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International Health Alerts 2023-1 Abstracts

Child health

1. IJE 2022;51(5):1522–32
Understanding the child mortality decline in Guinea-Bissau: the role of population-level nutritional status measured by mid-upper arm circumference

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Background. Malnutrition is considered an important contributing factor to child mortality, and the mid-upper arm circumference (MUAC) is regarded as one of the better anthropometric predictors of child mortality. We explored whether the decline in child mortality over recent decades could be explained by changes in children's MUAC.
Methods. This prospective study analysed individual-level data from 47 731 children from the capital of Guinea-Bissau followed from 3 months until 36 months of age over 2003 to 2016. We used standardization to compare the mortality rate as if only the MUAC distribution had changed between an early period (2003–05) and a late period (2014–16). We adjusted the analyses for age, sex, socioeconomic-related possessions and maternal education.
Results. A total of 949 deaths were included in the analysis. The adjusted mortality rate was 18.9 [95% confidence interval (CI) 14.3-23.3] deaths per 1000 person-years (pyrs) in the early period and declined to 4.4 (95% CI 2.9-6.0) deaths per 1000 pyrs in the late period, a 77% (95% CI 71-83%) reduction in the mortality rate. At all calendar years, the MUAC distribution in the population was close to the WHO reference population. MUAC below -1 z-score was associated with increased child mortality. The change in MUAC distribution from the early period to the late period (in the early period mortality standardization) corresponded to 1.5 (95% CI 1.0-2.2) fewer deaths per 1000 pyrs, equivalent to 11% (95% CI 7-14%) of the observed change in child mortality.
Conclusions. From 2003 to 2016, child mortality in urban Guinea-Bissau declined considerably but, though a low MUAC was associated with increased mortality, changes in the MUAC distribution in the population explained little of the decline. Understanding the driving factors of child mortality decline can help scope tomorrow's interventions.

Climate change

2. Lancet 2022;400(10363):1619-54
The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels
Romanello M et al., Institute for Global Health, University College London, London, UK
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Key findings
• Climate change is undermining every dimension of global health monitored, increasing the fragility of the global systems that health depends on, and increasing the vulnerability of populations to the coexisting geopolitical, energy, and cost-of-living crises.
• Climate change is increasingly undermining global food security, exacerbating the effects of the COVID-19, geopolitical, energy, and cost-of-living crises. New analysis of 103 countries shows that days of extreme heat, increasing in frequency and intensity due to climate change, accounted for an estimated 98 million more people reporting moderate to severe food insecurity in 2020 than the average in 1981–2010 (indicator 1.4).
• Well-prepared health systems are essential to protect populations from the health impacts of climate change. However, global health systems have been drastically weakened by the effects of the COVID-19 pandemic, and the funds available for climate action decreased in 239 (30%)

of 798 cities (indicator 2.1.3), with health systems increasingly being affected by extreme weather events and supply chain disruptions too.

• Insufficient climate change adaptation efforts have left health systems vulnerable to climate change-related health hazards. Only 48 of 95 countries have assessed their climate change adaptation needs (indicator 2.1.1) and only 63% of countries reported high to very high implementation status for health emergency management in 2021 (indicator 2.2.5). Increasing adaptation to climate change has the potential to simultaneously improve the capacity of health systems to manage both future infectious disease outbreaks and other health emergencies (indicator 2.3.1).

• Mitigation of the energy sector is crucial to keep the rise in global mean surface temperatures within the 1·5°C target set in the Paris Agreement. However, the energy sector is still heavily reliant on fossil fuels. Its carbon intensity decreased by less than 1% since the year the UNFCCC was signed, and a simultaneous increase in energy demand of 59% has increased total energy sector emissions to record high levels in 2021 (indicator 3.1). Now, as countries seek alternatives to Russian fossil fuels, many are backsliding to coal, and shifts in global energy supplies risk a net increase in fossil fuel production and consumption.

• The slow adoption of renewable energies, which contribute to only 2.2% of total global energy supply (indicator 3.1), means households remain vulnerable to highly volatile international fossil fuel markets, and millions lack access to reliable, clean sources of fuel. Traditional biomass accounts for 31% of the energy
consumed in the domestic sector globally, and for 96% of that in low HDI countries (indicator 3.2). New analysis shows that the air in people’s homes in 62 countries analysed exceeded WHO guidelines for safe concentrations of small particulate air pollution (PM2·5) in 2020, by 30-fold on average (indicator 3.2). The current energy and cost-of-living crises, now threatens to worsen enery poverty.

• A new indicator this year reveals that, on the basis of their existing production strategies and market shares, 15 of the largest oil and gas companies would exceed their share of greenhouse gas emissions compatible with the 1·5°C climate target by an average of 87% (publicly-listed international companies) and 111% (state-owned national companies) in 2040 making the goals of the Paris Agreement unattainable (indicator 4.2.6).

• In 2019, 69 (80%) of 86 countries reviewed had net-negative carbon prices (ie, provided a net subsidy to fossil fuels) for a net total of US$400 billion. These subsidies exceeded 10% of national health spending in 31 countries and exceeded 100% in 5 countries (indicator 4.2.4). Meanwhile, climate efforts are being undercut
by a profound scarcity of funding (indicator 2.1.1).

• A health-centred response to the coexisting climate, energy, and cost-of-living crises provides an opportunity to deliver a healthy, low-carbon future. Transitioning to clean energy and improved energy efficiency can avert the most catastrophic climate change impacts, while also improving energy security, supporting economic recovery, preventing the 1·2 million annual deaths resulting from exposure to fossil fuel-derived ambient PM2·5 (indicator 3.3),
and improving health outcomes by promoting active forms of travel for greener cities. The associated reduction in the burden of disease will in turn reduce the strain on overwhelmed healthcare providers, and enable better care.

• The media, the scientific community, corporations,
and country leaders are increasingly engaging in health and climate change (indicators 5.1–5.5), and new analysis shows that 86% of updated or new Nationally Determined Contributions now reference health (indicator 5.4).

• Countries are attempting to cut their dependence
on international oil and gas supplies in response to the war in Ukraine and energy crisis, with some focusing
on increasing renewable energy generation, raising hopes that a health-centred response could be emerging. However, the increased engagement and commitments must be urgently translated into action for hope to turn into reality.

Communicable diseases

3. Am J TMH 2022;108(1):37-40
Two Nigerian States (Plateau and Nasarawa) Have Eliminated Transmission of Human Onchocerciasis-A Report of Post-Ivermectin Mass Drug Administration Surveillance
Miri ES et al., The Carter Center Nigeria, Jos, Nigeria

Transmission of Onchocerca volvulus (causing "river blindness") was interrupted in two states of Nigeria (Plateau and Nasarawa) in 2017 in accordance with 2016 WHO guidelines. Ivermectin mass drug administration was halted in January 2018, and posttreatment surveillance activities were conducted over a 3-year period. Vector Simulium damnosum s.l. flies were collected during the 2019 (39 sites) and 2020 (42 sites) transmission seasons. Head pools were tested by polymerase chain reaction for the presence of third-stage O. volvulus larvae; 15,585 flies were all negative, demonstrating an infective rate of < 1/2,000 with 95% confidence. In 2021, the Nigerian Federal Ministry of Health declared the two-state area as having eliminated transmission. Plateau and Nasarawa states are the first of 30 endemic states in Nigeria to have met the WHO criteria for onchocerciasis elimination. Post-elimination surveillance will need to continue given the risk of reintroduction of transmission from neighboring states.

4. Am J TMH 2023;tpmd220535
Prevalence of Ocular Chlamydia trachomatis Infection in Amhara Region, Ethiopia, after 8 Years of Trachoma Control Interventions
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Although trachoma mass drug administration (MDA) programs target ocular Chlamydia trachomatis, the global trachoma control program does not monitor infection as a measure of impact but instead relies on monitoring clinical indicators. This study aimed to monitor the prevalence of ocular C. trachomatis among a population-based sample of children ages 1-5 years throughout Amhara, Ethiopia, a region that has received approximately 8 years of annual MDA as part of trachoma control. Between 2014 and 2021, trachoma impact surveys and surveillance surveys were conducted in all 156 districts of Amhara using a multistage cluster randomized methodology. Certified graders assessed individuals ages ≥ 1 year for trachomatous inflammation-follicular (TF), and a random subset of children ages 1-5 years also provided a conjunctival swab. Polymerase chain reaction was used to test for C. trachomatis. A total of 28,410 conjunctival swabs were collected from children ages 1-5 years across Amhara. The regional C. trachomatis infection prevalence was 4.7% (95% uncertainty interval: 4.3-5.1%). Infection was detected in all 10 zones of the region and ranged from 0.2% in Awi Zone to 11.9% in Waghemra Zone. Infection was detected in 17 (26%) districts with a TF prevalence < 10% and in 7 (21%) districts with a TF prevalence < 5%. Through programmatic monitoring of C. trachomatis

infection, this study demonstrated that considerable infection remained throughout Amhara despite approximately 8 years of trachoma interventions and that enhanced interventions such as more frequent than annual MDA will be needed if elimination thresholds are to be reached.

