United Nations Office
of the Secretary-General's Special Adviser
on Community Based Medicine and Lessons from Haiti

Treatment of MDR-TB in Peru:

From Demonstration to National Program

Written by Abbey Gardner and Jéhane Sedky, Senior Policy Advisors to Dr. Paul Farmer
With Research Assistance from David Lambert
Special thanks to Jaime Bayona, Public Health Advisor at the World Bank Group

November 2015

Executive Summary

Tuberculosis (TB) is a lung disease that disproportionately affects the poor and is the leading infectious cause of adult mortality globally. During the 1990s, multidrug-resistant tuberculosis (MDR-TB) developed escalating the challenge of combating the already prevalent global epidemic of drug-susceptible TB. Due to the high treatment cost and specialized diagnostics required to cure MDR-TB, the disease was considered nearly impossible to treat in low-income countries.[1] This paper provides an overview of the first community-based treatment program for MDR-TB and highlights the lessons learned from scaling up the program nationwide in Peru from 1996 to 2009.

In 1996, Socios En Salud, the Peruvian affiliate of the U.S.-based global health non-governmental organization (NGO) Partners In Health, began treating MDR-TB patients in Carabayllo, a low-income community on the outskirts of Lima. At the time, the global health policy led by the United Nations World Health Organization (WHO) recommended only testing and treatment for standard drug-susceptible TB. The human implications of this policy were that patients with MDR-TB would not receive the correct treatment and would be at high risk of either "…death, failure, or relapse", or remaining "diseased and infectious."[2] Despite the lack of any support from the global health establishment, Socios En Salud's approach was to test all those suspected of TB for the particular strain they were infected with and treat them accordingly. **They achieved results not previously seen in a resource-poor setting: Out of an initial cohort of 74 patients, Socios En Salud produced a cure rate of 85 percent.[3]**

Socios En Salud implemented their pilot MDR-TB treatment program in partnership with the Government of Peru's National Tuberculosis Control Program. Due to the success of the joint initiative, the Government of Peru developed plans to apply the model nationwide. From 1998 to 2009, Socios En Salud served as a technical adviser to the Ministry of Health as the program was scaled up.[4] The partnership had a transformative effect on MDR-TB care in Peru. By 2008, the country had achieved near-universal access to MDR-TB diagnosis and treatment with cure rates as high as 83 percent.[5] Nearly 8,000 MDR-TB patients were treated nationwide between 2002 and 2006. According to a report written by Socios en Salud, the Government of Peru and the WHO, close to 400,000 MDR-TB infections and 50,000 deaths were prevented as a result of the program.[6] When they took loss of economic productivity due to disease into account, they estimated that the program saved Peru $261,096,000 USD.[7] The success of Peru's national program set a new standard for MDR-TB care for Peru and beyond.

Scaling Up Treatment of MDR-TB in Peru

In 1991, the Government of Peru declared tuberculosis a public emergency making treatment of the disease one of its highest priorities. The Ministry of Health followed the World Health Organization's (WHO) recommended approach to TB treatment: DOTS,[8] a strategy in which TB patients are administered short-course antibiotic regimens under the direct observation of health workers. The adoption of DOTS resulted in thousands of individuals, who had previously been unable to receive daily treatment in an institutional setting, beginning to receive proper care. Because health workers visited patients' homes, the approach facilitated adherence to treatment and reduced the risk of developing drug resistance. The WHO considered Peru's DOTS program to be one of the best in the world, achieving an approximately 90 per cent recovery rate among new patients.[9] Though DOTS was extremely efficacious for drug-susceptible TB, it was not appropriate for patients with MDR-TB—defined as strains of the disease immune to the two standard anti-tuberculosis medications, isoniazid, and rifampin.[10]

