



# Childhood Tuberculosis: At the Tipping Point\*

## Çocuk Tüberkülozu: Dönüm Noktasında

Jeffrey R. Starke<sup>1</sup>

<sup>1</sup>Baylor College of Medicine, Department of Pediatrics, Houston, Texas, USA

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### Good Evening!

First, I would like to thank The Union and the organizers of this meeting for giving me the honor of representing the childhood tuberculosis community, whose members helped me prepare these remarks.

I also would like to thank the translators, and most of all thank YOU for being here.

1 million annual cases of childhood tuberculosis. 230.000 annual deaths from childhood tuberculosis.

A TREATABLE AND PREVENTABLE disease that is not being treated, and certainly not being prevented. Only about one-third of the cases are even recorded and reported. These are the current estimates from the World Health Organization, and some modeling studies have put the numbers even higher. The WHO started issuing estimates of childhood tuberculosis cases and mortality only in 2011 because there were inadequate methods to do so earlier.

This current mortality rate of 21% is about the same as in the era before treatment was invented. Then, there was nothing that could be done to help afflicted children. Now, the main problem is that a large proportion of childhood TB cases are never correctly diagnosed, mistaken for pneumonia, complications of malnutrition or bacterial meningitis. The modeling work of Peter Dodd and colleagues suggests that 96% of these tuberculosis deaths occur in children not receiving tuberculosis treatment.

The deadliest forms of tuberculosis occur disproportionately in the youngest children. Tuberculous meningitis accounts for many of the deaths, and the brain damage it causes creates a staggering amount of morbidity in the survivors, and a staggering economic burden for families and communities. Paradoxically, these vulnerable young children have been greatly under-represented in tuberculosis research and public policy.

Current modeling estimates are that tens to hundreds of millions of children in high tuberculosis burden countries already are infected with Mycobacterium tuberculosis, and although they may be free of disease now, they are the RESERVOIR from which future contagious TB patients will spring. My mentor, Katherine Hsu, famously stated, "Primary tuberculosis in children is the fountainhead of tuberculosis disease. When acquired during childhood, it may develop into serious disease within a short time, or remain latent during childhood only to emerge in adult life". It will be impossible to eliminate tuberculosis in children AND ADULTS unless this reservoir of childhood tuberculosis infection is addressed.

How did we get here? Why has childhood tuberculosis been so neglected? There are many reasons:

- First, childhood tuberculosis is a fundamentally different disease from adult tuberculosis. Most children who develop disease do so rapidly, within weeks or a few months of acquiring the infection, so time is critical. Childhood tuberculosis is often not difficult to diagnose clinically when

### Correspondence Address / Yazışma Adresi

Jeffrey R. Starke

Baylor College of Medicine, Department of Pediatrics, Houston, Texas-USA

E-mail: jrstarke@texaschildrens.org

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chest X-ray is available and the child can be linked to a recently diagnosed case of contagious tuberculosis. This link is most often within the family, and just a few questions about ill family members can usually show that an ill child is at risk for having tuberculosis. However, this link requires an integrated and functional health care system that is lacking in many high burden areas. Children with tuberculosis have far fewer bacteria than adults and, as a result, detecting the germ using a microscope or a culture is difficult, positive, at best, 30% of the time, making tuberculosis in children difficult to confirm microbiologically. Several decades ago, it was decided to make microbiologic confirmation the main basis for tuberculosis case reporting in all ages; unfortunately, doing this ensured the exclusion of most children from tuberculosis reporting and demonstrated yet again why vulnerable groups need to have a seat at the table when policy is made.

- Second, children with tuberculosis are rarely contagious, a “dead end” in terms of transmission. As a result, over-burdened and under-resourced tuberculosis programs have decided either actively or passively that children are less important than adults to address the overall burden of disease.
- Third, until recently the child health and survival communities did not consider tuberculosis as a priority item, because there were no accurate estimates of morbidity and mortality to justify their inclusion. Childhood tuberculosis has been a concealed major contributor to child mortality. As a result, there was no communication between tuberculosis and child health programs, and childhood tuberculosis fell into the chasm between these efforts. However, the recent estimates put tuberculosis squarely among the major causes of childhood morbidity and mortality, and the child health community is beginning to respond.
- Fourth, there was a perception among tuberculosis policy makers that treating adults was enough. If all the contagious adult tuberculosis is eliminated, no more children would get infected. As a result, children were rarely considered or even mentioned in many tuberculosis policy statements. I was told early in my career that the way to end childhood tuberculosis was to end adult tuberculosis. Even if this were true it would take generations to free the children of tuberculosis, with untold millions of children’s lives lost.
- Fifth, most national and local tuberculosis programs in high burden countries did not have policies or guidelines for the evaluation and management of children. There was a lack of expertise among pediatricians and little involvement by them in tuberculosis programs.
- Finally, while the BCG vaccines prevent many cases of severe childhood tuberculosis, they are not effective enough to prevent many more, and other measures are needed. BCG should be given at birth – not at 6 weeks of age as is done in many locales – but that is not enough to protect children. Most children are infected by people they are close to, especially in the home. Contact tracing is the evaluation of people who “share the air” with a person with contagious tuberculosis so they can be treated to prevent them from developing the disease. This activity is extremely effective and inexpensive, and has been recommended for children for decades, yet has not been performed in most high-burden settings. This represents a completely lost opportunity to prevent a large proportion of childhood tuberculosis cases.

