



Change the Game

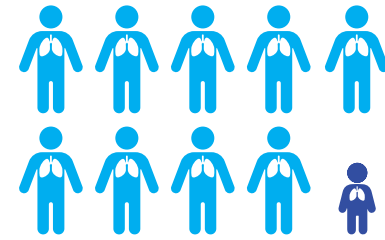
An agenda
for action on
childhood
tuberculosis



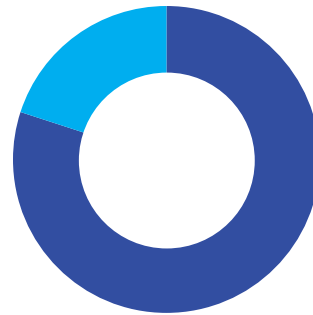


Four-year-old Nyajime Guet was suffering from severe acute malnutrition (SAM) when she was admitted to a UNICEF-supported clinic in Juba, South Sudan. Following admission, Nyajime was diagnosed with tuberculosis. Weighing just nine kilograms, rather than the 19 kilograms that would be expected for a healthy girl of her age and height, Nyajime was near death. Ten months later, she looks nothing like the emaciated little girl who was first admitted. Nyajime still attends regular check-ups to monitor her weight and to treat her tuberculosis, but she is progressing well and is healthy enough to attend school.

Every day, nearly **700 CHILDREN** die from tuberculosis (TB), **80%** of those before reaching their fifth birthday.^{1,2} Treatment exists that could prevent nearly all of these deaths, but less than **5%** of the children who need it receive access.²



