We need to find sustainable solutions to apply to vaccine development, not requiring, amongst other factors, cold chains or specialized personnel, and not compromising the future of our planet.

‘I’ve been here in this world a long time and our lords say that now it’s time for me to be quiet and sink down into the rubbish.’

*Undesirable*

Jose Emilio Pacheco

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*Group in Expectation*

Alfredo Sosabravo

Oil, acrylic and collage on canvas; 125 × 90 cm
INTRODUCTION

The contention that TB is a very contagious disease that easily spreads through air is perhaps best illustrated in 2007, following an alleged “scare” when the so-called “TB Man” managed to move almost without restrictions across the world as he had reportedly contracted multidrug resistance to TB (MDR-TB). The overall situation can be so pervasive, that according to the World Health Organisation (WHO), someone in the world is newly infected with the TB bacilli every second (1), and overall, one-third of the world’s population are currently infected with the TB bacillus. This is despite the finding that between 1991 and 2005, there were allegedly many chances available to put TB under control. As a result, last year, it was reported by the Global Health Observatory (2) that there were 8.8 million new TB cases, and 1.4 million deaths from TB, including 0.35 million people diagnosed with HIV. Meanwhile, there were 5.7 million new and recurrent TB cases being treated in the same year. The incidence rate is falling slowly after peaking in 2005 with the TB death rate declined by 40 per cent since 1990. Therefore, it is expected that the Millennium Development Goals (MDGs) number 6 on reducing TB incidence rates should also be on track to achieve the MDGs target. On the other hand, the Global TB Control 2011, a serial global report published by the WHO since 1997, has reported other new findings at the global level including: (a) the absolute number of TB cases has been falling since 2006, in contrast to previous global reports where it is noted to be rising slowly instead, (b) the TB incidence rates have been falling since 2002 — two years earlier than previously suggested, (c) the estimated number of deaths from TB each year has been revised downwards, whereas in 2009 there were almost 10 million children who were made orphans as a result of parental deaths caused by TB. Ongoing efforts to further improve the measurement of TB cases and deaths under the umbrella of the WHO Global Task Force on TB Impact Measurement show impressive progress on TB prevalence surveys and innovative work to strengthen surveillance. In China, for example, dramatic reductions in TB cases and deaths have been achieved. Between 1990 and 2010, prevalence rates were halved, from 215 to 108 per 100,000 population; whereas mortality rates fell by almost 80 percent, from 216,000 in 1990, to 55,000 in 2010. TB incidence rates fell by 3.4 per cent per year. Together
with India, China accounted for 40 per cent of the world’s notified cases of TB in 2010. Africa reported a further 24 per cent of the cases. In some African countries, such as Kenya and Tanzania, the burden of TB is estimated to have been declining for much of the last decade after a peak is linked to the HIV epidemic. The Global TB Control 2011 further indicates that based on global plus all of the WHO’s six regions, at least five are on track working to achieve the MDGs target by 2015. The TB mortality rates have fallen by just over a third since 1990. Still of concern is the African Region, as halving TB prevalence rates by 2015 compared with 1990 is unlikely to be achieved, which turns out in contrast to the target that has already been reached in the Region of the Americas, and is very close to reaching the target in the Western Pacific Region. On a similar note, from among women with TB in 2010, there were 3.2 million (ranging from 3.0–3.5 million) incident cases and 0.32 million (ranging from 0.20–44 million) deaths from TB, and about 13 per cent of TB cases occur among people living with HIV. In 2010, 1.1 million people living with HIV had developed TB, representing 82 per cent of them (900,000 people) in Africa. Worldwide, 12 per cent of TB patients have been reported to contract HIV co-infection. In terms of interventions to address the co-epidemics of TB and HIV, the Global TB Control 2011 has reported that (a) in 2010, HIV testing among TB patients reached 34 per cent globally (59 per cent in the African Region alone), (b) almost 80 percent of TB patients living with HIV had started on the co-trimoxazole preventive therapy (CPT) and 46 per cent were on antiretroviral therapy (ART) in 2010, (c) a large increase in screening for TB among people living with HIV and the provision of isoniazid preventive therapy (IPT) to those without active TB disease occurred in 2010, especially in South Africa. At the same time, in Africa, almost half of TB patients tested positive for HIV were taking antiretrovirals, and about three-quarters began CPT, which helps reduce mortality. Both treatments are among the essential elements of TB/HIV care. Although the majority of cases are said to involve many Asian and African populations, developed countries are increasingly not spared. This is in part due to the increased number of people contracting the disease are immunocompromised by HIV/AIDS, immunosuppressive drugs, or substance abuse. The screening of TB among people living with HIV and the provision of IPT has steadily increased, particularly since 2007. In 2010, 2.3 million were screened for TB (increased from 1.7 million in 2009) and 178,000 of those without active TB were admitted on IPT (double the level achieved in 2009). The number of people living with HIV who were screened for TB was equivalent to more than half of the reported number of people who were placed under HIV care worldwide in 2010. The number started on IPT was 24 per cent of the reported number of eligible people newly placed under HIV care in 2010. Intensified efforts
are needed to reach the Global Plan to Stop TB target by providing TB screening for all those placed under the HIV care, and IPT to those attend HIV care services, especially those who are eligible for it, by 2015 which is linked to the end-goal of the MDGs.

