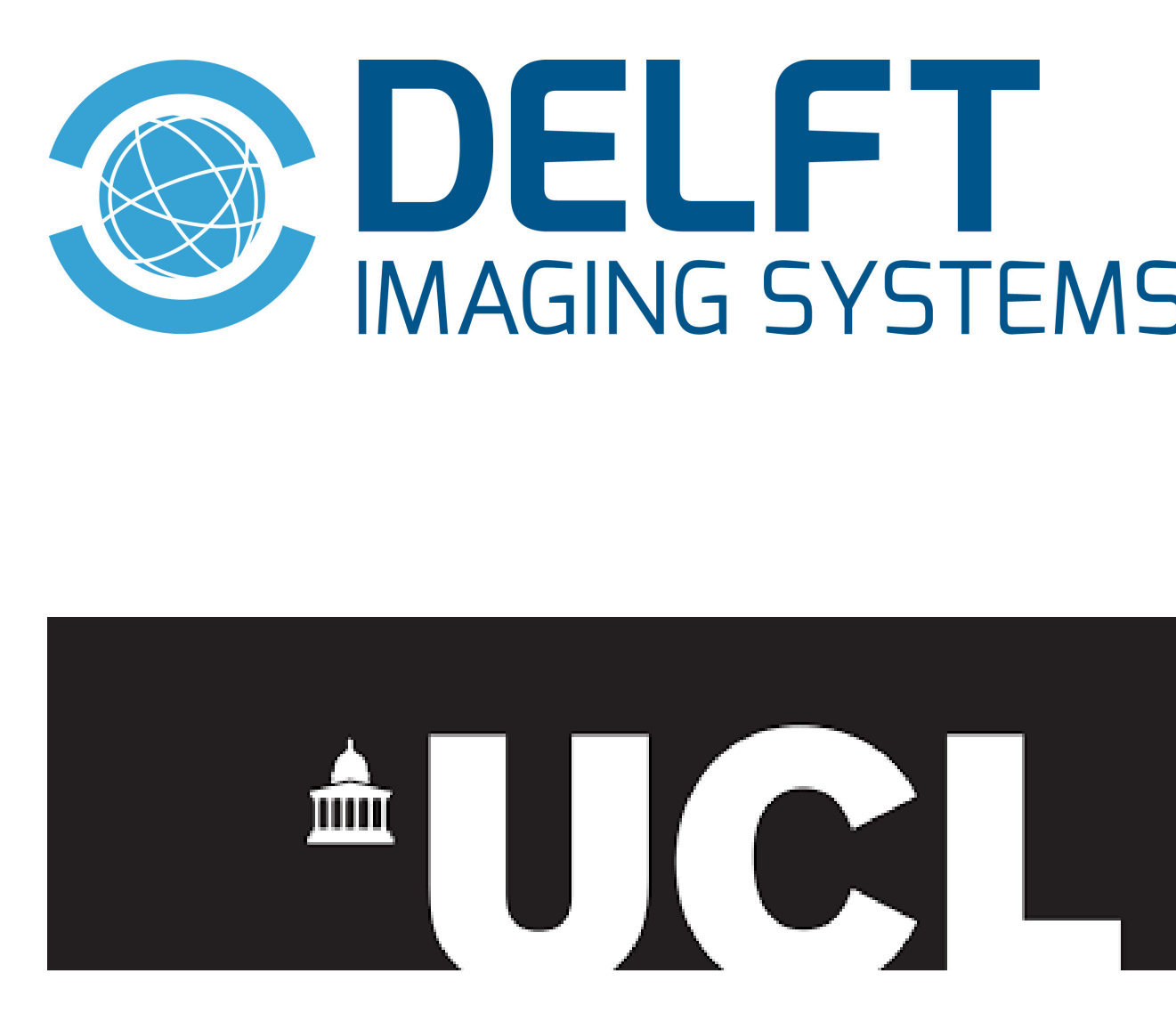


E-DETECT TB

early detection & treatment of tuberculosis in europe

Gerard de Vries¹, Lucia Barcellini², Caroline Batt³, Daniela M. Cirillo², Simon Collin⁴, Ana-Maria Duca⁵, Knut Lönnroth⁶, Valentina Marchese⁷, Alberto Matteelli⁷, Joanna Nederby Öhd⁶, Alistair Story³, Fatima Wurie⁴, Dominik Zenner⁴ and Ibrahim Abubakar³.