1 IN 10 TB CASES GLOBALLY IS A CHILD (0–14)¹



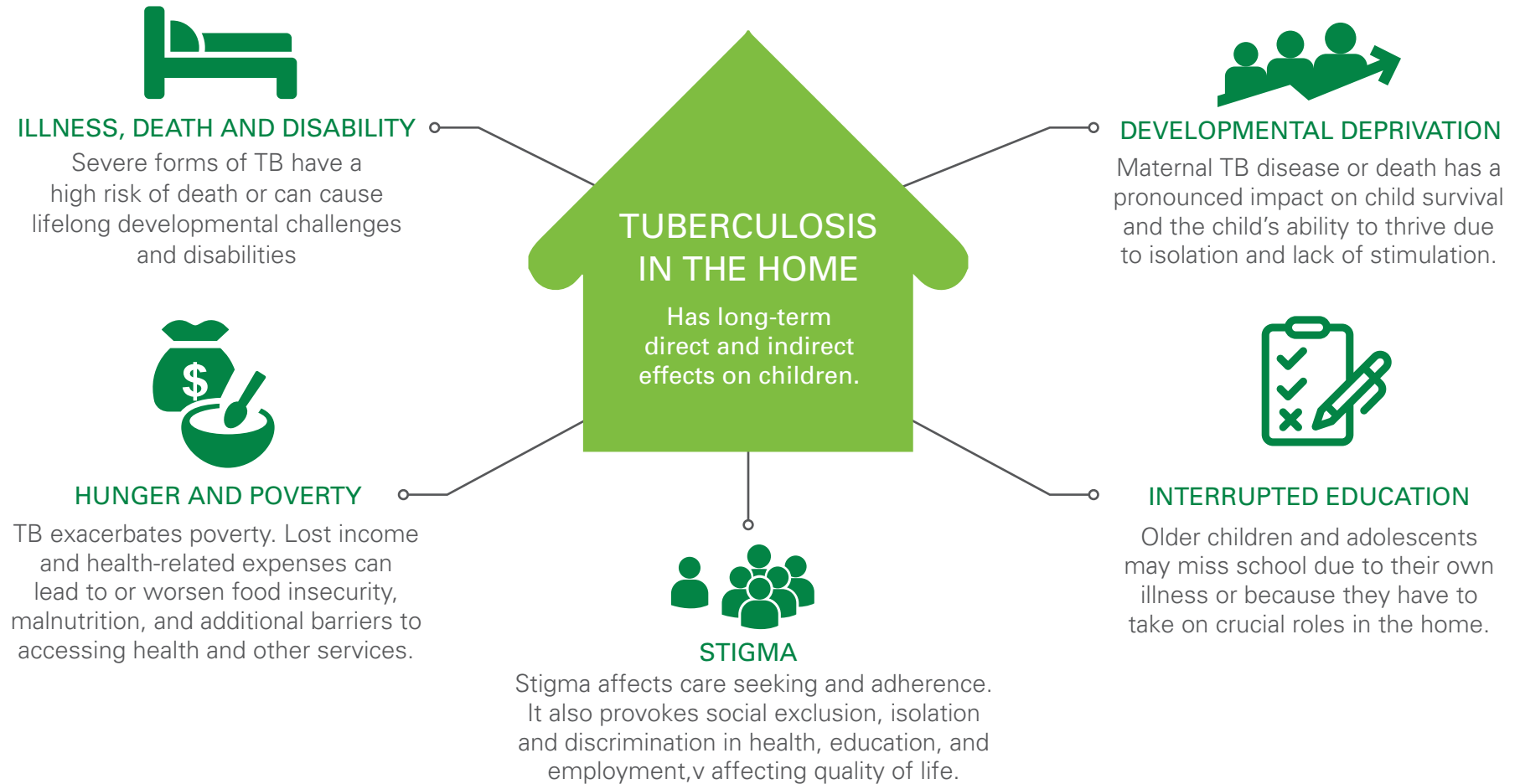
80% OF CHILD TB DEATHS OCCUR IN CHILDREN UNDER 5 YEARS OF AGE²

Of the **10.4 MILLION** new cases of TB in 2016, **1 MILLION** were among children under 14 years of age; **540,000** were among children under age 5.¹ In every region, children under 5 account for **MORE THAN HALF** of all TB cases among children under 15, and they are more likely to die from the disease.¹



As part of the Sustainable Development Goal agenda, the world has committed to ending preventable child deaths by 2030. Addressing childhood TB will be a critical ingredient for success in this undertaking. In September 2018, world leaders will renew this commitment to ending TB during the UN High Level Political Meeting on Tuberculosis.

The impact of TB is greatest on **HOUSEHOLDS ALREADY VULNERABLE** due to poverty, marginalization and limited access to services. TB rarely affects just one member of a household: It is often introduced into a household by an adolescent or adult, but quickly spreads to children, putting them at risk of disease.



Every child deserves a safe and healthy childhood. If we are to succeed in honouring our commitment to children, we must intensify our focus on TB, finding, diagnosing, and treating those at greatest risk and eliminating preventable deaths.

THE GAPS: PREVENTION. DIAGNOSIS. TREATMENT. RESEARCH AND INVESTMENT

Child deaths from TB ultimately result from four key gaps:

- 📍 The prevention gap: the failure to prevent TB disease through preventive therapy for at-risk children.
- 📍 The detection gap: the failure to diagnose TB disease in children.
- 📍 The treatment gap: the failure to ensure timely access to effective treatment.
- 📍 The research and investment gap: the failure to prioritize research and investment focused on the needs of children.

📍 THE PREVENTION GAP

Children are most commonly infected with the TB bacterium through contact with an adult or adolescent, usually within their own home or community. Each year, around 7.6 million children aged 0–14 are infected with the TB bacterium.³

In 2014 alone, 2.4 million children under the age of 5 lived in households with a known adult or adolescent with TB disease.⁴ These children and other vulnerable household members, including people living with HIV, can easily be identified through systematic screening of all members of a TB affected household; and they should receive **preventive therapy**. Pregnant women, especially those with HIV, should receive TB screening and preventive therapy as part of antenatal care or prevention of mother-to-child transmission to ensure their health and reduce transmission to newborns.⁵

Vaccination remains a critical component of efforts to prevent TB disease, but the tools at hand are limited. The bacille Calmette-Guerin (BCG) vaccine is the only vaccine currently available to protect young children from TB. The vaccine provides protection for a limited period of time, but does not provide long-term protection from TB infection and disease. Addressing this issue and developing a vaccine that can provide longer-term protection must remain a high priority.⁶

When children are exposed to a person with TB, the use of child-friendly fixed dose combinations, which are highly effective and available at low

