

- 6 Michelsen SW, Soborg B, Koch A, *et al.* The effectiveness of BCG vaccination in preventing *Mycobacterium tuberculosis* infection and disease in Greenland. *Thorax* 2014; 69: 851–856.
- 7 Naalakkersuisut. National TB strategi 2012–2016 [National TB Strategy 2012–2016]. http://dk.vintage.nanoq.gl/Service/Publikationer/Udgivelser/2011/~media/Naalakkersuisut/Peqqinnissaq/Tuberkulose_strategi/National%20TB%20strategi%202012%2016_final_dk_web.ashx Date last accessed: April 6, 2012.
- 8 Cox DR. Partial Likelihood. *Biometrika* 1975; 62: 269–276.
- 9 Dempster AP, Laird NM, Rubin DB. Maximum likelihood from incomplete data *via* the EM algorithm. *J R Stat Soc Ser B* 1977; 39: 1.
- 10 WHO. Global tuberculosis report 2014. www.who.int/tb/publications/global_report/en Date last accessed: April 6, 2014.
- 11 Stein K. Tuberkulosen i Grønland og dens bekæmpelse – et tilbageblik og et tidsbillede [Tuberculosis in Greenland and the fight against it – looking back]. Rødovre, Hafnia Tryk AS, 1994.
- 12 Bjorn-Mortensen K, Ladefoged K, Obel N, *et al.* The HIV epidemic in Greenland – a slow spreading infection among adult heterosexual Greenlanders. *Int J Circumpolar Health* 2013; 72: 19558.
- 13 Kommuneqarfik Sermersooq. Lokalsamfundsprofiler [Local society profiles]. http://sermersooq.gl/uploads/2014/12/Tasiilaq_DA_Final.pdf Date last accessed: April 6, 2014.
- 14 SliCA. Survey of Living Conditions in the Arctic. www.arcticlivingconditions.org Date last accessed: April 6, 2015.
- 15 D'Ambrosio L, Dara M, Tadolini M, *et al.* Tuberculosis elimination: theory and practice in Europe. *Eur Respir J* 2014; 43: 1410–1420.

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Universal health coverage and social support in Senegal: a comprehensive approach against tuberculosis

To the Editor:

The World Health Organization (WHO) recently launched the “End TB Strategy” [1] and, in collaboration with the European Respiratory Society, launched the framework for tuberculosis (TB) elimination in low-incidence countries [2]. Both documents focus on ending the global TB epidemic by 2035, through stimulating collaborative actions at country level and increased cooperation between high and low TB-incidence countries [3–5]. The world is a global village, where the increasing cross-border and cross-continental movement of people enables infectious diseases like TB to spread across communities and countries [6, 7]. No nation is immune to the threat of infectious outbreaks [8, 9], and a significant reduction of TB burden in low-incidence countries will not be possible unless TB care and prevention is also consistently scaled-up in high TB-incidence countries [5]. This interdependency calls for joint collaborative actions involving governments, governmental and nongovernmental agencies, civil society, and communities, families and individuals.

Here we report the experience of StopTB Italia Onlus in collaboration with Yungar per la Pace Onlus and the Senegal National TB Control Programme in fighting TB in Senegal, a country with 19 000 new TB cases and 29 000 prevalent cases estimated for 2013 [10].

This 3-year project (2013–2015), founded by Fondazione Italo Monzino (Milan, Italy), uses a systemic approach to address the broad spectrum of clinical and social issues as well as structural health system limitations (infrastructure, human resources and organisation) fuelling TB in the health district of Dioffior (Senegal). The Dioffior health district is located in the southern part of the Fatick Region, and has an area of 612 km² and a population of 80 599 inhabitants (population density: 131 inhabitants per km²).