¹ KNCV Tuberculosis Foundation, ² San Raffaele Scientific Institute, ³ University College London, ⁴ Public Health England, ⁵ Marius Nasta Institute, ⁶ Karolinska Institutet, ⁷ University of Brescia



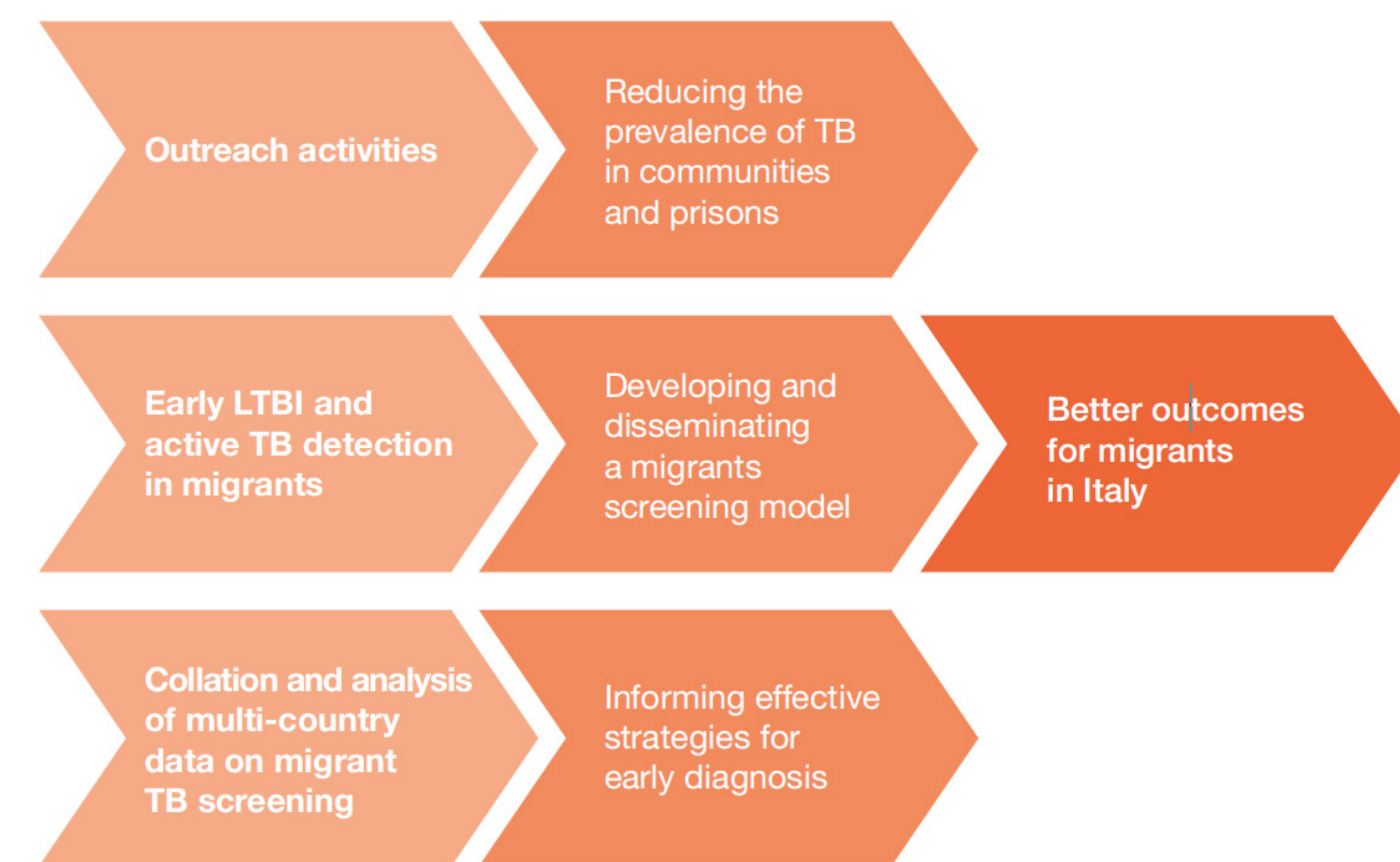
e-detecttb.eu

Our aim is to contribute to the elimination of TB in the European Union by applying evidenced-based interventions to ensure early diagnosis, improving integrated care and supporting community and prison outreach activities in low and high-incidence countries.