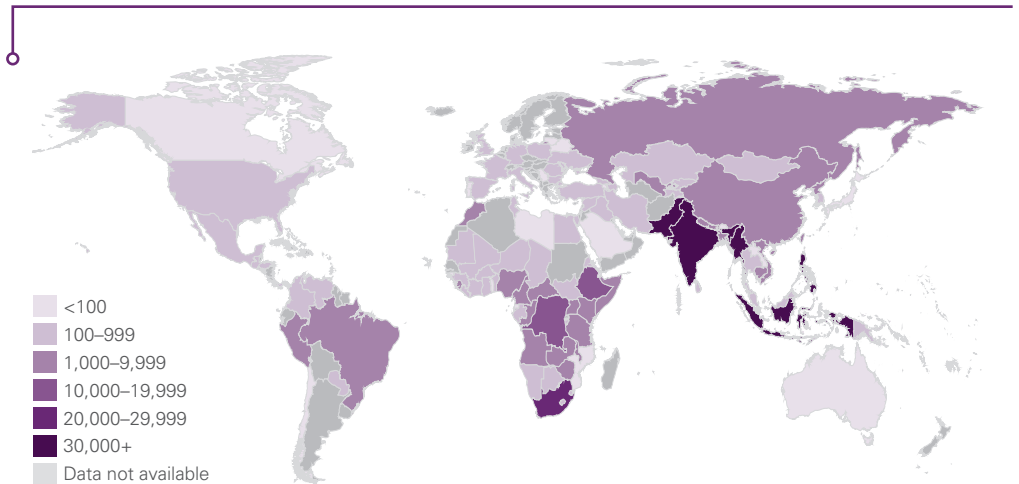
cost, can prevent development of TB disease.⁷ Despite the existence of these fixed-dose combinations, less than 15 per cent of children exposed to TB receive preventive therapy to prevent development of TB disease.¹

FROM INFECTION TO EMERGENCE OF DISEASE

Children infected with TB bacteria generally remain symptom-free and healthy, but they are at great risk of falling ill with TB disease during the year following exposure. Very young children and children with immune systems compromised by HIV or malnutrition are particularly vulnerable to developing

disease, including severe and often fatal presentations such as TB meningitis. TB contributes to increased morbidity and mortality among children living with HIV, and 17 per cent of child TB deaths occur among children living with HIV.¹ Even when children survive severe TB, they often go on to experience lifelong developmental and physical challenges.

Low-cost, high-impact tools are available to prevent TB disease, but in many cases, these are not being utilized effectively. As a consequence, more children fall sick and die from TB disease and countries are faced with the substantial economic burden of TB treatment and mitigation.



Estimated number of new TB cases among children (aged <15 years), global, 2016.

Source: World Health Organization, 'Global Tuberculosis Report 2017', WHO, Geneva, 2017

Note: The boundaries and the names shown and the designations used on these maps do not imply official endorsement or acceptance by the United Nations.

THE DETECTION GAP

We are failing to diagnose TB disease in young children.

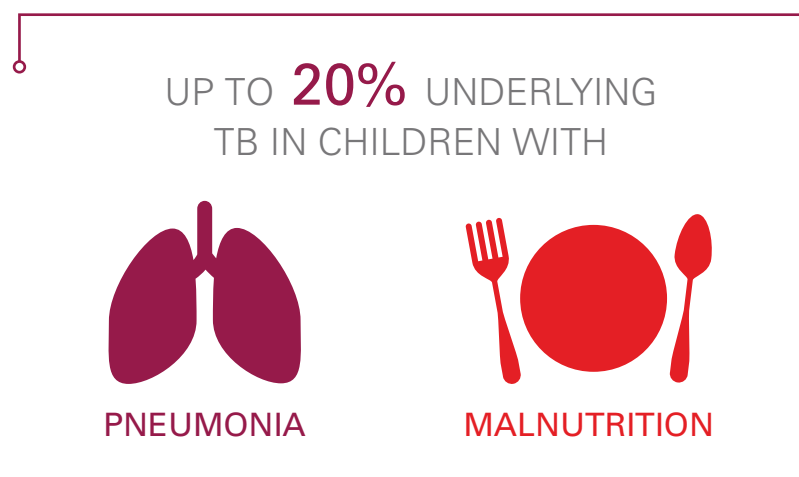
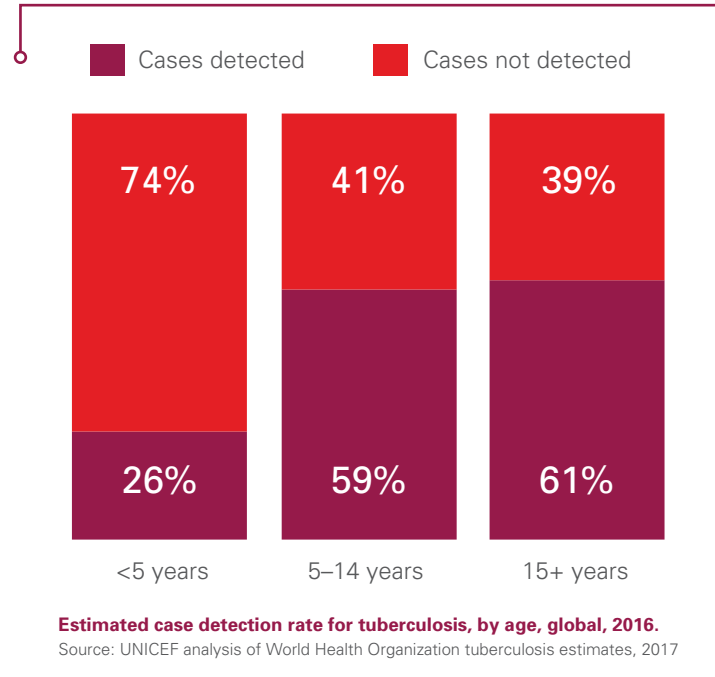
For children under 5 years of age, only 26 per cent of the estimated 540,000 annual TB cases are accurately diagnosed and reported. This stands in stark contrast to the 60 per cent of cases which are accurately diagnosed among older children and adults aged 5 and above.¹

