Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Measuring and monitoring child health and wellbeing: recommendations for tracking progress with a core set of indicators in the Sustainable Development Goals era

Jennifer Requejo, Kathleen Strong, Ambrose Agweyu, Sk Masum Billah, Cynthia Boschi-Pinto, Sayaka Horiuchi, Zeina Jamaluddine, Marzia Lazzerini, Abdoulaye Maiga, Neil McKerrow, Melinda Munos, Lois Park, Joanna Schellenberg, Ralf Weigel

Although great improvements in child survival were achieved in the past two decades, progress has been uneven within and across countries, and the COVID-19 pandemic threatens to reverse previous advances. Demographic and epidemiological transitions around the world have resulted in shifts in the causes and distribution of child death and diseases, and many children are living with short-term and long-term chronic illnesses and disabilities. These changes, plus global threats such as pandemics, transnational and national security issues, and climate change, mean that regular monitoring of child health and wellbeing is essential if we are to achieve the Sustainable Development Goals. This Health Policy describes the three-phased process undertaken by the Child Health Accountability Tracking technical advisory group (CHAT) to develop a core set of indicators on child health and wellbeing for global monitoring purposes, and presents CHAT’s research recommendations to address data gaps. CHAT reached consensus on 20 core indicators specific to the health sector, which include 11 impact-level indicators and nine outcome-level indicators that cover the topics of: acute conditions and prevention; health promotion and child development; and chronic conditions, disabilities, injuries, and violence against children. An additional six indicators (three impact and three outcome) that capture information on child health issues such as malaria and HIV are recommended; however, these indicators are only relevant to high-burden regions. CHAT’s four research priorities will require investments in health information systems and measurement activities. These investments will help to increase data on children aged 5–9 years; develop standard metadata and data collection processes to enable cross-country comparisons and progress assessments over time; reach a global consensus on essential interventions and associated indicators for monitoring emerging priority areas such as child development, chronic conditions, disabilities, and injuries; and implement strategies to increase the uptake of data on child health to improve evidence-based planning, programming, and advocacy efforts.

Introduction

The global community affirmed its commitment to end preventable child deaths and to support child development with the adoption of the Sustainable Development Goal (SDG) framework in 2015. Although children have a better chance of survival now than they did two decades ago, progress has been inconsistent around the world. Latest estimates indicate that 54 of the 193 UN member states will need accelerated action to achieve the SDG 3 target of reducing mortality in children younger than 5 years to at least as low as 25 per 1000 livebirths by 2030. Most of these countries are in sub-Saharan Africa and central and southern Asia. Children everywhere are facing an uncertain future given the disruptions to services, schools, and economies caused by the COVID-19 pandemic and climate change. Many children are also affected by conflicts, rapid urbanisation, and other forms of mass migration; online harassment and harmful online content; and predatory commercial practices. Each country’s ability to meet the health needs of its children is affected by its available resources, the strength of its health system, and its demographic and epidemiological profile. Continued high rates of birth and child mortality in many sub-Saharan African countries, for example, suggest that these countries might face serious challenges with scaling up high-quality, essential child health and nutrition services to meet growing demand. The proportion of child deaths due to chronic conditions and injuries is increasing in many countries, and more children than before are living with short-term and long-term disabilities, placing pressure on already over-stretched health systems to meet growing demand.

Key messages

- Regular monitoring of core child health and wellbeing indicators is essential for holding governments and partners to account for meeting the needs of children, addressing pervasive inequities and health threats, and making progress towards global goals
- The Child Health Accountability Tracking technical advisory group (CHAT) group undertook a three-phased process from 2018 to 2020 to reach a consensus on a core set of indicators for global monitoring that would keep the reporting burden on countries manageable and comprehensively cover key dimensions of child health and wellbeing
- The CHAT group has recommended 20 indicators for capturing information on the topics of acute conditions and prevention; health promotion and child development; and chronic conditions, disabilities, injuries, and violence against children
- The CHAT group has proposed four research recommendations to address data gaps and to increase the uptake of child health and wellbeing data for decision making, which will require investments in measurement activities and in country health information systems
- Next steps for the CHAT group are to develop guidance materials on how countries can adapt the recommended core indicators to their specific contexts, and a companion set of paediatric quality-of-care indicators informed by WHO-led efforts
adequately respond. These complex challenges highlight the importance of regular monitoring of child health to promote action and accountability at global, regional, national, and subnational levels, and to ensure adequate resources are efficiently and equitably allocated to support comprehensive child health policies and programmes.