E-DETECT TB is a practical programme of translational research targeting homeless people, prisoners, high-risk drug users and those with multi-drug resistant tuberculosis in Romania and Bulgaria, migrants arriving on Italian coasts and asylum seekers in Italy, and improved control of tuberculosis in migrants in other European countries.

We work jointly to evaluate the implementation of evidence-based interventions, taking best practice approaches from countries where national strategic plans have been developed. In collaboration with the European Center for Disease Prevention and Control (ECDC), we will provide a common framework for the adaptation of guidelines and policies to strengthen TB control across the European Union.

Our outcomes



The E-DETECT TB consortium

University College London (United Kingdom)
KNCV Tuberculosis Foundation (The Hague, The Netherlands)
Marius Nasta Institute of Pneumology (Bucharest, Romania)
Public Health England (London, United Kingdom)
Delft Imaging Systems (Veenendaal, The Netherlands)
Public Health Agency of Sweden (Stockholm, Sweden)
National Institute for Infectious Diseases (Rome, Italy)
Tsentr Za Zdravni Strategii i Programi (Sofia, Bulgaria)
Ospedale San Raffaele (Milan, Italy)
Karolinska Institute (Stockholm, Sweden)
University of Brescia (Brescia, Italy)

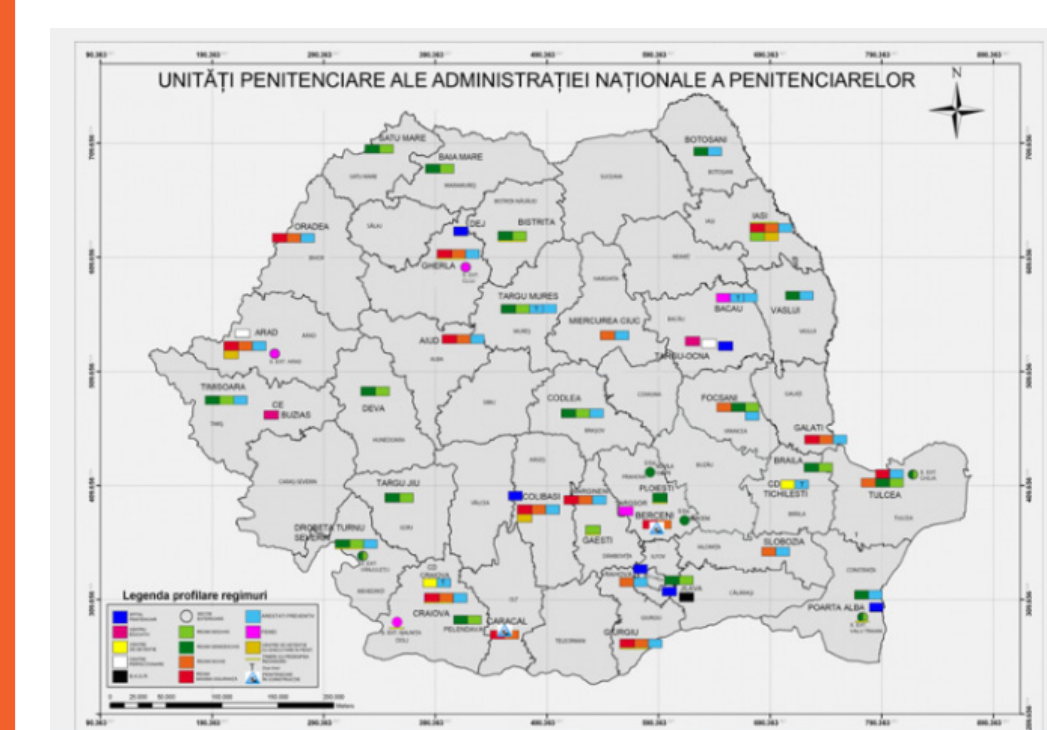
Work package 4: Outreach for Early Diagnosis

WHO recommends systematic screening for active TB in high-risk subpopulations that have poor access to health care. Romania and Bulgaria are countries in transition from high to intermediate incidence and are experiencing high TB rates among certain subpopulations.

This work package will utilise a mobile diagnostic unit equipped with digital radiography, computer aided detection and molecular point of care tests to improve early diagnosis in these populations.

