

International Health Alerts 2016-4 Contents

Child Health

1. [Bull WHO 2016;94:752–758](#)
Neonatal mortality within 24 hours of birth in six low- and lower-middle-income countries
2. [Bull WHO 2016;94\(11\):794-805B](#)
Inequalities in full immunization coverage: trends in low- and middle-income countries
3. [Lancet 2016 Oct 3. pii: S0140-6736\(16\)31389-7](#)
Early childhood development coming of age: science through the life course
4. [Lancet 2016 Oct 3. pii: S0140-6736\(16\)31390-3](#)
Nurturing care: promoting early childhood development
5. [Lancet 2016 Oct 3. pii: S0140-6736\(16\)31698-1](#)
Investing in the foundation of sustainable development: pathways to scale up for early childhood development
6. [Lancet 2016 Nov 9. pii: S0140-6736\(16\)31593-8](#)
Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals
7. [PLoS Med 2016;13\(11\): e1002164](#)
Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional, and Country Levels

Communicable Diseases

8. [AmJTMH 2016 Oct 5;95\(4\):902-907](#)
Seroprevalence of Hepatitis B Infection in Nigeria: A National Survey
9. [NEJM 375:11: 1081 – 1089](#)
Special Report: Twenty Years of Global Surveillance of Antituberculosis-Drug Resistance
10. [TMIH 2016;21\(9\):1181-90](#)

Tuberculosis and non-tuberculous mycobacteria among HIV-infected individuals in Ghana

11. [TMIH 2016;21\(9\):1191-6](#)
Clinical outcomes of Ghanaian Buruli ulcer patients who defaulted from antimicrobial therapy

Global Burden of Diseases

12. [Lancet 388, 10049, 10–16 Sept 2016, 1081–1088](#)
The global burden of viral hepatitis from 1990 to 2013: findings from the Global Burden of Disease Study 2013
13. [Lancet 388, 10049, 10–16 Sept 2016, 1089–1102](#)
Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees
14. [Lancet 388, 10053, 8–14 Oct 2016, 1459–1544](#)
Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015
15. [Lancet 388, 10053, 8–14 Oct 2016, 1545–1602](#)
Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015
16. [Lancet 388, 10053, 8–14 Oct 2016, 1603–1658](#)
Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015
17. [Lancet 388, 10053, 8–14 Oct 2016, 1659–1724](#)
Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015
18. [Lancet 388, 10053, 8–14 Oct 2016, 1725–1774](#)
Global, regional, national, and selected subnational levels of

stillbirths, neonatal, infant, and under-5 mortality, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015

19. [Lancet 388, 10053, 8–14 Oct 2016, 1775–1812](#)
Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015
20. [Lancet 388, 10053, 8–14 Oct 2016, Pages 1813–1850](#)
Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015

Health Policy

21. [Lancet 2016 Sep 14. pii: S0140-6736\(16\)30171-4](#)
Neglected tropical diseases: progress towards addressing the chronic pandemic
22. [NEJM 375;6: 587 – 596](#)
Special Report: After Ebola in West Africa — Unpredictable Risks, Preventable Epidemics
23. [HPP 31, 2016\(7\): 834–843](#)
Attributes of patient-centered primary care associated with the public perception of good healthcare quality in Brazil, Colombia, Mexico and El Salvador
24. [HPP 31, 2016\(7\): 868–877](#)
Motivating health workers up to a limit: partial effects of performance-based financing on working environments in Nigeria
25. [HPP 31, 2016\(Suppl.2\): ii1–ii2](#)
Commentary—District decision-making to strengthen maternal, newborn and child health services in low-income settings
26. [HPP 31, 2016\(8\): 1010–1019](#)
Sources, determinants and utilization of health workers' revenues: evidence from Sierra Leone
27. [HPP 31, 2016\(8\): 1100–1106](#)
Indicators for routine monitoring of effective mental healthcare coverage in low- and middle-income settings: a Delphi study
28. [HPP 31, 2016\(9\): 1297–1309](#)
Opening the 'black box' of performance-based financing in low-

and lower middle-income countries: a review of the literature

29. [HPP 31, 2016\(9\): 1143–1151](#)

Investigating the remuneration of health workers in the DR Congo: implications for the health workforce and the health system in a fragile setting

30. [HPP 31, 2016\(9\): 1152–1161](#)

The impact of delays on maternal and neonatal outcomes in Ugandan public health facilities: the role of absenteeism

31. [HPP 31, 2016\(9\): 1184–1192](#)

The effect of user fee exemption on the utilization of maternal health care at mission health facilities in Malawi

HIV – Aids

32. [TMIH 2016;21\(9\):1115-23](#)

Adherence clubs for long-term provision of antiretroviral therapy: cost-effectiveness and access analysis from Khayelitsha, South Africa

33. [TMIH 2016;21\(9\):1124-30](#)

Stable patients and patients with advanced disease: consensus definitions to support sustained scale up of antiretroviral therapy

Malaria

34. [AmJTMH 2016 Sep 7;95\(3\):588-94. 3.5 Series](#)

National Malaria Prevalence in Cambodia: Microscopy Versus Polymerase Chain Reaction Estimates

35. [2016 Oct 31. pii: 16-0598. \[Epub ahead of print\] 3.5](#)

Referral Patterns of Community Health Workers Diagnosing and Treating Malaria: Cluster-Randomized Trials in Two Areas of High- and Low-Malaria Transmission in Southwestern Uganda

36. [AmJTMH 2016 Oct 31. pii: 16-0160](#)

Implications of Plasmodium vivax Biology for Control, Elimination, and Research

37. [Lancet 2016 Sep 17;388\(10050\):1193-201](#)

The effect of mass mosquito trapping on malaria transmission and disease burden (SolarMal): a stepped-wedge cluster-randomised trial

Non communicable diseases

38. [BMJ 2016;355:i5923](#)

Developing a vaccine against Zika

39. [Lancet 2016 Oct 24. pii: S0140-6736\(16\)31660-9](#)

The heart of Africa: succeeding against the odds.

40. [Lancet 2016 Nov 15. pii: S0140-6736\(16\)31919-5](#)

Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19·1 million participants

41. [TMIH 2016;21\(9\):1099-105](#)

Infant oral mutilation in East Africa - therapeutic and ritual grounds

Public Health

42. [AmJTMH 2016 Nov 7. pii: 15-0910](#)

Combining Footwear with Public Health Iconography to Prevent Soil-Transmitted Helminth Infections.

43. [Lancet 2016 Sep 24;388\(10051\):1337-48](#)

Scaling up physical activity interventions worldwide: stepping up to larger and smarter approaches to get people moving

44. [Lancet 2016 Sep 24;388\(10051\):1311-2](#)

The economic burden of physical inactivity: a global analysis of major non-communicable diseases.

45. [Lancet 2016 Oct 15;388\(10054\):1939-1951](#)

Impact of air pollution on the burden of chronic respiratory diseases in China: time for urgent action

46. [Lancet 2016 Oct 12. pii: S0140-6736\(16\)31650-6](#)

The history, geography, and sociology of slums and the health problems of people who live in slums

47. [Lancet 2016 Oct 12. pii: S0140-6736\(16\)31848-7](#)

Improving the health and welfare of people who live in slums

48. [Lancet 2016 Nov 11. pii: S0140-6736\(16\)32124-9](#)

The Lancet Countdown: tracking progress on health and climate change

Sexual Reproductive Health

49. [BMJ 2016;355:i5662 Research](#)

International standards for symphysis-fundal height based on serial measurements from the Fetal Growth Longitudinal Study of the INTERGROWTH-21st Project: prospective cohort study in eight countries

50. [Lancet 2016 Nov 1. pii: S0140-6736\(16\)31392-7](#)

The global burden of women's cancers: a grand challenge in global health

51. [Lancet 2016 Sep 14. pii: S0140-6736\(16\)31533-1](#)

Diversity and divergence: the dynamic burden of poor maternal health. (First article in series on maternal health.)

52. [Lancet 2016 Sep 14. pii: S0140-6736\(16\)31533-1](#)

Diversity and divergence: the dynamic burden of poor maternal health

53. [Lancet 2016 Sep 14. pii: S0140-6736\(16\)31528-8](#)

The scale, scope, coverage, and capability of childbirth care

54. [Lancet 388, 10057, 5–11 Nov 2016, 2296–2306](#)

Next generation maternal health: external shocks and health-system innovations

55. [Lancet 388, 10057, 5–11 Nov 2016, 2307–2320](#)

Quality maternity care for every woman, everywhere: a call to action

56. [TMIH 2016 Sep;21\(9\):1138-46](#)

Evaluation of syndromic management guidelines for treatment of sexually transmitted infections in South African women

57. [TMIH 2016 Oct;21\(10\):1209-1239](#)

Actual and predicted prevalence of alcohol consumption during pregnancy in the WHO African Region

58. [TMIH 2016 Nov;21\(11\):1348-1365](#)

Pregnancy and childbirth after repair of obstetric fistula in sub-Saharan Africa: Scoping Review

Child Health

1. [Bull World Health Organ 2016;94:752–758](#)

Neonatal mortality within 24 hours of birth in six low- and lower-middle-income countries

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Objective To estimate neonatal mortality, particularly within 24 hours of birth, in six low- and lower-middle-income countries.

Methods We analysed epidemiological data on a total of 149 570 live births collected between 2007 and 2013 in six prospective randomized trials and a cohort study from predominantly rural areas of Bangladesh, Ghana, India, Pakistan, the United Republic of Tanzania and Zambia. The neonatal mortality rate and mortality within 24 hours of birth were estimated for all countries and mortality within 6 hours was estimated for four countries with available data. The findings were compared with published model-based estimates of neonatal mortality.

Findings Overall, the neonatal mortality rate observed at study sites in the six countries was 30.5 per 1000 live births (range: 13.6 in Zambia to 47.4 in Pakistan). Mortality within 24 hours was 14.1 per 1000 live births overall (range: 5.1 in Zambia to 20.1 in India) and 46.3% of all neonatal deaths occurred within 24 hours (range: 36.2% in Pakistan to 65.5% in the United Republic of Tanzania). Mortality in the first 6 hours was 8.3 per 1000 live births, i.e. 31.9% of neonatal mortality.

Conclusion Neonatal mortality within 24 hours of birth in predominantly rural areas of six low- and lower-middle-income countries was higher than model-based estimates for these countries. A little under half of all neonatal deaths occurred within 24 hours of birth and around one third occurred within 6 hours. Implementation of high-quality, effective obstetric and early newborn care should be a priority in these settings.

2. [Bull World Health Organ 2016;94\(11\):794-805B](#)

Inequalities in full immunization coverage: trends in low- and middle-income countries

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Objective: To investigate disparities in full immunization coverage across and within 86 low- and middle-income countries.

Methods: In May 2015, using data from the most recent Demographic and Health Surveys and Multiple Indicator Cluster Surveys, we investigated inequalities in full immunization coverage - i.e. one dose of bacille Calmette-Guérin vaccine, one dose of measles vaccine, three doses of vaccine against diphtheria, pertussis and tetanus and three doses of polio vaccine - in 86 low- or middle-income countries. We then investigated temporal trends in the level and inequality of such coverage in eight of the countries.

Findings: In each of the World Health Organization's regions, it appeared that about 56-69% of eligible children in the low- and middle-income countries had received full immunization. However, within each region, the mean recorded level of such coverage varied greatly. In the African Region, for example, it varied from 11.4% in Chad to 90.3% in Rwanda. We detected pro-rich inequality in such coverage in 45 of the 83 countries for which the relevant data were available and pro-urban inequality in 35 of the 86 study countries. Among the countries in which we investigated coverage trends, Madagascar and Mozambique appeared to have made the greatest progress in improving levels of full immunization coverage over the last two decades, particularly among the poorest quintiles of their populations.

Conclusion: Most low- and middle-income countries are affected by pro-rich and pro-urban inequalities in full immunization coverage that are not apparent when only national mean values of such coverage are reported.

3. [Lancet 2016 Oct 3. pii: S0140-6736\(16\)31389-7](#)

Early childhood development coming of age: science through the life course

(First article in series on early childhood development)

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Early childhood development programmes vary in coordination and quality, with inadequate and inequitable access, especially for children younger than 3 years. New estimates, based on proxy measures of stunting and poverty, indicate that 250 million children (43%) younger than 5 years in low-income and middle-income countries are at risk of not reaching their developmental potential. There is therefore an urgent need to increase multisectoral coverage of quality programming that incorporates health, nutrition, security and safety, responsive caregiving, and early learning. Equitable early childhood policies and programmes are crucial for meeting Sustainable Development Goals, and for children to develop the intellectual skills, creativity, and wellbeing required to become healthy and productive adults. In this paper, the first in a three part Series on early childhood development, we examine recent scientific progress and global commitments to early childhood development. Research, programmes, and policies have advanced substantially since 2000, with new neuroscientific evidence linking early adversity and nurturing care with brain development and function throughout the life course.

4. **Lancet 2016 Oct 3. pii: S0140-6736(16)31390-3**

Nurturing care: promoting early childhood development

(Second article in series on early childhood development)

Britto PR et al Early Childhood Development Series Steering Committee. UNICEF.
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5. **Lancet 2016 Oct 3. pii: S0140-6736(16)31698-1**

Investing in the foundation of sustainable development: pathways to scale up for early childhood development

(Third article in series on early childhood development)

Richter LM et al Lancet Early Childhood Development Series Steering Committee

See also:

- Lancet 2016 Oct 4. pii: S0140-6736(16)31659-2

Early childhood development: the foundation of sustainable development.

Daelmans B et al Lancet Early Childhood Development Series Steering Committee. WHO,
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- Lancet 2016 Oct 3. pii: S0140-6736(16)31700-7

Good early development-the right of every child.