NEW INITIATIVES

It is recognised that despite the ‘impressive improvements in recent years notwithstanding, much more needs to be done to reach the Global Plan targets that all TB patients should be tested for HIV and that all TB patients living with HIV should be provided with CPT and ART’. Summarily, the effort though strategies is thus far generally still not considered sustainable. Having said that, to make it sustainable we need to open up to other approaches including undertaking sound research and development (R&D) initiatives. This aspect is for the first time discussed in the global report indicating considerable progress in diagnostics in recent years, including the endorsement of Xpert MTB/RIF at the end of 2010. Other tests include point-of-care tests which are in the pipeline, plus ten new or re-purposed TB drugs in clinical trials that have the potential to shorten the treatment of drug-susceptible TB and improve the treatment of MDR-TB. While MDR-TB may not cause an immediate outbreak of disease, it reportedly has a heavy, long-term toll, as well as being a chronic, lingering, wasting disease. Some have even compared this to what AIDS was a decade ago in terms of it causing a slow and painful death. Formerly, TB is known as the ‘consumption’ for this reason, and like HIV, MDR-TB too kills working-age adults and causes poverty.

Furthermore, it is a well-known fact that MDR-TB raises the risk of a TB epidemic that would be costly and complex to control. Consequently, it would only make the achievement of the MDGs even more difficult. In fact, drugs used to treat MDR-TB can be about 100 times more costly than the regiment used for normal TB. Comparatively among the WHO regions, the Western Pacific Region has the largest number of MDR-TB cases, although the concentration of cases is higher in parts of Eastern Europe. In China and the Philippines, MDR-TB is claimed to be a serious problem, followed by Mongolia, the Republic of Korea and Viet Nam, where it is somewhat of greater concern. A former WHO Regional Director for the Western Pacific, Dr Shigeru Omi, was quoted as saying, ‘MDR-TB does not stop at borders. An uncontrolled local epidemic threatens the stability of global health security. TB anywhere is TB everywhere’.
Results from some of the R&D new initiatives are expected to be established between 2012 and 2013, with a possibility of licensing at least one new vaccine by 2020. New diagnostics, drugs and vaccines to fight latent disease is expected to be available, between 2012 and 2018, for the eventual elimination of TB. By 2015, it is expected that an entirely new regiment of novel chemical entities that will shorten treatment to one to two months is going to be concocted. Currently there are 12 vaccines, 15 diagnostics, and 27 candidates that have been reported in the R&D pipeline. Still, it is noted that the current investment in basic TB research is inadequate to sustain the pipeline of discovery. There is a need for increased investment in fundamental scientific research on TB to fortify the foundations of knowledge that will lead to future major advancements in the field. The collaboration with the Global Alliance for Vaccines and Immunization (GAVI), the newly established International Financing Facility for Immunization and the Expanded Programme on Immunization (EPI) is one attempt to develop plans and mechanisms for swift introduction of new-generation vaccines as they become available (approximately in 2013). In this regard, it is acknowledged that historically, significant time lags between the creation of new tools (including drugs and vaccines) and their adoption in the field have delayed patients’ access to the best technologies to fight TB. Therefore, this barrier needs to be tackled effectively at the same time.

Funding in general remains another important barrier in making the fight against TB sustainable. While donor funding for TB is expected to reach US$ 0.6 billion in 2012, a 50 per cent increase compared with US$ 0.4 billion in 2006, this is far short of donor funding for malaria amounting to US$ 1.8 billion in 2010, and HIV US$ 6.9 billion in the same year. It is noteworthy that in countries like Brazil, the Russian Federation, India, China and South Africa (BRICS) the investment in TB control is worth US$ 2.1 billion in 2010, 95 per cent of which was from domestic sources. Brazil has reported a significant and sustained decline in its TB burden since 1990. Worldwide, the share of domestic funding allocated to TB rose to 86 per cent of the total for 2012 with Global Fund accounting for 12 per cent. Overall, countries have reported a funding shortfall of US$1 billion for TB implementation in 2012 (3). Most low income countries, however, still rely heavily on external funding, and therefore remain vulnerable.