Our main objectives are:

- To ensure early diagnosis in vulnerable populations (prisoners, drug users, homeless persons and Roma population) in Romania and to pilot the screening for 1 week in Bulgaria. The aim is to screen 12,800 persons per year.
- To strengthen care integration using an outreach strategy by providing a one-stop "shop" (clinic).



left: map of Romanian prisons (credit: Administratia Nationala a Penitenciarelor)

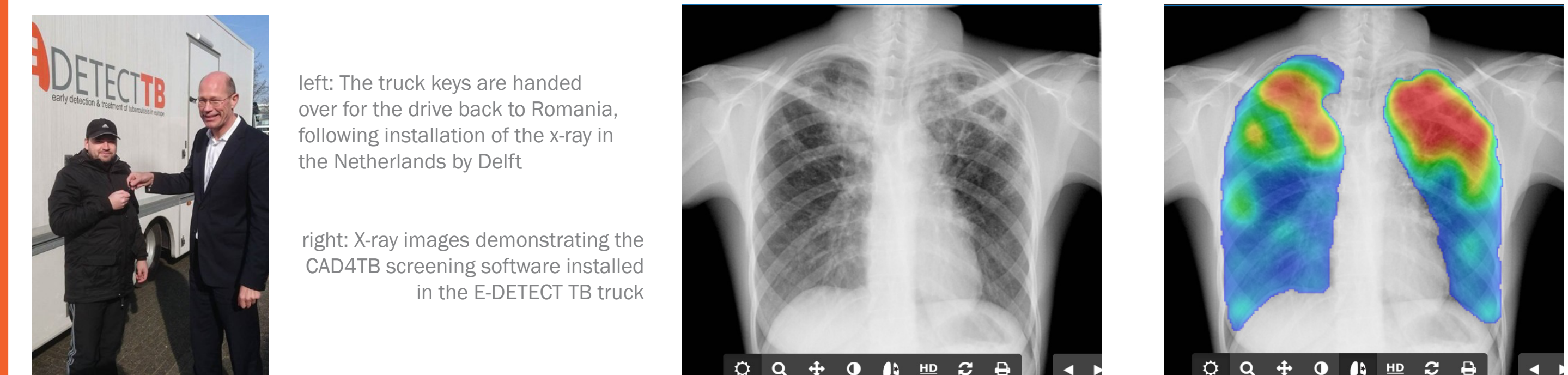
Vulnerable populations in Romania

In 2016, 12,790 TB patients were notified in Romania (64.7/100,000 population). The notification rate is steadily declining. In 2005, nearly 30,000 patients were notified.

Rates among vulnerable populations are not declining and remain much higher than in the general population, i.e. 600/100,000 among prisoners and drug users, and 1,600/100,000 among homeless persons.

Key achievements to date

- Mobile x-ray unit (MXU) was designed and built. Digital x-ray equipment, computer aided detection for TB (CAD4TB) and molecular point of care sputum testing were installed.
- Pulmonologists of Marius Nasta Institute, Bucharest were trained to use of CAD4TB technology. The staff operating the MXU received training during a field visit to the UK Find&Treat Project.
- Analysis was done of characteristics of risk groups in the Romanian surveillance data, which serves as a baseline for the screening project.
- Arrangements have been made with the Ministry of Justice and NGOs to implement the screening.



left: The truck keys are handed over for the drive back to Romania, following installation of the x-ray in the Netherlands by Delft

right: X-ray images demonstrating the CAD4TB screening software installed in the E-DETECT TB truck

Work package 5: Migrant TB detection, prevention and treatment

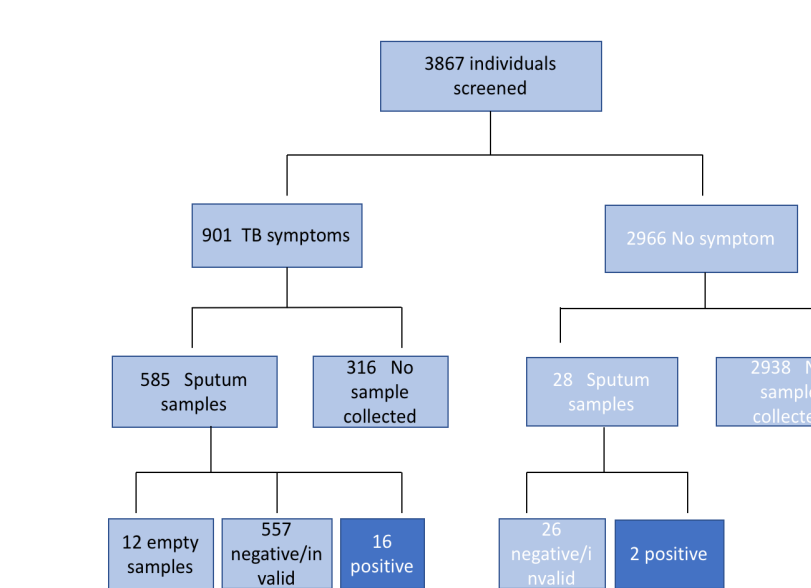
In Italy, we are actively screening new and settled migrants for active and latent TB respectively, ensuring that those testing positive are appropriately managed and generating the evidence to support future European policy.