5. BMJ Global Health 2022;7:e011073
Commentary
The East African Community's mobile laboratory network's rapid response during the first 2 weeks of the Ebola Sudan virus disease (SVD) outbreak in Uganda and pandemic preparedness activities in South Sudan, Rwanda, Tanzania, Burundi, Kenya
Gehre F et al. <affara@bnitm.de>

Since 2017, and with funding from the German Federal Ministry for Economic Cooperation and Development through the KfW Development Bank, the East African Community (EAC) together with the Bernhard-Nocht-Institute for Tropical Medicine established a network of nine mobile EAC laboratories embedded within the National Public Health Laboratories (NPHLs) of six EAC Partner States (Tanzania, Kenya, Burundi, Rwanda, South Sudan and Uganda). These field-deployable mobile laboratories have the capacity to diagnose risk group four pathogens, such as SVD. The EAC project was conceived in response to the West African Ebola epidemic and the EAC mobile laboratories were designed based on the blueprint of the European Mobile Laboratories (EMLabs, www.emlab.eu), which were successfully deployed to Guinea in 2015.
Summary box
Since 20 September 2022, Uganda is experiencing an Ebola outbreak caused by the Sudan virus strain. Within the first 14 days after outbreak confirmation, the East African Community Mobile laboratory network was actively involved in providing Sudan virus disease and differential diagnostics in the epicentre at Mubende Regional Referral Hospital (and neighbouring districts), as well as in coordination of mobile laboratory preparedness activities in five other East African countries.
We demonstrate for the first time that a locally established mobile laboratory network, embedded within the National Public Health Laboratories and the respective Ministries of Health, has the potential of bridging the crucial diagnostic time gap by providing immediate Biological Safety Level (BSL)-3/4 laboratory capacity at the site of the outbreak until large scale international emergency response starts.

6. EID 2023;29(1):160-3
Burden of Postinfectious Symptoms after Acute Dengue, Vietnam
Tam DTH et al.
We assessed predominantly pediatric patients in Vietnam with dengue and other febrile illness 3 months after acute illness. Among dengue patients, 47% reported >1 postacute symptom. Most resolved by 3 months, but alopecia and vision problems often persisted. Our findings provide additional evidence on postacute dengue burden and confirm children are affected.

7. Lancet 2023;400(10369):2221-48
Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019
GBD 2019 Antimicrobial Resistance Collaborators

Background: Reducing the burden of death due to infection is an urgent global public health priority. Previous studies have estimated the number of deaths associated with drug-resistant infections and sepsis and found that infections remain a leading cause of death globally. Understanding the global burden of common bacterial pathogens (both susceptible and resistant to antimicrobials) is essential to identify the greatest threats to public health. To our knowledge, this is the first study to present global comprehensive estimates of deaths associated with 33 bacterial pathogens across 11 major infectious syndromes.
Methods: We estimated deaths associated with 33 bacterial genera or species across 11 infectious syndromes in 2019 using methods from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019, in addition to a subset of the input data described in the Global Burden of Antimicrobial Resistance 2019 study. This study included 343 million individual records or isolates covering 11 361 study-location-years. We used three modelling steps to estimate the number of deaths associated with each pathogen: deaths in which infection had a role, the fraction of deaths due to infection that are attributable to a given infectious syndrome, and the fraction of deaths due to an infectious syndrome that are attributable to a given pathogen. Estimates were produced for all ages and for males and females across 204 countries and territories in 2019. 95% uncertainty intervals (UIs) were calculated for final estimates of deaths and infections associated with the 33 bacterial pathogens following standard GBD methods by taking the 2·5th and 97·5th percentiles across 1000 posterior draws for each quantity of interest.
Findings: From an estimated 13·7 million (95% UI 10·9-17·1) infection-related deaths in 2019, there were 7·7 million deaths (5·7-10·2) associated with the 33 bacterial pathogens (both resistant and susceptible to antimicrobials) across the 11 infectious syndromes estimated in this study. We estimated deaths associated with the 33 bacterial pathogens to comprise 13·6% (10·2-18·1) of all global deaths and 56·2% (52·1-60·1) of all sepsis-related deaths in 2019. Five leading pathogens-Staphylococcus aureus, Escherichia coli, Streptococcus pneumoniae, Klebsiella pneumoniae, and Pseudomonas aeruginosa-were responsible for 54·9% (52·9-56·9) of deaths among the investigated bacteria. The deadliest infectious syndromes and pathogens varied by location and age. The age-standardised mortality rate associated with these bacterial pathogens was highest in the sub-Saharan Africa super-region, with 230 deaths (185-285) per 100 000 population, and lowest in the high-income super-region, with 52·2 deaths (37·4-71·5) per 100 000 population. S aureus was the leading bacterial cause of death in 135 countries and was also associated with the most deaths in individuals older than 15 years, globally. Among children younger than 5 years, S pneumoniae was the pathogen associated with the most deaths. In 2019, more than 6 million deaths occurred as a result of three bacterial infectious syndromes, with lower respiratory infections and bloodstream infections each causing more than 2 million deaths and peritoneal and intra-abdominal infections causing more than 1 million deaths.
Interpretation: The 33 bacterial pathogens that we investigated in this study are a substantial source of health loss globally, with considerable variation in their distribution across infectious syndromes and locations. Compared with GBD Level 3 underlying causes of death, deaths associated with these bacteria would rank as the second leading cause of death globally in 2019; hence, they should be considered an urgent priority for intervention within the global health community. Strategies to address the burden of bacterial infections include infection prevention, optimised use of antibiotics, improved capacity for microbiological analysis, vaccine development, and improved and more

pervasive use of available vaccines. These estimates can be used to help set priorities for vaccine need, demand, and development.

8. Lancet 2023;400(10369):2261-2264
A call to accelerate an end to human rabies deaths
Thumbi SM et al., Center for Epidemiological Modelling and Analysis, University of Nairobi, Nairobi, Kenya <thumbi.mwangi@wsu.edu>

Introduction. Every year, an estimated 59 000 vaccine-preventable deaths occur globally due to rabies. These deaths occur despite more than 100 years of existence of effective vaccines against rabies in humans and dogs, which serve as the main source of infection for humans.
Most of these deaths are in Africa and Asia among neglected populations that are hard to reach or economically disadvantaged, living in areas where availability of and access to these life-saving human rabies vaccines is poor and dog vaccination is low. Several epidemiological characteristics support the feasibility of rabies elimination. For example, the virus is transmitted by a known and accessible vector (ie, the domestic dog); transmission is by symptomatic animals, making it possible to identify suspected rabid animals; efficacious rabies vaccines exist that confer long-term immunity; and, across many settings, the basic reproduction ratio for rabies cases is low ($R0<2$), with vaccination covering 70% of dogs in a region being sufficient to eliminate the disease.
A call to action. At the time of writing, the Gavi position on implementing its commitment is unclear, with a risk that a decision could be delayed until at least 2024. This delay does not only scupper any chance of achieving the 2030 goal but also risks emphasising the global inequities in health. Gavi has the opportunity to be a leader in improving access to rabies post-exposure prophylaxis and ending preventable deaths from rabies, strengthening health systems that support emergency supply chains (eg, for rabies post-exposure prophylaxis and snake antivenom), and operationalising the One Health systems, for which the benefit goes beyond controlling endemic diseases, such as rabies, to addressing other diseases, including those that are prone to outbreaks, epidemics, or pandemics. If Gavi fails to meet the vaccine investment strategy commitments by 2022 and instead delays until 2024, then the 2030 target of ending rabies will be missed, and more than 40000 rabies deaths will occur that would have otherwise been prevented.

9. PLoS Med 19(10): e1004128. (2022)
Perspective: The rapidly evolving monkeypox epidemic: A call to action to leave no one behind
Strathdee SA et al., Affiliation: Division of Infectious Diseases and Global Public Health, Department of Medicine, University of California San Diego, California, USA <sstrathdee@health.ucsd.edu>

We know enough to act.
Learn from past successes. Smallpox was eradicated in 1980 following a globally coordinated plan involving testing, contact tracing, and ring vaccination. Similar approaches should be undertaken for MPXV, using sero-surveillance, molecular testing of high-risk populations, and wastewater surveillance.
Learn from past mistakes. Although MPXV is very different from SARS-CoV-2 and HIV, the Coronavirus Disease 2019 (COVID-19) and HIV/AIDS pandemics offer lessons. Testing, vaccination, and treatment should be immediately scaled up and offered free to high-risk populations globally, through coordinated strategies that minimize bureaucracy (e.g., strict eligibility requirements for testing) and

includes timely contact tracing. Affordable health care, paid sick leave, and tele-health should be expanded. Health communication requires mandated reporting, consistent messaging and transparency, being clear about what we know and what we don't. Concerted efforts should be made to quell stigma, misinformation, and disinformation through meaningful consultation with affected populations.
Address global health inequities. International multiagency coordination is needed so high-income countries do not hoard vaccines, treatments, or protect patents at the expense of lower and middle-income countries where MPXV is endemic. Global cooperation and political will is needed to assist lower income countries with access and last-mile delivery of testing, treatment, and vaccines. Affected populations need to be consulted at all stages to ensure that interventions are regionally and culturally appropriate.
Take action. Decriminalizing substance use, sex work, homosexuality, and homelessness would decrease stigma and encourage vulnerable populations to seek testing, improving case-finding, and treatment. During the COVID-19 pandemic, some regions depopulated prisons or included sex workers in government subsidies. Regions facing armed conflict and other complex emergencies cannot be overlooked in prevention and treatment efforts. Testing and vaccination programs should leverage social media and engage nongovernmental organizations in mobile outreach.
Invest in research. Studies to characterize the epidemiology, social networks, clinical presentation, morbidity, and mortality associated with MPXV infection are critically needed to inform primary and secondary prevention. Sero-surveillance should extend to animals, including pets and wildlife that could serve as reservoirs. Treatments found safe and effective should be evaluated as prophylaxis in high-risk populations. Research and implementation studies could leverage existing networks including but not limited to those established for HIV/AIDS (e.g., AIDS Clinical Treatment Group, Centers for AIDS Research, HIV Prevention Trials Network, HIV Vaccine Trials Network) and COVID-19 (e.g., ACTIV, RADx, RADxUP).
What about the unknown unknowns?
MPXV isn't the first pandemic of the 21st century, but it has already shown how unprepared we continue to be. Declaring a public health emergency of international concern (PHEIC) has limited impact if not met with action, building upon COVID-19 mitigation approaches, with an eye towards other threats (e.g., enteroviruses, avian influenza, new coronaviruses and antimicrobial resistance). Addressing root causes of syndemics that disproportionately affect socially disadvantaged populations could significantly reduce health disparities associated with multiple disease outcomes and would ultimately be cost saving. Ensuring that we leave no one behind requires global cooperation to strengthen infrastructures for public health surveillance and capacities of health care systems and their workers. Without addressing global health inequities, we will continue to be unprepared for future pandemics.