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- Lancet 2016 Oct 3. pii: S0140-6736(16)31702-0.

Expanding the evidence base to drive more productive early childhood investment.

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6. **Lancet 2016 Nov 9. pii: S0140-6736(16)31593-8**

Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals

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BACKGROUND: Despite remarkable progress in the improvement of child survival between 1990 and 2015, the Millennium Development Goal (MDG) 4 target of a two-thirds reduction of under-5 mortality rate (U5MR) was not achieved globally. In this paper, we updated our annual estimates of child mortality by cause to 2000-15 to reflect on progress toward the MDG 4 and consider implications for the Sustainable Development Goals (SDG) target for child survival. **METHODS:** We increased the estimation input data for causes of deaths by 43% among neonates and 23% among 1-

59-month-olds, respectively. We used adequate vital registration (VR) data where available, and modelled cause-specific mortality fractions applying multinomial logistic regressions using adequate VR for low U5MR countries and verbal autopsy data for high U5MR countries. We updated the estimation to use *Plasmodium falciparum* parasite rate in place of malaria index in the modelling of malaria deaths; to use adjusted empirical estimates instead of modelled estimates for China; and to consider the effects of pneumococcal conjugate vaccine and rotavirus vaccine in the estimation.

FINDINGS: In 2015, among the 5.9 million under-5 deaths, 2.7 million occurred in the neonatal period. The leading under-5 causes were preterm birth complications (1.055 million [95% uncertainty range (UR) 0.935-1.179]), pneumonia (0.921 million [0.812 -1.117]), and intrapartum-related events (0.691 million [0.598 -0.778]). In the two MDG regions with the most under-5 deaths, the leading cause was pneumonia in sub-Saharan Africa and preterm birth complications in southern Asia.

Reductions in mortality rates for pneumonia, diarrhoea, neonatal intrapartum-related events, malaria, and measles were responsible for 61% of the total reduction of 35 per 1000 livebirths in U5MR in 2000-15. Stratified by U5MR, pneumonia was the leading cause in countries with very high U5MR. Preterm birth complications and pneumonia were both important in high, medium high, and medium child mortality countries; whereas congenital abnormalities was the most important cause in countries with low and very low U5MR. **INTERPRETATION:** In the SDG era, countries are advised to prioritise child survival policy and programmes based on their child cause-of-death composition. Continued and enhanced efforts to scale up proven life-saving interventions are needed to achieve the SDG child survival target. **FUNDING:** Bill & Melinda Gates Foundation, WHO.

7. [PLoS Med 2016 Nov 1;13\(11\):e1002164](#)

Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional, and Country Levels

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Background: Stunting affects one-third of children under 5 y old in developing countries, and 14% of childhood deaths are attributable to it. A large number of risk factors for stunting have been identified in epidemiological studies. However, the relative contribution of these risk factors to stunting has not been examined across countries. We estimated the number of stunting cases among children aged 24-35 mo (i.e., at the end of the 1,000 days' period of vulnerability) that are attributable to 18 risk factors in 137 developing countries.

Methods and Findings: We classified risk factors into five clusters: maternal nutrition and infection, teenage motherhood and short birth intervals, fetal growth restriction (FGR) and preterm birth, child nutrition and infection, and environmental factors. We combined published estimates and individual-level data from population-based surveys to derive risk factor prevalence in each country in 2010 and identified the most recent meta-analysis or conducted de novo reviews to derive effect sizes. We estimated the prevalence of stunting and the number of stunting cases that were attributable to each risk factor and cluster of risk factors by country and region. The leading risk worldwide was FGR, defined as being term and small for gestational age, and 10.8 million cases (95% CI 9.1 million-12.6 million) of stunting (out of 44.1 million) were attributable to it, followed by unimproved sanitation, with 7.2 million (95% CI 6.3 million-8.2 million), and diarrhea with 5.8 million (95% CI 2.4 million-9.2 million). FGR and preterm birth was the leading risk factor cluster in all regions. Environmental risks had the second largest estimated impact on stunting globally and in the South Asia, sub-Saharan Africa, and East Asia and Pacific regions, whereas child nutrition and infection was the second leading cluster of risk factors in other regions. Although extensive, our analysis is limited to risk factors for which effect sizes and country-level exposure data were available. The global nature of the study required approximations (e.g., using exposures estimated among women of reproductive age as a proxy for maternal exposures, or estimating the impact of risk factors on stunting through a mediator rather than directly on stunting). Finally, as is standard in global risk factor analyses, we used the effect size of risk factors on stunting from meta-analyses of epidemiological studies and assumed that proportional effects were fairly similar across countries.

Conclusions: FGR and unimproved sanitation are the leading risk factors for stunting in developing countries. Reducing the burden of stunting requires a paradigm shift from interventions focusing

solely on children and infants to those that reach mothers and families and improve their living environment and nutrition.

Communicable Diseases

8. [Am J Trop Med Hyg. 2016 Oct 5;95\(4\):902-907](#)

Seroprevalence of Hepatitis B Infection in Nigeria: A National Survey

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Hepatitis B virus (HBV) infection accounts for about 1 million deaths worldwide annually. This study was to determine the prevalence, distribution of HBV, and factors associated with infection in an apparently healthy population in Nigeria. A cross-sectional study among the general population was conducted employing a multistage sampling technique. Data on demographic, social, and behavioral indicators were collected using questionnaires and blood samples tested for HBV seromarkers. Descriptive, bivariate, and multivariate analyses were done. Prevalence of hepatitis B infection was 12.2% (confidence interval [CI] = 10.3-14.5). Of the participants, more than half, 527 (54.6%), had evidence of previous exposure to HBV, while 306 (31.7%) showed no serologic evidence of infection or vaccination. Only 76 (7.9%) participants showed serologic evidence of immunity to HBV through vaccination. Factors associated with testing positive for HBV infection were dental procedure outside the health facility (odds ratios[OR] = 3.4, 95% CI = 1.52-7.70), local circumcision (OR = 1.73, 95% CI = 1.17-2.57), and uvulectomy (OR = 1.65, 95% CI = 1.06-2.57). With logistic regression, only dental procedure outside the health facility (adjusted OR = 3.32, 95% CI = 1.38-7.97) remained significant. This first national survey on seroprevalence of hepatitis B describes the epidemiology and high prevalence of HBV infection in Nigeria and highlights the need for improved vaccination against HBV.

9. [N Engl J Med 375;11: 1081 – 1089](#)

Special Report: Twenty Years of Global Surveillance of Antituberculosis-Drug Resistance

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Antimicrobial resistance represents a major threat to global health and security. In 2014, the World Health Assembly called on all nations and the international community to take every necessary measure to control it, including surveillance of its emergence and spread.¹ The development of drug resistance in *Mycobacterium tuberculosis* was first documented in the late 1940s, soon after antibiotic therapy was introduced for tuberculosis treatment.² It quickly became obvious that combination chemotherapy could prevent the emergence of drug resistance³ and that patients infected with drug-resistant strains were less likely to be cured.⁴ Nevertheless, it was only in the early 1990s that drug-resistant tuberculosis began to receive global attention as a public health threat. This coincided with the detection of outbreaks of multidrug-resistant (MDR) tuberculosis (defined as resistance to at least rifampin and isoniazid) that were associated with high mortality among patients coinfecting with the human immunodeficiency virus (HIV).⁵⁻⁸ The urgent need for a global mechanism to monitor the emergence and spread of resistance to antituberculosis drugs became clear. In 1994, the Global Tuberculosis Program of the World Health Organization (WHO), with the support of the International Union against Tuberculosis and Lung Disease (the Union), established the Global Project on Anti-Tuberculosis Drug Resistance Surveillance (hereafter referred to as “the project”) to measure the magnitude of drug resistance and to monitor trends. This project remains the oldest and largest initiative on the surveillance of antimicrobial resistance in the world.⁹ In this article, we describe the history of global surveillance of drug resistance in tuberculosis and discuss methods for surveillance, the quality of available data, the key achievements and findings to date, the main challenges that remain, and future directions.

10. Trop Med Int Health 2016 Sep;21(9):1181-90

Tuberculosis and non-tuberculous mycobacteria among HIV-infected individuals in Ghana

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Objectives: To assess the prevalence and clinical importance of previously unrecognised tuberculosis (TB) and isolation of non-tuberculous mycobacteria (NTM) among HIV-infected individuals in a teaching hospital in Ghana.

Methods: Intensified mycobacterial case finding was conducted among HIV-positive individuals before initiation of antiretroviral therapy (ART). Data were collected on socio-demographic characteristics, medical history and TB-related signs and symptoms, and participants were followed for six months to determine treatment and vital status. Two sputum samples were obtained and examined for mycobacteria with smear microscopy, culture and Xpert MTB/RIF assay. NTM species were identified with the GenoType Mycobacterium CM/AS or sequence analysis of 16S rRNA gene.

Results: Of 473 participants, 60 (12.7%) had confirmed pulmonary TB, and 38 (8.0%) had positive cultures for NTM. Mycobacterium avium complex was identified in 9/38 (23.7%) of NTM isolates. Participants with NTM isolated were more likely to have CD4 cell count < 100 cells/μL (aOR 2.37; 95% CI: 1.10-5.14), BMI < 18.5 kg/m² (aOR 2.51; 95% CI: 1.15-5.51) and fever ≥ 2 weeks (aOR 2.76; 95% CI: 1.27-6.03) at baseline than participants with no mycobacteria. By six months, 76 (16.1%) participants had died; 20 (33.3%) with confirmed TB and 9 (23.7%) with NTM-positive culture. Mortality at six months was independently associated with TB diagnosis at enrolment (aHR 1.97; 95% CI 1.09-3.59), but not with NTM isolation after controlling for age, sex, CD4 cell count, BMI, prolonged fever and ART initiation.

Conclusions: Intensified mycobacterial screening of HIV-infected individuals revealed a high burden of unrecognised pulmonary TB before ART initiation, which increased risk of death within six months. NTM were frequently isolated and associated with signs of poor clinical status but not with increased mortality.

11. Trop Med Int Health 2016 Sep;21(9):1191-6

Clinical outcomes of Ghanaian Buruli ulcer patients who defaulted from antimicrobial therapy

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Objectives: Buruli ulcer (BU) is a tropical skin disease caused by infection with Mycobacterium ulcerans, which is currently treated with 8 weeks of streptomycin and rifampicin. The evidence to treat BU for a duration of 8 weeks is limited; a recent retrospective study from Australia suggested that a shorter course of antimicrobial therapy might be equally effective. We studied the outcomes of BU in a cohort of Ghanaian patients who defaulted from treatment and as such received less than 8 weeks of antimicrobial therapy.

Methods: A number of days of antimicrobial therapy and patient and lesion characteristics were recorded from charts from a cohort of BU patients treated at Nkawie-Toase hospital between 2008 and 2012. Patients who defaulted from treatment were retrieved, and lesion characteristics and functional limitations were recorded.

Results: About 54% of patients defaulted from therapy or wound care. Forty-seven defaulters with follow-up completed had received < 56 days of antibiotics. 84% of these patients healed after 32 days or less of antibiotics. There appeared to be an increased rate of healing in smaller lesions; 94% of WHO category I lesions had healed after 32 days or less of antibiotics.

Conclusion: Although numbers were small, and a potential for bias exists, our findings suggest that a reduction in the duration of antimicrobial therapy in BU in small, early lesions is feasible. These findings can serve as a basis for future well-designed studies.

Global Burden of Diseases

12. [The Lancet 388, Issue 10049, 10–16 September 2016, Pages 1081–1088](#)

The global burden of viral hepatitis from 1990 to 2013: findings from the Global Burden of Disease Study 2013

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Background With recent improvements in vaccines and treatments against viral hepatitis, an improved understanding of the burden of viral hepatitis is needed to inform global intervention strategies. We used data from the Global Burden of Disease (GBD) Study to estimate morbidity and mortality for acute viral hepatitis, and for cirrhosis and liver cancer caused by viral hepatitis, by age, sex, and country from 1990 to 2013.

Methods We estimated mortality using natural history models for acute hepatitis infections and GBD's cause-of-death ensemble model for cirrhosis and liver cancer. We used meta-regression to estimate total cirrhosis and total liver cancer prevalence, as well as the proportion of cirrhosis and liver cancer attributable to each cause. We then estimated cause-specific prevalence as the product of the total prevalence and the proportion attributable to a specific cause. Disability-adjusted life-years (DALYs) were calculated as the sum of years of life lost (YLLs) and years lived with disability (YLDs).

Findings Between 1990 and 2013, global viral hepatitis deaths increased from 0·89 million (95% uncertainty interval [UI] 0·86–0·94) to 1·45 million (1·38–1·54); YLLs from 31·0 million (29·6–32·6) to 41·6 million (39·1–44·7); YLDs from 0·65 million (0·45–0·89) to 0·87 million (0·61–1·18); and DALYs from 31·7 million (30·2–33·3) to 42·5 million (39·9–45·6). In 2013, viral hepatitis was the seventh (95% UI seventh to eighth) leading cause of death worldwide, compared with tenth (tenth to 12th) in 1990.

Interpretation Viral hepatitis is a leading cause of death and disability worldwide. Unlike most communicable diseases, the absolute burden and relative rank of viral hepatitis increased between 1990 and 2013. The enormous health loss attributable to viral hepatitis, and the availability of effective vaccines and treatments, suggests an important opportunity to improve public health.

13. [The Lancet 388, Issue 10049, 10–16 September 2016, Pages 1089–1102](#)

Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees

(First article in series of six papers on HIV and related infections in prisoners.)