Our main objectives are:

- To create a network with local partners to agree a detailed protocol for migrant screening.
- To establish active TB screening in temporary migrants in Italy.
- To start screening for active and latent TB in more settled migrants in Italy.
- To collect data and produce evidences aiming at impact European policy.

Migrants and tuberculosis

- Most of the migrants come from countries with estimated TB incidence above 150/100,000.
- Addressing at risk groups (including migrants) is crucial to reduce TB burden in low incidence countries.
- There is a shortage and fragmentation of epidemiological data on TB among migrants (either active TB or latent tuberculosis infection)
- Strategies for screening and early detection of TB among migrants are debated and still to be clearly defined.



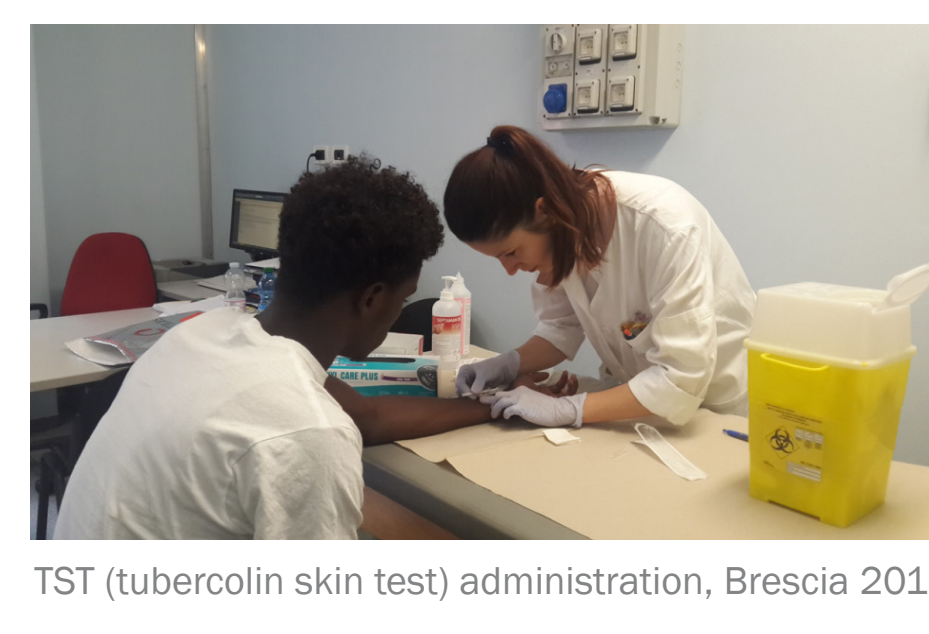
left: flow-chart of screening for active TB in Sicily.