Numerous global initiatives have been launched in the SDG era, and many include monitoring frameworks with indicators relevant to child survival and development. Although these initiatives have helped raise the visibility of child health, they have inadvertently contributed to widespread use of inconsistently defined indicators and non-standard data collection approaches. Consequently, the reporting burden on countries has increased, and tracking the progress of child health over time and within and across countries has become challenging. To help address these problems, WHO and UNICEF, with support from the US Agency for International Development, co-convened the Child Health Accountability Tracking technical advisory group (CHAT) in 2018. The aims, objectives, and membership of CHAT and the companion advisory groups on maternal and newborn health (Mother and Newborn Information for Tracking Outcomes and Results [MoNITOR]) and adolescent health (Global Action for Measurement of Adolescent Health [GAMA]) are described elsewhere. CHAT set out to map child health and wellbeing indicators included in global accountability initiatives, prioritise a core set of standard indicators on child health and wellbeing, and propose a research agenda to address identified gaps. This Health Policy paper describes how CHAT completed these tasks and presents the group's recommendations.

How the priority indicators were selected: a three-phased approach
CHAT arrived at its indicator and research recommendations through a three-phased approach undertaken between November, 2018, and January, 2020. This approach comprised: (1) mapping existing child health and wellbeing indicators from the most salient global initiatives launched in the SDG era between 2015 and 2020; (2) organising the indicators into three domains covering major aspects of child health and wellbeing; and (3) developing selection criteria and prioritising the indicators (figure). CHAT reaffirmed its recommendations in July, 2021.

Phase one: mapping and review of indicators in relevant global health initiatives
The first step involved mapping and review of indicators for children aged 1 month to 9 years, to complement similar exercises conducted on the first month of life by MoNITOR and the 10–19 year age group by GAMA. Phase one also covered the survive, thrive, and transform dimensions as defined in the Global Strategy for Women’s, Children’s, and Adolescents’ Health. The review component focused on relevant global accountability initiatives introduced between 2015 (the start of the SDG era) and 2020 that include indicators on child health and are used for regular progress assessments and comparisons across countries and time. These initiatives include the SDGs, the WHO core list of 100 indicators, Global Strategy, Countdown to 2030, and the Nurturing Care Framework. A total of 149 indicators were identified and compiled into an Excel file that includes information on the metadata for each indicator (appendix pp 1–15).

Phase two: organising indicators into three main domains
CHAT organised the 149 indicators into three domains that cover major areas of child health and wellbeing: acute conditions and prevention; health promotion and child development; and chronic conditions, disabilities, injuries, and violence against children. Separate working groups covering these three domains were established. These groups met face to face and virtually to agree which indicators from the mapping exercise were relevant for their area; develop a set of criteria and a scoring system to rank the indicators; apply the criteria; discuss, refine, and agree on the results; and identify gap areas for future research.

Phase three: prioritisation
The prioritisation phase started with a reconvening of the three groups to reach a consensus on the distribution of indicators by domain using a Delphi process, to identify cross-cutting indicators that were relevant to more than one of the three domains, and to discuss the scoring systems and initial results of each group. After this step, CHAT developed exclusion and inclusion criteria applicable to all three groups. CHAT agreed to select indicators that only capture information on the health sector. Therefore, transform indicators (eg, completion of secondary education and elimination of discrimination) were excluded because they capture information beyond the health sector. In addition, the underlying constructs for transform-related indicators are often poorly defined, and most have little or no available data or collection mechanisms. Indicators on health and social determinants such as poverty, conflict or humanitarian disasters, and pollution were excluded because they are context-specific, are outside the scope of the health sector, and require complex measurement. Assessments of the core indicators should be followed by in-depth investigations that include information on determinants and other factors to understand why a country is progressing or falling behind.