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The prison setting presents not only challenges, but also opportunities, for the prevention and treatment of HIV, viral hepatitis, and tuberculosis. We did a comprehensive literature search of data published between 2005 and 2015 to understand the global epidemiology of HIV, hepatitis C virus (HCV), hepatitis B virus (HBV), and tuberculosis in prisoners. We further modelled the contribution of imprisonment and the potential impact of prevention interventions on HIV transmission in this population. Of the estimated 10·2 million people incarcerated worldwide on any given day in 2014, we estimated that 3·8% have HIV (389 000 living with HIV), 15·1% have HCV (1 546 500), 4·8% have chronic HBV (491 500), and 2·8% have active tuberculosis (286 000). The few studies on incidence suggest that intraprison transmission is generally low, except for large-scale outbreaks. Our model indicates that decreasing the incarceration rate in people who inject drugs and providing opioid agonist therapy could reduce the burden of HIV in this population. The prevalence of HIV, HCV, HBV, and tuberculosis is higher in prison populations than in the general population, mainly because of the criminalisation of drug use and the detention of people who use drugs. The most effective way of controlling these infections in prisoners and the broader community is to reduce the incarceration of people who inject drugs.

Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 Mortality and Causes of Death Collaborators.

Background Improving survival and extending the longevity of life for all populations requires timely, robust evidence on local mortality levels and trends. The Global Burden of Disease 2015 Study (GBD 2015) provides a comprehensive assessment of all-cause and cause-specific mortality for 249 causes in 195 countries and territories from 1980 to 2015. These results informed an in-depth investigation of observed and expected mortality patterns based on sociodemographic measures.

Findings Globally, life expectancy from birth increased from 61·7 years (95% uncertainty interval 61·4–61·9) in 1980 to 71·8 years (71·5–72·2) in 2015. Several countries in sub-Saharan Africa had very large gains in life expectancy from 2005 to 2015, rebounding from an era of exceedingly high loss of life due to HIV/AIDS. At the same time, many geographies saw life expectancy stagnate or decline, particularly for men and in countries with rising mortality from war or interpersonal violence. From 2005 to 2015, male life expectancy in Syria dropped by 11·3 years (3·7–17·4), to 62·6 years (56·5–70·2). Total deaths increased by 4·1% (2·6–5·6) from 2005 to 2015, rising to 55·8 million (54·9 million to 56·6 million) in 2015, but age-standardised death rates fell by 17·0% (15·8–18·1) during this time, underscoring changes in population growth and shifts in global age structures. The result was similar for non-communicable diseases (NCDs), with total deaths from these causes increasing by 14·1% (12·6–16·0) to 39·8 million (39·2 million to 40·5 million) in 2015, whereas age-standardised rates decreased by 13·1% (11·9–14·3). Globally, this mortality pattern emerged for several NCDs, including several types of cancer, ischaemic heart disease, cirrhosis, and Alzheimer's disease and other dementias. By contrast, both total deaths and age-standardised death rates due to communicable, maternal, neonatal, and nutritional conditions significantly declined from 2005 to 2015, gains largely attributable to decreases in mortality rates due to HIV/AIDS (42·1%, 39·1–44·6), malaria (43·1%, 34·7–51·8), neonatal preterm birth complications (29·8%, 24·8–34·9), and maternal disorders (29·1%, 19·3–37·1). Progress was slower for several causes, such as lower respiratory infections and nutritional deficiencies, whereas deaths increased for others, including dengue and drug use disorders. Age-standardised death rates due to injuries significantly declined from 2005 to 2015, yet interpersonal violence and war claimed increasingly more lives in some regions, particularly in the Middle East. In 2015, rotaviral enteritis (rotavirus) was the leading cause of under-5 deaths due to diarrhoea (146 000 deaths, 118 000–183 000) and pneumococcal pneumonia was the leading cause of under-5 deaths due to lower respiratory infections (393 000 deaths, 228 000–532 000), although pathogen-specific mortality varied by region. Globally, the effects of population growth, ageing, and changes in age-standardised death rates substantially differed by cause. Our analyses on the expected associations between cause-specific mortality and SDI show the regular shifts in cause of death composition and population age structure with rising SDI. Country patterns of premature mortality (measured as years of life lost [YLLs]) and how they differ from the level expected on the basis of SDI alone revealed distinct but highly heterogeneous patterns by region and country or territory. Ischaemic heart disease, stroke, and diabetes were among the leading causes of YLLs in most regions, but in many cases, intraregional results sharply diverged for ratios of observed and expected YLLs based on SDI. Communicable, maternal, neonatal, and nutritional diseases caused the most YLLs throughout sub-Saharan Africa, with observed YLLs far exceeding expected YLLs for countries in which malaria or HIV/AIDS remained the leading causes of early death.

Interpretation At the global scale, age-specific mortality has steadily improved over the past 35 years; this pattern of general progress continued in the past decade. Progress has been faster in most countries than expected on the basis of development measured by the SDI. Against this background of progress, some countries have seen falls in life expectancy, and age-standardised death rates for some causes are increasing. Despite progress in reducing age-standardised death rates, population growth and ageing mean that the number of deaths from most non-communicable causes are increasing in most countries, putting increased demands on health systems.

15. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1545–1602](#)

Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 Disease and Injury Incidence and Prevalence Collaborators.

Background Non-fatal outcomes of disease and injury increasingly detract from the ability of the world's population to live in full health, a trend largely attributable to an epidemiological transition in many countries from causes affecting children, to non-communicable diseases (NCDs) more common in adults. For the Global Burden of Diseases, Injuries, and Risk Factors Study 2015 (GBD 2015), we estimated the incidence, prevalence, and years lived with disability for diseases and injuries at the global, regional, and national scale over the period of 1990 to 2015.

Findings We generated 9.3 billion estimates from the various combinations of prevalence, incidence, and YLDs for causes, sequelae, and impairments by age, sex, geography, and year. In 2015, two causes had acute incidences in excess of 1 billion: upper respiratory infections (17.2 billion, 95% uncertainty interval [UI] 15.4–19.2 billion) and diarrhoeal diseases (2.39 billion, 2.30–2.50 billion). Eight causes of chronic disease and injury each affected more than 10% of the world's population in 2015: permanent caries, tension-type headache, iron-deficiency anaemia, age-related and other hearing loss, migraine, genital herpes, refraction and accommodation disorders, and ascariasis. The impairment that affected the greatest number of people in 2015 was anaemia, with 2.36 billion (2.35–2.37 billion) individuals affected. The second and third leading impairments by number of individuals affected were hearing loss and vision loss, respectively. Between 2005 and 2015, there was little change in the leading causes of years lived with disability (YLDs) on a global basis. NCDs accounted for 18 of the leading 20 causes of age-standardised YLDs on a global scale. Where rates were decreasing, the rate of decrease for YLDs was slower than that of years of life lost (YLLs) for nearly every cause included in our analysis. For low SDI geographies, Group 1 causes typically accounted for 20–30% of total disability, largely attributable to nutritional deficiencies, malaria, neglected tropical diseases, HIV/AIDS, and tuberculosis. Lower back and neck pain was the leading global cause of disability in 2015 in most countries. The leading cause was sense organ disorders in 22 countries in Asia and Africa and one in central Latin America; diabetes in four countries in Oceania; HIV/AIDS in three southern sub-Saharan African countries; collective violence and legal intervention in two north African and Middle Eastern countries; iron-deficiency anaemia in Somalia and Venezuela; depression in Uganda; onchocerciasis in Liberia; and other neglected tropical diseases in the Democratic Republic of the Congo.

Interpretation Ageing of the world's population is increasing the number of people living with sequelae of diseases and injuries. Shifts in the epidemiological profile driven by socioeconomic change also contribute to the continued increase in years lived with disability (YLDs) as well as the rate of increase in YLDs. Despite limitations imposed by gaps in data availability and the variable quality of the data available, the standardised and comprehensive approach of the GBD study provides opportunities to examine broad trends, compare those trends between countries or subnational geographies, benchmark against locations at similar stages of development, and gauge the strength or weakness of the estimates available.

16. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1603–1658](#)

Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 DALYs and HALE Collaborators.

Background Healthy life expectancy (HALE) and disability-adjusted life-years (DALYs) provide summary measures of health across geographies and time that can inform assessments of epidemiological patterns and health system performance, help to prioritise investments in research and development, and monitor progress toward the Sustainable Development Goals (SDGs). We aimed to provide updated HALE and DALYs for geographies worldwide and evaluate how disease burden changes with development.

Findings Total global DALYs remained largely unchanged from 1990 to 2015, with decreases in communicable, neonatal, maternal, and nutritional (Group 1) disease DALYs offset by increased DALYs due to non-communicable diseases (NCDs). Much of this epidemiological transition was caused by changes in population growth and ageing, but it was accelerated by widespread improvements in SDI that also correlated strongly with the increasing importance of NCDs. Both total DALYs and age-standardised DALY rates due to most Group 1 causes significantly decreased by 2015, and although total burden climbed for the majority of NCDs, age-standardised DALY rates due to NCDs declined. Nonetheless, age-standardised DALY rates due to several high-burden NCDs (including osteoarthritis, drug use disorders, depression, diabetes, congenital birth defects, and skin, oral, and sense organ diseases) either increased or remained unchanged, leading to increases in their relative ranking in many geographies. From 2005 to 2015, HALE at birth increased by an average of 2.9 years (95% uncertainty interval 2.9–3.0) for men and 3.5 years (3.4–3.7) for women, while HALE at age 65 years improved by 0.85 years (0.78–0.92) and 1.2 years (1.1–1.3), respectively. Rising SDI was associated with consistently higher HALE and a somewhat smaller proportion of life spent with functional health loss; however, rising SDI was related to increases in total disability. Many countries and territories in central America and eastern sub-Saharan Africa had increasingly lower rates of disease burden than expected given their SDI. At the same time, a subset of geographies recorded a growing gap between observed and expected levels of DALYs, a trend driven mainly by rising burden due to war, interpersonal violence, and various NCDs.

Interpretation Health is improving globally, but this means more populations are spending more time with functional health loss, an absolute expansion of morbidity. The proportion of life spent in ill health decreases somewhat with increasing SDI, a relative compression of morbidity, which supports continued efforts to elevate personal income, improve education, and limit fertility. Our analysis of DALYs and HALE and their relationship to SDI represents a robust framework on which to benchmark geography-specific health performance and SDG progress. Country-specific drivers of disease burden, particularly for causes with higher-than-expected DALYs, should inform financial and research investments, prevention efforts, health policies, and health system improvement initiatives for all countries along the development continuum.

17. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1659–1724](#)

Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 Risk Factors Collaborators

Findings Between 1990 and 2015, global exposure to unsafe sanitation, household air pollution, childhood underweight, childhood stunting, and smoking each decreased by more than 25%. Global exposure for several occupational risks, high body-mass index (BMI), and drug use increased by more than 25% over the same period. All risks jointly evaluated in 2015 accounted for 57.8% (95% CI 56.6–58.8) of global deaths and 41.2% (39.8–42.8) of DALYs. In 2015, the ten largest contributors to global DALYs among Level 3 risks were high systolic blood pressure (211.8 million [192.7 million to 231.1 million] global DALYs), smoking (148.6 million [134.2 million to 163.1 million]), high fasting plasma glucose (143.1 million [125.1 million to 163.5 million]), high BMI (120.1 million [83.8 million to 158.4 million]), childhood undernutrition (113.3 million [103.9 million to 123.4 million]), ambient particulate matter (103.1 million [90.8 million to 115.1 million]), high total cholesterol (88.7 million [74.6 million to 105.7 million]), household air pollution (85.6 million [66.7 million to 106.1 million]), alcohol use (85.0 million [77.2 million to 93.0 million]), and diets high in sodium (83.0 million [49.3 million to 127.5 million]). From 1990 to 2015, attributable DALYs declined for micronutrient deficiencies, childhood undernutrition, unsafe sanitation and water, and household air pollution; reductions in risk-deleted DALY rates rather than reductions in exposure drove these declines. Rising exposure contributed to notable increases in attributable DALYs from high BMI, high fasting plasma glucose, occupational carcinogens, and drug use. Environmental risks and childhood undernutrition declined steadily with SDI; low physical activity, high BMI, and high fasting plasma glucose increased with SDI. In 119 countries, metabolic risks, such as high BMI and fasting plasma glucose, contributed the most attributable DALYs in 2015. Regionally, smoking still ranked among

the leading five risk factors for attributable DALYs in 109 countries; childhood underweight and unsafe sex remained primary drivers of early death and disability in much of sub-Saharan Africa.

Interpretation Declines in some key environmental risks have contributed to declines in critical infectious diseases. Some risks appear to be invariant to SDI. Increasing risks, including high BMI, high fasting plasma glucose, drug use, and some occupational exposures, contribute to rising burden from some conditions, but also provide opportunities for intervention. Some highly preventable risks, such as smoking, remain major causes of attributable DALYs, even as exposure is declining. Public policy makers need to pay attention to the risks that are increasingly major contributors to global burden.

18. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1725–1774](#)

Global, regional, national, and selected subnational levels of stillbirths, neonatal, infant, and under-5 mortality, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 Child Mortality Collaborators

Background Established in 2000, Millennium Development Goal 4 (MDG4) catalysed extraordinary political, financial, and social commitments to reduce under-5 mortality by two-thirds between 1990 and 2015. At the country level, the pace of progress in improving child survival has varied markedly, highlighting a crucial need to further examine potential drivers of accelerated or slowed decreases in child mortality. The Global Burden of Disease 2015 Study (GBD 2015) provides an analytical framework to comprehensively assess these trends for under-5 mortality, age-specific and cause-specific mortality among children under 5 years, and stillbirths by geography over time.