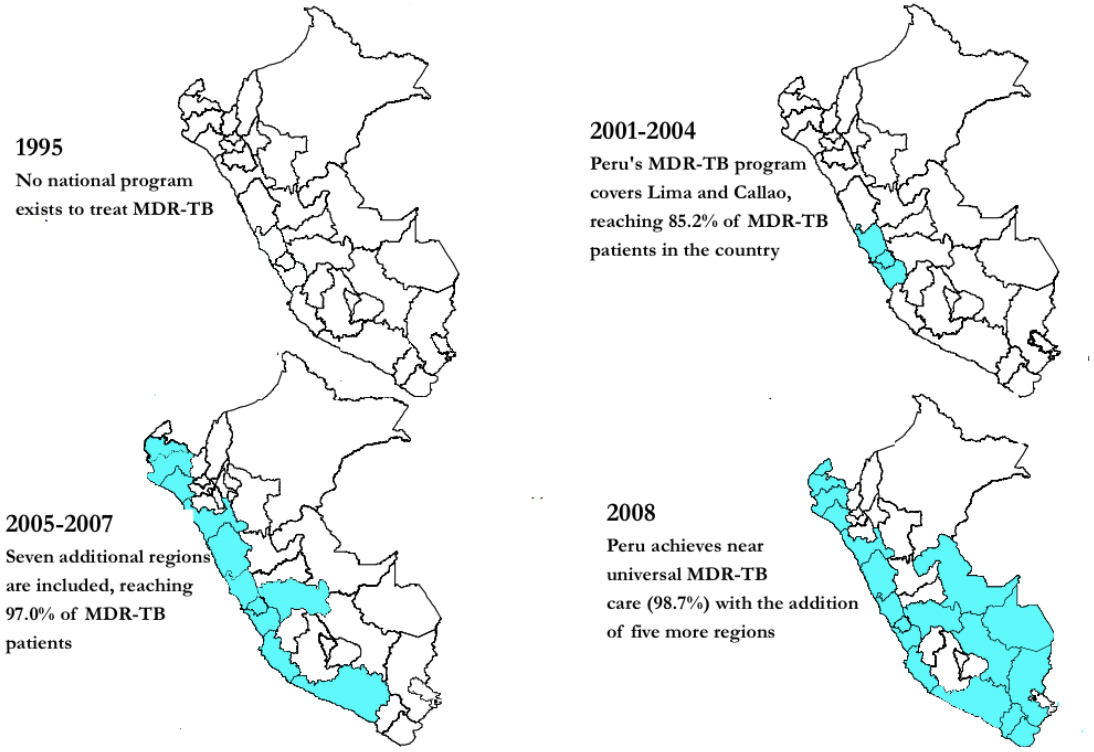
In 1996, the non-governmental organization Socios En Salud conducted its own survey on drug resistance in Carabayllo, where its leadership had set up headquarters in 1995. Out of 160 TB patients tested who had not been cured through the National Tuberculosis Control Program, 93.8 percent had active MDR-TB.[11] In order to effectively treat those with TB as well as those with MDR-TB, Socios En Salud built on the existing DOTS model of home-based care while assessing individual treatment needs for each patient's unique pattern of resistance and then providing appropriate, tailored treatment. This expanded approach became known as DOTS-Plus. The DOTS-Plus approach was complementary to DOTS with provisions for treating MDR-TB. Another aspect of the expanded approach was a more comprehensive range of services provided by Socios En Salud community health workers (CHWs) implementing DOTS-Plus. These CHWs went further than the traditional DOTS health workers by addressing socioeconomic and psychological aspects of the disease such as providing basic food and supplies, linking families with community services, providing mental health support when needed, etc.[12]

Out of an initial cohort of 74 patients resistant to all four of the drugs used in the National Tuberculosis Control Program, Socios En Salud was able to achieve an 85 percent cure rate with its model of care including different next line antibiotics.[13] These results stood in contrast with the one-third of patients who were cured in the Ministry of Health's first attempt to treat MDR-TB. The patients in this government trial were tested to determine if they had MDR-TB. Patients who tested positive were given a standardized MDR-TB regimen designed to cost no more than $1,500 per patient instead of a more costly individualized treatment regimen.[14] The remaining two-thirds of patients continued to be smear-positive

for MDR-TB or dropped out of treatment.[15]

While Socios En Salud was implementing their MDR-TB program in Peru, data collected by the WHO globally was indicating higher burdens of drug resistance than previously recorded. This evidence demonstrated that short-course therapy would not be sufficient in reigning in MDR-TB leading the WHO to support programs specifically tailored to treating the disease. In 2001, Harvard Medical School and Partners In Health/Socios En Salud signed an agreement with the Ministry of Health to develop the Collaborative Project for Strengthening the DOTS-Plus Strategy in Peru. In 2001, shortly after the results of the Socios En Salud program were shared with the Peruvian authorities, Socios En Salud and the Ministry of Health agreed to expand treatment from Carabayllo to the whole of metropolitan Lima, where approximately 85 percent of Peru's MDR-TB patients lived.[16] Though Socios En Salud and the Ministry of Health had been collaborating on projects since 1996, the agreement marked the start of an official partnership. The Bill and Melinda Gates Foundation provided funding as the Ministry of Health and Socios En Salud worked to build capacity and expand services across the country. By 2005, Peru had achieved near-universal access to MDR-TB diagnosis and treatment, reaching nationwide cure rates comparable to those gained in Carabayllo. In 2009, the Government of Peru assumed all aspects of the program and is now offering technical assistance to countries around the world on their MDR-TB programs.[17]