Global surgery

10. Lancet 2022;400(10365):1767-76
Controlled Trial
Routine sterile glove and instrument change at the time of abdominal wound closure to prevent surgical site infection (ChEETAh): a pragmatic, cluster-randomised trial in seven low-income and middle-income countries
NIHR Global Research Health Unit on Global Surgery

Background: Surgical site infection (SSI) remains the most common complication of surgery around the world. WHO does not make recommendations for changing gloves and instruments before wound closure owing to a lack of evidence. This study aimed to test whether a routine change of gloves and instruments before wound closure reduced abdominal SSI.
Methods: ChEETAh was a multicentre, cluster randomised trial in seven low-income and middle-income countries (Benin, Ghana, India, Mexico, Nigeria, Rwanda, South Africa). Any hospitals (clusters) doing abdominal surgery in participating countries were eligible. Clusters were randomly assigned to current practice (42) versus intervention (39; routine change of gloves and instruments before wound closure for the whole scrub team). Consecutive adults and children undergoing emergency or elective abdominal surgery (excluding caesarean section) for a clean-contaminated, contaminated, or dirty operation within each cluster were identified and included. It was not possible to mask the site investigators, nor the outcome assessors, but patients were masked to the treatment allocation. The primary outcome was SSI within 30 days after surgery (participant-level), assessed by US Centers for Disease Control and Prevention criteria and on the basis of the intention-to-treat principle. The trial has 90% power to detect a minimum reduction in the primary outcome from 16% to 12%, requiring 12 800 participants from at least 64 clusters. The trial was registered with ClinicalTrials.gov, NCT03700749.
Findings: Between June 24, 2020 and March 31, 2022, 81 clusters were randomly assigned, which included a total of 13 301 consecutive patients (7157 to current practice and 6144 to intervention group). Overall, 11 825 (88·9%) of 13 301 patients were adults, 6125 (46·0%) of 13 301 underwent elective surgery, and 8086 (60·8%) of 13 301 underwent surgery that was clean-contaminated or 5215 (39·2%) of 13 301 underwent surgery that was contaminated-dirty. Glove and instrument change took place in 58 (0·8%) of 7157 patients in the current practice group and 6044 (98·3%) of 6144 patients in the intervention group. The SSI rate was 1280 (18·9%) of 6768 in the current practice group versus 931 (16·0%) of 5789 in the intervention group (adjusted risk ratio: 0·87, 95% CI 0·79-0·95; p=0·0032). There was no evidence to suggest heterogeneity of effect across any of the prespecified subgroup analyses. We did not anticipate or collect any specific data on serious adverse events.
Interpretation: This trial showed a robust benefit to routinely changing gloves and instruments before abdominal wound closure. We suggest that it should be widely implemented into surgical practice around the world.

Health Policy

11. BMJ 2022;379:o2999
Opinion
Africa needs to take the lead in shaping the future of health on the continent
Binagwaho A et al.

Decisions about Africa’s health priorities and policies should no longer exclude the most important stakeholder.
For decades, Africa’s health priorities, policies, funding sources, and access to medicines have largely been shaped by international organisations, funders, consortiums, and conferences based in the global north. The notion that Africa still has “limited capacity” and “an unskilled workforce” means

that funding is often channelled through “experts” and entities in the global north, rather than directly to local organisations or programmes in the global south. This approach inhibits lasting progress.
The covid-19 pandemic reinforced the need for Africa to take charge of its own health agenda. Despite fears that the continent would be devastated by the virus, public health institutions like the Africa Centres for Disease Control and Prevention (Africa CDC) acted swiftly to coordinate a continental response. In partnership with national public health institutes, ministries of health, and other local, regional, and international partners, Africa CDC supported surveillance, testing, case management, and more—as well as forging new partnerships across sectors.
Africa CDC established itself as the leading public health agency on the continent, showing why we need strong, African led institutions that can provide countries with guidance, resources, and technical support during times of crisis.
Unfortunately, the pandemic also reminded us that when it comes to “global” health, Africa remains at the end of the queue for access to essential medicines. Without the purchasing power to compete with wealthier countries, African nations were left behind as countries in the global north hoarded doses of covid-19 vaccines. Vaccine rollouts across the continent were affected by patent restrictions, supply shortages, and delivery delays. Despite concerted efforts, only 25% of the eligible population across the continent has been fully vaccinated against covid-19 to date.1 Africa is also dealing with multiple concurrent outbreaks of infectious diseases. A number of cases of the Sudan ebolavirus in Uganda is one such recent outbreak, requiring a robust and swift response to be contained.
African driven partnerships and institutions—such as the Partnership for African Vaccine Manufacturing (PAVM), the Africa Continental Free Trade Area (AfCFTA), and the African Medicines Agency (AMA) will be key to collectively tackling these challenges. Through collaboration, market shaping, domestic investment, advocacy, and knowledge sharing, these homegrown partnerships and institutions have the potential to usher in a new era for public health in Africa.
“African led” does not, however, mean “African only.” Global actors still have a part to play. Africa’s health challenges are vast and cannot be contained by borders. Finding solutions will require a broad coalition of partners. International partners should continue to invest in health in Africa, but we must recognise that the donor-driven charity model no longer works. Partnerships should be innovative, action oriented, sustainable, and respectful of Africa’s health priorities and urgent needs.

12. BMJ 2022;379:e069671
Analysis
Cities and global health: fragmented housing policies increase health risks for vulnerable people
Doyle, YG et al.

Call for more innovative approaches to healthy housing in cities to improve health inequalities.
The association of housing with health was recorded scientifically over 170 years ago, and housing remains a wider determinant of health globally. In urban settings where about 54% of the world’s population now live, poor housing conditions influence physical health and psychosocial wellbeing through indoor temperature; air and noise pollution; risk of injury, stress, and infection; and the external and internal environment of homes. The cost of housing also affects health as it determines what residual income remains for other needs such as food, transportation, and medical services. Reviews have identified that experiencing foreclosure and lack of housing stability are associated with worse physical and mental health.

Globally, environmental risk factors can contribute more than a third of the preventable disease burden in children. In parts of Africa, lack of facilities for simple exercise have contributed to a recent and disproportionately increased incidence of obesity in women. Also, recent studies indicate growing incidence of obesity among children and young people in African cities because of the absence of play spaces. In India and parts of east Asia and sub-Saharan Africa, inadequate combustion of charcoal in badly ventilated indoor environments increases risk of respiratory disease among people who spend much time indoors. Furthermore, lack of public services in the poorest districts not only causes immediate health threats but delays detection of risk factors for disease with adverse consequences. Housing as a pointer to urban health and equity. Poor housing conditions are a known mechanism through which social and environmental inequality translates into health inequality.

13. HPP 2023;38(1):97 - 108
Exploring the roles of players in strategic purchasing for healthcare in Africa—a scoping review
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Following the World Health Organization (WHO) guidance on strategic purchasing in 2000, low- and middle-income countries (LMICs) are trying to shift from passive purchasing (using fixed budgets) to strategic purchasing of healthcare which ties reimbursement to outcomes. However, there is limited evidence on strategic purchasing in Africa. We conducted a scoping literature review aimed at summarizing the roles played by governments, purchasers and providers in relation to citizens/population in strategic purchasing in Africa. The review searched for scientific journal articles that contained data on strategic purchasing collected from Africa. The literature search identified 957 articles of which 80 matched the inclusion criteria and were included in the review. The study revealed that in some countries strategic purchasing has been used as a tool for healthcare reforms or for strengthening systems that were not functional under fixed budgets. However, there was some evidence of a lack of government commitment in taking leading roles and funding strategic purchasing. Further, in some countries the laws need to be revised to accommodate new arrangements that were not part of fixed budgets. The review also established that there were some obstacles within the public health systems that deterred purchasers from promoting efficiency among providers and that prevented providers from having full autonomy in decision making. As African countries strive to shift from passive to strategic purchasing of healthcare, there is need for full government commitment on strategic purchasing. There is need to further revise appropriate legal frameworks to support strategic purchasing, conduct assessments of the healthcare systems before designing strategic purchasing schemes and to sensitize the providers and citizens on their roles and entitlements respectively.