Findings Globally, 5·8 million (95% uncertainty interval [UI] 5·7–6·0) children younger than 5 years died in 2015, representing a 52·0% (95% UI 50·7–53·3) decrease in the number of under-5 deaths since 1990. Neonatal deaths and stillbirths fell at a slower pace since 1990, decreasing by 42·4% (41·3–43·6) to 2·6 million (2·6–2·7) neonatal deaths and 47·0% (35·1–57·0) to 2·1 million (1·8–2·5) stillbirths in 2015. Between 1990 and 2015, global under-5 mortality decreased at an annualised rate of decrease of 3·0% (2·6–3·3), falling short of the 4·4% annualised rate of decrease required to achieve MDG4. During this time, 58 countries met or exceeded the pace of progress required to meet MDG4. Between 2000, the year MDG4 was formally enacted, and 2015, 28 additional countries that did not achieve the 4·4% rate of decrease from 1990 met the MDG4 pace of decrease. However, absolute levels of under-5 mortality remained high in many countries, with 11 countries still recording rates exceeding 100 per 1000 livebirths in 2015. Marked decreases in under-5 deaths due to a number of communicable diseases, including lower respiratory infections, diarrhoeal diseases, measles, and malaria, accounted for much of the progress in lowering overall under-5 mortality in low-income countries. Compared with gains achieved for infectious diseases and nutritional deficiencies, the persisting toll of neonatal conditions and congenital anomalies on child survival became evident, especially in low-income and low-middle-income countries. We found sizeable heterogeneities in comparing observed and expected rates of under-5 mortality, as well as differences in observed and expected rates of change for under-5 mortality. At the global level, we recorded a divergence in observed and expected levels of under-5 mortality starting in 2000, with the observed trend falling much faster than what was expected based on SDI through 2015. Between 2000 and 2015, the world recorded 10·3 million fewer under-5 deaths than expected on the basis of improving SDI alone.

Interpretation Gains in child survival have been large, widespread, and in many places in the world, faster than what was anticipated based on improving levels of development. Yet some countries, particularly in sub-Saharan Africa, still had high rates of under-5 mortality in 2015. Unless these countries are able to accelerate reductions in child deaths at an extraordinary pace, their achievement of proposed SDG targets is unlikely. Improving the evidence base on drivers that might hasten the pace of progress for child survival, ranging from cost-effective intervention packages to innovative financing mechanisms, is vital to charting the pathways for ultimately ending preventable child deaths by 2030.

19. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1775–1812](#)

Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

GBD 2015 Maternal Mortality Collaborators

Background In transitioning from the Millennium Development Goal to the Sustainable Development Goal era, it is imperative to comprehensively assess progress toward reducing maternal mortality to identify areas of success, remaining challenges, and frame policy discussions. We aimed to quantify maternal mortality throughout the world by underlying cause and age from 1990 to 2015.

Findings Only ten countries achieved MDG 5, but 122 of 195 countries have already met SDG 3.1. Geographical disparities widened between 1990 and 2015 and, in 2015, 24 countries still had a maternal mortality ratio greater than 400. The proportion of all maternal deaths occurring in the bottom two SDI quintiles, where haemorrhage is the dominant cause of maternal death, increased from roughly 68% in 1990 to more than 80% in 2015. The middle SDI quintile improved the most from 1990 to 2015, but also has the most complicated causal profile. Maternal mortality in the highest SDI quintile is mostly due to other direct maternal disorders, indirect maternal disorders, and abortion, ectopic pregnancy, and/or miscarriage. Historical patterns suggest achievement of SDG 3.1 will require 91% coverage of one antenatal care visit, 78% of four antenatal care visits, 81% of in-facility delivery, and 87% of skilled birth attendance.

Interpretation Several challenges to improving reproductive health lie ahead in the SDG era. Countries should establish or renew systems for collection and timely dissemination of health data; expand coverage and improve quality of family planning services, including access to contraception and safe abortion to address high adolescent fertility; invest in improving health system capacity, including coverage of routine reproductive health care and of more advanced obstetric care—including EmOC; adapt health systems and data collection systems to monitor and reverse the increase in indirect, other direct, and late maternal deaths, especially in high SDI locations; and examine their own performance with respect to their SDI level, using that information to formulate strategies to improve performance and ensure optimum reproductive health of their population.

20. [The Lancet 388, Issue 10053, 8–14 October 2016, Pages 1813–1850](#)

Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015

GBD 2015 SDG Collaborators

Background In September, 2015, the UN General Assembly established the Sustainable Development Goals (SDGs). The SDGs specify 17 universal goals, 169 targets, and 230 indicators leading up to 2030. We provide an analysis of 33 health-related SDG indicators based on the Global Burden of Diseases, Injuries, and Risk Factors Study 2015 (GBD 2015).

Findings In 2015, the median health-related SDG index was 59.3 (95% uncertainty interval 56.8–61.8) and varied widely by country, ranging from 85.5 (84.2–86.5) in Iceland to 20.4 (15.4–24.9) in Central African Republic. SDI was a good predictor of the health-related SDG index ($r^2=0.88$) and the MDG index ($r^2=0.92$), whereas the non-MDG index had a weaker relation with SDI ($r^2=0.79$). Between 2000 and 2015, the health-related SDG index improved by a median of 7.9 (IQR 5.0–10.4), and gains on the MDG index (a median change of 10.0 [6.7–13.1]) exceeded that of the non-MDG index (a median change of 5.5 [2.1–8.9]). Since 2000, pronounced progress occurred for indicators such as met need with modern contraception, under-5 mortality, and neonatal mortality, as well as the indicator for universal health coverage tracer interventions. Moderate improvements were found for indicators such as HIV and tuberculosis incidence, minimal changes for hepatitis B incidence took place, and childhood overweight considerably worsened.

Interpretation GBD provides an independent, comparable avenue for monitoring progress towards the health-related SDGs. Our analysis not only highlights the importance of income, education, and fertility as drivers of health improvement but also emphasises that investments in these areas alone will not be sufficient. Although considerable progress on the health-related MDG indicators has been made, these gains will need to be sustained and, in many cases, accelerated to achieve the ambitious SDG targets. The minimal improvement in or worsening of health-related indicators beyond the

MDGs highlight the need for additional resources to effectively address the expanded scope of the health-related SDGs.

Health Policy

21. [Lancet. 2016 Sep 14. pii: S0140-6736\(16\)30171-4](#)

Neglected tropical diseases: progress towards addressing the chronic pandemic

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The concept of neglected tropical diseases (NTDs) emerged more than a decade ago and has been recognised as a valid way to categorise diseases that affect the poorest individuals. Substantial progress in control and elimination has been achieved and policy momentum has been generated through continued bilateral, philanthropic, and non-governmental development organisation (NGDO) support, and donations of drugs from pharmaceutical companies. WHO has defined a Roadmap to reach 2020 targets, which was endorsed by member states in a World Health Assembly Resolution in 2013. NTDs have been included within the Sustainable Development Goal targets and are a crucial component of universal health coverage, conceptualised as "leaving no one behind". WHO reported that more than 1 billion people in 88 countries have benefited from preventive chemotherapy in 2014. The research agenda has defined the need for affordable products (diagnostics, drugs and insecticides). However challenges such as insecurity and weak health systems continue to prevail in the poorest countries, inhibiting progress in scaling up and also in achieving Roadmap goals.

22. [N Engl J Med 375;6: 587 – 596](#)

Special Report: After Ebola in West Africa — Unpredictable Risks, Preventable Epidemics

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Between December 2013 and April 2016, the largest epidemic of Ebola virus disease (EVD) to date generated more than 28,000 cases and more than 11,000 deaths in the large, mobile populations of Guinea, Liberia, and Sierra Leone. Tracking the rapid rise and slower decline of the West African epidemic has reinforced some common understandings about the epidemiology and control of EVD but has also generated new insights. Despite having more information about the geographic distribution of the disease, the risk of human infection from animals and from survivors of EVD remains unpredictable over a wide area of equatorial Africa. Until human exposure to infection can be anticipated or avoided, future outbreaks will have to be managed with the classic approach to EVD control — extensive surveillance, rapid detection and diagnosis, comprehensive tracing of contacts, prompt patient isolation, supportive clinical care, rigorous efforts to prevent and control infection, safe and dignified burial, and engagement of the community. Empirical and modelling studies conducted during the West African epidemic have shown that large epidemics of EVD are preventable — a rapid response can interrupt transmission and restrict the size of outbreaks, even in densely populated cities. The critical question now is how to ensure that populations and their health services are ready for the next outbreak, wherever it may occur. Health security across Africa and beyond depends on committing resources to both strengthen national health systems and sustain investment in the next generation of vaccines, drugs, and diagnostics.

23. [Health Policy and Planning, 31, 2016 \(7\): 834–843](#)

Attributes of patient-centered primary care associated with the public perception of good healthcare quality in Brazil, Colombia, Mexico and El Salvador

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This study evaluated primary care attributes of patient-centered care associated with the public perception of good quality in Brazil, Colombia, Mexico and El Salvador. We conducted a secondary

data analysis of a Latin American survey on public perceptions and experiences with healthcare systems. The primary care attributes examined were access, coordination, provider–patient communication, provision of health-related information and emotional support. A double-weighted multiple Poisson regression with robust variance model was performed. The study included between 1500 and 1503 adults in each country. The results identified four significant gaps in the provision of primary care: not all respondents had a regular place of care or a regular primary care doctor (Brazil 35.7%, Colombia 28.4%, Mexico 22% and El Salvador 45.4%). The communication with the primary care clinic was difficult (Brazil 44.2%, Colombia 41.3%, Mexico 45.1% and El Salvador 56.7%). There was a lack of coordination of care (Brazil 78.4%, Colombia 52.3%, Mexico 48% and El Salvador 55.9%). Also, there was a lack of information about healthy diet (Brazil 21.7%, Colombia 32.9%, Mexico 16.9% and El Salvador 20.8%). The public’s perception of good quality was variable (Brazil 67%, Colombia 71.1%, Mexico 79.6% and El Salvador 79.5%). The primary care attributes associated with the perception of good quality were a primary care provider ‘who knows relevant information about a patient’s medical history’, ‘solves most of the health problems’, ‘spends enough time with the patient’, ‘coordinates healthcare’ and a ‘primary care clinic that is easy to communicate with’. In conclusion, the public has a positive perception of the quality of primary care, although it has unfulfilled expectations; further efforts are necessary to improve the provision of patient-centered primary care services in these four Latin American countries.

24. Health Policy and Planning, 31, 2016 (7): 868–877

Motivating health workers up to a limit: partial effects of performance-based financing on working environments in Nigeria

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Background: In 2012, the Nigerian government launched performance-based financing (PBF) in three districts providing financial incentives to health workers based on the quantity and quality of service provision. They were given autonomy to use funds for operational costs and performance bonuses. This study aims to understand changes in perceived motivation among health workers with the introduction of PBF in Wamba district, Nigeria.

Methods: The study used a qualitative research design to compare perceptions of health workers in facilities receiving PBF payments in the pilot district of Wamba to those that were not. In-depth semi-structured interviews (n = 39) were conducted with health workers from PBF and non-PBF facilities along with managers of the PBF project. Framework analysis was used to identify patterns and variations in responses. Facility records were collated and triangulated with qualitative data.

Findings: Health workers receiving PBF payments reported to be ‘awakened’ by performance bonuses and improved working environments including routine supportive supervision and availability of essential drugs. They recounted being more punctual, hard working and proud of providing better services to their communities. In comparison, health workers in non-PBF facilities complained about the dearth of basic equipment and lack of motivating strategies. However, health workers from both sets of facilities considered there to be a severe shortage of manpower resulting in excessive workload, fatigue and general dissatisfaction.

Conclusions: PBF strategies can succeed in motivating health workers by bringing about a change in incentives and working conditions. However, such programmes need to be aligned with human resource reforms including timely recruitment and appropriate distribution of health workers to prevent burn out and attrition. As people working on the frontline of constrained health systems, health workers are responsive to improved incentives and working conditions, but need more comprehensive support.

25. Health Policy and Planning, 31, 2016 (Suppl.2): ii1–ii2

Commentary—District decision-making to strengthen maternal, newborn and child health services in low-income settings

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Information systems and health planning are relatively neglected areas of health policy and system research. A rapid search of papers published in *Health Policy and Planning* identified only 15 out of a total of 726 papers published the last 5 years on the topics of information systems, monitoring and evidence-informed decisionmaking. Some of these papers focused on the extent to which research evidence is used by policymakers and health system managers, yet collecting high quality routine information and using this information to plan and evaluate health services is critical for health system strengthening. The articles in this series outline a model for a data-informed platform for health which would bring together routine information from the public and private sectors on health care inputs and processes including service delivery, that could inform decision making, priority setting and planning at the district level, and assist in the evaluation of maternal, newborn and child health (MNCH) services. This is a useful extension to the literature on health information systems because of its focus on how information is used to take decisions at the local level. By keeping data users at the centre of the system, it raises important questions of who collects information and how it flows among levels of the system—all of which influence the incentives to generate valid data on health services, their coverage and key inputs used in delivering them.

Further in this supplement:

- **District decision-making for health in low-income settings: a feasibility study of a data-informed platform for health in India, Nigeria and Ethiopia.**
- **District decision-making for health in low-income settings: a systematic literature review.**
- **District decision-making for health in low-income settings: a case study of the potential of public and private sector data in India and Ethiopia.**
- **District decision-making for health in low-income settings: a qualitative study in Uttar Pradesh, India, on engaging the private health sector in sharing health-related data.**

26. **Health Policy and Planning, 31, 2016 (8): 1010–1019**

Sources, determinants and utilization of health workers' revenues: evidence from Sierra Leone

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Exploring the entire set of formal and informal payments available to health workers (HWs) is critical to understand the financial incentives they face and devise effective incentive packages to motivate them. We investigate this issue in the context of Sierra Leone by collecting quantitative data through a survey and daily logbooks on the incomes of 266 HWs in three districts, and carrying out 39 qualitative in-depth interviews. We find that, while earnings related to the HWs official jobs represent the largest share, their income is fragmented and composed of a variety of payments, and there is a large heterogeneity in the importance of each income source within the total remuneration.