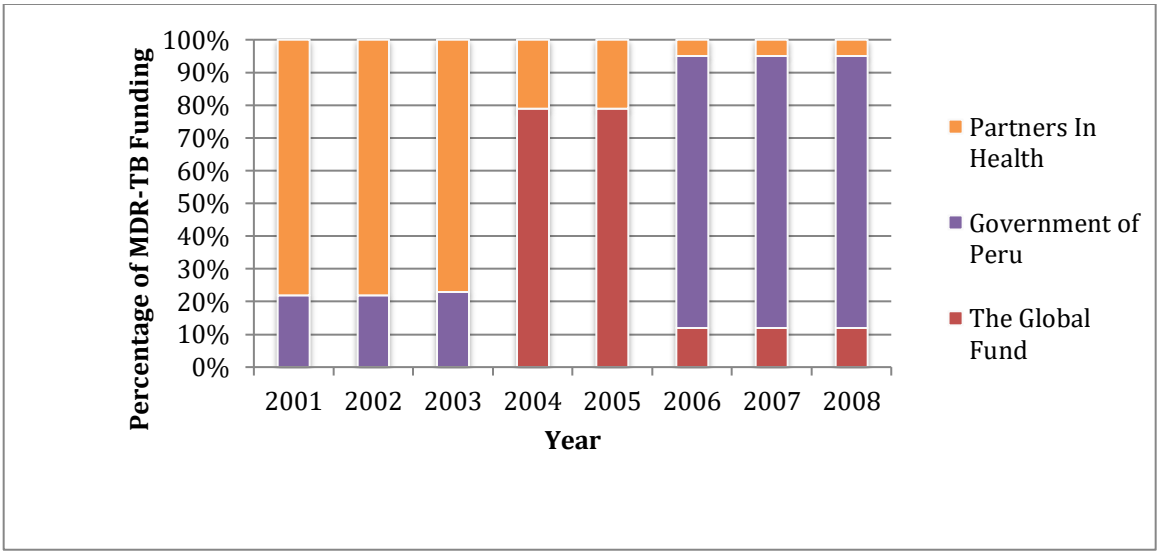
Expansion of MDR-TB Care, Peru 1995-2008[18]



Sources of Funding for TB and MDR-TB Treatment, 1997-2006[19]

Year	TB funding sources	MDR-TB funding sources
1997	National Tuberculosis Control Program	Private donors
1998	National Tuberculosis Control Program	Private donors
1999	National Tuberculosis Control Program	Private donors
2000	National Tuberculosis Control Program	Private donors
2001	National Tuberculosis Control Program	The Bill and Melinda Gates Foundation
2002	National Tuberculosis Control Program	The Bill and Melinda Gates Foundation
2003	National Tuberculosis Control Program	The Bill and Melinda Gates Foundation
2004	National Tuberculosis Control Program	The Global Fund
2005	National Tuberculosis Control Program	The Global Fund
2006	National Tuberculosis Control Program	The Global Fund and the National Tuberculosis Control Program

Evolution of Financial Support for MDR-TB Treatment[20]



Timeline

Year	Event
1983	The Peruvian Ministry of Health begins providing treatment regimens for TB with first-line drugs, rifampicin, and isoniazid. Annual coverage of free treatment in the 1980s reaches approximately 35 percent of those in need.[21] The number of patients cured does not reach 50 percent due to low rate of adherence, limited resources, and interrupted drug supplies, all of which serve to increase drug resistance.[22]
1987	In an early effort to address drug resistance, the National Tuberculosis Control Program refines its treatment protocol by adding two additional medications, kanamycin, and ethambutol, to the existing standard drug regimen for previously treated patients. But similar issues such as sporadic and incomplete administration of drugs and scarce resources continue to increase resistance.[23] The Government of Peru made several revisions to the treatment protocols throughout the 1990s.
1991	The Government of Peru declares TB a public emergency and increases the National Tuberculosis Control Program's budget from USD $600,000 to USD $5 million. New and previously treated TB patients are promised care through a single six-month treatment regimen.[24] For the first time in the country's history, 100 percent of patients are guaranteed drugs and care based on WHO recommendations.
1993-94	The WHO adopts a policy called Directly Observed Treatment Short-Course (DOTS) for TB in which TB patients are visited by health care workers to ensure adherence to taking their medications as directed.
1995	Socios En Salud begins operations in Carabayllo.
1996	Socios En Salud creates a community-based model to treat MDR-TB consisting of comprehensive outpatient therapy designed for each patient's unique pattern of resistance, while also addressing the socioeconomic and psychological aspects of the disease. The model would later become known as DOTS-Plus. An 85 percent cure rate is achieved with its model of care.
1997	The National Tuberculosis Control Program receives advisory and financial assistance from the WHO, allowing it to create a technical unit to treat MDR-TB, the first in Latin America.
1998	The efficacy of the Socios En Salud model and the realization that MDR-TB poses a serious threat prompts the Ministry of Health to begin collaborating with Socios En Salud to expand the DOTS-Plus model across Peru.
1999	The WHO and partners launch "DOTS-Plus for MDR-TB" to treat MDR-TB with second-line drugs in low-resource settings globally.[25]
2001	The Infectious Diseases and Social Change Program of Harvard University, Partners In Health/Socios En Salud, and the Ministry of Health sign a memorandum of understanding to expand MDR-TB care