Most (131 [89%]) of the 149 indicators are outcome or impact measures. These types of measures are the most appropriate for global monitoring because greater consensus has been reached on standard definitions and data collection approaches for them, enabling comparisons over time and across settings. Input, output, and process
indicators were excluded because these three types of measures generally capture programme-specific data, country-specific information on financial flows or human resource issues, or are adapted to a given context and are not as useful for global monitoring. Input, output, and process indicators are essential for understanding health system readiness and other aspects of quality of care, and should be considered for in-depth national and subnational monitoring exercises. CHAT also agreed to exclude indicators for which there is evidence of invalidity, such as the collection of information on antibiotic treatment for children with diagnosed or suspected pneumonia through household surveys. Indicator validation studies have been conducted for only a handful of child health indicators, making it unrealistic to insist upon evidence of validity as an inclusion criterion.

CHAT reached consensus on the following inclusion criteria: (1) related to a leading cause of child death, disease, disability, or injury within the age range of 1 month to 9 years; (2) for outcome indicators, effective in addressing one or more of these causes and with programmatic relevance (ie, changes in the indicator can be detected in a timely manner to inform a programmatic response); (3) consensus on a standard definition and data collection approach; (4) feasibility (ie, a reliable mechanism is in place for regular data collection across most countries); (5) stability (ie, making it possible to track trends); and (6) child specific or child centred.

CHAT members agreed that after application of the first list of inclusion criteria, an additional set of inclusion criteria would be applied: (1) elimination of duplicates; (2) ensuring a balance across all leading causes of child death, disability, disease, or injury; and (3) consideration of equity through recommending disaggregation as appropriate (eg, by age, sex, geographical location, wealth quintile, and maternal education) and by ensuring that indicators for diseases associated with poverty (ie, diarrhoea and pneumonia) were included so that the most disadvantaged children are not left behind. Each of the working groups developed some additional criteria specific to their domain area and prepared detailed reports of their deliberations (appendix pp 16–32).

**Recommendations for a core set of child health and wellbeing indicators**

This section presents the CHAT indicator recommendations. Table 1 shows the 20 recommended core indicators that cover the three domain areas and are relevant to all countries. Table 2 presents six additional recommended indicators that should be regularly collected and reported on by countries in high-burden regions. Both tables include information on indicator definitions, associated domain area (more than one domain is relevant for some indicators, such as nutrition indicators), and measurement activities needed.

