France explored development of a risk profile for female sex workers in Zambia based on sexual environment, history, and behaviour to enable better tailoring of interventions for those at highest risk. He is particularly interested in preventing the high levels of sexual violence against sex workers and the use of technological applications for this purpose, such as the “Circle of 6” app, which has 300,000 users in 36 countries.

Finally, [Francis Matthew Simmonds](#) from the Elisabeth Glaser Pediatric AIDS Foundation (EGPAF) in Zimbabwe noted that only 64 per cent of infants exposed to HIV in Zimbabwe received early infant diagnosis in 2017, and discussed EGPAF’s Unitaids-supported work to introduce point-of-care technology to expand access to early infant diagnosis. A key advantage of the technology is that it may be operated by non-specialized, laboratory-trained personnel, including nurses.

In a panel discussion on potential applications of new technology, the young investigators emphasized that technology can play an important role in supporting task-shifting and patient self-management. Potential applications for mobile technology include point-of-care and self-screening for mental health conditions, support for adherence to PrEP, and monitoring “seasons of sexual risk”.

The work of the young investigators was complemented by a presentation on the final day of INTEREST 2019 from Christoph Benn, former Director of Resource Mobilization at the Global Fund to Fight AIDS, TB and Malaria, who emphasized the Global Fund’s vital role in supporting countries to bring innovation to scale in the region.

10. Closing of the 13th INTEREST meeting

In concluding remarks from the conference co-chairs, Kwasi Torpey noted that INTEREST participants felt to him like family, and that the value of the meeting was reflected in the fact that people who attended one INTEREST meeting almost invariably attended another. He noted that this year’s meeting had the highest numbers of abstracts, registrations, and attendees ever. Elly Katabira, the self-described “grandfather” of INTEREST, urged the young participants present to continue their efforts to advance HIV research in Africa. Thanking attendees, presenters, committees, and sponsors, Scientific Chair Cate Hankins presented the Joep Lange Award for the highest scoring abstract prior to closing the 13th INTEREST meeting.

Acknowledgements

This report was researched and written by science writer Ian Grubb and edited by INTEREST's Scientific Chair Catherine Hankins.

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