	(DOTS-Plus) across Peru from 2001 to 2005. The Bill and Melinda Gates Foundation provide $45 million in funding. It is agreed that the program will be transferred over to the Ministry of Health when it is able to run it independently.[26]
2000-2003	The WHO convenes a committee of TB experts from around the world to help advance TB treatment globally, including lowering drug prices. The Green Light Committee (GLC)[27] is established and lowers the price of second-line drugs by 95 percent less than what Socios En Salud had paid when it began its pilot program in 1996.[28]
2003	The Global Fund allocates $25 million to strengthen Peru's National Strategic Plan for MDR-TB.[29]
2006	The Government of Peru increases the national TB budget to approximately $10 million dollars—an increase of 250 percent in relation to the annual average allocated in the past 15 years.[30]
2006	The Global Fund allocates an additional $32 million for MDR-TB treatment in Peru in its fifth round of funding.[31] By this point, 97 percent of Peru (27 million citizens) has access to MDR-TB care. It is estimated that between 2002 and 2006 alone close to 400,000 MDR-TB infections and 50,000 deaths were prevented as a result of the program.[32]
2009	The Ministry of Health incorporates all aspects of the Socios En Salud program into its national TB program.
2014	As of 2014, the Global Fund has provided $72,223,009 for TB treatment in Peru.[33]

Lessons Learned

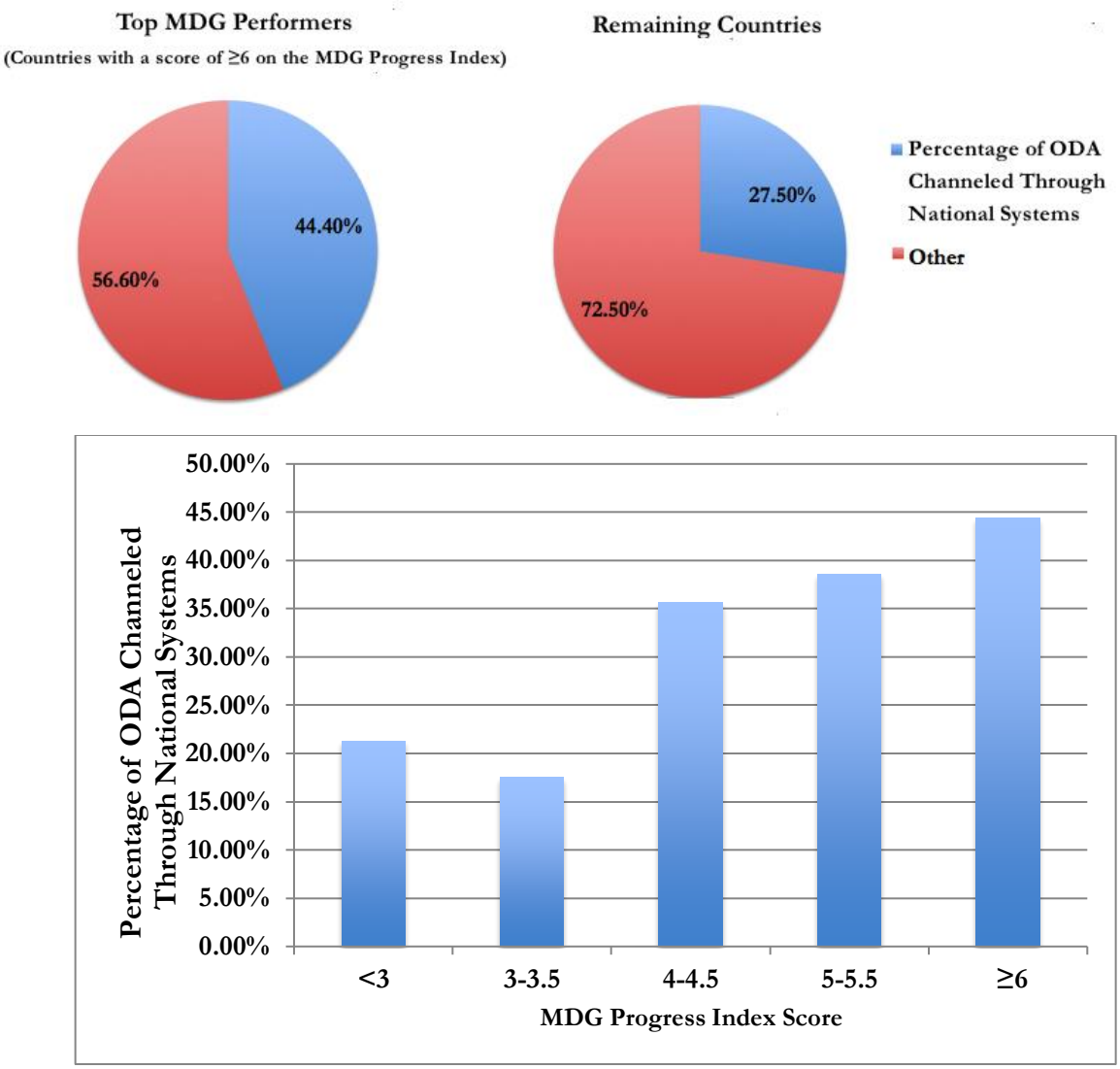
1. **Healthcare initiatives run by non-governmental organizations should be structured in a way that supports the public sector in order to achieve a significant and durable impact.**