The project is comprehensive and includes clinical and technological support for the health service, training of health staff (involved in TB diagnosis, treatment and control) and 50 women in the villages (*badieu'ngox*), economic support for the patients and education of the population (table 1) [1–4]. Due to poverty in Senegal [11], the economic support provided to the patients doesn't impact on socioeconomic status, but it is sufficient to encourage patients to adhere to treatment. ~20 000 FCFA (Franc of the French Community of Africa) is offered to all patients who complete treatment (20 000 FCFA ≈ 30 €). Economic benefits of 4000 FCFA (~6 €) are offered to the *badieu'ngox* for communication activities, and additional 20 000 FCFA offered to those who follow the patient until the end of their treatment. Moreover, the

badieu'ngox receive extra economic support 20 000 FCFA when the annual target (of increased case finding and outcomes compared with the previous year) is reached.

In this rural setting in Senegal, a special effort has been made to implement the recommendations of the WHO End TB Strategy to ensure universal health coverage and provision of high-quality health services, while ensuring that disparities in access to and uptake of healthcare, and coverage and impact of health services are minimised across populations. Finally, social protection has been provided to vulnerable populations to prevent catastrophic costs in households affected by TB [1, 4]. We report the results of the project in 2013 as compared with baseline data from 2012.

In terms of diagnosis and treatment, an awareness campaign, supported by distribution of informative material, organisation of public events and the implementation of molecular diagnostics (one four-module GeneXpert MTB/Rif system (Cepheid, Sunnydale, CA, USA)), contributed to increase the confirmed TB case detection rate by 9.5% (42 patients in 2012 *versus* 46 in 2013, but still below the 94 cases expected). The number of bacteriologically confirmed sputum samples increased by 12.6% (30 out of 42 cases detected *versus* 37 out of 46) and the number of patients involved in community based directly observed therapy increased by 39.4% (16 out of 30 *versus* 29 out of 39). During 2013, out of 46 patients treated for TB at the “Centre de Santé” in Dioffior: 84.7% (39 out of 46) patients were successfully treated, 78.2% (36 out of 46) were cured, 6.5% (3 out of 46) completed the treatment, 8.6% (4 out of 46) died during the treatment, and only 2.1% (1 out of 46) defaulted.

As a consequence of community-based activities, such as reducing stigma and discrimination, raising public awareness of the disease and providing social and livelihood support, a 643% increase in the number of people involved in information, education and communication activities at the village level (789 *versus* 5866) was registered.

Health education was one of the cornerstones of this project. Enhancing health education at all levels of the community, including the local administration, allowed us raise public awareness of the disease, stimulating more political commitment and mobilisation of local resources for TB control. The recognition of the TB threat has resulted in more resources spent on renewal and expansion of primary healthcare, and increased confidence in molecular diagnostics among patients and clinicians as well as plans for implementation of a mobile radiography unit.

A few conclusions can be drawn from this “operational research” project. 1) The GeneXpert MTB/Rif system can be managed at the rural level and, if combined with a properly designed training and health education project, it is able to impact on case detection treatment outcomes. 2) Direct observation of treatment, managed at the community level, allowed us to achieve a very high treatment success rate and low rate of treatment default, and to create a model suitable for expansion across the entire country. 3) Universal health coverage and social support had a crucial role in achieving the aforementioned results.

This project, which was developed on a small scale and aimed to operate as a pilot study, needs additional data to evaluate the real impact on TB programmes. However, we believe that social support and complementary monetary incentives may add significant value to TB control. We hope that similar field projects will gradually demonstrate that even high TB burden countries can gradually start their roadmap towards TB elimination [2, 4, 12].

TABLE 1 Main activities in the north–south cooperation project in Dioffior District, Senegal

Purchasing and installing the GeneXpert MTB/Rif platform allowing early diagnosis of active TB as well as detection of possible resistance in the responsible strain
Training 50 women representing the community TB programme at village level to perform the following tasks:
Raising public awareness of the disease, its modes of transmission and the possibility of achieving cure, while breaking down the barriers of TB stigma by increasing public knowledge
Informing the population about the existing free access to diagnosis, treatment and economic support for all patients
Identifying possible patients with signs and symptoms compatible with TB to be referred to diagnostic TB services
Monitoring and supporting TB patients during treatment
Producing informative material, such as posters and brochures, about the disease and the project activities for health education in the community
Providing economic support to patients to enable them to access health facilities, undergo medical examination, appropriate diagnosis, and effective treatment; the support was linked to proper adherence to treatment and monitoring activities

TB: tuberculosis.