At the 58th World Health Assembly (WHA), on May 25, 2005, the WHO Member States had endorsed a resolution supporting sustainable financing for TB prevention and control. Dr Raviglione, WHO’s Stop TB Director, explained on how
the resolution will shape the future of TB control with regards that sustainable financing can serve as the key to the progress towards the MDGs TB targets for 2015. By carrying out the actions proposed in the resolution, the chances are high of reaching the 2015 targets, and they represent an enormous step towards the long-term goal of eliminating TB as a global public health problem by 2050 (4). In passing the resolution, lack of finances apart from that of long-term planning are clearly identified as barriers to TB control that must be sustained over many years, coordinated among a wide range of partners working in each country together effectively. The resolution in fact endorses the long-term 2006–2015 Global Plan. The year 2006 saw WHO launching the new Stop TB Strategy, which is to be implemented over the next 10 years, described as The Global Plan to Stop TB (2006–2015). The strategy is intended as a comprehensive assessment of the actions and resources needed to implement the Stop TB Program. A single Global Plan to Stop TB coordinated in this way with a global monitoring and evaluation system would enable the WHO to annually report on the country and global progress. A decade ago, the WHA recognized the need for this in combating the disease through a pioneering approach.

This is now followed through by investing to strengthen the general health systems in improving the performance of TB programmes, investing in TB programmes to strengthen the general health system, for example, through improvements in staff capacity, monitoring and evaluation systems, and laboratories. More strategically, this means that TB must be given a higher health priority. Specifically, it calls for:

- estimating the resources required and available, and identifying funding gaps in the medium-term;

- ensuring there are sufficient domestic and external resources to achieve the 2015 MDGs setting up national Stop TB partnerships to support long term plans for DOTS (directly observed therapy, a short course as part of the Stop TB Strategy) expansion;

- ensuring that all patients have access to the universal standard of care, consistent with the DOTS strategy;

- mobilising societies against TB;

- setting up collaboration between TB and HIV programmes, and

- integrating TB control in the mainstream of development plans.
The resolution in turn is expected to:

- intensify support to countries to accelerate progress towards 2005 targets and 2015 MDGs;
- strengthen cooperation with countries to improve the collaboration between HIV and TB programmes;
- strengthen strategies for control and care of drug-resistant TB;
- devise, strengthen and support mechanisms with partners, for sustainable financing;
- enhance the WHO’s support to the Stop TB Partnership;
- promote research and development for new TB control tools, and
- recommend that TB is to be specifically named in Goal 6 and Target 8 of the MDGs.

In other words, the strategy is set to realize the MDGs, namely Goal 6, Target 8: Halt and begin to reverse the incidence of TB by 2015 where TB prevalence and death that are reduced by 50 per cent relative to 1990 could still be a daunting one. A major challenge is that by 2050, TB is expected to be eliminated as a public health problem (evident in one case per million population). In short, the issue of equity, accessibility, availability, affordability and quality is of paramount importance to be embraced in its totality, without being biased to just one or a few of them.

**SCENARIOS**

On a broader horizon, scenarios for the implementation for 2006–2015 have been developed globally and for seven of the eight TB epidemiological regions. In developing the scenarios, assumptions have been made about the pace of scale-up and the coverage of different activities. Estimates have been made of TB case detection and treatment outcomes over the next ten years, as well as of TB prevalence, incidence and death rates in relation to the 2015 targets. The scenarios also include estimated costs of the country implementation as well as external technical support. This is in contrast to the current epidemiological modeling which does not include any assumptions about poverty reduction and its impact on the TB epidemic. If there are considerable socioeconomic improvements as a result of action to achieve other MDGs targets, the prospects of reaching the TB
control targets earlier — in Africa and Eastern Europe, for example — will be much better. Similarly, if new preventive, diagnostic or treatment tools become available, they could have dramatic effects on the TB epidemic. It is envisaged that under this ambitious but realistic scenario generated, most, if not all regions, will see incidence, prevalence and death rate trends go down rapidly over the next ten years as a result of the various planned TB control activities. The MDGs target to ‘halt and begin to reverse the incidence of TB by 2015’ will be met in all regions. The Stop TB Partnership’s own challenging 2015 targets — to halve prevalence and death rates from the 1990 baseline — could also be met globally by 2015, with potentially enormous progress in most regions where the TB epidemic is concentrated. This is hoped to lay the foundation for eliminating TB by 2050. To date, however, the exception based on the scenarios has shown that in Africa and Eastern Europe these targets may not possibly be achieved by 2015. For instance, a third of estimated TB cases worldwide are said to have gone unnotified and therefore it is unknown whether they have been diagnosed and if the diagnoses are done properly. As a reminder the United Nations Secretary-General Ban Ki-moon had once been quoted to have said: ‘…it is no cause for complacency’(5). ‘Too many millions still develop TB each year, and too many die. I urge serious and sustained support for TB prevention and care, especially for the world’s poorest and most vulnerable people,’ he added.