The history described in this paper illustrates an effective, decade-long collaboration between an NGO, a research university, and the public sector of a low-income country that worked effectively and sustainably towards achieving the common goal of eliminating MDR-TB in Peru through evidence-based diagnosis and treatment. While a critical aspect of Peru's success with MDR-TB was the development of effective diagnosis and treatment protocols (as recommended by Socios En Salud), it was the nationwide implementation that makes it a model to be replicated. One of the six components of the WHO Stop TB Strategy is health system strengthening, explicitly acknowledging that effective and sustainable TB control relies on the general health system, especially on well-functioning primary healthcare.[34]

There is consensus that strengthening national health systems is essential if the health-related Millennium Development Goals (MDGs) are to be achieved. The 2005 Paris Aid Effectiveness Principles[35]—namely using the systems of public institutions and delinking funding from requirements to purchase goods and services from specific countries[36]—provide guidance for ensuring that actions are aligned with national priorities and harmonized in practice.[37] In 2005 and 2007, the earliest years in which Paris Declaration Survey data is available,[38] only 24.7 percent of official development assistance (ODA) to Peru was channeled through the public sector, the rest mainly going to NGOs.[39] By 2010, however, this figure had increased to 77.3 percent.

Research from Dr Paul Farmer's United Nations office shows that high percentages of ODA channeled through national systems are a strong predictor of a county's performance on the MDGs. The MDG Progress Index methodology, created by the Center for Global Development, allocates scores (1 for on track, 0.5 for partially on track, and 0 for off track) for eight key MDG targets.[40] Among the 75 countries that participated in the 2010 Paris Declaration Survey,[41] those with a score of six or higher[42] on the MDG Progress Index received close to 17 percent more ODA through national systems than the remainder of the countries, and over 23 percent more than countries with a score of below three.

Top MDG Performers Receive Close to 17 Percent More ODA through National Systems Than Other Countries



2. Support public institutions with robust and sustained funding.

Before 1995, there were no public treatment options for MDR-TB available in Peru. When Socios En Salud first started treating patients in 1996, the program relied heavily on private donors, which limited the number of patients it could treat. In 2000, the Bill and Melinda Gates Foundation provided Socios En Salud and a cohort of other NGOs with $45 million to expand MDR-TB treatment across the country. Between 2003 and 2011, the Global Fund, in its second and fifth round projects, disbursed more than $58 million to support Peru's National Strategic Plan for MDR-TB.[43] The influx of funding provided the

Government of Peru with the resources it needed to rapidly integrate MDR-TB services into the primary healthcare system. In a timeframe of less than ten years, Peru went from having no public treatment options for MDR-TB to covering over 85 percent of patients in the country. Three years later this figure grew to 98.7 percent.

Increases in international funding for health initiatives have resulted in significant achievements in low-resource settings, including the distribution of public goods leading to higher child survival rates and a reduction in deaths attributed to infectious diseases such as malaria, HIV, and TB. The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund demonstrate that when adequate resources are channeled to pressing social problems aims once considered quixotic in low-resource settings can be realized.[44]

Between 1990 and 2013, the global under-five mortality rate declined by nearly half (49 percent), plunging from 90 per 1,000 in 1990 to 46 per 1,000 in 2013.[45] New HIV infections declined by 33 percent between 2001 and 2012, with 9.7 million people in low-and middle-income countries receiving antiretroviral treatment in 2012. During the same period, mortality rates due to malaria fell by 42 percent. And between 1995 and 2012, 56 million people were successfully treated for TB, saving an estimated 22 million lives.[46] These historical achievements are largely a result of ambitious global efforts supported by increases in funding.

3. All standards of care should be guided by the highest aspirations.

The implementation of DOTS-Plus in Peru is an example of how public health leaders reimagined what is possible. At the time Socios En Salud began its operations in Carabayllo, the WHO DOTS manual contained the following statement: "In settings of resource constraints, it is necessary for rational resource allocation to prioritize TB treatment categories according to the cost-effectiveness of treatment of each category."[47] As Peru demonstrated, it was not only possible to treat MDR-TB patients, but the cost of *not* doing so would have been far greater than providing the highest standards of care.