Of the 149 indicators from the mapping exercise, 79 were related to the domain of acute conditions and prevention. After applying the predefined criteria, these 79 indicators were narrowed down to 16, covering five subdomains: mortality; nutrition; immunisation;
| Definition                                                                 | Indicator type       | Domain and subdomain area | Data sources                                                                 | Measurement uses                                                                 | Areas for measurement improvement                                                                 |
|----------------------------------------------------------------------------|----------------------|---------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Mortality rate of children younger than 5 years                           | Acute and prevention | Health Policy             | Estimate from UN-IGME; can be disaggregated by age to include 1–11 months (postneonatal mortality rate) and 1–4 years (child mortality rate) | Monitoring progress at country and global level towards SDG 3.2.1 (reducing child mortality and ending preventable child deaths) | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Mortality rate of children aged 5–9 years                                  | Acute and prevention | Health Policy             | Estimate from UN-IGME                                                       | Monitoring progress towards the reduction of mortality among older children       | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Causes of death (children younger than 5 years and children aged 5–9 years) | Acute and prevention | Health Policy             | Estimates from WHO and Maternal and Child Epidemiology Estimation Group     | Targeting programmes and policies, and for evidence-based resource allocation     | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Neural tube defect (prevalence)                                           | Chronic condition    | Health Policy             | WHO Global Health Estimates; IHME Global Burden of Disease modelled data on prevalence of moderate and severe neural tube defects at birth | Represents one of the most common congenital malformations; important information for planning prevention and treatment services and anticipating needs | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Uncorrected refractive error (prevalence)                                 | Chronic condition    | Health Policy             | WHO Global Health Estimates                                                  | One of the top ten conditions with the highest YLDs globally; important to ensure children can learn effectively in schools | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Asthma (prevalence)                                                       | Chronic condition    | Health Policy             | WHO Global Health Estimates; IHME Global Burden of Disease modelled data     | One of the top ten conditions with the highest YLDs globally; important to ensure children can learn effectively in schools | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Road traffic accidents (YLDs)                                             | Injury               | Health Policy             | WHO Global Health Estimates                                                  | One of the top ten conditions with the highest YLDs globally; important to ensure children can participate fully in school and extracurricular activities | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Anaemia prevalence in children                                            | Chronic condition    | Health Policy             | WHO global database on anaemia                                               | A leading cause of YLDs for children in LMICs; important for school performance and child health | Improve measurement of burden of disease and consensus on definition; develop indicators on effective interventions |
| Stunting prevalence among children younger than 5 years (SDG 2.2.1)        | Acute and prevention | Health Policy             | Household surveys (DHS, MICS); population surveys, surveillance systems     | Monitoring progress on the reduction of chronic undernutrition in early childhood | Improvements in input data for models; strengthen routine information systems in LMICs and regularity of population-based surveys |
| Wasting prevalence in children younger than 5 years (SDG 2.2.2)            | Acute and prevention | Health Policy             | Household surveys (DHS, MICS); population surveys, surveillance systems     | Monitoring progress on acute malnutrition resulting from poor nutrient intake or disease that increases susceptibility to infection and death | Improvements in input data for models; strengthen routine information systems and regularity of population-based surveys |
| Overweight prevalence among children younger than 5 years (SDG 2.2.2)       | Acute and prevention | Health Policy             | Household surveys (DHS, MICS); population surveys, surveillance systems     | Monitoring progress on overweight to reduce short-term and long-term health risks for children | Improvements in input data for models; strengthen routine information systems in LMICs and regularity of population-based surveys |

(Table 1 continues on next page)
| Definition | Indicator type | Domain and subdomain area | Data sources | Measurement uses | Areas for measurement improvement |
|---|---|---|---|---|---|
| Exclusive breastfeeding | Percentage of children aged 0–5 months who are fed exclusively with breast milk | Outcome | Acute and prevention (nutrition); health promotion and child development (nutrition and growth) | Household surveys (DHS, MICS); population surveys | Monitoring progress | Ensure consistent use of standard definition; regularity of population-based surveys |
| Vitamin A supplementation (full coverage) | Percentage of children aged 6–59 months who received two doses of vitamin A supplements approximately 4–6 months apart in a given calendar year | Outcome | Acute and prevention (nutrition); health promotion and child development (nutrition and growth) | UNICEF global databases based on administrative reports from countries submitted through UNICEF NutriDash system | Monitoring progress is crucial in countries where there is high child mortality and vitamin A deficiency | Strengthen routine information systems in all vitamin A priority countries; further develop approaches to identify children who have not received all recommended vaccinations (including children who have had no vaccinations) |
| Full vaccination coverage (SDG 3.3.1) | Percentage of children who have received two doses of measles-containing vaccine in a given year, according to the nationally recommended schedule | Outcome | Acute and prevention (vaccines) | Estimates from WHO and UNICEF (combining administrative system and population-based survey data) | Monitoring coverage to guide measles eradication and elimination efforts | Strengthen routine information systems in all LMICs, and further develop approaches to identify children who have not received all recommended vaccinations (including children who have had no vaccinations) |
| Measles vaccination | Percentage of children who have received two doses of measles-containing vaccine in a given year, according to the nationally recommended schedule | Outcome | Acute and prevention (vaccines) | Estimates from WHO and UNICEF (combining administrative system and population-based survey data) | Monitoring coverage to guide measles eradication and elimination efforts | Strengthen routine information systems in all LMICs, and further develop approaches to identify children who have not received all recommended vaccinations (including children who have had no vaccinations) |
| Care-seeking for children with symptoms of acute respiratory infection | Percentage of children younger than 5 years with symptoms of acute respiratory infection (cough and fast or difficult breathing due to a problem in the chest and not due to a blocked nose only) in the 2 weeks preceding the survey for whom advice or treatment was sought from a health facility or provider | Outcome | Acute and prevention (pneumonia and diarrhoea) | Household surveys (DHS, MICS); other population-based surveys | Reducing child deaths from pneumonia, a leading cause of death in children | Children aged 5–9 years; improve measurement of antibiotic treatment for children with pneumonia |
| Care-seeking for fever in children younger than 5 years | Percentage of children younger than 5 years with fever in the 2 weeks preceding the survey for whom advice or treatment was sought from a health facility or provider | Outcome | Acute and prevention (all causes of fever; including meningitis) | Household surveys (DHS, MICS); other population-based surveys | An essential aspect of making sure children are receiving life-saving services | Children aged 5–9 years; improve availability through regular population-based surveys |
| Diarrhoea treatment | Percentage of children younger than 5 years who had diarrhoea in the 2 weeks preceding the survey and who received oral rehydration salts (packets or prepackaged fluids) and zinc | Outcome | Acute and prevention (pneumonia and diarrhoea) | Household surveys (DHS, MICS); other population-based surveys | Reducing child deaths from this preventable and treatable disease; diarrhoea remains a leading cause of death in young children | Children aged 5–9 years; improve availability through regular population-based surveys |
| ECDI2030 | Recommended measure for reporting on SDG 4.2.1, which is defined as the proportion of children younger than 5 years who are developmentally on track in health, learning, and psychosocial wellbeing | Outcome | Health promotion and child development (learning and responsive caregiving) | UNICEF custodial agency, household surveys | Ensuring children everywhere reach essential cognitive, social, emotional, and physical development milestones | Improve measurement of each component of the indicator and data availability through population-based surveys |
| Malnutrition, harsh punishment by caregivers (SDG 16.2) | Proportion of children aged 1–17 years who have experienced any physical punishment or psychological aggression by caregivers in the past month | Outcome | Health promotion and child development (safety and security) | UNICEF custodial agency (MICS and DHS) | Ensuring that children’s human rights are not violated, and that they do not have short-term or long-term damage from maltreatment | Improve data availability through regular population-based surveys including large enough sample sizes to disaggregate by more granular age categories |

