HUMAN TECHNOLOGY

ISSN: 1795-6889

www.humantechnology.jyu.fi Volume 17(1), June 2021, 1–4

From the Editor in Chief

LIFE-SAVING TECHNOLOGIES THAT ARE NOT USED TO SAVE LIVES

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A hundred years ago, on July 17, 1921, a Parisian woman was killed by a mass murderer a few hours after she had given birth. She was survived by her newborn infant, but concern abounded whether he was to be the next victim. The killer was old, efficient, and experienced, having massacred 20–25% of the European population during the 19th century Europe alone (Sakula, 1983, p. 807). This mass murderer went by different names, such as consumption, the White Plague, or phthisis. Many people had been hunting it down for decades already. In 1882, German microbiologist Robert Koch caught and identified it with the help of new technology: a microscope with oil immersion lenses and a device that would later be called the Petri dish. Koch named the culprit *Mycobacterium tuberculosis*. It could now be detected, studied, and perhaps even vaccinated against (Barnett, 2017; Saleem & Azher, 2013; Sakula, 1983, p. 809).

In 1896, tuberculosis was the main worry of French microbiologist Louis Calmette when he began as the director of Pasteur Institute in Lille. He and his assistant, a veterinarian named Camille Guérin, wanted to develop a method to immunize people against the disease. In 1919, after many years of painstaking trial and error—and a bit of luck, an important element of scientific discoveries—they finally were able to modify the *tubercle bacillus* in a way that, when inserted into a living being, it would awaken the immune system to prevent the host from contracting the bacterial infection . After a few years of animal testing, Calmette and Guérin thought the time was ripe to test their invention on a human. On July 18, 1921 in Paris, the infant who had survived the death of his mother a day earlier, was the first human to be given Bacille Calmette-Guérin—or BCG. The vaccine proved safe and functional, and soon mass production was underway. Finally, after a two decades-long search for a prevention to this killing disease, BCG became a worldwide vaccine to combat tuberculosis (Sakula, 1983, pp. 810−811).

https://doi.org/10.17011/ht/urn.202106223975

BCG was not, and still is not, a perfect vaccine, as it prevents only 20 % of its recipients from being infected. However, as a result of the vaccine, half of those who are infected do not develop any symptoms. Moreover, an effective antibacterial medication to cure tuberculosis has been around for more than 75 years now (Iseman, 2002, p. 87s). Combined, the vaccine and medical treatment have saved hundreds of millions of lives.

One could say the invention and implementation of BCG to prevent tuberculosis (TB) and the medication to treat it have been one of the major medical technological success stories of last century. Indeed, in many countries, tuberculosis has become nearly extinct. However, although the disease is quite preventable and almost totally curable, it still kills as many as 1.5 million people a year, a death toll close to that of COVID-19 in 2020 (World Health Organization [WHO], 2020a). Despite the technology to prevent and cure it, tuberculosis remains the leading cause of death from a single infectious agent in the world (WHO, 2020c).

Factors keeping TB as a persistent global killer are human in nature: the antivaccination beliefs, patients' noncompliance and/or abandonment of treatment and, more importantly, the simple lack of commitment to fund organized health care (Iseman, 2002, p. 88s; Sullivan, Esmaili & Cunningham, 2017). If TB symptoms are not treated, half of the patients die. Yet, just about a billion dollars of additional annual funding to fight TB would eradicate the disease by the end of the decade (Makoni, 2018). However, it seems that because tuberculosis is not a disease of the more affluent countries, where people often do not even know it still exists, the relatively small amount of money needed to kill the killer is hard to come by as foreign aid. Hence, tuberculosis makes a useful—but also very sad—example of how humans can invent technologies to improve and save lives but fail to do so because of unevenly distributed resources. Unfortunately, it is only one of the many such cases.

For example, around 4 million people die each year from indoor air pollution because they do not have proper cooking stoves, chimneys, and vents (WHO, 2018b). Another big killer is malaria, with a million preventable deaths a year, deaths that could be avoided with indoor spraying and mosquito nets or curable with medication (WHO, 2021). Other relatively easily preventable causes of death are diarrheal diseases, killing 1.6 million a year (Dadonaite, Ritchie, & Roser, 2018), or neonatal deaths due to sepsis/pneumonia, tetanus, diarrhea and more ending the lives of 3 million every year (WHO, 2020b). For comparison, WHO (2018a) estimates that climate change, a valid and important worry of the whole of humankind—including the wealthy countries—is predicted to kill 250,000 people (directly or indirectly) annually in the coming decades.

This is not to say people should invest in health problems only if the body count is high enough. All deaths are certainly tragedies. But if resources to fight life-threatening problems are limited, and the aim would be to maximize the number of lives saved on the planet, then some tragedies are easier to prevent or alleviate than others. There are "smart targets" that save more lives with simpler and less costly solutions than others (see, e.g., Lomborg, 2015). However, it is quite evident some causes of death appear more alarming and some victims perceived as more "valuable" due to the amount of information about and the media coverage of them—and, of course, how probable people think it is they that would be in danger of that illness. Technologies and their applications do not exist in a vacuum; rather, they are embedded in economic, political, and sociological realities that determine their uses and targets. That is pure human technology.

The articles of the current *Human Technology* issue are not dealing with technological issues that are matter of life and death, but one can still say they are dealing with quite essential phenomena of life, money and music. **Laura Stark**'s article, "Mobile Money and the Impact of Mobile Phone Regulatory Enforcement Among the Urban Poor in Tanzania," is a qualitative study based on 165 interviews conducted in Dar es Salaam, Tanzania, over 8 years. Stark examined the role of mobile money in the survival strategies of the urban poor in that city, and, for example, how their valuable microvending practices are challenged and even disrupted by the government's new regulatory policies. The two other articles of the issue focus on music. In "Appropriating Biosensors as Embodied Control Structures in Interactive Music Systems," **Luís Aly, Hugo Silva, Gilberto Bernardes**, and **Rui Penha** compiled, categorized, and analyzed a catalog of artistic uses of biosensing technologies based on their proposed taxonomy and how the taxonomy could apply to interactive music systems. They looked at the historical trends, starting from as early as 1965, and they see a growing emphasis on the role of biosensing in enabling or controlling interactive music creation, which may lead to new noncorporeal ways to create and perform music. **Andrew Danso, Rebekah Rousi,** and **Marc Thompson** investigated music technology in the classroom in their article, "Novel and Experimental Music Technology Use in the Music Classroom: Learning Performance, Experience, and Concentrated Behavior." They a used mixed methods approach to discover how different music applications, such as digital tables, specifically the iPad, and new types of embodied music technologies, in this case a glove with sensors and musical buttons, contribute to learning music.

With these articles, *Human Technology* wishes you an enjoyable journey to the ways technology can make a better and enjoyable world for humans.

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ISSN 1795-6889
www.humantechnology.jyu.fi