The approach taken in Peru set the stage for modifying MDR-TB treatment in other countries. For example, the Socios En Salud method was replicated by Partners in Health in partnership with the Russian Ministry of Health and Justice in the mid-1990s. In the region of Tomsk, Russia, an area the size of Poland, a quarter of prisoners being treated for TB were dying because most of them had multidrug-resistant strains of the disease and were receiving ineffective medications. Within one year of applying a DOTS-Plus approach, the number dropped to zero, where it remains as of the time this paper was written.

Likewise, twenty years ago AIDS was also considered impractical—if not impossible—to treat on a

large scale in Africa. It took bold leadership to implement the WHO/UNAIDS 3X5 Initiative which aimed to provide three million people in low-resource settings with antiretroviral therapy by 2005.[48] The goal was achieved by 2007, and by 2012 more than nine million Africans with HIV had received treatment.

4. Community healthcare workers are a critical part of the continuum of care.

A 2010 WHO study based on eight country case studies on the "impact and effectiveness of global experience of community health workers (CHWs) in delivering healthcare" concluded that:

> CHWs provide a critical link between their communities and the health and social services system. Communities across all the countries that we studied recognized the value of CHWs as a member of the health delivery team and therefore have supported the utilization and skill development of CHWs.[49]

In both the DOTS and the DOTS-Plus approaches to TB control, CHWs were integral to the programs' success. In Peru, Socios En Salud invested heavily in human resources at the community level. The CHWs offered instrumental knowledge about their communities, helped test different approaches to service delivery, and strengthened the sense of trust between community members and healthcare workers. As Jaime Bayona, co-founder and former director of Socios En Salud, notes:

> CHWs give you confidence if something is going to work or not. Doctors don't necessarily have the tools to do this. When implementing healthcare at the home or community level, you need a different kind of human resource to help you adapt services into disparate environments. This has not been emphasized enough in medicine.[50]

One of the key lessons learned from the Peruvian experience is how much more effective a healthcare initiative can be when CHWs are used to address a wide range of individual and family needs beyond the immediate vertical program in which they are engaged. It highlights the importance of capitalizing on the experience of trained CHWs.

Conclusion

The National Strategic Plan for MDR-TB in Peru was the first large-scale attempt to treat MDR-TB in a poor country. And because of its success, the model that the Government of Peru developed with Socios En Salud in the 1990s has now been replicated in dozens of nations around the world. Broadly, the achievement can be attributed to several factors:

1) Strong leadership: The Government of Peru committed to providing care to its citizens at a time when global health authorities were still debating whether MDR-TB treatment was feasible in low-resource settings. Implementing the national MDR-TB program challenged the common assumption that the disease was untreatable and engendered a global paradigm shift toward aggressive treatment.[51]

2) Leveraging partnerships: When Partners In Health/Socios En Salud started operating in Carabayllo, it was a small-profile NGO, engaged in work that was considered impossible at the time. Yet as the evidence mounted that Socios En Salud was curing MDR-TB with its model of care, the Government of Peru initiated a working relationship and by 1998 began collaborating to scale up the program nationwide. The Peruvian authorities recognized the need to partner with a wide array of organizations, from large multilaterals such as the WHO to the numerous grassroots, community-based organizations which had formed in the poorest communities. The partnership with Harvard University was also critical as it provided the Ministry of Health with the data and analysis needed to expand the program from Carabayllo to the rest of metropolitan Lima, covering approximately 85 percent of Peru's MDR-TB patients.

3) Financing national plan: In 2001, a consortium consisting of the Ministry of Health, Harvard Medical School, and Partners In Health/Socios En Salud received a grant of $45 million from the Bill and Melinda Gates Foundation with the agreement that the Ministry of Health would assume responsibility over all facets of the program when it was ready.[52] Further funding from the Global Fund allowed Peru to provide near-universal MDR-TB care, covering 98.7 percent of the country by 2008. While the Global Fund did not disburse funding directly to the Government of Peru, it supported the National Strategic Plan for MDR-TB by paying the salaries of numerous nurses, doctors, and other critical personnel working for the Ministry of Health. By 2006, the Government of Peru had increased its national TB budget to approximately $10 million, an increase of 250 percent in relation to the annual average allocated in the past 15 years, demonstrating its own political commitment.[53] During this period, the cost of second-line medications fell by 95 percent, freeing resources to further strengthen Peru's public health sector.[54]

Between 2002 and 2006, close to 8,000 MDR-TB patients were treated nationwide. And by 2008, near-universal access to MDR-TB diagnosis and treatment was achieved, with cure rates as high as 83 percent.[55] As a result, an estimated 400,000 MDR-TB infections and 50,000 deaths were prevented.[56] Yet

the overall effort to strengthen Peru's public health sector went well beyond MDR-TB. Peru is likely to achieve all the health-related MDGs this year.[57, 58] The under-five mortality rate decreased from 114 per 1,000 in 1983 to 17 per 1,000 in 2013. During the same time period, infant mortality dropped from 76 per 1,000 births to 13. And overall life expectancy increased from 60 to 75 years of age.[59] The unprecedented accomplishments witnessed in Peru regarding MDR-TB along with the myriad of other health-related gains demonstrate that with strong leadership, partnerships, and robust support to the public sector, even the most challenging issues can be overcome.