14. HHP 2023;38(1):109-21
Health-care worker retention in post-conflict settings: a systematic literature review
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Conflicts affect health-care systems not only during but also well beyond periods of violence and immediate crises by draining resources, destroying infrastructure and perpetrating human resource shortages. Improving health-care worker (HCW) retention is critical to limiting the strain placed on

health systems already facing infrastructure and financial challenges. We reviewed the evidence on the retention of HCWs in fragile, conflict-affected and post-conflict settings and evaluated strategies and their likely success in improving retention and reducing attrition. We conducted a systematic review of studies, following PRISMA guidelines. Included studies (1) described a context that is post-conflict, conflict-affected or was transformed by war or a crisis; (2) examined the retention of HCWs; (3) were available in English, Spanish or French and (4) were published between 1 January 2000 and 25 April 2021. We identified 410 articles, of which 25 studies, representing 17 countries, met the inclusion criteria. Most of the studies (22 out of 25) used observational study designs and qualitative methods to conduct research. Three studies were literature reviews. This review observed four main themes: migration intention, return migration, work experiences and conditions of service and deployment policies. Using these themes, we identify a consolidated list of six push and pull factors contributing to HCW attrition in fragile, conflict-affected and post-conflict settings. The findings suggest that adopting policies that focus on improving financial incentives, providing professional development opportunities, establishing flexibility and identifying staff with strong community links may ameliorate workforce attrition.

HIV/AIDS

15. Plos Med 2022;19(9):e1004102
Policy Forum: HIV prevention for the next decade: Appropriate, person-centred, prioritised, effective, combination prevention
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- UNAIDS and a broad range of partners have collaborated to establish a new set of HIV prevention targets to be achieved by 2025 as an intermediate step towards the sustainable development target for 2030.
- The number of new HIV infections in the world continues to decline, in part due to the extraordinary expansion of effective HIV treatment. However, the decline is geographically heterogeneous, with some regions reporting a rise in incidence. The incidence target that was agreed for 2020 has been missed.
- A range of exciting new HIV prevention technologies have become available or are in the pipeline but will only have an impact if they are accessible and affordable and delivered within systems that take full account of the social and political context in which most infections occur. Most new infections occur in populations that are marginalised or discriminated against due to structural, legal, and cultural barriers.
- The new targets imply a new approach to HIV prevention that emphasises appropriate, person-centred, prioritised, effective, combination HIV prevention within a framework that reduces existing barriers to services and acknowledges heterogeneity, autonomy, and choice.
- These targets have consequences for people working in HIV programmes both for delivery and for monitoring and evaluation, for health planners setting local and national priorities, and for funders both domestic and global. Most importantly, they have consequences for people who are at risk of HIV exposure and infection.
- Achieving these targets will have a huge impact on the future of the HIV epidemic and put us back on track towards ending AIDS as a public health threat by 2030.

The world (through the United Nations General Assembly) has committed to ending AIDS as a public health threat by 2030. However, progress has not been sufficient and in 2020 there were over 1.5 million new HIV infections, compared to the target of 500,000 that had been adopted. The United Nations Joint Programme on AIDS therefore convened a broad range of partners to develop new targets for 2025 that will put us back on track to meet the 2030 goal. These targets are at the heart of the global HIV strategy for 2021 to 2025 and include targets to maximise HIV services, to minimise societal barriers, and to integrate HIV services within the wider health system.
This paper forms part of a larger PLoS Collection that describes the overall 2025 Targets process and lays out the exciting developments and prospects for HIV prevention and explains the rationale and the details of the new prevention targets.
The specific prevention targets signal a shift in the global HIV prevention strategy to maximise agency, equity, and efficiency. They aim to achieve a world where 95% of people who are exposed to HIV use "Appropriate, Person-centred, Prioritised, Effective, Combination Prevention".

Malaria

16. Am J TMH 2022;tpmd220147
Private Sector Contributions to National Malaria Surveillance Systems in Elimination Settings: Lessons Learned from Cambodia, Lao PDR, Myanmar, and Vietnam
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Comprehensive malaria case surveillance is necessary to achieve and sustain malaria elimination. In the Greater Mekong Subregion (GMS), the private sector plays a substantial role in malaria treatment. Yet, none of the six GMS countries collects complete case data from private sector points-of-care. Between 2016 and 2019, the GMS Elimination of Malaria through Surveillance program supported national malaria programs in Cambodia, Lao PDR, Myanmar, and Vietnam to execute elimination strategies by engaging the private sector in malaria case management, generating private sector case data, and integrating these data into national surveillance systems. The project enrolled 21,903 private sector outlets, covering between 52% and 80% of the private sector in targeted geographies, which were trained and equipped to perform rapid diagnostic tests (RDTs) and report malaria case data. By 2019, the private providers enrolled in the program reported a total of 3,521,586 suspected cases and 96,400 confirmed malaria cases into national surveillance systems, representing 16% of the total reported caseload by these countries (Cambodia, 25%; Lao PDR, 5%; Myanmar, 12%; Vietnam, 8%). Results demonstrated that with comprehensive support, such as training, provision of free or subsidized RDTs, first-line treatments, and routine supportive supervision, private providers can provide quality malaria case management and achieve high reporting rates.

17. BMJ Global Health 2022;7:e009674
Original research
Long-lasting insecticidal nets provide protection against malaria for only a single year in Burundi, an African highland setting with marked malaria seasonality
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Background. Long-lasting insecticidal nets (LLINs) are one of the key interventions in the global fight against malaria. Since 2014, mass distribution campaigns of LLINs aim for universal access by all citizens of Burundi. In this context, we assess the impact of LLINs mass distribution campaigns on malaria incidence, focusing on the endemic highland health districts. We also explored the possible correlation between observed trends in malaria incidence with any variations in climate conditions.
Methods. Malaria cases for 2011—2019 were obtained from the National Health Information System. We developed a generalised additive model based on a time series of routinely collected data with malaria incidence as the response variable and timing of LLIN distribution as an explanatory variable to investigate the duration and magnitude of the LLIN effect on malaria incidence. We added a seasonal and continuous-time component as further explanatory variables, and health district as a random effect to account for random natural variation in malaria cases between districts.
Results. Malaria transmission in Burundian highlands was clearly seasonal and increased non-linearly over the study period. Further, a fast and steep decline of malaria incidence was noted during the first year after mass LLIN distribution ($p<0.0001$). In years 2 and 3 after distribution, malaria cases started to rise again to levels higher than before the control intervention.
Conclusion. This study highlights that LLINs did reduce the incidence in the first year after a mass distribution campaign, but in the context of Burundi, LLINs lost their impact after only 1 year.

18. IJE 2022;51(5):1489–1501
Association between indoor residual spraying and pregnancy outcomes: a quasi-experimental study from Uganda
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Background. Malaria is a risk factor for adverse pregnancy outcomes. Indoor residual spraying with insecticide (IRS) reduces malaria infections, yet the effects of IRS on pregnancy outcomes are not well established. We evaluated the impact of a large-scale IRS campaign on pregnancy outcomes in Eastern Uganda.
Methods. Birth records (n = 59 992) were obtained from routine surveillance data at 25 health facilities from five districts that were part of the IRS campaign and six neighbouring control districts ∼27 months before and ∼24 months after the start of the campaign (January 2013-May 2017). Campaign effects on low birthweight (LBW) and stillbirth incidence were estimated using the matrix completion method (MC-NNM), a machine-learning approach to estimating potential outcomes, and compared with the difference-in-differences (DiD) estimator. Subgroup analyses were conducted by HIV and gravidity.
Results. MC-NNM estimates indicated that the campaign was associated with a 33% reduction in LBW incidence: incidence rate ratio (IRR) = 0.67 [95% confidence interval (CI): 0.49–0.93)]. DiD estimates were similar to MC-NNM [IRR = 0.69 (0.47–1.01)], despite a parallel trends violation during the pre-IRS period. The campaign was not associated with substantial reductions in stillbirth incidence [IRRMC-NNM = 0.94 (0.50–1.77)]. HIV status modified the effects of the IRS campaign on LBW [βIRSxHIV = 0.42 (0.05–0.78)], whereby HIV-negative women appeared to benefit from the campaign [IRR = 0.70 (0.61–0.81)], but not HIV-positive women [IRR = 1.12 (0.59–2.12)].
Conclusions. Our results support the effectiveness of the campaign in Eastern Uganda based on its benefit to LBW prevention, though HIV-positive women may require additional interventions. The IRS

campaign was not associated with a substantively lower stillbirth incidence, warranting further research.

19. Lancet 2022;400(10367):1914-5
World Report
A missed opportunity? Anopheles stephensi in Africa
Samarasekera, U.

A malaria vector new to Africa threatens to undo decades of progress.
Mosquitoes can travel far from home, especially if they stow away on boats.
Typically found in south Asia and the Arabian Peninsula, Anopheles stephensi has made its way from its usual habitats to the African continent. Malaria experts and global health agencies are concerned about this spread because An stephensi is not only a good vector for Plasmodium falciparum and P vivax malaria parasites, but also it has several unusual traits that make it a formidable foe to defeat. WHO considers the vector a major potential threat to malaria control and elimination, especially in Africa, where it has made several new inroads. WHO is working, along with malaria researchers and affected countries, to stop the spread of this mosquito, but the effort faces many challenges and uncertainties.
As well as urban settings, An stephensi seems very adaptable to other environments.
An stephensi has other notable behaviours. Compared with endemic African malaria vectors, it feeds and rests outdoors rather than indoors and blood feeds on animals, such as cattle and goats, as well as humans. These traits mean that it not only evades traditional malaria mosquito surveillance spots but also the commonly used vector control tools: indoor residual spraying (IRS) and insecticide-treated nets.
WHO is hoping their new initiative to stop the spread of An stephensi in Africa will make a difference. Launched on Sept 29, 2022, it champions a five-pronged approach: improving information exchange; increasing collaboration across sectors and borders; strengthening entomological surveillance and epidemiological surveillance and monitoring trends, especially in urban settings; prioritising research; and developing guidance.
Getting the balance right between rural and urban malaria responses is crucial. But a particular worry remains: is it too late to stop the spread of An stephensi in Africa?