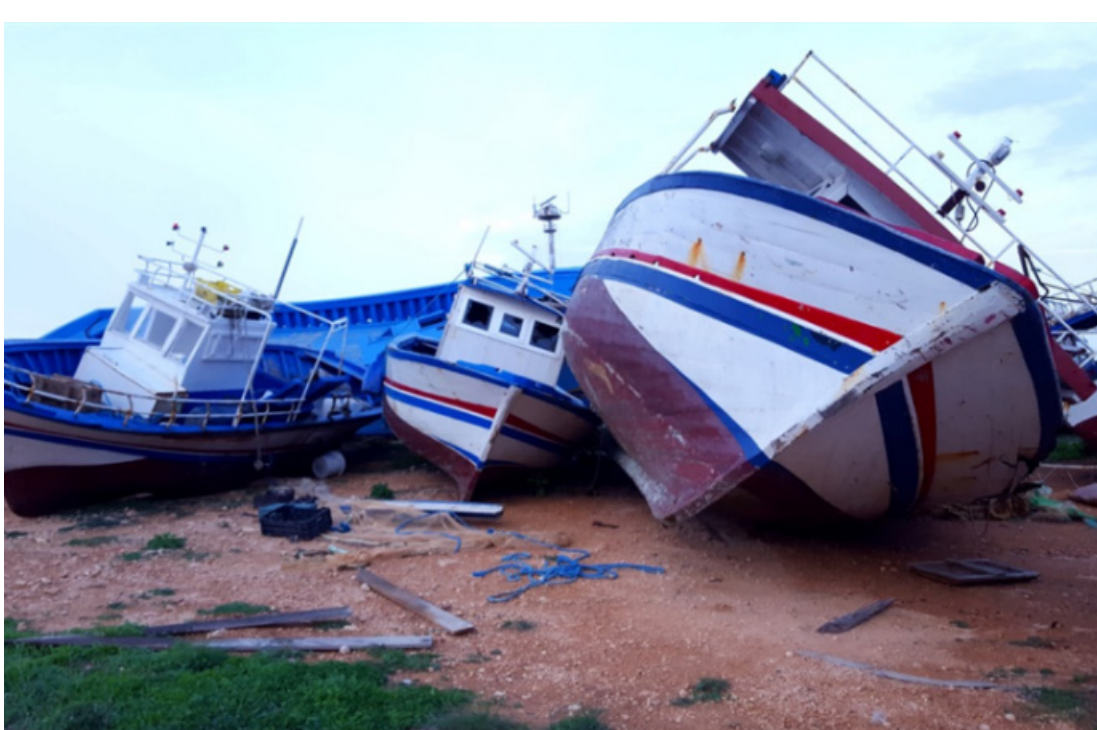
right: the E-DETECT TB team in Mineo and Lampedusa, Sicily, 2017

Key achievements to date in Sicily (newly-arrived migrants)

- Collaborations established with several local stakeholders (both in Sicily and in Lombardia); agreement with the Local Health Authority in Agrigento (Sicily) almost reached.
- Almost 4,000 newly-arrived migrants have been screened. Considering confirmed cases, estimated screening yield for active TB among asylum seekers is 336 per 100,000 persons.



TST (tuberculin skin test) administration, Brescia 2018



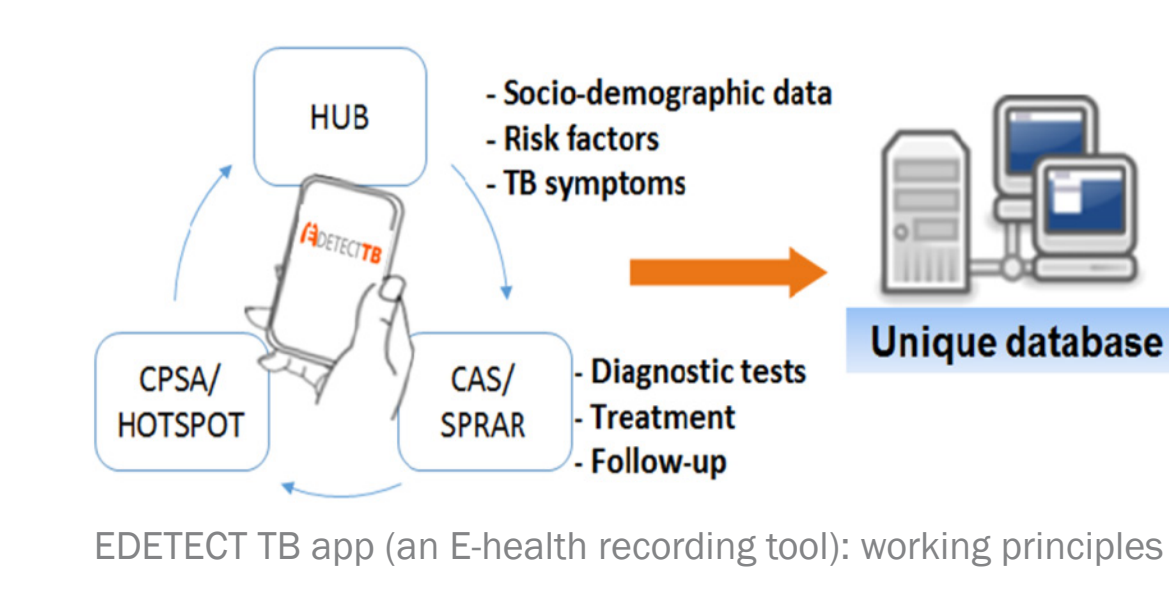
above: boat graveyard, Lampedusa, Sicily