Low rates of TB case detection are linked to a lack of awareness among primary health care workers around the risks of TB to children. Capacity for diagnosis often exists only at the hospital level. TB programming is often highly verticalized and not integrated with other health programmes and services. As a result, opportunities to find children who may have TB are missed.

Diagnosis of TB in children is also complicated by the fact that current sputum-based TB diagnostic tools are not sufficiently accurate and difficult to use with children.

TB contributes significantly to common causes of child morbidity and mortality.

Another challenge is the fact that health-care workers do not reliably assess all sick children to evaluate their risk of TB. In high-TB-burden settings, up to 20 per cent of children diagnosed with pneumonia may have underlying TB⁸, but this is often missed due to lack of systematic evaluation. Malnourished children are also at increased risk of TB, and studies of children in high-TB-burden settings have found prevalence of up to 20 per cent among children with severe malnutrition.⁹



INTEGRATION: MAXIMIZING OPPORTUNITIES FOR CHILD SURVIVAL

There is growing evidence that children suffering from undernutrition and/or pneumonia are at increased risk of death from infectious diseases, including TB, and that TB can increase a child's vulnerability to these diseases.^{8,9} Integration of TB screening into all maternal and child health (MNCH) guidelines and screening protocols in high TB incidence settings is a critical first step toward intensified TB case detection and increased coverage of preventive therapy and treatment.

In Uganda, the experience of integration of childhood TB interventions into the national health system suggests "the way forward lies with strengthening the referral system, building capacity of healthcare workers (HCWs) at all levels, contact tracing, and further integration with MNCH, including HIV and nutrition."¹⁰

TB-HIV COINFECTION

TB is the leading cause of death among people with HIV, accounting for some 370,000 people who died from HIV-associated TB in 2016. Of the **250,000** child TB deaths in 2016, **40,000** were among children co-infected with HIV.¹ TB preventive therapy and regular TB screenings are essential components of comprehensive HIV care for both children and adults. In HIV-infected children, early diagnosis and ART initiation reduces TB risk substantially.¹¹ This highlights the importance of closing the large TB treatment gap among children living with HIV.

ANTIMICROBIAL RESISTANCE AND TB: A GLOBAL HEALTH THREAT

Tuberculosis poses a heightened risk to global health due to antimicrobial resistance. Multi-drug-resistant (MDR) TB deepens the prevention, case finding and treatment gaps faced by children.

Of the 600,000 people who develop MDR-TB every year, only 22 per cent have access to treatment, and treatment is only successful in 56 per cent.¹ This results in ongoing transmission of drug resistance, including to children. It was estimated that, by 2014, **2 MILLION CHILDREN** had been infected with MDR TB.¹² Even worse, not even 10 per cent of the estimated 32,000¹³ children that fall ill with MDR-TB each year are diagnosed and able to access treatment. This is a direct consequence of missed opportunities for screening of children in contact with a person with MDR TB, limited diagnostic capacity and tools. As newer drugs and shortened regimens for MDR TB become available, capacity and the use of these regimens in children have to be accelerated.