20. Lancet 2023;401(10371):118-30
Pregnancy outcomes after first-trimester treatment with artemisinin derivatives versus non-artemisinin antimalarials: a systematic review and individual patient data meta-analysis
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Background: Malaria in the first trimester of pregnancy is associated with adverse pregnancy outcomes. Artemisinin-based combination therapies (ACTs) are a highly effective, first-line treatment for uncomplicated Plasmodium falciparum malaria, except in the first trimester of pregnancy, when quinine with clindamycin is recommended due to concerns about the potential embryotoxicity of artemisinins. We compared adverse pregnancy outcomes after artemisinin-based treatment (ABT) versus non-ABTs in the first trimester of pregnancy.

Methods: For this systematic review and individual patient data (IPD) meta-analysis, we searched MEDLINE, Embase, and the Malaria in Pregnancy Library for prospective cohort studies published between Nov 1, 2015, and Dec 21, 2021, containing data on outcomes of pregnancies exposed to ABT and non-ABT in the first trimester. The results of this search were added to those of a previous systematic review that included publications published up until November, 2015. We included pregnancies enrolled before the pregnancy outcome was known. We excluded pregnancies with missing estimated gestational age or exposure information, multiple gestation pregnancies, and if the fetus was confirmed to be unviable before antimalarial treatment. The primary endpoint was adverse pregnancy outcome, defined as a composite of either miscarriage, stillbirth, or major congenital anomalies. A one-stage IPD meta-analysis was done by use of shared-frailty Cox models. This study is registered with PROSPERO, number CRD42015032371.
Findings: We identified seven eligible studies that included 12 cohorts. All 12 cohorts contributed IPD, including 34 178 pregnancies, 737 with confirmed first-trimester exposure to ABTs and 1076 with confirmed first-trimester exposure to non-ABTs. Adverse pregnancy outcomes occurred in 42 (5·7%) of 736 ABT-exposed pregnancies compared with 96 (8·9%) of 1074 non-ABT-exposed pregnancies in the first trimester (adjusted hazard ratio [aHR] 0·71, 95% CI 0·49-1·03). Similar results were seen for the individual components of miscarriage (aHR=0·74, 0·47-1·17), stillbirth (aHR=0·71, 0·32-1·57), and major congenital anomalies (aHR=0·60, 0·13-2·87). The risk of adverse pregnancy outcomes was lower with artemether-lumefantrine than with oral quinine in the first trimester of pregnancy (25 [4·8%] of 524 vs 84 [9·2%] of 915; aHR 0·58, 0·36-0·92).
Interpretation: We found no evidence of embryotoxicity or teratogenicity based on the risk of miscarriage, stillbirth, or major congenital anomalies associated with ABT during the first trimester of pregnancy. Given that treatment with artemether-lumefantrine was associated with fewer adverse pregnancy outcomes than quinine, and because of the known superior tolerability and antimalarial effectiveness of ACTs, artemether-lumefantrine should be considered the preferred treatment for uncomplicated P falciparum malaria in the first trimester. If artemether-lumefantrine is unavailable, other ACTs (except artesunate-sulfadoxine-pyrimethamine) should be preferred to quinine. Continued active pharmacovigilance is warranted.

Mental Health

21. Lancet 2022;400(10360):1321-33

Comparing dedicated and designated approaches to integrating task-shared psychological interventions into chronic disease care in South Africa: a three-arm, cluster randomised, multicentre, open-label trial

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Background: Community health workers (CHWs) are increasingly providing task-shared psychological interventions for depression and alcohol use in primary health care in low-income and middle-income countries. We aimed to compare the effectiveness of CHWs dedicated to deliver care with CHWs designated to deliver care over and above their existing responsibilities and with treatment as usual for patients with a chronic physical disease.
Methods: We did a three-arm, cluster randomised, multicentre, open-label trial done in 24 primary health-care clinics (clusters) within the Western Cape province of South Africa. Clinics were randomly

assigned (1:1:1) to implement dedicated care, designated care, or treatment as usual, stratified by urban-rural status. Patients with HIV or type 1 or type 2 diabetes were eligible if they were 18 years old or older, taking antiretroviral therapy for HIV or medication to manage their diabetes, had an Alcohol Use Disorders Identification Test (AUDIT) score of eight or more or a Center for Epidemiologic Studies Depression Scale score of 16 or more, and were not receiving mental health treatment. In the intervention arms, all participants were offered three sessions of an evidence-based psychological intervention, based on motivational interviewing and problem-solving therapy, delivered by CHWs. Our primary outcomes were depression symptom severity and alcohol use severity, which we assessed separately for the intention-to-treat populations of people with HIV and people with diabetes cohorts and in a pooled cohort, at 12 months after enrolment. The Benjamini-Hochberg procedure was used to adjust for multiple testing. The trial was prospectively registered with the Pan African Clinical Trials Registry, PACTR201610001825403.
Findings: Between May 1, 2017, and March 31, 2019, 1340 participants were recruited: 457 (34·1%) assigned to the dedicated group, 438 (32·7%) assigned to the designated group, and 445 (33·2%) assigned to the treatment as usual group. 1174 (87·6%) participants completed the 12 month assessment. Compared with treatment as usual, the dedicated group (people with HIV adjusted mean difference -5·02 [95% CI -7·51 to -2·54], p<0·0001; people with diabetes -4·20 [-6·68 to -1·72], p<0·0001) and designated group (people with HIV -6·38 [-8·89 to -3·88], p<0·0001; people with diabetes -4·80 [-7·21 to -2·39], p<0·0001) showed greater improvement on depression scores at 12 months. By contrast, reductions in AUDIT scores were similar across study groups, with no intervention effects noted.
Interpretation: The dedicated and designated approaches to delivering CHW-led psychological interventions were equally effective for reducing depression, but enhancements are required to support alcohol reduction. This trial extends evidence for CHW-delivered psychological interventions, offering insights into how different delivery approaches affect patient outcomes.

22. Lancet 2022;400(10361):1438-80
The Lancet Commission on ending stigma and discrimination in mental health
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It is time to end all forms of stigma and discrimination against people with mental health conditions, for whom there is double jeopardy: the impact of the primary condition and the severe consequences of stigma. Indeed, many people describe stigma as being worse than the condition itself. This Lancet Commission report is the result of a collaboration of more than 50 people worldwide. It brings together evidence and experience of the impact of stigma and discrimination and successful interventions for stigma reduction. We include material that brings alive the voices of people with lived experience of mental health conditions (PWLE). This is right in principle because we agree with the view of nothing about us without us. It is right in practice because the evidence summarised in this report shows that PWLE are the key change agents for stigma reduction. For these reasons, this report has been co-produced by people who have such lived experience and others who do not. Their voices whisper, speak, and shout in the poems, testimonies, and quotations.
Key messages
• Stigma and discrimination contravene basic human rights and have severe, toxic effects on people with mental health conditions that exacerbate marginalisation and social exclusion, for example by

reducing access to mental and physical health care and diminishing educational and employment opportunities
• Our umbrella review of 216 systematic reviews shows that interventions based on the principle of social contact (whether in person, virtual, or indirect) that have been appropriately adapted to different contexts and cultures are the most effective ways to reduce stigmatisation worldwide
• Our evaluation of ten large-scale anti-stigma programmes around the world found that they are most effective when they involve people with lived experience of mental health conditions (PWLE) as co-producers in all aspects of development, when target groups are consulted on programme content and delivery, and when programmes are sustained over the long term
• The media play powerful roles in increasing stigma when they reinforce stereotypes associated with mental health conditions, such as unpredictability or dangerousness, and decreasing stigma when they align with guidelines on responsible reporting, for example of suicide
• In a global, multilanguage survey of PWLE, 391 people responded from 45 countries and territories. Most (≥70%) participants agreed that PWLE should be treated as equal to people with physical health conditions; stigma and discrimination negatively affect most PWLE; the media are an important factor in worsening stigma and discrimination; the media could play a crucial part in reducing stigma and discrimination; and stigma and discrimination can be worse than the impact of the mental health condition itself
• The findings of this Lancet Commission show that PWLE are key agents for change in stigma reduction and need to be strongly supported to lead or co-lead interventions that use social contact
• We propose eight key recommendations for action by international organisations, governments, employers, the health-care and social-care sectors, the media, PWLE, local communities, and civil society, each with a specific target and indicators that may be used to develop a framework for accountability and track progress towards ending mental- health-related stigma and discrimination
Conclusions: Commission guiding principles, goals, recommendations, and call to action
The time to act to eradicate mental-health-related stigma and discrimination is now. Such forms of social exclusion are quite simply no longer acceptable. WHO's Comprehensive Action Plan 2013–30 clearly states, "The vision of the action plan is a world in which mental health is valued, promoted and protected, mental health conditions are prevented and persons affected by these conditions are able to exercise the full range of human rights and to access high quality, culturally-appropriate health care and social care in a timely way to promote recovery, in order to attain the highest possible level of health and participate fully in society and at work, free from stigmatization and discrimination."