Importantly, each income has different features in terms of regularity, reliability, ease of access, etc. Our analysis also reveals the determinants of the incomes received and their level based on individual and facility characteristics, and finds that these are not in line with HRH policies defined at national level. Additionally, from their narratives, it emerges that HWs are 'managing', in the sense both of 'getting by' and of enacting financial coping strategies, such as mental accounting (spending different incomes differently), income hiding to shelter it from family pressures, and re-investment of incomes to stabilize overall earnings over time, in order to ensure their livelihoods and those of their families. These strategies question the assumption of fungibility of incomes and the neutrality of increasing or regulating one rather than another of them. Together, our findings on earning and income use patterns have important policy implications for how we go about (re)thinking financial incentive strategies.

Key words: Human resources, incentives, income use strategies, income hiding, mental accounting, Sierra Leone

Key messages

- This study describes the incomes of primary health workers in Sierra Leone and finds that salaries make up about 60% of the total revenues, while the rest is composed by a variety of formal and informal incomes.

- Health workers' narratives reveal that the satisfaction related to the incomes does not depend only on their amounts, but also on non-financial features. Based on these features, health workers choose to assign incomes to different uses.
- These findings have policy implications for designing incentives as they call for more attention to the earning opportunities for health workers beyond formal allowances, and to the HWs own perspectives which question the assumption of income fungibility.

27. Health Policy and Planning, 31, 2016 (8): 1100–1106

Indicators for routine monitoring of effective mental healthcare coverage in low- and middle-income settings: a Delphi study

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High-quality information to measure the need for, and the uptake, cost, quality and impact of care is essential in the pursuit of scaling up mental health care in low- and middle-income countries (LMIC). The aim of this study was to identify indicators for the measurement of effective coverage of mental health treatment. We conducted a two-round Delphi study (n= 93 experts from primarily LMIC countries Ethiopia, India, Nepal, Nigeria, South Africa and Uganda), in order to generate and prioritize a set of indicators. First, 52 unique indicators were generated (based on a total of 876 responses from participants). Second, the selected indicators were then scored for significance, relevance and feasibility. Mean priority scores were calculated per indicator (score range, 1–5). All 52 indicators had a weighted mean score that ranged from 3.20 for the lowest ranked to 4.27 for the highest ranked. The 15 highest ranked indicators cover the different domains of measuring effective mental health treatment coverage. This set of indicators is highly stable between the different groups of experts, as well as between the different participating countries. This study provides data on how mental health service and financial coverage can be assessed in LMIC. This is an important element in the move to scale-up mental health care.

28. Health Policy and Planning, 31, 2016 (9): 1297–1309

Opening the 'black box' of performance-based financing in low- and lower middle-income countries: a review of the literature

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Although performance-based financing (PBF) receives increasing attention in the literature, a lot remains unknown about the exact mechanisms triggered by PBF arrangements. This article aims to summarize current knowledge on how PBF works, set out what still needs to be investigated and formulate recommendations for researchers and policymakers from donor and recipient countries alike. Drawing on an extensive systematic literature review of peer-reviewed journals, we analysed 35 relevant articles. To guide us through this variety of studies, point out relevant issues and structure findings, we use a comprehensive analytical framework based on eight dimensions. The review inter alia indicates that PBF is generally welcomed by the main actors (patients, health workers and health managers), yet what PBF actually entails is less straightforward. More research is needed on the exact mechanisms through which not only incentives but also ancillary components operate. This knowledge is essential if we really want to appreciate the effectiveness, desirability and appropriate format of PBF as one of the possible answers to the challenges in the health sector of low-and lower middle-income countries. A clear definition of the research constructs is a primordial starting point for such research. Key words: Performance-based financing, developing countries, health financing .

Key Messages

- The findings are often contradictory, therefore we need more research on the influence of the context and the design of the performance-based financing (PBF) scheme.
- A common definition of the construct of PBF, supported by proponents and opponents, is needed to better structure research and the debate on PBF. Such a definition should make clear which projects should be seen as PBF and which elements compose it.
- More research is needed on the exact mechanisms through which not only incentives but also ancillary components operate and how these mechanisms interact with each other.
- Local norms and values matter and should be taken into account when deciding whether or not (or how) to implement PBF.

29. **Health Policy and Planning, 31, 2016 (9): 1143–1151**

Investigating the remuneration of health workers in the DR Congo: implications for the health workforce and the health system in a fragile setting

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The financial remuneration of health workers (HWs) is a key concern to address human resources for health challenges. In low-income settings, the exploration of the sources of income available to HWs, their determinants and the livelihoods strategies that those remunerations entail are essential to gain a better understanding of the motivation of the workers and the effects on their performance and on service provision. This is even more relevant in a setting such as the DR Congo, characterized by the inability of the state to provide public services via a well-supported and financed public workforce. Based on a quantitative survey of 1771 HWs in four provinces of the DR Congo, this article looks at the level and the relative importance of each revenue. It finds that Congolese HWs earn their living from a variety of sources and enact different strategies for their financial survival. The main income is represented by the share of user fees for those employed in facilities, and per diems and top-ups from external agencies for those in Health Zone Management Teams (in both cases, with the exception of doctors), while governmental allowances are less relevant. The determinants at individual and facility level of the total income are also modelled, revealing that the distribution of most revenues systematically favours those working in already favourable conditions (urban facilities, administrative positions and positions of authority within facilities). This may impact negatively on the motivation and performance of HWs and on their distribution patterns. Finally, our analysis highlights that, as health financing and health workforce reforms modify the livelihood opportunities of HWs, their design and implementation go beyond technical aspects and are unavoidably political. A better consideration of these issues is necessary to propose contextually grounded and politically savvy approaches to reform in the DR Congo.

30. **Health Policy and Planning, 31, 2016 (9): 1152–1161**

The impact of delays on maternal and neonatal outcomes in Ugandan public health facilities: the role of absenteeism

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Maternal mortality in low- and middle-income countries continues to remain high. The Ugandan Ministry of Health's Strategic Plan suggests that little, if any, progress has been made in Uganda in terms of improvements in Maternal Health [Millennium Development Goal (MDG) 5] and, more specifically, in reducing maternal mortality. Furthermore, the UNDP report on the MDGs describes Uganda's progress as 'stagnant'. The importance of understanding the impact of delays on maternal and neonatal outcomes in low resource settings has been established for some time. Indeed, the '3-delays' model has exposed the need for holistic multi-disciplinary approaches focused on systems change as much as clinical input. The model exposes the contribution of social factors shaping individual agency and care-seeking behaviour. It also identifies complex access issues which, when combined with the lack of timely and adequate care at referral facilities, contributes to extensive and damaging delays. It would be hard to find a piece of research on this topic that does not reference

human resource factors or ‘staff shortages’ as a key component of this ‘puzzle’. Having said that, it is rare indeed to see these human resource factors explored in any detail. In the absence of detailed critique (implicit) ‘common sense’ presumptions prevail: namely that the economic conditions at national level lead to inadequacies in the supply of suitably qualified health professionals exacerbated by losses to international emigration. Eight years’ experience of actionresearch interventions in Uganda combining a range of methods has lead us to a rather stark conclusion: the single most important factor contributing to delays and associated adverse outcomes for mothers and babies in Uganda is the failure of doctors to be present at work during contracted hours. Failure to acknowledge and respond to this sensitive problem will ultimately undermine all other interventions including professional voluntarism which relies on local ‘co-presence’ to be effective. Important steps forward could be achieved within the current resource framework, if the political will existed. International NGOs have exacerbated this problem encouraging forms of internal ‘brain drain’ particularly among doctors. Arguably the system as it is rewards doctors for non-compliance resulting in massive resource inefficiencies.

31. **Health Policy and Planning, 31, 2016 (9): 1184–1192**

The effect of user fee exemption on the utilization of maternal health care at mission health facilities in Malawi

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The Government of Malawi has signed contracts called service level agreements (SLAs) with mission health facilities in order to exempt their catchment populations from paying user fees. Government in turn reimburses the facilities for the services that they provide. SLAs started in 2006 with 28 out of 165 mission health facilities and increased to 74 in 2015. Most SLAs cover only maternal, neonatal and in some cases child health services due to limited resources. This study evaluated the effect of user fee exemption on the utilization of maternal health services. The difference-in-differences approach was combined with propensity score matching to evaluate the causal effect of user fee exemption. The gradual uptake of the policy provided a natural experiment with treated and control health facilities. A second control group, patients seeking non-maternal health care at CHAM health facilities with SLAs, was used to check the robustness of the results obtained using the primary control group. Health facility level panel data for 142 mission health facilities from 2003 to 2010 were used. User fee exemption led to a 15% ($P < 0.01$) increase in the mean proportion of women who made at least one antenatal care (ANC) visit during pregnancy, a 12% ($P < 0.05$) increase in average ANC visits and an 11% ($P < 0.05$) increase in the mean proportion of pregnant women who delivered at the facilities. No effects were found for the proportion of pregnant women who made the first ANC visit in the first trimester and the proportion of women who made postpartum care visits. We conclude that user fee exemption is an important policy for increasing maternal health care utilization. For certain maternal services, however, other determinants may be more important.

HIV – Aids

Other articles (outside article 13 under the chapter of Global Burden of Disease) in the series of papers on HIV and related infections in prisoners are:

- The Lancet Volume 388, Issue 10049, 10–16 September 2016, Pages 1103–1114
Clinical care of incarcerated people with HIV, viral hepatitis, or tuberculosis
Rich JD et al., Department of Medicine, Brown University, Providence, RI, USA
- The Lancet Volume 388, Issue 10049, 10–16 September 2016, Pages 1115–1126
Prevention of transmission of HIV, hepatitis B virus, hepatitis C virus, and tuberculosis in prisoners
Kamarulzaman A et al., Centre of Excellence for Research in AIDS, Faculty of Medicine, University Malaya, Kuala Lumpur, Malaysia
- The Lancet Volume 388, No. 10050, p1202–1214, 17 September 2016

HIV, prisoners, and human rights

Leonard S Rubenstein, et al

- The Lancet Volume 388, No. 10050, p1215–1227, 17 September 2016

HIV and tuberculosis in prisons in sub-Saharan Africa

Lilanganee Telisinghe et al.

- The Lancet Volume 388, No. 10050, p1228–1248, 17 September 2016

The perfect storm: incarceration and the high-risk environment perpetuating transmission of HIV, hepatitis C virus, and tuberculosis in Eastern Europe and Central Asia

Frederick L Altice et al

32. **Trop Med Int Health 2016 Sep;21(9):1115-23**

Adherence clubs for long-term provision of antiretroviral therapy: cost-effectiveness and access analysis from Khayelitsha, South Africa

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Objectives: As the scale of the South African HIV epidemic calls for innovative models of care that improve accessibility for patients while overcoming chronic human resource shortages, we (i) assess the cost-effectiveness of lay health worker-led group adherence clubs, in comparison with a nurse-driven 'standard of care' and (ii) describe and evaluate the associated patient cost and accessibility differences.

Methods: Our cost-effectiveness analysis compares an 'adherence club' innovation to conventional nurse-driven care within a busy primary healthcare setting in Khayelitsha, South Africa. In each alternative, we calculate provider costs and estimate rates of retention in care and viral suppression as key measures of programme effectiveness. All results are presented on an annual or per patient-year basis. In the same setting, a smaller sample of patients was interviewed to understand the direct and indirect non-healthcare cost and access implications of the alternatives. Access was measured using McIntyre and colleagues' 2009 framework.

Results: Adherence clubs were the more cost-effective model of care, with a cost per patient-year of \$300 vs. \$374 and retention in care at 1 year of 98.03% (95% CI 97.67-98.33) for clubs vs. 95.49% (95% CI 95.01-95.94) for standard of care. Viral suppression in clubs was 99.06% (95% CI 98.82-99.27) for clubs vs. 97.20% (95% CI 96.81-97.56) for standard of care. When interviewed, club patients reported fewer missed visits, shorter waiting times and higher acceptability of services compared to standard of care.

Conclusions: Adherence clubs offer the potential to enhance healthcare efficiency and patient accessibility. Their scale-up should be supported.

33. **Trop Med Int Health 2016 Sep;21(9):1124-30**

Stable patients and patients with advanced disease: consensus definitions to support sustained scale up of antiretroviral therapy

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Objective: As guidelines are evolving towards recommending starting antiretroviral therapy (ART) in all HIV-positive individuals irrespective of clinical and immunological status, HIV programmes will be challenged to manage an increasingly diverse set of patient needs. To support global guideline recommendations for differentiated service delivery, WHO developed consensus definitions for two distinct patient populations: patients presenting with advanced disease and patients who are stable on ART.

Methods: An expert panel consisting of 73 respondents from 28 countries across all six WHO regions supported the development of these definitions. The panel included clinicians, researchers, programme managers, technical advisors and patient group representatives.

Results: Patients presenting with advanced disease at presentation to care were defined as CD4 count <200 CD4 cells/mm³ or WHO Stage III & IV defining illness. Patients stable on ART were defined as those who were receiving ART for at least 1 year with no adverse drug reactions requiring regular monitoring, no current illnesses or pregnancy, a good understanding of lifelong adherence, and

evidence of treatment success. Treatment success was defined as two consecutive undetectable viral load measures or, in the absence of viral load monitoring, rising CD4 counts or CD4 counts above 200 cells/mm³ and an objective adherence measure.