Further information on the recommended indicators is available in the appendix (pp 16–32). Because of overlaps in some of the indicators across the three domains, the indicators in the table are organised by impact indicators followed by outcome indicators, rather than by domain area. Domain area is specified for each indicator. All indicators are to be disaggregated by stratifiers (e.g. wealth quintile, urban vs. rural location, maternal education, and sex) as relevant. Although used as a moderate priority, ECDI2030 is an SDG indicator and included in the list of the global accountability initiatives included in the mapping. Birth registrations are not included in the core list because it is not exclusively a health indicator although the health sector often facilitates birth registration in many countries. However, it is an essential indicator of children’s rights and should be part of country-level analyses on progress. SDG= Sustainable Development Goal. UN-IGME = United Nations Inter-agency Group on Mortality Estimation. GSRV= Civil registration and vital statistics. LMIC= Low-income and middle-income country. IHME= Institute for Health Metrics and Evaluation. YLD= Years lived with disability. DHS= Demographic and Health Surveys. MICS= Multiple Indicator Cluster Surveys. ECDI2030= Early Childhood Development Index 2030. |
| Definition | Indicator type | Domain and subdomain area | Data sources | Measurement uses | Areas for measurement improvement |
|------------|----------------|--------------------------|--------------|-----------------|-------------------------------|
| New HIV infections in children (estimated paediatric HIV incidence) | Estimated number of new HIV infections per 1000 uninfected population at risk of HIV infection (available for children aged 0–5 years) | Impact | Chronic conditions (infectious cause) | UNAIDS estimates | Crucial for assessing progress in eliminating maternal-to-child transmission of HIV and paediatric infections | Build country capacity to collect and analyse data from Spectrum models |
| Tuberculosis (incidence) | Estimated number of sputum-smear-positive cases of tuberculosis in a population in a year or given period of time; expressed as the number of sputum-smear-positive cases per 100 000 population in a given year | Impact | Chronic conditions (infectious cause) | WHO Global Tuberculosis Programme estimates | Monitoring paediatric tuberculosis epidemics in countries | Strengthen country surveillance systems and burden-of-disease estimates to improve data quality and to enable disaggregation by the child population |
| Thalassaemia (prevalence) | Prevalence of an inherited blood disorder caused when the body does not make enough haemoglobin; consensus needed on a definition of prevalence of thalassaemia in children younger than 5 years and children aged 5–9 years | Impact | Chronic conditions | International and national surveillance systems for birth defects and genetic diseases | Determination of service needs | Strengthen country surveillance systems and burden-of-disease estimates |
| Use of insecticide-treated bednets for children younger than 5 years | Percentage of children younger than 5 years who slept under an insecticide-treated mosquito net | Outcome | Acute and prevention (malaria) | Household surveys (DHS, MICS), malaria indicator surveys, and other population-based surveys | Crucial for understanding progress in reducing malaria infection, a leading cause of death in children | Improve regularity of population-based surveys, including malaria-specific surveys |
| Malaria diagnostics in children younger than 5 years | Percentage of children younger than 5 years with fever, for whom advice or treatment was sought, and who had blood taken from a finger or heel for testing | Outcome | Acute and prevention (malaria) | Malaria indicator surveys | Crucial to ensuring that febrile children in endemic countries are properly diagnosed, and that only febrile children diagnosed with malaria receive antimalarials | Improve regularity of population-based surveys, including malaria-specific surveys; strengthen routine information systems in all LMICs |
| Malaria treatment—first-line treatment for children younger than 5 years | Percentage of febrile children younger than 5 years receiving first-line antimalarial drug, among those receiving any antimalarial drugs | Outcome | Acute and prevention (malaria) | Household surveys (DHS, MICS), malaria indicator surveys | Determining whether these children are receiving effective treatment for malaria | Improve regularity of population-based surveys, including malaria-specific surveys; strengthen routine information systems in all LMICs |