---

[1] Keshavjee, Salmaan, and Paul Farmer. "Tuberculosis, Drug Resistance, and the History of Modern Medicine." *New England Journal of Medicine* 367.10 (2012). p. 932-933.

[2] [2] M.C. Becerra, P.E. Farmer, and J.Y. Kim, "The Problem of Drug-Resistant Tuberculosis: An Overview" *The Global Impact of Drug Resistant Tuberculosis.* (1999.) Harvard Medical School and the Open Society Institute. p. 31.

[3] Farmer, Paul. "DOTS and DOTS-Plus." *Annals of the New York Academy of Sciences* 953.1 (2001). p. 177.

[4] Stop TB Partnership. "Peru an experience to share in TB management." Presentation. April 03, 2010. Beijing. Web. 30 Oct. 2013. Available at: http://www.who.int/tb_beijingmeeting/media/press_pack/presentations/day3_presentation5.pdf

[5] World Health Organization (2013). "A 'to do list' on MDR-TB." For further information, see: http://www.who.int/tb/publications/2009/airborne/background/list/en/

[6] Socios En Salud, Ministerio de Salud del Perú, and the World Health Organization. "Building Strategic Partnerships to Stop Tuberculosis: The Peruvian Experience." (2006). p. 82.

[7] Ibid.

[8] Cheng, Hong, Philip Kotler, and Nancy Lee. *Social Marketing for Public Health: Global Trends and Success Stories: Global Trends and Success Stories*. Jones & Bartlett Learning. (2010). p. 113.

[9] Becerra, M. C., et al. "Using Treatment Failure Under Effective Directly Observed Short-Course Chemotherapy Programs to Identify Patients with Multidrug-Resistant Tuberculosis." *The International Journal of Tuberculosis and Lung Disease*. (2000). p. 108.

[10] Socios En Salud. "Socios En Salud Nurses Guide of MDR-TB and DOTS-Plus." (2006). p. 01.

[11] *Op. cit.* 17, p. 110.

[12] Palacios, Eda and Julio Albújar "Socio-Economic and Psycho-Emotional Support for MDR-TB Management: Identifying Needs and Monitoring Support." Presentation. Socios En Salud. Cape Town, South Africa. November 10, 2007.

[13] Farmer, Paul, and Jim Yong Kim. "Community based approaches to the control of multidrug resistant tuberculosis: introducing 'DOTS-plus'." *BMJ: British Medical Journal* 317.7159 (1998). p. 671.

[14] Smith-Nonini, Sandy. "When The Program is Good, But the Disease is Better: Lessons from Peru on Drug-Resistant Tuberculosis." *Medical anthropology* 24.3 (2005). p. 282.

[15] Ibid.

[16] *Op. cit.* 7, p. 30.

[17] World Health Organization (2013). "A 'to do list' on MDR-TB." For further information, see: http://www.who.int/tb/publications/2009/airborne/background/list/en/

[18] *Op. cit.* 5.

[19] Bayona, Jaime. "Lessons Learned About the Management of Second-line Anti-TB drugs." Sixth Meeting of the Working Group on MDR-TB of the Stop TB Partnership, Tbilisi, Georgia. September 20, 2007. Available at: http://www.stoptb.org/wg/mdrtb/assets/documents/tblisipres/Day%201/07%20Management%20of%20Second%20Line%20Drugs%20Jaime%20Bayona.pdf

[20] Ibid.

[21] *Op. cit.* 7, p. 30.

[22] Ibid.

[23] Ibid.

[24] *Op. cit.* 16, p. 115.

[25] Raviglione, Mario C. "The Global Plan to Stop TB, 2006–2015 [Editorial]." *The International Journal of Tuberculosis and Lung Disease* 10.3 (2006). p. 238.