Conclusions: Patients who are stable on ART should be offered a less intensive care package that can lead to improved outcomes while saving resources, including less frequent clinic visits, out-of-clinic drug refills and reduced laboratory monitoring. This will allow for clinic resources to be directed towards reducing morbidity and mortality among patients presenting with advanced disease.

Malaria

34. **Am J Trop Med Hyg 2016 Sep 7;95(3):588-94. 3,5 Series**

National Malaria Prevalence in Cambodia: Microscopy Versus Polymerase Chain Reaction Estimates

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Accurate information regarding malaria prevalence at national level is required to design and assess malaria control/elimination efforts. Although many comparisons of microscopy and polymerase chain reaction (PCR)-based methods have been conducted, there is little published literature covering such comparisons in southeast Asia especially at the national level. Both microscopic examination and PCR detection were performed on blood films and dried blood spots samples collected from 8,067 individuals enrolled in a nationwide, stratified, multistage, cluster sampling malaria prevalence survey conducted in Cambodia in 2007. The overall malaria prevalence and prevalence rates of *Plasmodium falciparum*, *Plasmodium vivax*, and *Plasmodium malariae* infections estimated by microscopy (N = 8,067) were 2.74% (95% confidence interval [CI]: 2.39-3.12%), 1.81% (95% CI: 1.53-2.13%), 1.14% (95% CI: 0.92-1.40%), and 0.01% (95% CI: 0.003-0.07%), respectively. The overall malaria prevalence based on PCR detection (N = 7,718) was almost 2.5-fold higher (6.31%, 95% CI: 5.76-6.89%, P < 0.00001). This difference was significantly more pronounced for *P. falciparum* (4.40%, 95% CI: 3.95-4.90%, P < 0.00001) compared with *P. vivax* (1.89%, 95% CI: 1.60-2.22%, P < 0.001) and *P. malariae* infections (0.22%, 95% CI: 0.13-0.35%, P < 0.0001). The significant proportion of microscopy-negative but PCR-positive individuals (289/7,491, 3.85%) suggest microscopic examination frequently underestimated malaria infections and that active case detection based on microscopy may miss a significant reservoir of infection, especially in low-transmission settings.

Other titles in this series are:

- **Am J Trop Med Hyg 2016 Oct 5. Diagnosis and Treatment of Plasmodium vivax Malaria**
Baird JK et al .Eijkman-Oxford Clinical Research Unit, Jakarta kevin.baird@ndm.ox.ac.uk.
- **Am J Trop Med Hyg 2016 Oct 5. Plasmodium vivax Landscape in Brazil: Scenario and Challenges**
Siqueira AM et al
- **Am J Trop Med Hyg 2016 Oct 5. Epidemiology and Control of Plasmodium vivax in Afghanistan** Leslie T et al
- **Am J Trop Med Hyg 2016 Oct 5. Plasmodium vivax Malaria in Cambodia**
Siv S et al
- **Am J Trop Med Hyg 2016 Oct 5. 4,5 Attacking Plasmodium vivax**
Baird JK Eijkman-Oxford Clinical Research Unit, Jakarta, kbaird@eocru.org
- **Am J Trop Med Hyg 2016 Oct 5. Epidemiology of Plasmodium vivax in Indonesia**
Surjadjaja C et al
- **Am J Trop Med Hyg 2016 Oct 5. Elimination of Plasmodium vivax Malaria in Azerbaijan**
Mammadov S et al

35. **Am J Trop Med Hyg 2016 Oct 31. pii: 16-0598. [Epub ahead of print] 3,5**

Referral Patterns of Community Health Workers Diagnosing and Treating Malaria: Cluster-Randomized Trials in Two Areas of High- and Low-Malaria Transmission in Southwestern Uganda

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Malaria-endemic countries have implemented community health worker (CHW) programs to provide malaria diagnosis and treatment to populations living beyond the reach of health systems. However, there is limited evidence describing the referral practices of CHWs. We examined the impact of malaria rapid diagnostic tests (mRDTs) on CHW referral in two cluster-randomized trials, one conducted in a moderate-to-high malaria transmission setting and one in a low-transmission setting in Uganda, between January 2010 and July 2012. All CHWs were trained to prescribe artemisinin-based combination therapy (ACT) for malaria and recognize signs and symptoms for referral to health centers. CHWs in the control arm used a presumptive diagnosis for malaria based on clinical symptoms, whereas intervention arm CHWs used mRDTs. CHWs recorded ACT prescriptions, mRDT results, and referral inpatient registers. An intention-to-treat analysis was undertaken using multivariable logistic regression. Referral was more frequent in the intervention arm versus the control arm (moderate-to-high transmission, $P < 0.001$; low transmission, $P < 0.001$). Despite this increase, referral advice was not always given when ACTs or prereferral rectal artesunate were prescribed: 14% prescribed rectal artesunate in the moderate-to-high setting were not referred. In addition, CHWs considered factors alongside mRDTs when referring. Child visits during the weekends or the rainy season were less likely to be referred, whereas visits to CHWs more distant from health centers were more likely to be referred (low transmission only). CHWs using mRDTs and ACTs increased referral compared with CHWs using a presumptive diagnosis. To address these concerns, referral training should be emphasized in CHW programs as they are scaled-up.

36. [Am J Trop Med Hyg 2016 Oct 31. pii: 16-0160](#)

Implications of Plasmodium vivax Biology for Control, Elimination, and Research

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This paper summarizes our current understanding of the biology of *Plasmodium vivax*, how it differs from *Plasmodium falciparum*, and how these differences explain the need for *P. vivax*-tailored interventions. The article further pinpoints knowledge gaps where investments in research are needed to help identify and develop such specific interventions. The principal obstacles to reduce and eventually eliminate *P. vivax* reside in 1) its higher vectorial capacity compared with *P. falciparum* due to its ability to develop at lower temperature and over a shorter sporogonic cycle in the vector, allowing transmission in temperate zones and making it less sensitive to vector control measures that are otherwise effective on *P. falciparum*; 2) the presence of dormant liver forms (hypnozoites), sustaining multiple relapsing episodes from a single infectious bite that cannot be diagnosed and are not susceptible to any available antimalarial except primaquine, with routine deployment restricted by toxicity; 3) low parasite densities, which are difficult to detect with current diagnostics leading to missed diagnoses and delayed treatments (and protracted transmission), coupled with 4) transmission stages (gametocytes) occurring early in acute infections, before infection is diagnosed.

37. [Lancet 2016 Sep 17;388\(10050\):1193-201.](#)

The effect of mass mosquito trapping on malaria transmission and disease burden (SolarMal): a stepped-wedge cluster-randomised trial

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BACKGROUND: Odour baits can attract host-seeking *Anopheles* mosquitoes indoors and outdoors. We assessed the effects of mass deployment of odour-baited traps on malaria transmission and disease burden. **METHODS:** We installed solar-powered odour-baited mosquito trapping systems (SMoTS) to households on Rusinga Island, Lake Victoria, western Kenya (mean population 24 879), in a stepped-wedge cluster-randomised trial. All residents in the completed health and demographic

surveillance system were eligible to participate. We used the travelling salesman algorithm to assign all households to a cluster (50 or 51 geographically contiguous households); nine contiguous clusters formed a metacluster. Initially, no cluster had SMoTS (non-intervened). During the course of the intervention roll-out SMoTS were gradually installed cluster by cluster until all clusters had SMoTS installed (intervened). We generated 27 cluster randomisations, with the cluster as unit of randomisation, to establish the order to install the traps in the clusters until all had a SMoTS installed. Field workers and participants were not masked to group allocation. The primary outcome of clinical malaria was monitored through repeated household visits covering the entire population, once before roll-out (baseline) and five times throughout the 2-year roll-out. We measured clinical malaria as fever plus a positive result with a rapid diagnostic test. The SolarMal project was registered on the Dutch Trial Register (NTR 3496). **FINDINGS:** We enrolled 34 041 participants between April 25, 2012, and March 23, 2015, to 81 clusters and nine metaclusters. 4358 households were provided with SMoTS during roll-out between June 3, 2013, and May 16, 2015. 23 clinical malaria episodes were recorded in intervened clusters and 33 episodes in non-intervened clusters (adjusted effectiveness 40.8% [95% CI -172.8 to 87.1], $p=0.5$) during the roll-out. Malaria prevalence measured by rapid diagnostic test was 29.8% (95% CI 20.9-38.0) lower in SMoTS clusters (prevalence 23.7%; 1552 of 6550 people) than in non-intervened clusters (prevalence 34.5%; 2002 of 5795 people). **INTERPRETATION:** The unexpectedly low clinical incidence of malaria during roll-out led to an imprecise estimate of effectiveness from the clinical incidence data. The substantial effect on malaria prevalence is explained by reduction in densities of *Anopheles funestus*. Odour-baited traps might be an effective malaria intervention. **FUNDING:** COMON Foundation.

Non communicable diseases

38. [BMJ 2016;355:i5923 Editorials](#)

Developing a vaccine against Zika

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We've made a good start but substantial challenges remain

The race to develop a vaccine against Zika began in February 2016, when the unusual clustering of cases of microcephaly and other neurological disorders associated with Zika virus infection led to the declaration of a public health emergency of international concern. When the World Health Organization held its first consultation in March, 14 active vaccine projects had already been announced. Today, WHO's pipeline tracker counts about 30 active projects, pursued by developers from endemic and non-endemic countries, private and public sector.

Such a jump start in vaccine development is rare, and several candidates have already progressed to clinical development. This pace is facilitated by our collective experience in developing vaccines against flaviviruses, the availability of novel vaccine technologies that greatly facilitate manufacturing of vaccines appropriate for trials in humans, and generous funding from some governments to support both basic research and product development.

However, there is no guarantee that the pace we have seen in early development will continue for the clinical evaluation of vaccine candidates, nor that the technical feasibility of developing a vaccine will ultimately result in products capable of effectively protecting the public. To overcome such difficulties WHO established the Research and Development Blueprint for Action to Prevent Epidemics. This framework sets out to guide the preclinical and clinical development of vaccines, diagnostics, and therapeutics for various priority diseases, including Zika. The blueprint builds on lessons learnt from the Ebola epidemic, where substantial delays occurred as stakeholders sought consensus on the best path forwards and tried to establish the necessary agreements. It aims to minimise delays and uncertainty. Providing guidance on development of Zika vaccine candidates is the first test of this blueprint.

At the March 2016 consultation, WHO proposed that priority should be given to developing vaccines to protect women from developing Zika disease during pregnancy, which could prevent microcephaly and related pathologies in newborn infants. In the following months WHO, Unicef, and other partners developed a target product profile (TPP) for Zika vaccines for use in an emergency context. The TPP

describes the minimal and preferred characteristics of a product destined for a specific public health purpose. Although it is not a regulatory document, it describes performance characteristics that are both technologically achievable and able to fulfil a public health function. The aim of the TPP is not to narrow the scope of scientific work but to direct the scientific, regulatory, and public health communities to priority characteristics.

Developing the TPP for Zika vaccine was challenging, mostly because we have a limited understanding of the epidemiology of the infection and the relative importance of different routes of transmission. Safety is paramount because the priority target group is women of childbearing age and some women may already be pregnant when vaccinated. Pregnancy has repercussions for most suitable vaccine technologies. The TPP may be revised as our understanding of the epidemiology, disease, and disease modulating factors evolves.

39. [Lancet 2016 Oct 24. pii: S0140-6736\(16\)31660-9](#)

The heart of Africa: succeeding against the odds

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South Africa and other areas of sub-Saharan Africa have in the past 20 years undergone rapid demographical changes, largely due to urbanisation and changes in lifestyle. This rapid change has led to a marked increase in specific cardiac conditions, such as hypertensive heart disease and coronary artery disease (with the highest prevalence in the middle-aged population), in conjunction with a range of other heart diseases, which are historically common in Africa-eg, rheumatic heart disease, cardiomyopathies, and unoperated congenital heart disease. The short supply of well-equipped screening facilities, late diagnosis, and inadequate care at primary, secondary, and tertiary levels have led to a large burden of patients with poorly treated heart failure. Excellent progress has been made in the understanding of the epidemiology, sociodemographical factors, effect of urbanisation, and pathophysiology of cardiac conditions, such as peripartum cardiomyopathy, rheumatic heart disease, and tuberculous pericarditis, which are common in sub-Saharan Africa. This progress has been achieved largely through several studies, such as the Heart of Soweto, THESUS, REMEDY, BA-HEF, Abeokuta-HF, and the PAPUCO studies. Studies on the suitable therapeutic management of several heart conditions have also been done or are underway. In this Lecture, I provide a personal perspective on the evolving burden of cardiac disease, as witnessed since my appointment at Chris Hani Baragwanath Hospital, in Soweto, South Africa, in 1992, which was also the year that the referendum to end apartheid in South Africa was held. Subsequently, a network of cardiologists was formed under the umbrella of the Heart of Africa Studies and the Pan African Cardiac Society. Furthermore, I summarise the major gaps in the health-care system dealing with the colliding epidemic of communicable and non-communicable heart diseases, including cardiac diseases common in peripartum women. I also touch on the fantastic opportunities available for doing meaningful research with enthusiastic colleagues and, thereby, having a large effect, despite the need to be highly innovative in finding much needed funding support.