THE TREATMENT GAP

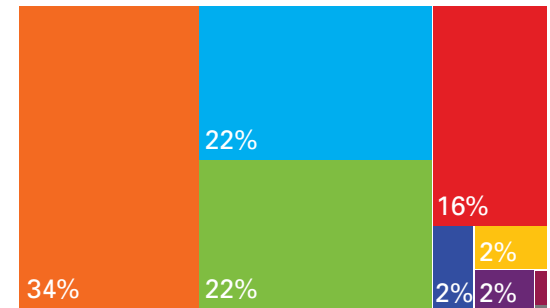
About 250,000 children died from TB in 2016. 60 per cent of such deaths occurred in Asia and 35 per cent in sub-Saharan Africa.¹ When they receive appropriate treatment, less than 1 per cent of children with TB die, compared to around 24 per cent of children who do not receive treatment. Over 96 per cent of TB deaths among children under the age of 15 are among children who have not received treatment.²

Two years ago, appropriately dosed, child-friendly formulations for the prevention and treatment of drug-sensitive TB became available.⁷ Since then, 79 countries have rapidly transitioned to these formulations and have ordered treatment for 590,000 children.¹⁴ However, the treatment gap is closely linked to the case detection gap.

When children with TB are not found and diagnosed, they cannot be treated. Over 60 per cent of new TB cases in children are never detected. As a consequence, these children remain untreated and at serious risk of death. If all children with TB were detected, 1 million treatment courses would be needed per year, and over two million courses for preventive therapy.

Children tolerate TB treatment for drug-sensitive TB very well. But treatment can be challenging.

Current TB drugs require adherence for three to six months for prevention, six or more months for treatment, and at least nine months for treatment of multi-drug-resistant (MDR)-TB.



Estimated distribution of global tuberculosis deaths among children (aged <15), 2016, by UNICEF region.

Source: UNICEF analysis of data from Dodd et al.

THE RESEARCH AND INVESTMENT GAP

Cases of TB among children represent a substantial share of all TB cases, making the response to childhood TB a critical component of the global TB response. Despite this, funding for childhood TB stagnated between 2013 to 2016, increasing only marginally from US\$25 million to US\$29.1 million.¹⁵

Health interventions designed for adults with TB are rarely appropriate for children and there is an urgent need to research and develop interventions suitable for children. But while children represent approximately ten per cent of

the global burden of TB, funding for paediatric research represents just three per cent of overall spending on TB research and development.¹⁵

Low levels of investment limit research and innovation to help children with TB. A lack of public awareness and funding, and regulatory conditions that hinder effective research, is slowing the development of child-friendly diagnostic tools, more effective vaccines and shorter, safer regimens for the prevention and treatment of all forms of TB.

AN AGENDA FOR ACTION: COMMIT, INVEST AND COORDINATE TO SAVE THE LIVES OF CHILDREN

Political commitment, targeted investment and coordinated multi-sectoral planning and service delivery can change the game for children with TB,
SAVING MILLIONS OF LIVES.
Ending child deaths from TB must remain a top priority at global, national and community levels.

TB response efforts must be fully integrated in maternal and child health and nutrition policies and strategies and
WE MUST DO MORE
to scale up the use of existing effective tools. In parallel, there is an urgent need for expanded investment in childhood TB, and in the development of new technologies that meet the specific needs of children affected by TB.

A number of key actions will be critical in
ENDING PREVENTABLE DEATHS FROM TB →

→ GLOBAL AND NATIONAL DECISION MAKERS

COMMIT to targeted actions for children at the TB High level meeting in September 2018.

- Align policies and strategies to serve the needs of children.
- Increase coordination and collaboration across health programs – at both global and national levels.
- Set specific targets, define indicators and improve data collection
- Focus on implementation and scale-up of evidence-based, effective interventions to bridge the policy-practice gap.
- Promote equitable access to services for children and their families and recognize the importance of a strong frontline health system.

→ MINISTRIES OF HEALTH AND IMPLEMENTING PARTNERS

FIND children with TB.

- Empower communities to understand the risk TB represents, particularly to their most vulnerable members
- Equip frontline health workers to deliver TB diagnosis, prevention, and care where children and their families live, including systematic assessment of all sick children for TB risk.
- Operationalize and intensify contact screening in households of newly diagnosed TB patients as a key priority for prevention and case finding.
- Operationalize and intensify systematic screening of sick children and pregnant women attending maternal and child health and nutrition services.
- Decentralize diagnostic capacity by building clinical capacity, strengthening mentoring and providing support to health workers, as well as improving specimen

collection for diagnostic testing.

- Integrate TB into maternal and child health and nutrition services by building awareness and capacity for basic screening and diagnosis of children and pregnant women.

TREAT children at risk of, or with TB disease.