Meanwhile, the Director-General of the WHO, Dr Margaret Chan, acknowledged: ‘In many countries, strong leadership and domestic financing, with robust donor support, has started to make a real difference in the fight against TB’. She urged that it is time to build on that commitment, to increase the global effort — and to pay particular attention to the growing threat of MDR-TB so that expanded efforts and progress in these countries could be sustained.

It cannot be over-emphasized that treating MDR-TB remains one of the most under-funded areas, as reported by the WHO. Meanwhile, the number of MDR-TB patients treated had increased to 46,000 in 2010 — this is just 16 per cent of the estimated number of MDR-TB patients that needed treatment. Of the US$1 billion gap reported by countries for 2012, US$200 million is for the MDR-TB response. In the 12th annual WHO report on Global TB Control (6), Dr Margaret Chan, WHO Director-General was quoted as saying: ‘We’ve entered a new era’. She suggests that in order to make progress, public programmes must be further strengthened, as well as fully tap the potential of other service providers. ‘Enlisting these other providers, working in partnership with national programmes, will markedly increase the diagnosis and treatment for people in need’. In fact, the report reasserts that the epidemic could further slow down the progress of TB control. The fatal combination of TB and HIV, which is fuelling the TB epidemic in many
parts of the world, especially in Africa, is another barrier. Dr Raviglione however, is optimistic that a new rapid test for MDR-TB is revolutionizing the TB diagnosis, with 26 countries using the test only six months after its endorsement by the WHO last December. At least ten more countries are expected to have it by the end of 2011, according to the Director of WHO’s Stop TB Department. But this is not all until the promise of testing more people is matched with the commitment to treat all detected, as aptly remarked Dr Raviglione: ‘It would be a scandal to leave diagnosed patients without treatment’.

It is in this context that this compilation is undertaken jointly and generously by renowned experts and foremost authorities on TB research worldwide. Through the evidence-based opinions, well-articulated arguments and up-to-date information presented in this compilation, it is hoped that they will be compelled to persuade more leaders to make firm commitment to halt and reverse the global TB epidemic as expressed in MDGs 6. More significantly, there is barely five years left before the conclusion of the MDG is made in 2015, and unless there is a firm political will demonstrated across the globe, any approaches, no matter how well thought of they are, cannot bring about any sustainable solution to the prevailing pressing problem. Here is where leaders are expected to be resolute, to act in finding a new strategic vision to combat the growing TB menace in view of the WHO Stop TB Strategy and the Stop TB Partnership’s Global Plan targeted for completion by 2015.

In short, the over-arching purpose of this compilation is to generate sufficient debate on key issues in order to set the scene on what needs to be done swiftly so as to meet the 2015 MDGs TB-related control targets, even indirectly. It is important to keep in mind that the WHA in 1991 planned to achieve the target set at the time - a TB case detection rate of 70 per cent and a treatment success of 85 per cent among detected cases by 2000. Unfortunately, it was later deferred to 2005 in recognition that more time was needed to meet the predetermined global targets.