40. [Lancet 2016 Nov 15. pii: S0140-6736\(16\)31919-5](#)

Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19·1 million participants

NCD Risk Factor Collaboration (NCD-RisC)

BACKGROUND: Raised blood pressure is an important risk factor for cardiovascular diseases and chronic kidney disease. We estimated worldwide trends in mean systolic and mean diastolic blood pressure, and the prevalence of, and number of people with, raised blood pressure, defined as systolic blood pressure of 140 mmHg or higher or diastolic blood pressure of 90 mm Hg or higher.

METHODS: For this analysis, we pooled national, subnational, or community population-based studies that had measured blood pressure in adults aged 18 years and older. We used a Bayesian hierarchical model to estimate trends from 1975 to 2015 in mean systolic and mean diastolic blood pressure, and the prevalence of raised blood pressure for 200 countries. We calculated the

contributions of changes in prevalence versus population growth and ageing to the increase in the number of adults with raised blood pressure. **FINDINGS:** We pooled 1479 studies that had measured the blood pressures of 19.1 million adults. Global age-standardised mean systolic blood pressure in 2015 was 127.0 mm Hg (95% credible interval 125.7-128.3) in men and 122.3 mm Hg (121.0-123.6) in women; age-standardised mean diastolic blood pressure was 78.7 mm Hg (77.9-79.5) for men and 76.7 mm Hg (75.9-77.6) for women. Global age-standardised prevalence of raised blood pressure was 24.1% (21.4-27.1) in men and 20.1% (17.8-22.5) in women in 2015. Mean systolic and mean diastolic blood pressure decreased substantially from 1975 to 2015 in high-income western and Asia Pacific countries, moving these countries from having some of the highest worldwide blood pressure in 1975 to the lowest in 2015. Mean blood pressure also decreased in women in central and eastern Europe, Latin America and the Caribbean, and, more recently, central Asia, Middle East, and north Africa, but the estimated trends in these super-regions had larger uncertainty than in high-income super-regions. By contrast, mean blood pressure might have increased in east and southeast Asia, south Asia, Oceania, and sub-Saharan Africa. In 2015, central and eastern Europe, sub-Saharan Africa, and south Asia had the highest blood pressure levels. Prevalence of raised blood pressure decreased in high-income and some middle-income countries; it remained unchanged elsewhere. The number of adults with raised blood pressure increased from 594 million in 1975 to 1.13 billion in 2015, with the increase largely in low-income and middle-income countries. The global increase in the number of adults with raised blood pressure is a net effect of increase due to population growth and ageing, and decrease due to declining age-specific prevalence. **INTERPRETATION:** During the past four decades, the highest worldwide blood pressure levels have shifted from high-income countries to low-income countries in south Asia and sub-Saharan Africa due to opposite trends, while blood pressure has been persistently high in central and eastern Europe. **FUNDING:** Wellcome Trust.

41. **Trop Med Int Health 2016 Sep;21(9):1099-105**

Infant oral mutilation in East Africa - therapeutic and ritual grounds

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This paper reviews the practice and ritual traditions of infant oral mutilation, drawing on a literature search in PubMed and Google Scholar, historical reports, relevant textbooks, NGO materials and personal observations of the authors.

In 2004, the World Medical Association put IOM on its agenda and urgently called for an end of this practice (http://www.wma.net/en/40news/20archives/2004/2004_07/, [56]. Although access to academic dental care is rare in many parts of Africa, improved dental care, especially in rural areas of affected countries, received high priority and appropriate commitment was imperatively demanded. Considering the small number of dental surgeons in many parts of Africa, the problem cannot be solved by NGOs such as Dentaid or Dentists Without Limits alone. Concerted efforts involving political commitment, a legal basis, appropriate stimuli and adequate incentives for medical students and dentists, plus better formal dentistry education are required. Most importantly, awareness-raising campaigns among both the general population [5] and healthcare professionals, separation of facts from fiction and sound oral public health education will encourage indigenous populations [18] to refrain from the injurious custom of IOM.

Public Health

42. **Am J Trop Med Hyg 2016 Nov 7. pii: 15-0910**

Combining Footwear with Public Health Iconography to Prevent Soil-Transmitted Helminth Infections

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Shoes are effective for blocking soil-transmitted helminths (STHs) that penetrate the skin. Unfortunately, shoe-wearing is uncommon in many areas where STHs are prevalent, in part because local populations are unaware of the health benefits of wearing shoes. This is especially true in low-

literacy populations, where information dissemination through written messages is not possible. We launched a public health intervention that combines a public health image with sandals. The image is a "lenticular image" that combines two alternating pictures to depict the efficacy of shoes for preventing STH infection. This image is adhered to the shoe, such that the message is linked directly to the primary means of prevention. To create a culturally appropriate image, we conducted five focus group discussions, each with a different gender and age combination. Results of focus group discussions reinforced the importance of refining public health messages well in advance of distribution so that cultural acceptability is strong. After the image was finalized, we deployed shoes with the image in communities in western Uganda where hookworm is prevalent. We found that the frequency of shoe-wearing was 25% higher in communities receiving the shoes than in control communities. Microscopic analyses of fecal samples for parasites showed a sustained reduction in infection intensity for parasites transmitted directly through the feet when people received shoes with a public health image. Our results show that combining culturally appropriate images with public health interventions can be effective in low-literacy populations.

43. [Lancet 2016 Sep 24;388\(10051\):1337-48](#)

Scaling up physical activity interventions worldwide: stepping up to larger and smarter approaches to get people moving

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The global pandemic of physical inactivity requires a multisectoral, multidisciplinary public-health response. Scaling up interventions that are capable of increasing levels of physical activity in populations across the varying cultural, geographic, social, and economic contexts worldwide is challenging, but feasible. In this paper, we review the factors that could help to achieve this. We use a mixed-methods approach to comprehensively examine these factors, drawing on the best available evidence from both evidence-to-practice and practice-to-evidence methods. Policies to support active living across society are needed, particularly outside the health-care sector, as demonstrated by some of the successful examples of scale up identified in this paper. Researchers, research funders, and practitioners and policymakers in culture, education, health, leisure, planning, and transport, and civil society as a whole, all have a role. We should embrace the challenge of taking action to a higher level, aligning physical activity and health objectives with broader social, environmental, and sustainable development goals.

44. [Lancet 2016 Sep 24;388\(10051\):1311-24](#)

The economic burden of physical inactivity: a global analysis of major non-communicable diseases

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BACKGROUND: The pandemic of physical inactivity is associated with a range of chronic diseases and early deaths. Despite the well documented disease burden, the economic burden of physical inactivity remains unquantified at the global level. A better understanding of the economic burden could help to inform resource prioritisation and motivate efforts to increase levels of physical activity worldwide. **METHODS:** Direct health-care costs, productivity losses, and disability-adjusted life-years (DALYs) attributable to physical inactivity were estimated with standardised methods and the best data available for 142 countries, representing 93.2% of the world's population. Direct health-care costs and DALYs were estimated for coronary heart disease, stroke, type 2 diabetes, breast cancer, and colon cancer attributable to physical inactivity. Productivity losses were estimated with a friction cost approach for physical inactivity related mortality. Analyses were based on national physical inactivity prevalence from available countries, and adjusted population attributable fractions (PAFs) associated with physical inactivity for each disease outcome and all-cause mortality. **FINDINGS:** Conservatively estimated, physical inactivity cost health-care systems international \$ (INT\$) 53.8 billion worldwide in 2013, of which \$31.2 billion was paid by the public sector, \$12.9 billion by the private sector, and

\$9.7 billion by households. In addition, physical inactivity related deaths contribute to \$13.7 billion in productivity losses, and physical inactivity was responsible for 13.4 million DALYs worldwide. High-income countries bear a larger proportion of economic burden (80.8% of health-care costs and 60.4% of indirect costs), whereas low-income and middle-income countries have a larger proportion of the disease burden (75.0% of DALYs). Sensitivity analyses based on less conservative assumptions led to much higher estimates. **INTERPRETATION:** In addition to morbidity and premature mortality, physical inactivity is responsible for a substantial economic burden. This paper provides further justification to prioritise promotion of regular physical activity worldwide as part of a comprehensive strategy to reduce non-communicable diseases.

45. [Lancet 2016 Oct 15;388\(10054\):1939-1951](#)

Impact of air pollution on the burden of chronic respiratory diseases in China: time for urgent action

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Comment in *Lancet*. 2016 Oct 15;388(10054):1851. *Lancet*. 2016 Oct 15;388(10054):1859-1860.

Lancet. 2016 Oct 15;388(10054):1860-1862. *Lancet*. 2016 Oct 15;388(10054):1863-1864.

In China, where air pollution has become a major threat to public health, public awareness of the detrimental effects of air pollution on respiratory health is increasing-particularly in relation to haze days. Air pollutant emission levels in China remain substantially higher than are those in developed countries. Moreover, industry, traffic, and household biomass combustion have become major sources of air pollutant emissions, with substantial spatial and temporal variations. In this Review, we focus on the major constituents of air pollutants and their impacts on chronic respiratory diseases. We highlight targets for interventions and recommendations for pollution reduction through industrial upgrading, vehicle and fuel renovation, improvements in public transportation, lowering of personal exposure, mitigation of the direct effects of air pollution through healthy city development, intervention at population-based level (systematic health education, intensive and individualised intervention, pre-emptive measures, and rehabilitation), and improvement in air quality. The implementation of a national environmental protection policy has become urgent.

46. [Lancet 2016 Oct 12. pii: S0140-6736\(16\)31650-6](#)

The history, geography, and sociology of slums and the health problems of people who live in slums

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Massive slums have become major features of cities in many low-income and middle-income countries. Here, in the first in a Series of two papers, we discuss why slums are unhealthy places with especially high risks of infection and injury. We show that children are especially vulnerable, and that the combination of malnutrition and recurrent diarrhoea leads to stunted growth and longer-term effects on cognitive development. We find that the scientific literature on slum health is underdeveloped in comparison to urban health, and poverty and health. This shortcoming is important because health is affected by factors arising from the shared physical and social environment, which have effects beyond those of poverty alone. In the second paper we will consider what can be done to improve health and make recommendations for the development of slum health as a field of study.

47. [Lancet 2016 Oct 12. pii: S0140-6736\(16\)31848-7](#)

Improving the health and welfare of people who live in slums

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In the first paper in this Series we assessed theoretical and empirical evidence and concluded that the health of people living in slums is a function not only of poverty but of intimately shared physical and

social environments. In this paper we extend the theory of so-called neighbourhood effects. Slums offer high returns on investment because beneficial effects are shared across many people in densely populated neighbourhoods. Neighbourhood effects also help explain how and why the benefits of interventions vary between slum and non-slum spaces and between slums. We build on this spatial concept of slums to argue that, in all low-income and middle-income countries, census tracts should henceforth be designated slum or non-slum both to inform local policy and as the basis for research surveys that build on censuses. We argue that slum health should be promoted as a topic of enquiry alongside poverty and health.

48. [Lancet 2016 Nov 11. pii: S0140-6736\(16\)32124-9](#)

The Lancet Countdown: tracking progress on health and climate change

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The Lancet Countdown: tracking progress on health and climate change is an international, multidisciplinary research collaboration between academic institutions and practitioners across the world. It follows on from the work of the 2015 Lancet Commission, which concluded that the response to climate change could be "the greatest global health opportunity of the 21st century". The Lancet Countdown aims to track the health impacts of climate hazards; health resilience and adaptation; health co-benefits of climate change mitigation; economics and finance; and political and broader engagement. These focus areas form the five thematic working groups of the Lancet Countdown and represent different aspects of the complex association between health and climate change. These thematic groups will provide indicators for a global overview of health and climate change; national case studies highlighting countries leading the way or going against the trend; and engagement with a range of stakeholders. The Lancet Countdown ultimately aims to report annually on a series of indicators across these five working groups. This paper outlines the potential indicators and indicator domains to be tracked by the collaboration, with suggestions on the methodologies and datasets available to achieve this end. The proposed indicator domains require further refinement, and mark the beginning of an ongoing consultation process—from November, 2016 to early 2017—to develop these domains, identify key areas not currently covered, and change indicators where necessary. This collaboration will actively seek to engage with existing monitoring processes, such as the UN Sustainable Development Goals and WHO's climate and health country profiles. The indicators will also evolve over time through ongoing collaboration with experts and a range of stakeholders, and be dependent on the emergence of new evidence and knowledge. During the course of its work, the Lancet Countdown will adopt a collaborative and iterative process, which aims to complement existing initiatives, welcome engagement with new partners, and be open to developing new research projects on health and climate change.

Sexual Reproductive Health

49. [BMJ 2016;355:i5662 Research](#)

International standards for symphysis-fundal height based on serial measurements from the Fetal Growth Longitudinal Study of the INTERGROWTH-21st Project: prospective cohort study in eight countries

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Objective To create international symphysis-fundal height standards derived from pregnancies of healthy women with good maternal and perinatal outcomes.

Design Prospective longitudinal observational study.

Setting Eight geographically diverse urban regions in Brazil, China, India, Italy, Kenya, Oman, United Kingdom, and United States.

Participants Healthy, well nourished pregnant women enrolled into the Fetal Growth Longitudinal Study component of the INTERGROWTH-21st Project at 9-14 weeks' gestation, and followed up until birth.

Main outcome measures Symphysis-fundal height was measured every five weeks from 14 weeks' gestation until birth using standardised methods and dedicated research staff who were blinded to the symphysis-fundal height measurements by turning the tape measure so that numbers were not visible during examination. The best fitting curve was selected using second degree fractional polynomials and further modelled in a multilevel framework to account for the longitudinal design of the study.