Non-communicable diseases

23. BMJ 2022;379:e072385
Research

Global burden of type 2 diabetes in adolescents and young adults, 1990-2019: systematic analysis of the Global Burden of Disease Study 2019

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Objective. To estimate the global burden of type 2 diabetes in adolescents and young adults (aged 15-39 years) from 1990 to 2019.
Design Systematic analysis. Data source Global Burden of Disease Study 2019. Participants aged 15-39 years from 204 countries and territories, 1990-2019.

Main outcomes measures. Age standardised incidence rate, age standardised disability adjusted life years (DALY) rate, and age standardised mortality rate for type 2 diabetes in people aged 15-39 years from 1990 to 2019, and proportional DALY attributable to different risk factors.
Results From 1990 to 2019, significant increases in age standardised incidence rate and age standardised DALY rate were found for type 2 diabetes in adolescents and young adults globally (P<0.001). Age standardised incidence rate (per 100 000 population) increased from 117.22 (95% confidence interval 117.07 to 117.36) in 1990 to 183.36 (183.21 to 183.51) in 2019, and age standardised DALY rate (per 100 000 population) increased from 106.34 (106.20 to 106.48) in 1990 to 149.61 (149.47 to 149.75) in 2019. The age standardised mortality rate (per 100 000 population) was modestly increased from 0.74 (0.72 to 0.75) in 1990 to 0.77 (0.76 to 0.78) in 2019. When grouped by countries with different sociodemographic indexes, countries with a low-middle and middle sociodemographic index had the highest age standardised incidence rate and age standardised DALY rate in 2019, whereas countries with a low sociodemographic index had the lowest age standardised incidence rate but the highest age standardised mortality rate. Women generally had higher mortality and DALY rates than men at ages <30 years, but differences between the sexes were reversed in those aged >30 years except in countries with a low sociodemographic index. The main attributable risk factor for DALY for early onset type 2 diabetes was high body mass index in all regions by sociodemographic index. The proportional contribution of other risk factors varied across regions, however, with higher proportions of ambient particulate air pollution and smoking in countries with a high sociodemographic index and higher proportions of household air pollution from solid fuels and diet low in fruit in countries with a low sociodemographic index.
Conclusions. Early onset type 2 diabetes is a growing global health problem in adolescents and young adults, especially in countries with a low-middle and middle sociodemographic index. A greater disease burden in women aged <30 years was found. Specific measures are needed in countries with different levels of socioeconomic development because of the variable attributable risk factors for type 2 diabetes in adolescents and young adults.

Ophthalmology

24. Thesis
Glaucoma in and out of Africa
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This thesis describes epidemiologic and genetic studies on primary open-angle glaucoma (POAG) in primarily sub-Saharan African, European and Asian populations. In the thesis, I aimed on the one hand to focus on sub-Saharan populations which are at high risk but underrepresented in clinical, epidemiological and genetic research. On the other hand, I aimed to explore novel approaches to study glaucoma endophenotypes. The major goals of our studies were
Chapter 2: to address differences in POAG phenotype in sub-Saharan African populations compared to European populations
Chapter 3: to identify genetic variants associated with POAG in sub-Saharan African populations
Chapter 4: to explore novel approaches to study genetic and phenotypic associations with glaucoma endophenotypes.

Pharmaceuticals

25. TMIH 2022;27(11):942-60
Availability and affordability of essential medicines and diagnostic tests for diabetes mellitus in Africa
Kibirige D et al., Non-communicable Diseases Program, Medical Research Council/Uganda Virus Research Institute and London School of Hygiene and Tropical Medicine Uganda Research Unit, Entebbe, Uganda

Objective: To investigate the current status of the availability and affordability of specific essential medicines and diagnostics for diabetes in Africa.
Methods: Systematic review and meta-analysis. Studies conducted in Africa that reported any information on the availability and affordability of short-acting, intermediate-acting, and premixed insulin, glibenclamide, metformin, blood glucose, glycated haemoglobin or HbA1c, and lipid profile tests were included. Random-effect model meta-analysis and descriptive statistics were performed to determine the pooled availability and affordability, respectively.
Results: A total of 21 studies were included. The pooled availability of each drug was as follows: short-acting insulin 33.5% (95% CI: 17.8%-49.2%, I2 = 95.02%), intermediate-acting insulin 23.1% (95% CI: 6.3%-39.9%, I2 = 91.6%), premixed insulin 49.4% (95% CI: 24.9%-73.9%, I2 = 90.57%), glibenclamide 55.9% (95% CI: 43.8%-68.0%, I2 = 96.7%), and metformin 47.0% (95% CI: 34.6%-59.4%, I2 = 97.54%). Regarding diagnostic tests, for glucometers the pooled availability was 49.5% (95% CI: 37.9%-61.1%, I2 = 97.43%), for HbA1c 24.6% (95% CI: 3.1%-46.1%, I2 = 91.64), and for lipid profile tests 35.7% (95% CI: 19.4%-51.9%, I2 = 83.77%). The median (IQR) affordability in days' wages was 7 (4.7-7.5) for short-acting insulin, 4.4 (3.9-4.9) for intermediate-acting insulin, 7.1 (5.8-16.7) for premixed insulin, 0.7 (0.7-0.7) for glibenclamide, and 2.1 (1.8-2.8) for metformin.
Conclusion: The availability of the five essential medicines and three diagnostic tests for diabetes in Africa is suboptimal. The relatively high cost of insulin, HbA1c, and lipid profile tests is a significant barrier to optimal diabetes care. Pragmatic country-specific strategies are urgently needed to address these inequities in access and cost.

26. TMIH 2023;28(1):53-63
Access to opioid analgesics for medical use at hospital level in the Democratic Republic of Congo: An exploratory mixed-method study
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Objective: To investigate the availability of and access to opioid analgesics at hospital level in the Democratic Republic of Congo.
Methods: Exploratory mixed-method study combining a descriptive survey of the availability of opioid analgesics at hospital pharmacies with a qualitative survey that explored the experiences and perceptions of healthcare workers, managers, patients and caregivers, by means of a short questionnaire and of semi-structured interviews. The study was conducted in a convenience sample of 12 hospitals, located in five different provinces, in 2021.
Results: The quality and completeness of stock data for opioid analgesics were generally poor. Stock-outs were frequent. Only five hospital pharmacies had records on prescriptions of opioids in 2020. In-patients and caregivers indicated they generally must purchase opioids out-of-pocket, sometimes far from the place of residence. Doctors and nurses confirmed that prescribed opioids are often unavailable at the hospital pharmacy. Furthermore, they suggested an important need of training in

pain management with opioids, and of effective regulation to ensure opioid availability. Pharmacists and managers recognised important weaknesses in the processes of needs quantification, stock management, planning and supply.
Conclusions: Our exploratory study suggests the need of a complex set of coordinated actions to be undertaken by all relevant actors in DRC to correct the poor practices in opioids' management and to improve opioids' availability, affordability and adequate use. This will require a change of mindset to overcome the neglect of the health needs of persons with acute and chronic pain.

Public Health

27. Am J TMH 2022;107(6):1162-5
Toward a New Paradigm of North-South and South-South Partnerships for Pandemic Preparedness: Lessons Learned from COVID-19 and Other Outbreaks
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COVID-19 underscores the need to reimagine North-South partnerships and redefine best practices for building public health and research capacity to address emergent health threats and pandemic preparedness in low- and-middle income countries (LMICs). Historically, outbreak and emergency responses have failed to ensure that the Global South has the autonomy and capacity to respond to public health threats in a timely and equitable manner. The COVID-19 response, however, has demonstrated that innovations and solutions in the Global South can not only fill resource and capacity gaps in LMICs but can also provide solutions to challenges globally. These innovations offer valuable lessons about strengthening local manufacturing capacity to produce essential diagnostic, treatment, and prevention tools; implementing high-quality research studies; expanding laboratory and research capacity; and promoting effective cooperation and governance. We discuss specific examples of capacity-building from Rwanda, South Africa, and Senegal. To fulfill promises made to the Global South during the COVID-19 pandemic, restore and resume health service delivery, and effectively prevent and respond to the next health threat, we need to prioritize equitable access to local manufacturing of basic health tools while building health systems capacities in the Global South.

28. Lancet 2022;400(10359):1224–80
The Lancet Commission on lessons for the future from the COVID-19 pandemic
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Key findings
• The proximal origin of SARS-CoV-2 remains unknown. There are two leading hypotheses: that the virus emerged as a zoonotic spillover from wildlife or a farm animal, possibly through a wet market, in a location that is still undetermined; or that the virus emerged from a research- related incident, during the field collection of viruses or through a laboratory-associated escape. Commissioners held diverse views about the relative probabilities of the two explanations, and both possibilities require further scientific investigation. Identification of the origin of the virus will help to prevent future pandemics and strengthen public trust in science and public authorities.
• WHO acted too cautiously and too slowly on several important matters: to warn about the human transmissibility of the virus, to declare a Public Health Emergency of International Concern, to support

international travel protocols designed to slow the spread of the virus, to endorse the public use of face masks as protective gear, and to recognise the airborne transmission of the virus.

• As the outbreak became known globally in early January, 2020, most governments around the world were too slow to acknowledge its importance and act with urgency in response. It was mainly the countries in WHO's Western Pacific region, primed by their experience with severe acute respiratory syndrome, that reacted with urgency to the outbreak, and that generally pursued a suppression strategy that led to low cumulative mortality, although the omicron variant (B.1.1.529) has been undoing some of these gains.