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Social support and complementary monetary incentives may add significant value to TB control programmes <http://ow.ly/KPKji>

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References

- 1 Sotgiu G, Mauch V, Migliori GB, *et al.* Evidence-based, agreed-upon health priorities to remedy the tuberculosis patient's economic disaster. *Eur Respir J* 2014; 43: 1563–1566.
- 2 Lönnroth K, Migliori GB, Abubakar I, *et al.* Towards tuberculosis elimination: an action framework for low-incidence countries. *Eur Respir J* 2015; 45: 928–952.
- 3 Falzon D, Zellweger JP, Migliori GB, *et al.* Drug resistance and tuberculosis elimination in low-incidence countries. *Eur Respir J* 2014; 44: 1408–1411.
- 4 Tanimura T, Jaramillo E, Weil D, *et al.* Financial burden for tuberculosis patients in low- and middle-income countries: a systematic review. *Eur Respir J* 2014; 43: 1763–1775.
- 5 Sixty-seventh World Health Assembly. Resolution WHA67.1. Global strategy and targets for tuberculosis prevention, care and control after 2015. Geneva, World Health Organization, 2014. http://apps.who.int/gb/ebwha/pdf_files/WHA67/A67_R1-en.pdf
- 6 Institute of Medicine (US) Forum on Microbial Threats. Knobler S, Mahmoud A, Lemon S, *et al.*, eds. The Impact of Globalization on Infectious Disease Emergence and Control. Exploring the Consequences and Opportunities. Workshop Summary. Washington, National Academies Press (US), 2006.
- 7 Dara M, de Colombani P, Petrova-Benedict R, *et al.* Minimum package for cross-border TB control and care in the WHO European region: a Wolfheze consensus statement. *Eur Respir J* 2012; 40: 1081–1090.
- 8 Esposito S, D'Ambrosio L, Tadolini M, *et al.* ERS/WHO Tuberculosis Consilium assistance with extensively drug-resistant tuberculosis management in a child: case study of compassionate delamanid use. *Eur Respir J* 2014; 44: 811–815.
- 9 Codecasa LR, Ciconali G, Mazzola E, *et al.* Managing an extensively drug-resistant tuberculosis outbreak: the public health face of the medal. *Eur Respir J* 2015; 45: 292–294.
- 10 World Health Organization. Global tuberculosis report 2014. WHO/HTM/TB/2014.08. Geneva, World Health Organization, 2014.
- 11 Groupe Consultatif pour le Sénégal. Senegal Poverty, Inequality and Gender: an Overview. Poverty Note GC2014-012. 2014. www.gcsenegal.gouv.sn/docs/GC2014-012%20Poverty%20Note%20%201_Overview_final%20Englishn.pdf
- 12 Diel R, Lodenkemper R, Zellweger JP, *et al.* Old ideas to innovate tuberculosis control: preventive treatment to achieve elimination. *Eur Respir J* 2013; 42: 785–801.

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Video directly observed therapy for treatment of tuberculosis is patient-oriented and cost-effective

To the Editor:

Curing tuberculosis (TB) entails adhering to a multidrug regimen for ≥ 6 months [1]. Failure to take the medications as prescribed can lead to treatment failure, drug resistance and further spread of TB, resulting in morbidity and death for the patient and a threat to public health. Treatment failure is the most important cause of drug-resistant TB, which is much more long, expensive and toxic to treat, and the outcomes of which are still unsatisfactory [2–4]. The public health consequences of nonadherence to TB treatment led to