HOWEVER, despite all this, I believe that the tide has turned, and I am the most optimistic I have been in my 35 years of being a childhood tuberculosis physician. In his 2000 book, “The Tipping Point”, Malcolm Gladwell described three basic elements of social epidemics that lead to fundamental change – THE TIPPING POINT:

1. The first element is how trends are often driven by a handful of exceptional people. As stated by the famous anthropologist, Margaret Mead, “Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has!” For me, this all started in 2011 when the European Centre for Disease Prevention and Control organized in Stockholm a meeting of international childhood tuberculosis experts, the first such meeting in several decades. The participants created a “Call to Action for Childhood Tuberculosis” with a set of principles that provided the framework for advancement of the field. This meeting was the catalyst for international cooperation in research and clinical care in childhood tuberculosis, and it cemented the collaboration of a small but incredibly talented and dedicated group of childhood tuberculosis investigators and clinicians, leading to important advances in prevention, diagnosis and treatment.
2. The second element is determining how to make a “contagious” message memorable. This element includes both the technical aspects of improving childhood tuberculosis care, but also the messaging and branding of the efforts. The Union has been very active in this regard, as has the Childhood Tuberculosis Subgroup of the Stop Tuberculosis Partnership. However, this is an area where much more needs to be done.
3. The third element of the tipping point is the central importance of the environment in changing behaviors.

All public health is local, and each nation and community needs to determine what it needs to do to address childhood tuberculosis. This means we need to make fundamental changes in how we approach the disease and its prevention. It can no longer be seen as the purview only of tuberculosis programs, but must be integrated into other programs that serve children at risk for tuberculosis, especially maternal and child health programs, malnutrition programs, and HIV care programs.

Over the past 6 years there has been lots of good news and progress! Through the World Health Organization and several others, a series of evidence-based guidelines have been developed to help clinicians better manage all aspects of childhood tuberculosis. As a result, many high burden countries have updated their tuberculosis policies and guidelines to include the needs and management of children. Some high burden countries are starting to do contact tracing for newly diagnosed cases and determining the best methods for evaluating and treating the child contacts to prevent disease now and in the future. In India, Pakistan and Bangladesh, programs of door-to-door contact tracing and treatment are being carried out in particularly high burden neighborhoods. In 2013, The Union, WHO, Stop TB partnership, UNICEF and several other organizations published the Roadmap for Childhood Tuberculosis, a document that presents 10 fundamental principles and approaches for ending childhood tuberculosis. As a result, several organizations that are intimately involved in child health and survival, such as UNICEF, are now devoting time and resources to childhood tuberculosis. Through the efforts of organizations like the TB Alliance and USAID, new child-friendly drug formulations have been developed and deployed, making treatment of childhood tuberculosis easier. And there has emerged a whole new generation of incredibly bright and talented young researchers, clinicians and policy experts who have centered their careers on childhood tuberculosis.

1 million annual cases. 230,000 annual deaths.

So, are we really at the tipping point for the elimination of childhood tuberculosis? I think we are, although it will take a great effort and fundamental changes in how the disease is approached in high burden settings. It will take a paradigm shift, to include children in all aspects of tuberculosis elimination and, for children, to put as much emphasis on prevention of tuberculosis as there should be on treating the disease once it occurs. We have to adequately address childhood tuberculosis – both disease and infection, treatment and prevention – if we are to “bend the curve” in the WHO End TB effort to eliminate the disease. While End TB has emphasized patient-centered care, for children this is not enough. For them, we need family-centered care, the consideration of the needs of the entire family when an adult is diagnosed with tuberculosis.

Most importantly, the tipping point will require the political will within the tuberculosis and child health communities, and governments, to devote the resources and energy that will be required if we are to reach our goal of tuberculosis elimination. Political will means money! We need better funding and integration of health care systems for effective and sustainable tuberculosis service delivery to children and adolescents. We need money for applied childhood tuberculosis-specific research. We need government officials, foundations and other health care leaders to make sure that the needs of children are included in tuberculosis program budgets, Global Fund applications, and research portfolios.

In 2004, my friend and colleague Peter Donald stated, “The time has come for the hidden epidemic of childhood tuberculosis to emerge from the shadow of adult tuberculosis and be seen as a neglected child health problem of considerable proportions in precisely those communities that do not have the resources to deal with it adequately”. These words remain true in 2017 but we now have the means to do something about it. The question is: Do we have the will? Children have the same right as adults to benefit from tuberculosis care and research! It is time that we put these words into action, and the elimination of tuberculosis depends on it.

Thank you!