• Coordination among governments was inadequate on policies to contain the pandemic, including travel protocols to slow the global transmission of the virus, testing strategies, public health and social measures, commodity supply chains, data standards and reporting systems, and advice to the public, despite the very high interdependence among countries.

• Epidemic control was seriously hindered by substantial public opposition to routine public health and social measures, such as the wearing of properly fitting face masks and getting vaccinated. This opposition reflects a lack of social trust, low confidence in government advice, inconsistency of government advice, low health literacy, lack of sufficient behavioural-change interventions, and extensive misinformation and disinformation campaigns on social media. Public policies have also failed to draw upon the behavioural and social sciences; doing so would have led to more successful implementation of public health interventions and helped to increase social trust, prosociality, equity, and wellbeing. In many cases, policies and decision making have not been informed by robust and continuously updated evidence syntheses.

• Public policies did not properly address the profoundly unequal effects of the pandemic. Heavily burdened groups include essential workers, who are already disproportionately concentrated in more vulnerable minority and low-income communities; children; women, who face employment, safety, and income losses, exacerbated by the adverse consequences of school closures; people living in congregate settings, such as prisons or care homes, especially for older populations; people living with chronic conditions and disability; Indigenous Peoples; migrants, refugees, and displaced populations; people without access to quality and affordable health care; and people who face the burdens of long COVID.

• Among high-income countries, those with strong and resilient national health systems—including public health systems that complement clinical health care—have generally fared better at addressing COVID-19 and maintaining non-pandemic-related health services. In low- income and middle-income countries (LMICs), where health systems tend to be under-resourced and fragmented, better outcomes were seen when previous experiences with outbreaks and epidemics were built upon, and when community-based resources—notably community health workers—were used to support screening and contact- tracing capacity and trust-building within communities.

• Rapid development of multiple vaccines has been a triumph of the research and development system and the result of long-standing public and private investment and cooperation. However, the lack of a multilateral and coordinated approach by governments to manage intellectual property rights, technology transfer, international financing, the allocation of vaccines from multinational pharmaceutical companies, and the support for vaccine production in LMICs for use in those countries, has come at a great cost in terms of inequitable access to vaccines.

• Economic recovery depends on sustaining high rates of vaccination coverage and low rates of new, clinically significant COVID-19 infections, and on fiscal and monetary policies to mitigate the socioeconomic effects of the pandemic and prevent a financial crisis. Emergency global financing from

the International Monetary Fund, the World Bank, and regional development banks had a salutary role, although much larger financial flows from high-income to low-income regions were warranted.
• The sustainable development process has been set back by several years, with a deep underfinancing of investments needed to achieve the Sustainable Development Goals (SDGs) and the aims of the Paris Climate Agreement. In most countries, the pandemic diverted resources and policy attention away from longer-term goals, thereby reversing progress towards the SDGs in many countries.

29. Lancet 2022;400(10361):1481–86
Has traditional medicine had its day? The need to redefine academic medicine
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The field of medicine has traditionally focused on care for individual patients, with emphasis on disease treatment and less focus on disease deterrence and the socioeconomic and behavioural factors that impact health and wellbeing. Over the years, this model has served patient care well. However, the most pressing issues facing health and health care today—including non-communicable diseases (NCDs), an ageing global population, and complex, systemic barriers to health equity—are not easily solved with an individual patient approach. Infectious diseases outbreaks such as COVID-19 present similar challenges, in that effective response and preparedness all require population-level management in addition to direct clinical care. This combination of strategies is made difficult by the continued fragmentation of the traditional medical system and a lack of a strong relationship with community public health infrastructure.
The practice of traditional medicine is rooted in the bench-to-bedside model of academic medicine that is responsible for today's education, research, and approach to medical care. To meet current needs of health and health care, medicine will require more health workers who are community and population health oriented and digitally competent; whose work integrates social, behavioural, data, and other sciences; and who are socially responsible. To modernise traditional medicine to be fit for today's purpose will require a re-examination of the current approach of academic medicine.
Conclusion
The title of this paper asks the question, has traditional medicine had its day? The answer is a strong no. Over the years, the medical model has served patients well. Our society needs the dedicated practitioners of medicine to provide direct compassionate patient care and retain the important attributes of traditional medicine. However, to address the increasing challenges in health in the current era, traditional medicine must evolve to meet the demands of our time. Medicine must extend from the traditional individual patient-disease focus to promote prevention and alignment with public health and social needs. The foundation of traditional medicine is rooted in the education, research, and practice of academic medicine. To change traditional medicine, it is necessary to redefine academic medicine. Over the past decade, academic medicine has faced rapid, dramatic changes, including the impact of a global pandemic. Given the complex, systematic challenges facing global health care
today, there is a need to transition away from the bench- to-bedside model to an approach that more accurately reflects the need for attention to social determinants of health, healthy equity, and broad population-level needs: the bench-to-bedside-to-population-to-society model.
Reimagining of academic medicine and the traditional AHSC will only be able to occur with a close partnership between patient care and public health, seeking increased integration to achieve

population health. It should be supported by the adoption of convergence science and practice, data integration, improved community engagement, and equity-oriented action. The new model will produce clinicians who are community-oriented, socially connected, and capable of using data and digital technology effectively. With these key principles in mind, we are hopeful that medicine will evolve to meet the major health-care challenges of our time.

30. Lancet 2022;400(10368):2095–96
Series
Racism, Xenophobia, Discrimination, and Health
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This Series has four main aims.
First, we aim to build on the work of others to reinforce the importance of viewing racism, xenophobia, and discrimination as public health priorities that all health professionals should consider. Racism and xenophobia are fundamental in the determination of health and must be included alongside other upstream factors such as political, economic, and environmental variables.
Second, we address discrimination against minoritised populations due to the multiple and inter-related identities of caste, colour, ethnicity, race, indigeneity, migratory status, and religion.
Third, we situate racism, xenophobia, and discrimination as global health issues. These issues are a part of every society and manifest transnationally, although the forms of discrimination and the persecuted groups differ.
Finally, we emphasise the structural nature of racism and other forms of discrimination. Policies that appear racially neutral and non-discriminatory might still disproportionately affect minoritised groups in a negative way.
To address these aims, this Series consists of four papers based around our conceptual framework. The first paper proposes contemporary definitions and introduces our conceptual model, before examining the underlying reasons why discrimination exists. The precursors to discrimination are the two core structural processes of separation—individuals seeing themselves as different from others, which contributes to the othering of different groups and hierarchical power. We focus on what happens at a structural level and include discussions of law, power, and populism, with historical examples that provide an appreciation of the durability of racist beliefs and structures that undergird social organisation and, by extension, affect health. We confront the legacy of science and epistemic injustice that have preserved the power hierarchies among different groups, and we highlight the extent to which colonial history has relied on racist ideologies.
The second paper challenges the inevitability associated with increased mortality and morbidity associated with particular minoritised groups and explores the role of discrimination in determining these risks. This paper describes the mental and physical health consequences of racism, xenophobia, and discrimination, taking into account their association with myriad other health determinants. We reveal the complex pathways that link racism and xenophobia to ill health (acting both independently and mediated by other social determinants), which can also vicariously lead to poorer health in others.1 Discrimination affects health via biological pathways— including neuroendocrine and stress responses— throughout the life course, and can have intergenerational consequences via changes in maternal mental health, parenting, and epigenetic changes.3–7

The third paper uses an intersectional lens to analyse case studies from different global locations. Inter- sectionality is a framework recognising that individuals and their lives are complex and should not be reduced to a unidimensional analysis.8 Understanding the effects of racism and xenophobia on health requires us to look at overlapping systems of oppression and their discriminatory social and structural processes in their entirety. For example, other forms of oppression based on age, gender, abilities and disabilities, and socio- economic status can exacerbate or mitigate experiences of discrimination.
Finally, in the fourth paper, we summarise interventions to address the spectrum of drivers of adverse health outcomes with a focus on the structural, societal, legal, human rights, institutional, and system levels. Building on the first three papers, we discuss the limitations of existing evidence for individual action, discuss research recommendations, and propose key approaches for moving forward.
Health professionals must seize the opportunity to engage with and tackle the pervasive forces of racism, xenophobia, and discrimination. This action might be at an individual level supporting their patients or advocating national and international policy change. Understanding and challenging racism, xenophobia, and discrimination, and the structural violence they have caused, is central to public health and the promotion of social equity.
Articles:

- Racism, xenophobia, discrimination, and the determination of health
- Racism, xenophobia, and discrimination: mapping pathways to health outcomes
- Intersectional insights into racism and health: not just a question of identity
- Confronting the consequences of racism, xenophobia, and discrimination on health and health-care systems

Sexual and Reproductive Health

31. BMJ 2022;379:o2691
Editorial
Accurate surveillance of maternal deaths is an international priority
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Variations in maternal mortality remain one of the starkest health injustices in the world.
Any death related to pregnancy is devasting. Equally shocking are the avoidable discrepancies in worldwide maternal mortality. Some of the longest audits in the world (since 1952) relate to tracking the causes of maternal death in the United Kingdom, and lessons learnt have been effective in reducing mortality. As deaths have become rarer, lessons from individual tragedies continue to guide clinicians' actions.
Differences in some countries may have been related to lack of data linkage owing to national privacy laws. Quality of maternal mortality data was linked to the presence or absence of dedicated government funding for data collection and analysis. Such funding should be considered by countries that are currently without it.
The relatively low maternal mortality ratios identified in this study are striking compared with those recorded globally, with many countries still reporting more than 500 maternal deaths per 100000 live births, despite focused efforts. The overwhelming majority (99%) of preventable maternal deaths occur in low and middle income countries. Although women born abroad or from a minoritised ethnicity were 50% more likely to die in this European cohort, the discrepancy with maternal mortality

rates elsewhere is revealing. A woman's lifetime risk of maternal death is defined as the probability that a 15 year old woman will eventually die from a maternal cause. In high resourced areas, lifetime risk is 1 in 5400, but the risk is more than 100 times higher for the same woman born in a low or middle income setting.
Causes of death are relatively consistent across the world, and largely avoidable. Most deaths are due to haemorrhage, sepsis, and hypertensive disorders of pregnancy. Interventions to prevent these deaths are effective and relatively affordable; strategies must include recognition, training, and access to care that is adequately resourced and staffed.
Deaths from pre-eclampsia are particularly avoidable, even in low income settings. Prospectively collected urban data show an eightfold difference in maternal mortality between Zambia and Sierra Leone, where women are 2000 times more likely to die from pre-eclampsia than women in the UK. As one in five babies die in utero in women with pre-eclampsia, timely delivery also has the potential to save many babies lives. Extending accurate collection of maternal mortality data around the world to expose these issues must be a priority for the future.