Further information on the recommended indicators is available in the appendix (pp 15–32). Because of overlaps in some of the indicators across the three domains, the indicators in the table are organised by impact indicators followed by outcome indicators, rather than by domain area. Domain area is specified for each indicator. All indicators are to be disaggregated by stratifiers (eg, wealth quintile, urban or rural location, maternal education, and sex) as relevant. DHS=Demographic and Health Surveys. LMIC=low-income and middle-income country. MICS=Multiple Indicator Cluster Surveys.

Table 2: Child Health Accountability Tracking recommendations for regionally specific indicators in areas of high endemicity or burden

pneumonia and diarrhoea; and malaria and all other causes of fever, including meningitis. 50 of the 149 indicators were considered applicable to health promotion and child development, which were reduced to ten indicators once the selection criteria were applied. These indicators covered three subdomains consistent with the Nurturing Care Framework: nutrition and growth (including anthropometry, infant and young child feeding, micronutrients, and anaemia); early learning and responsive caregiving; and safety and security.

The four topic areas of chronic conditions, disabilities, injuries, and violence against children have historically received little global visibility. For example, of the top ten conditions afflicting children according to WHO’s latest evidence on years lived with disability (iron deficiency anaemia; skin diseases; congenital anomalies; asthma; uncorrected refractive error; diabetes, endocrine and blood disorders; other neurological problems; autism spectrum disorder; unintentional injury; and hearing loss),6 only two (anaemia and road traffic injuries [a specific type of unintentional injury]) were included in the 149 indicators. This observation is not surprising given that global guidance on a recommended set of effective interventions and supportive policy measures for these conditions in children is still under development. Review of the cause of child death and data on years lived with disability for 2019 showed that disabilities, injuries, violence, and congenital malformations are of equal relevance for children younger than 5 years and for children aged 5–9 years. Chronic infections and non-communicable diseases are proportionally more impactful on the health of older children. CHAT recommended focusing on the highest burden conditions for the two age groups, starting with tracking conditions for which prevalence data are available. CHAT also recommended...
that WHO and UNICEF undertake a consultative process to reach consensus on a core set of essential interventions for these conditions and associated indicators. Once this step is completed and data become available for these indicators, these data can be added to monitoring efforts.”