- Empower frontline health workers to provide preventive therapy to healthy, exposed children.
- Implement preventive TB therapy as part of comprehensive HIV care.
- Ensure stable supplies of existing child-friendly formulations for prevention and treatment of drug-sensitive TB.
- Improve access to new medicines and shortened regimens for drug-resistant TB and build capacity in diagnosis and management of drug-resistant TB in children.
- Partner with caregivers to promote adherence.

→ GOVERNMENTS, DONORS, RESEARCHERS

INVEST in innovation for children.

- Prioritize research and development of an accurate, non-sputum-based diagnostic test for use at the point of care.
- Develop vaccines to prevent all forms of TB, including drug-resistant and reactivated TB, for all age groups.
- Develop shorter regimens and more child-friendly formulations for TB treatment to improve adherence, reduce treatment failure, and save children's lives.
- Prioritize childhood TB in the research agenda. Innovations can tilt the scale for millions of children's lives, yet TB focused research funding is stagnant, with only 3 per cent focused on pediatric TB research.¹⁵

This publication was developed by the Programme Division, Health Section; Division of Data, Research and Policy, Data and Analytics Section; Division of Communication in UNICEF HQ.

<http://uni.cf/tbdata>

Data and Analytics Section Division
of Data, Research and Policy
3 UN Plaza, New York, NY 10017
www.data.unicef.org
© United Nations Children's Fund (UNICEF)
March 2018

PHOTO CREDITS

Cover: © UNICEF/UNI201755/Rich; page 1: © UNICEF/
UN0152951/Rich

REFERENCES

- 1 World Health Organization. Global Tuberculosis Report. 2017.
- 2 Dodd PJ, Yuen CM, Sismanidis C, Seddon JA, Jenkins HE. The global burden of tuberculosis mortality in children: a mathematical modelling study. *Lancet Globl Health* 2017;5:e898-e906.
- 3 Dodd PJ, Gardiner E, Coghlan R, Seddon JA. Burden of childhood tuberculosis in 22 high-burden countries: a mathematical modelling study. *Lancet Glob Health*. 2014;2:e453-9.
- 4 Yuen CM, Jenkins HE, Chang R, Mpunga J, Becerra MC. Two methods for setting child-focused tuberculosis care targets. *Public Health Action*. 2016;6:83-96.
- 5 World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. 2016.
- 6 World Health Organization. Weekly epidemiological record. BCG vaccines: WHO position paper. 2018;8, 2018, 93, 73-96.
- 7 WHO and UNICEF Statement on the use of child-friendly fixed-dose combinations for the treatment of TB in children. 2017
- 8 Oliwa JN, Karumbi JM, Marais BJ, Madhi SA, Graham SM. Tuberculosis as a cause or comorbidity of childhood pneumonia in tuberculosis-endemic areas: a systematic review. *Lancet Respir Med*. 2015;3:235-43.
- 9 Patel LN, Detjen AK. Integration of childhood TB into guidelines for the management of acute malnutrition in high burden countries. *Public Health Action*. 2017;7(2):110-115.
- 10 UNICEF 2016. Integration of childhood TB into maternal and child health, HIV and nutrition services A case study from Uganda.
- 11 Dodd PH, Prendergast AJ, Beecroft C, Kampman B, Seddon JA. The impact of HIV and antiretroviral therapy on TB risk in children: a systematic review and meta-analysis. *Thorax*. 2017;72:559-575.
- 12 Dodd PJ, Sismanidis C, Seddon JA. Global burden of drug-resistant tuberculosis in children: a mathematical modelling study. *Lancet Infect Dis*. 2016;16:1193-1201.
- 13 Jenkins HE et al. Incidence of multidrug-resistant tuberculosis disease in children: systematic review and global estimates. *Lancet* 2014;383:1572-9.
- 14 Global Drug Facility. February 2018.
- 15 Treatment Action Group. 2017. The Ascent Begins: Tuberculosis Research Funding Trends, 2005-2016.
- 16 Huffington Post 2013. Desmond Tutu. On Ending Childhood Tuberculosis.

"It is a sad statement that childhood tuberculosis still kills as many children as it does. But this is an eminently solvable problem. All the world needs is a more aggressive commitment to end the disease. That would make this tuberculosis survivor, and millions of others like me, very happy."

Archbishop Desmond Tutu, 2013¹⁶

"There will be no end to the TB epidemic without an end to TB among the groups most threatened by the disease."

Treatment Action Group, 2017¹⁵