32. BMJ 2022;379:o2733
Feature Reproductive Rights
Abortion in India: legal, but not a woman's right
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On the surface, India has one of the world's highest abortion rates and most progressive abortion laws, but this hides a tangle of issues that prevent many women from accessing safe abortion. Geetanjali Krishna reports
"I wanted to be sterilised when my second set of twins was born," says Maina Devi. "But my family said that life in our village is too uncertain for such things."
Devi is a 25 year old farmer from Jamunipur, a hamlet in the northern Indian state of Uttar Pradesh, who has two sets of twins under 5 years of age. Her husband refuses to use contraception. She's not aware that, during her second pregnancy, she could have opted for abortion on the grounds of contraceptive failure. All she does now is pray that she doesn't get pregnant again.
About 885 miles south, Anusha Pilli, a Hyderabad based medic and public health professional, is struck by the lack of awareness about abortion in the city, even among middle class college graduates. "Few of them know about medical abortion drugs available to them, or about the gestation period up to which abortion is legally allowed in India," she says. "It's hard to imagine that Indian law has legally allowed abortion for over 50 years—and still women have not felt empowered by it."
On International Safe Abortion Day on 28 September 2022, the Supreme Court of India extended the right to legal abortion to 20 weeks' gestation for all women and to 24 weeks' gestation under special circumstances. With this change, India's Medical Termination of Pregnancy Act 1971—one of the older abortion laws in the world—also became one of the more progressive.

33. Bull WHO 2023;101(1):2–2A
Editorial
Improving policy, financing and delivery of postnatal care services
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Postnatal care has long been neglected within the essential package of services across the continuum of reproductive, maternal, newborn and child health. Yet, the highest burden of mortality and morbidity for mothers and infants occurs within the postnatal period and is largely preventable with access to high-quality and timely care. Increasing coverage of postnatal care for vulnerable populations is needed, including adolescent mothers, refugee families and other disadvantaged groups.

The postnatal period (6 weeks after childbirth) is a vital opportunity to improve maternal and newborn health through supporting healthy behaviours, facilitating breastfeeding, counselling about family planning options, and preventing and treating subsequent maternal complications and neonatal health issues. This period is also an opportunity to initiate early childhood development interventions, thus stimulating integration of care along the continuum of essential reproductive, maternal, newborn, child and adolescent health services.

Despite these facts, estimates of postnatal care coverage across 66 low- and middle-income countries show that over 15% of mothers and infants still do not receive any postnatal care. The COVID-19 pandemic response has exacerbated poor coverage. As of July 2022, sustained disruptions to postnatal care continue, with only 46 out of 84 countries assessed delivering essential postnatal care services at a pre-pandemic level.

The World Health Organization has recently updated its recommendations on maternal and newborn care for a positive postnatal experience, providing the latest guidance on evidence-based interventions to inform policy and practice. The guidelines support recommendations that place women and newborns at the centre of care, including health workforce interventions such as task-sharing and midwifery-led continuity of care models.

Unfortunately, postnatal care is largely undervalued by communities and often perceived as a low priority for health professionals; these perceptions negatively influence the uptake and coverage of care. Among various solutions, antenatal care contacts provide a strategic opportunity to promote the value and importance of care following childbirth.

Now is the time to raise the bar on policy, financing and service delivery for essential postnatal care services. These efforts will be critical to accelerate progress and achieve the sustainable development goals related to maternal and newborn health by 2030.

34. Plos Med 2022;19(9):e1004096

Perspective: New research on the global prevalence of female genital mutilation/cutting: Research, clinical, and policy implications

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Female genital mutilation or cutting (FGM/C) involves the partial or total removal of external female genitalia including other injuries to the female genital organs for nonmedical reasons. The practice is considered a violation of a child’s human right to bodily integrity, a form of gender-based violence (GBV), and can result in severe health complications resulting in significant healthcare costs. The United Nations Sustainable Development Goal (SDG) 5.3 calls for an end to the practice; however, one of the challenges in charting progress relates to establishing accurate baseline prevalence data within countries and regions.

In a recently published PLOS Medicine article, Farouki and colleagues present a global systematic review estimating the prevalence of FGM/C among women and girls. The review includes 397,683

women across 28 countries, and 283,437 girls across 23 countries. Farouki and colleagues derive a global estimate of approximately 100 million women and girls affected, which is on the lower bound of previously published estimates, which range between 100 and 200 million. This may be because some previous estimates included household-level prevalence studies that may not be nationally representative. The most common type of FGM/C among women was "flesh removed" (Type I or II) in 19 countries, and "not sewn closed" (Type I, II, or IV) among girls in 9 countries. The overall pooled prevalence of FGM/C among women aged 15 to 49 years was 38.3% (95% CI: 20.8% to 59.5%; PI: 0.48% to 98.8%) and 7.25% (95% CI: 3.1% to 16.0%; PI: 0.1% to 88.9%) among girls aged 0 to14 years. The prevalence among 0- to 14-year-old girls is likely underreported as they are still at risk at the point of surveying. Regardless, these data and others suggest the practice is less common in younger generations perhaps due to changing attitudes within communities in high-prevalence countries. While FGM/C decreased for women and girls in 23 and 25 countries, respectively, some increases were reported in countries including Somalia, Burkina Faso, and Guinea-Bissau.
The data implore us to work with local communities to determine effective prevention strategies, particularly in countries with persistently high prevalence including Somalia and Egypt, and to learn from countries such as Ethiopia where prevalence appears to be falling. It is not possible to attribute the decline in Ethiopia to an individual approach, but evaluations of previous strategies stress the importance of multisectoral engagement rather than isolated programmes. Strategies implemented include community conversations involving local faith leaders and policy and legal reform prohibiting FGM. When planning future interventions, it is important to focus on the rights-based narrative of the child, including the importance of early education campaigns exploring gender equity and FGM. Strategies coproduced with local communities are likely to be more effective than "anti-FGM/C" campaigns focussing on harm reduction. FGM/C is a deeply embedded social norm, and success in reducing prevalence is often associated with grassroots community initiatives. Effective examples include locally cocreated media and radio campaigns in Kenya and community engagement on the importance of formal education of women and girls in Ethiopia. It should be noted that legal protection against FGM/C exists in most countries, and legislation may serve as deterrent in countries with a low prevalence of FGM/C owing to little societal support but will likely be ineffective in countries with a high prevalence as law enforcement officials may disregard legal consequences if the practice has societal value. There is also a call to widen our gaze, recognising SDG 5 calls for an end to GBV and improving health equality for women and girls. We must consider how the prevalence of FGM/C relates to other forms of GBV, low levels of female education, and child marriage to work to ensure emancipation for women and girls across the world.
Article:
The global prevalence of female genital mutilation/cutting: A systematic review and meta-analysis of national, regional, facility, and school-based studies.

35. TMIH 2022;27(11):970-80
Menstrual hygiene management inequalities among school girls in Badagry, Nigeria
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Objectives: The study assessed menstrual hygiene management (MHM) inequalities among public and private in-school adolescents in Badagry, southwest Nigeria. Also assessed was the impact of available water, sanitation and hygiene (WASH) facilities on MHM within the school premises.

Methods: For this descriptive cross-sectional study, 420 students were selected via multi-stage sampling and data were obtained via a validated semi-structured questionnaire and observational checklist. Data were analysed at 95% confidence limit.
Results: The students had a mean age of 15.3 ± 1.6 years. All the private schools had functioning WASH facilities whereas only 50% of public schools did. The toilet to student ratios for the private and public schools were 1:155 and 1:296, respectively. Over two-thirds (67.1%) of the students reportedly use sanitary napkins for MHM, followed by tissue (17.1%) and clothes (15.5%). Additionally, the private school students were two times less likely to use alternatives to sanitary napkins and 9.8 times more likely to obtain sanitary materials at school if required ($p < 0.001$). A significantly higher proportion of public-school menstruating in-school adolescents changed their sanitary towels in the bush ($p = 0.003$) due to lack of privacy and took their used sanitary materials home ($p < 0.001$) for management due to reduced access to sanitary bins.
Conclusion: Even though the situation in the public schools was worse, both public and private schools lack the enabling environment for MHM. School health promotion interventions, such as provision of subsidised/affordable menstrual pads and basic WASH facilities and campaigns to break the culture of silence are required for the wellbeing of girls.