Results Of 13 108 women screened in the first trimester, 4607 (35.1%) met the study entry criteria. Of the eligible women, 4321 (93.8%) had pregnancies without major complications and delivered live singletons without congenital malformations. The median number of symphysis-fundal height measurements was 5.0 (range 1-7); 3976 (92.0%) women had four or more measurements. Symphysis-fundal height measurements increased almost linearly with gestational age; data were used to determine fitted 3rd, 50th, and 97th centile curves, which showed excellent agreement with observed values.

Conclusions This study presents international standards to measure symphysis-fundal height as a first level screening tool for fetal growth disturbances.

Conclusions and policy implications Assessment of fetal size and growth by SFH measurement is a simple and inexpensive clinical activity, widely used during antenatal care in both high and low income settings. The international standards we present will go some way to reducing the wide range in sensitivity for the detection of small for gestational age. Given that SFH measurement constitutes a first level screen, with suspected pregnancies referred—without treatment—for further non-invasive investigations with ultrasound, a high false positive rate could be acceptable if it leads to improved detection rates overall. Future work should concentrate on the optimal frequency of SFH measurement to maximise detection.

Assessment of fetal growth using SFH remains an important first level screening tool during routine antenatal care. We recommend the use of the new international SFH standards in combination with standardised measurement methodology to unify and improve clinical practice. Plotting measurements in the medical records with these tools should be undertaken to identify women who require referral for an ultrasound scan.

50. [Lancet 2016 Nov 1. pii: S0140-6736\(16\)31392-7](#)

The global burden of women's cancers: a grand challenge in global health

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Every year, more than 2 million women worldwide are diagnosed with breast or cervical cancer, yet where a woman lives, her socioeconomic status, and agency largely determines whether she will develop one of these cancers and will ultimately survive. In regions with scarce resources, fragile or fragmented health systems, cancer contributes to the cycle of poverty. Proven and cost-effective interventions are available for both these common cancers, yet for so many women access to these is beyond reach. These inequities highlight the urgent need in low-income and middle-income countries for sustainable investments in the entire continuum of cancer control, from prevention to palliative care, and in the development of high-quality population-based cancer registries. In this first paper of the Series on health, equity, and women's cancers, we describe the burden of breast and cervical cancer, with an emphasis on global and regional trends in incidence, mortality, and survival, and the consequences, especially in socioeconomically disadvantaged women in different settings.

See also:

- [Lancet. 2016 Nov 1. pii: S0140-6736\(16\)31393-9. **Changing global policy to deliver safe, equitable, and affordable care for women's cancers.**](#) Ginsburg O et al Women's College Research Institute, Faculty of Medicine, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada ophira.ginsburg@wchospital.ca

- Lancet. 2016 Nov 1. pii: S0140-6736(16)31795-0. **Interventions to close the divide for women with breast and cervical cancer between low-income and middle-income countries and high-income countries.** Denny L et al Department of Obstetrics and Gynaecology, University of Cape Town and Groote Schuur Hospital, Cape Town, South Africa. lynette.denny@uct.ac.za

51. Lancet 2016 Sep 14. pii: S0140-6736(16)31533-1

Diversity and divergence: the dynamic burden of poor maternal health

(First article in series on maternal health.)

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Maternal health is a big issue and is central to sustainable development. Each year, about 210 million women become pregnant and about 140 million new born babies are delivered—the sheer scale of maternal health alone makes maternal well being and survival vital concerns. In this Series paper, we adopt primarily a numerical lens to illuminate patterns and trends in outcomes, but recognize that understanding of poor maternal health also warrants other perspectives, such as human rights. Our use of the best available evidence highlights the dynamic burden of maternal health problems. Increased diversity in the magnitude and causes of maternal mortality and morbidity between and within populations presents a major challenge to policies and programmes aiming to match varying needs with diverse types of care across different settings. This diversity, in turn, contributes to a widening gap or differences in levels of maternal mortality, seen most acutely in vulnerable populations, predominantly in sub-Saharan Africa. Strong political and technical commitment to improve equity-sensitive information systems is required to monitor the gap in maternal mortality, and robust research is needed to elucidate major interactions between the broad range of health problems. Diversity and divergence are defining characteristics of poor maternal health in the 21st century. Progress on this issue will be an ultimate judge of sustainable development.

52. Lancet 2016 Sep 14. pii: S0140-6736(16)31533-1

Diversity and divergence: the dynamic burden of poor maternal health

(Second article in series on maternal health.)

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On the continuum of maternal health care, two extreme situations exist: too little, too late (TLTL) and too much, too soon (TMTS). TLTL describes care with inadequate resources, below evidence-based standards, or care withheld or unavailable until too late to help. TLTL is an underlying problem associated with high maternal mortality and morbidity. TMTS describes the routine over-medicalisation of normal pregnancy and birth. TMTS includes unnecessary use of non-evidence-based interventions, as well as use of interventions that can be life saving when used appropriately, but harmful when applied routinely or overused. As facility births increase, so does the recognition that TMTS causes harm and increases health costs, and often concentrates disrespect and abuse. Although TMTS is typically ascribed to high-income countries and TLTL to low-income and middle-income ones, social and health inequities mean these extremes coexist in many countries. A global approach to quality and equitable maternal health, supporting the implementation of respectful, evidence-based care for all, is urgently needed. We present a systematic review of evidence-based clinical practice guidelines for routine antenatal, intrapartum, and postnatal care, categorising them as recommended, recommended only for clinical indications, and not recommended. We also present prevalence data from middle-income countries for specific clinical practices, which demonstrate TLTL and increasing TMTS. Health-care providers and health systems need to ensure that all women receive high-quality, evidence-based, equitable and respectful care. The right amount of care needs to be offered at the right time, and delivered in a manner that respects, protects, and promotes human rights.

53. Lancet 2016 Sep 14. pii: S0140-6736(16)31528-8

The scale, scope, coverage, and capability of childbirth care

(Third article in series on maternal health.)

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All women should have access to high quality maternity services-but what do we know about the health care available to and used by women? With a focus on low-income and middle-income countries, we present data that policy makers and planners can use to evaluate whether maternal health services are functioning to meet needs of women nationally, and potentially subnationally. We describe configurations of intrapartum care systems, and focus in particular on where, and with whom, deliveries take place. The necessity of ascertaining actual facility capability and providers' skills is highlighted, as is the paucity of information on maternity waiting homes and transport as mechanisms to link women to care. Furthermore, we stress the importance of assessment of routine provision of care(not just emergency care), and contextualise this importance within geographic circumstances (eg, in sparsely-populated regions vs dense urban areas). Although no single model-of-care fits all contexts, we discuss implications of the models we observe, and consider changes that might improve services and accelerate response to future challenges. Areas that need attention include minimisation of overintervention while responding to the changing disease burden. Conceptualisation, systematic measurement, and effective tackling of coverage and configuration challenges to implement high quality, respectful maternal health-care services are key to ensure that every woman can give birth without risk to her life, or that of her baby.

- [The Lancet, 388, 10057 **Drivers of maternity care in high-income countries: can health systems support woman-centred care?** (Fourth article in series on maternal health.)
Dorothy Shaw, et al.]

54. [The Lancet 388, 10057, 5–11 November 2016, 2296–2306](#)

Next generation maternal health: external shocks and health-system innovations

(Fifth article in series on maternal health.)

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In this Series we document the substantial progress in the reduction of maternal mortality and discuss the current state of science in reducing maternal mortality. However, maternal health is also powerfully influenced by the structures and resources of societies, communities, and health systems. We discuss the shocks from outside of the field of maternal health that will influence maternal survival including economic growth in low-income and middle-income countries, urbanisation, and health crises due to disease outbreaks, extreme weather, and conflict. Policy and technological innovations, such as universal health coverage, behavioural economics, mobile health, and the data revolution, are changing health systems and ushering in new approaches to affect the health of mothers. Research and policy will need to reflect the changing maternal health landscape.

55. [The Lancet 388, 10057, 5–11 November 2016, 2307–2320](#)

Quality maternity care for every woman, everywhere: a call to action

(Sixth article in series on maternal health.)

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To improve maternal health requires action to ensure quality maternal health care for all women and girls, and to guarantee access to care for those outside the system. In this paper, we highlight some of the most pressing issues in maternal health and ask: what steps can be taken in the next 5 years to catalyse action toward achieving the Sustainable Development Goal target of less than 70 maternal deaths per 100 000 livebirths by 2030, with no single country exceeding 140? What steps can be taken to ensure that high-quality maternal health care is prioritised for every woman and girl everywhere? We call on all stakeholders to work together in securing a healthy, prosperous future for all women. National and local governments must be supported by development partners, civil society, and the private sector in leading efforts to improve maternal–perinatal health. This effort means dedicating needed policies and resources, and sustaining implementation to address the many factors influencing

maternal health-care provision and use. Five priority actions emerge for all partners: prioritise quality maternal health services that respond to the local specificities of need, and meet emerging challenges; promote equity through universal coverage of quality maternal health services, including for the most vulnerable women; increase the resilience and strength of health systems by optimising the health workforce, and improve facility capability; guarantee sustainable finances for maternal–perinatal health; and accelerate progress through evidence, advocacy, and accountability.

56. [Trop Med Int Health 2016 Sep;21\(9\):1138-46](#)

Evaluation of syndromic management guidelines for treatment of sexually transmitted infections in South African women

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Objective: To evaluate the performance of three different guidelines for the management of vaginal discharge syndrome (VDS) for women living in a rural setting in South Africa.

Methods: We conducted a secondary analysis of data from a cross-sectional study in Mopani District, South Africa. The 2015 and 2008 guidelines of the South African Department of Health (DoH) and the most recent WHO guidelines were evaluated for adequate treatment of *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium* and *Trichomonas vaginalis* infection.

Results: Of the 489 women included in this analysis, 35% presented with VDS according to the DoH and 30% per WHO definition of VDS. Fifty-six per cent of the women with VDS would be treated adequately for these STI when using the 2015 DoH guideline, whereas 76% ($P = 0.01$) and 64% ($P = 0.35$) would receive adequate treatment with the 2008 DoH and WHO guidelines, respectively. Of the symptomatic women who tested negative for all four STI, STI treatment would have been indicated for 36% as per 2015 DoH guideline vs. 69% ($P < 0.001$) per 2008 DoH and 67% ($P < 0.001$) per WHO guidelines.

Conclusion: A considerable proportion of symptomatic women infected with these common curable STI would receive adequate treatment when using a syndromic management approach, and significant differences exist between the three guidelines. Many symptomatic women without these STI receive broad-spectrum antibiotics, so new approaches are needed to improve syndromic STI control.

57. [Trop Med Int Health 2016 Oct;21\(10\):1209-1239](#)

Actual and predicted prevalence of alcohol consumption during pregnancy in the WHO African Region

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Objective: To estimate the prevalence of alcohol consumption and binge drinking during pregnancy among the general population in the World Health Organization (WHO) African Region, by country.

Methods: First, a comprehensive systematic literature search was performed to identify all published and unpublished studies. Then, several meta-analyses, assuming a random-effects model, were conducted to estimate the prevalence of alcohol consumption and binge drinking during pregnancy among the general population for countries in the WHO African Region with two or more studies available. Lastly, for countries with less than two studies or no known data predictions were obtained using regression modelling.

Results: The estimated prevalence of alcohol consumption during pregnancy among the general population ranged from 2.2% (95% confidence interval [CI]: 1.6-2.8%; Equatorial Guinea) to 12.6% (95% CI: 9.9-15.4%; Cameroon) in Central Africa, 3.4% (95% CI: 2.6-4.3%; Seychelles) to 20.5% (95% CI: 16.4-24.7%; Uganda) in Eastern Africa, 5.7% (95% CI: 4.4-7.1%; Botswana) to 14.2% (95% CI: 11.1-17.3%; Namibia) in Southern Africa, 6.6% (95% CI: 5.0-8.3%; Mauritania) to 14.8% (95% CI: 11.6-17.9%; Sierra Leone) in Western Africa, and 4.3% (95% CI: 3.2-5.3%; Algeria) in Northern Africa.

Conclusions: The high prevalence of alcohol consumption and binge drinking during pregnancy in some African countries calls for educational campaigns, screening and targeted interventions for women of childbearing age.

58. Trop Med Int Health 2016 Nov;21(11):1348-1365

Pregnancy and childbirth after repair of obstetric fistula in sub-Saharan Africa: Scoping Review

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Objective: To synthesise the evidence on pregnancy and childbirth after repair of obstetric fistula in sub-Saharan Africa and to identify the existing knowledge gaps.

Methods: A scoping review of studies reporting on pregnancy and childbirth in women who underwent repair for obstetric fistula in sub-Saharan Africa was conducted. We searched relevant articles published between 1 January 1970 and 31 March 2016, without methodological or language restrictions, in electronic databases, general Internet sources and grey literature.

Results: A total of 16 studies were included in the narrative synthesis. The findings indicate that many women in sub-Saharan Africa still desire to become pregnant after the repair of their obstetric fistula. The overall proportion of pregnancies after repair estimated in 11 studies was 17.4% (ranging from 2.5% to 40%). Among the 459 deliveries for which the mode of delivery was reported, 208 women (45.3%) delivered by elective caesarean section (CS), 176 women (38.4%) by emergency CS and 75 women (16.3%) by vaginal delivery. Recurrence of fistula was a common maternal complication in included studies while abortions/miscarriage, stillbirths and neonatal deaths were frequent foetal consequences. Vaginal delivery and emergency C-section were associated with increased risk of stillbirth, recurrence of the fistula or even maternal death.

Conclusion: Women who get pregnant after repair of obstetric fistula carry a high risk for pregnancy complications. However, the current evidence does not provide precise estimates of the incidence of pregnancy and pregnancy outcomes post-repair. Therefore, studies clearly assessing these outcomes with the appropriate study designs are needed.