Research recommendations
CHAT identified four research priorities to address data gaps (panel). The first area involves improving data availability for children aged 5–9 years. Increasing data on all dimensions of child health and wellbeing for older children will require greater investments in country health information systems, civil registration and vital statistics systems, and household survey programmes. These investments will also improve data availability for children younger than 5 years.

The second area concerns investments in measurement activities to improve how indicators are defined and collected, so that constructs (including all relevant equity dimensions) are correctly captured. The mapping exercise found numerous duplicates for the same domain and indicator (eg, care-seeking for symptoms of acute respiratory illness, diarrhoea treatment, and exclusive breastfeeding). These duplicates might lead to inconsistencies in measurement and challenges in interpretation. Efforts are needed to ensure that standard definitions for child health and wellbeing indicators available in the SDG and UN agencies global databases are used across monitoring efforts, and that the best data collection platform (eg, household surveys, facility surveys, or administrative systems) for each indicator is identified.

A third area involves reaching consensus on essential interventions and associated indicators for child development, chronic conditions, disabilities, injuries, and violence. Although there are robust indicators for anthropometry and for infant and young child feeding, standard indicators on nutrition interventions such as counselling need to be regularly included in data collection processes. Initiatives such as the WHO–UNICEF Child Health Redesign and the Nurturing Care Framework are helping to spearhead consensus building efforts.

A final research area is developing strategies to increase the uptake of available data on child health and wellbeing for informing policies and programmes and for promoting accountability. This work includes building country capacity to collect, analyse, and use data on child health and wellbeing for monitoring and resource allocation purposes.

Implications for global monitoring
CHAT enacted a multiphased approach to prioritise a core set of child health and wellbeing indicators for global monitoring. Starting with mapping indicators from relevant global accountability initiatives, the group developed exclusion and inclusion criteria and a scoring system for selecting indicators that covered major dimensions of child health and wellbeing—acute conditions and prevention; health promotion and child development; and chronic conditions, disabilities, injuries, and violence against children. Through this exercise, CHAT reached consensus on a core indicator set and research recommendations to address major data gaps. Similar prioritisation exercises should be done periodically so that the core set remains reflective of global and national priorities and accounts for new evidence on effective interventions, measurement advancements, and changes in the causes and geographical distribution of child deaths, diseases, and disability. The core indicator set should be regularly monitored and used as a starting point for in-depth analyses exploring factors such as social determinants, supportive policies, and health system elements that contribute to or detract from progress within and between countries.

The COVID-19 pandemic has highlighted the importance of strong information systems for enabling countries to mount rapid responses to crises while also maintaining essential services. The pandemic also threatens to reverse the major advances the world has made in improving children’s lives, through service disruptions that leave many children without the care they need, school closures, and economic declines that increase children’s risk of poverty, poor health, and exposure to violence. Fulfilling the CHAT recommendations will require greater investments in health information systems and improvements in measurement and monitoring of child health and wellbeing—two actions that are essential to making sure children are not left behind in the pandemic’s wake. CHAT’s next tasks are to help WHO and UNICEF develop guidance materials on how countries can use and adapt the core indicator set to their specific contexts, and to develop recommendations on a companion set of paediatric quality-of-care indicators, which are now under development by WHO and partners. The work on quality of care will be informed by the WHO Quality of Care

Panel: Research priorities
Investments in measurement activities and country health information systems are needed to:

- Improve data availability for children aged 5–9 years
- Develop standard indicator metadata and data collection procedures so that child health constructs are correctly captured, and to ensure indicators are harmonised across global initiatives and in global databases
- Reach consensus on essential interventions and associated indicators for the topic areas of child development, chronic conditions, disabilities, injuries, and violence
- Build country capacity to collect, analyse, and use data, and to increase the use of child health data for decision making at global, regional, and national levels
Network20 and the recently established WHO advisory group on quality of care across the life course.

Contributors
JR and KS were responsible for writing the article drafts. All authors participated in the conceptualisation, indicator mapping and prioritisation work, formal analysis, and reviewing article drafts. LP produced the visualisation.

Declaration of interests
We declare no competing interests.