This is despite the fact that, as mentioned earlier, that between 1991 and 2005, there were allegedly many chances available to put TB under control. Data on progress towards achieving the TB targets, collected and evaluated since 1995, were recently presented to the WHO in May 2007, where many more issues that have emerged have made it more difficult to sustain whatever has been achieved to date. The prevailing deterioration in socio-economic situation worldwide can be expected to widen the gap of access and equity due to the increasing cost of treatment. With the changing climatic condition and global warming, additional constraints are bound to influence the provision of health care all round, putting further impediments on available resources.
Against such uncertainties, the global TB strategy must embrace the notion of sustainable development aimed at ensuring efficient control of TB far beyond just the present generation. In other words, it must be sustainable well beyond the MDGs endpoint in 2015. Through the numerous relentless mission-oriented efforts undertaken thus far, we must be ready to further enmesh in the new, as well as emerging, challenges to solve local issues for global problems with the confidence to make a lasting difference at all levels. The catch-word of sustainability is intended as a platform to create a better future, based on the ultimate over-arching concept of meeting ‘the needs of the present without compromising the ability of future generations to meet their needs’ as contained in the Brundtland Report of 1987 (7). This would also mean that in order to sustain the implementation of a successful effort, it is important to consider the wider context of the health system, for example (8). One of the six components of the Stop TB Strategy, for example, emphasises on the contribution to the strengthening of health systems where national TB control programmes can significantly contribute to overall strategies to advance financing, planning, management, information and supply systems and innovative service delivery scale-up. At the same time, enabling and promoting research work to improve the current tools used to control TB, including practices and disease elimination, which will depend on new diagnostics, drugs and vaccines. In a sense, it is about engaging all care providers, not confining to the public sector and practitioners alone. In other words, for the TB control programme to be sustainable, the health system will need to be improved, in tandem to enable the relevant services to be reconfigured so that incentives are created to reward improvements in efficiency and outcomes as suggested by the Russian experience (9).

Sustainability, as has been broadly defined thus, breaks down the silos around disciplines, be it economic development, environmental and natural resources management, food and energy production, and socio-cultural dimensions and lifestyles (namely the social sciences and humanities, including the arts, as illustrated in the previous edition of this compilation), in ways that makes transdisciplinary engagement possible; to allow the highest level of interactions and cross-fertilisation of ideas. It would be better, still, if it can serve as a basis for policy-decision (10) by promoting the appropriate level of incentives for others to seek out, research and innovation on the use of TB-related diagnostics and treatment services. Like Pasteur’s revolutionary work on microbiology, we must equally inspire to lay the foundation of new ‘sustainable science’ in the era that requires knowledge to converge as an integrated whole so that it can offer better alternatives and solutions.
It is within this framework, in fact, institutions of higher learning are poised to facilitate the meeting of the existing (e.g. Millennium Development Goals, Education for All, Education for Sustainable Development) and other future global and universal aspirations towards the uplifting of billions of others trapped at the bottom of the quality of life pyramid. They, without doubt, are the most vulnerable groups who, if not comprehensively engaged will tend to derail the health programmes no matter how much success has been achieved thus far. Otherwise, it poses a variety of barriers that will make the programmes unsustainable.

As the most critical success indicators are linked to factors such as mortality rates, life expectancy, disease prevalence, nutritional indicators, income and education levels, each of these can act as additional barriers if not appropriately catered for. Some even regard these as basic human rights that must be met before the problems related to TB can be totally solved. Ultimately, it is about solving issues related to diseases like TB, or more generally neglected tropical diseases: namely for the betterment of the quality of life of the majority of the population. Moreover, by practicing transdisciplinary approaches, the locus of measurements, and thus definition, takes into account inherent factors not only of health, but also the ecology, socio-economy, in a way that it provides a more comprehensive and effective alternative solution towards improving the quality of life of the so-called ‘bottom billions’. It is also more empowering when health is intricately linked to education, similarly to the socio-economic and ecological imperatives. More specifically therefore, the emerging concept of sustainable health (11) will be given due importance. This could be as straightforward as maintaining good nutrition as argued above, since the link between nutrition and TB has been clarified recently. Reportedly, malnutrition can increase the risk of developing TB, according to Dr Soumya Swaminathan of Chennai’s TB Research Centre (TRC) in India (12).

Given that globally about 8.8 million new cases and 1.7 million TB-related deaths occurred in 2007 (India alone has accounted for one-fifth of the global TB burden and 400,000 deaths), improving nutritional status in the population helps prevent TB, however, this has never been given priority as an infection control measure.
CONCLUSION

As far back as the World Health Report 2008, it has been duly noted that many health systems have lost their focus on equitable access to care and their capacity to meet the needs and expectations of people, especially the poor and marginalised groups, more so the billions of people at the bottom layer of the society. This compilation, and the previous compilation, serves as a timely effort on the control of TB to illustrate and highlight the many issues involved, and the resulting complexities that must be faced in seeking new solutions and alternatives as in the case of the concept of sustainable health. Dependency on any one mainstream approach is no longer tenable as we further appreciate the multi-dimensional aspects of the problem in an increasingly ailing planet. Empowering people with TB, the support services and communities have been able to show that they can undertake some essential TB control tasks, especially when networked to mobilise civil societies and political will towards a more sustainable TB control programme.

REFERENCES