[26] *Op. cit.* 7, p. 164.
[27] Established in 2000, the GLC Initiative is the mechanism that enables access to affordable, high-quality second-line anti-TB drugs for the treatment of MDR-TB. Its objectives are: ensuring effective treatment of patients with MDR-TB in accordance with guidelines published by the WHO on the programmatic management of MDR-TB; increasing access to technical assistance to facilitate rapid scale-up of MDR-TB management; increasing access to high-quality, low-cost, second-line anti-TB drugs for the treatment of MDR-TB among well-performing programs; preventing the development of resistance to second-line anti-TB drugs by ensuring rational drug use; advising WHO on policy-related matters to effectively prevent and control MDR-TB based on the best available scientific evidence. (WHO, The Green Light Committee Initiative; 2000).
[28] *Op. cit.* 13, p. 61.
[29] Ibid.
[30] *Op. cit.* 7, p. 153.
[31] *Op. cit.* 7, p. 165.
[32] *Op. cit.* 7, p. 82.
[33] *Op. cit.* 9.
[34] World Health Organization. *Stop TB Policy Paper: Contributing to Health System Strengthening: Guiding Principles for National Tuberculosis Control Programmes*. WHO/HTM/TB/2008. 400. Geneva, Switzerland: WHO. 2008. p.vi.
[35] The Paris Declaration (2005) was created to improve the quality of aid and its impact on development. It gives a series of specific implementation measures and establishes a monitoring system to assess progress and ensure that donors and recipients hold each other accountable for their commitments. The Paris Declaration outlines the following five fundamental principles for making aid more effective: ownership, alignment, harmonization, results, and mutual accountability (OECD).
[36] (OECD), "The Paris Declaration on Aid Effectiveness," (Paris Declaration) (Paris, 2005). Available at: www.oecd.org/dac/aideffectiveness/43911948.pdf
[37] Atun, Rifat, et al. "Health-System Strengthening and Tuberculosis Control." *The Lancet* 375.9732 (2010). p. 01
[38] As part of the 2005 Paris Declaration principles for achieving more effective aid, participating countries agreed to meet a set of measurable targets related to aid allocation by 2010, as measured by surveys conducted in 2005, 2007, and 2010.
[39] Estimates of the Office of Dr. Paul Farmer based on the OECD's Paris Declaration Survey, see: http://stats.oecd.org/Index.aspx?DataSetCode=SURVEYDATA and the OECD's Creditor Reporting Scheme, see: http://stats.oecd.org/index.aspx?DataSetCode=CRS1
[40] Targets include: 1) Halve extreme poverty (MDG 1a); 2) Halve the proportion of people who suffer from hunger (MDG 1c); 3) Ensure children everywhere complete primary schooling (MDG 2); 4) Eliminate gender disparity in education (MDG 3); 5) Reduce by two-thirds child mortality (MDG 4); 6) Reduce by three-quarters the maternal mortality ratio (MDG 5); 7) Halve and begun to reverse the spread of HIV/AIDs and other diseases (MDG 6); 8) Halve the proportion of the population without access to safe drinking water (MDG 7c).
[41] Due to data limitations, the percentage of ODA channeled through Indonesia's country systems was taken from the Paris Declaration 2007 survey.
[42] These countries include Bolivia, Cambodia, Ecuador, Egypt, Honduras, Indonesia, Laos, Mali, Mongolia, Nepal, Peru, Rwanda, and Vietnam.
[43] UNAIDS. "Peru: Country Situation 2009." For further information, see: http://www.unaids.org/ctrysa/LACPER_en.pdf
[44] Farmer, Paul. "Rethinking Foreign Aid." *Foreign Affairs*. December 12, 2013.
[45] UNICEF. Child Survival: Current Status and Progress. Available at http://data.unicef.org/child-mortality/under-five
[46] World Health Organization. Millennium Development Goals: Key Facts. Available at: http://www.who.int/mediacentre/factsheets/fs290/en/
[47] World Health Organization. "Tratamiento De La Tuberculosis: Directrices Para Los Programas Nacionales." 1997. p. 15.
[48] World Health Organization. The 3 by 5 Initiative. For further information, see: http://www.who.int/3by5/en/
[49] Bhutta, Zulfiqar A. et al. "Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems." World Health Organization and Global Health Work Force Alliance. April 2010. p. 07.
[50] Interview. Jaime Bayona, Program Director, Socios En Salud. May 28, 2013.
[51] *Op. cit.* 13, p. 59.
[52] *Op. cit.* 7, p. 153.
[53] Ibid.
[54] *Op. cit.* 13, p. 61.
[55] World Health Organization (2013). "A 'to do list' on MDR-TB." For further information, see: http://www.who.int/tb/publications/2009/airborne/background/list/en/
[56] *Op. cit.* 7, p. 82.
[57] Presidencja de Consejo de Ministros. "Perú: Tercer Informe Nacional De Cumplimiento De Los Objectivos De Desarrolle Del Milenio." 2013. p. 21-22.

[58] According to the latest available Peru MDG progress report, Peru is likely to meet all health related MDG goals. The slowest progress has been MDG 5, improving maternal health. According to the report, the country is in a favorable position to achieve the goal of reducing the maternal mortality ratio by three quarters between 1990 and 2015. However, as of 2013, a further reduction of 29 percent is required.

[59] World Bank. Life expectancy at birth, total (years). Available at: http://data.worldbank.org/indicator/SP.DYN.LE00.IN