Acknowledgments
We thank Holly Newby for her support in developing the indicator map. We would also like to thank the US Agency for International Development for their financial support to the Child Health Accountability Tracking group. The funder played no role in the study design, collection, analysis, or interpretation of the data.

Search strategy and selection criteria
This study did not involve a systematic or scoping review of the literature. The search strategy for the indicator mapping phase of the study involved identifying global initiatives launched between 2015 and 2020, which included indicators for monitoring child health and wellbeing. The selection criteria for prioritising the indicators were agreed upon through a consensus-based process involving all CHAT technical experts and on the basis of epidemiological considerations as well as programmatic implications.

References
1. UN. Transforming our world: the 2030 agenda for sustainable development. 2015. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed March 20, 2022).
2. UN Inter-agency Group for Child Mortality Estimation. Levels and trends in child mortality: report 2021, estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation. 2021. https://www.unicef.org/media/79137/file/UN-IGME-child-mortality-report-2021.pdf (accessed March 20, 2022).
3. Clark H, Coll-Seck AM, Banerjee A, et al. A future for the world’s children? A WHO–UNICEF–Lancet Commission. Lancet 2020; 395: 605–38.
4. Victoria CG, Christian P, Vidalletti LP, Gatica-Dominguez G, Menon P, Black RE. Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda. Lancet 2021; 397: 1388–99.
5. You D, Beine J, Lee S, Requejo J, Strong K. Demographic challenges and opportunities for child health programming in Africa and Asia. BMJ 2021; 372: n9.
6. Cieza A, Kamienov K, Sanchez MG, et al. Burden of disability in children and adolescents must be integrated into the global health agenda. BMJ 2021; 372: n9.
7. Strong KL, Requejo J, Agwewu A, et al. Revitalising child health: lessons from the past. Glob Health Action 2021; 14: 194565.
8. Strong K, Requejo J, Agwewu A, et al. Child Health Accountability Tracking—extending child health measurement. Lancet Child Adolesc Health 2020; 4: 259–61.
9. Moran AC, Moller AB, Chou D, et al. ‘What gets measured gets managed’: reinvigorating the indicators for maternal and newborn health programmes. Reprod Health 2018; 15: 19.
10. Guthold R, Moller AB, Azzopardi P, et al. The Global Action for Measurement of Adolescent health (GAMA) initiative—rethinking adolescent metrics. J Adolesc Health 2019; 64: 697–99.
11. Moller AB, Newby H, Hanson C, et al. Measures matter: a scoping review of maternal and newborn indicators. PLoS One 2018; 13: e0204763.
12. UN. The global strategy for women’s, children’s and adolescents’ health (2016–2030). 2015. https://www.who.int/life-course/partners/global-strategy/globalestrategyreport2016-2030-lowres.pdf (accessed March 20, 2022).
13. WHO. 2018 Global reference list of 100 core health indicators (plus health-related SDGs). Geneva: World Health Organization, 2018.
14. Countdown to 2030. Tracking progress towards universal coverage for women’s, children’s and adolescents’ health. 2017 Report. Washington: United Nations Children’s Fund and World Health Organization, 2017.
15. WHO, UNICEF, World Bank Group. Nurturing care for early childhood development: a framework for helping children survive and thrive to transform health and human potential. Geneva: World Health Organization, 2018.
16. Requejo JH, Newby H, Bryce J. Measuring coverage in MNCH: challenges and opportunities in the selection of coverage indicators for global monitoring. PLoS Med 2013; 10: e1001416.
17. Campbell H, El Arifeen S, Hazir T, et al. Measuring coverage in MNCH: challenges in monitoring the proportion of young children with pneumonia who receive antibiotic treatment. PLoS Med 2018; 15: e0204763.
18. WHO. Global health estimates 2019. https://www.who.int/data/global-health-estimates (accessed Oct 31, 2021).
19. UNICEF. Programme guidance for early life prevention of non-communicable diseases. New York: United Nations Children’s Fund, 2019.
20. WHO. The network for improving quality of care for maternal, newborn and child health (quality of care network). https://www.who.int/groups/Quality-of-care-network (accessed March 20, 2022).

© 2022 World Health Organization. Published by Elsevier Ltd. All rights reserved.