	Screening completion (N/10)	Adjusted OR	95% CI	p value
age		0.99	0.98-1.00	0.004
sex				
male	538 (85.8)	Reference		
female	1,365 (72.4)	0.55	0.43-0.69	0.003
area of origin				
Asia	248 (80.3)	Reference		
Africa	2,075 (74.2)	0.74	0.55-0.99	0.042

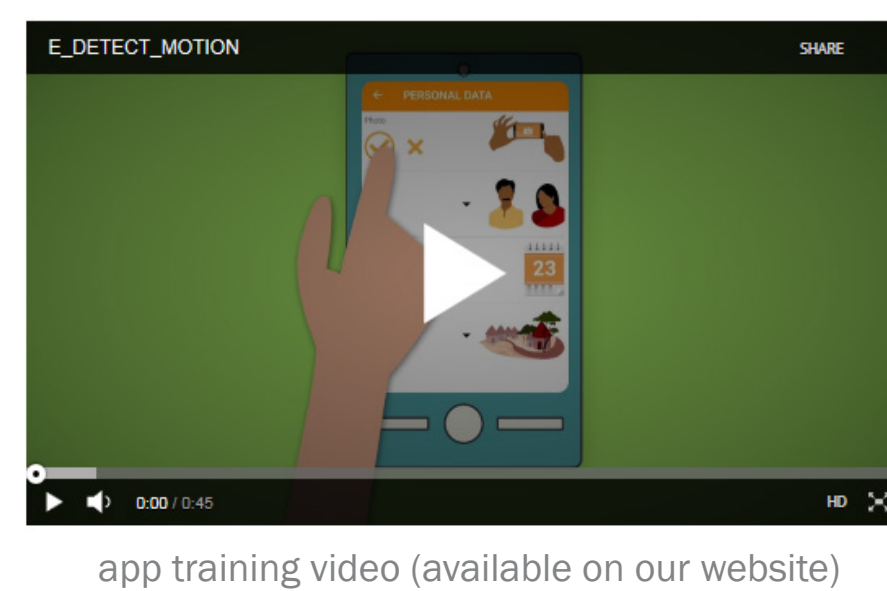
above: LTBI screening completion in Brescia (2015-2016): multivariate logistic regression analysis. Migrants arrived in Brescia in months at high influx in which the number of arrivals exceeded the median value (completed less frequently the screening procedures)

Key achievements to date: the data collection system

- Creation of a data collection system called EDETECT TB. Rationale is that the data sharing among health care services and clinicians involved in screening activities could significantly reduce losses of both patients and clinical data needed to complete the cascade. Eventually, data could be collected starting from the first arrival in hotspots/CPSA (centre for first aid and reception (usually in Sicily), to guarantee a quick and adequate evaluation and treatment at secondary resettlement sites.



EDETECT TB app (an E-health recording tool): working principles



app training video (available on our website)

Work package 6: Establishing a database on migrant TB screening in Europe

Many low-incidence EU countries have a high TB burden in migrants from endemic countries. Migrant TB screening policies vary widely across EU countries. This work package is establishing a multi-country database on migrant TB screening that will be used to inform the identification and harmonisation of cost-effective screening strategies in the EU.

Our main objectives are:

- To agree a protocol for sharing migrant data between countries on latent and active TB.
- To establish a database on latent and active TB in screened migrants.
- To collate multi-country data on migrants in low incidence countries in Europe aimed at informing early diagnosis of active and latent TB.

Migrant TB screening in the EU

- EU countries have very different TB screening policies and different surveillance data on TB screening.
- In most countries, the coverage and yield of the screening is poorly documented, especially screening for latent TB infection.
- Some EU countries have previously evaluated their TB screening strategies, but no multi-country evaluation has been done previously.

Key achievements to date

- Survey among all participating countries in order to map available data.
- Protocol for data transfer and analysis, as well as a data sharing and pooling agreement developed.
- Variable list for the database finalised.
- Database set up at the Farr Institute at UCL.
- Safety training for data base access of data managers finalised.
- Uploading to database is ongoing.
- Data analysis and dissemination of data will now proceed.

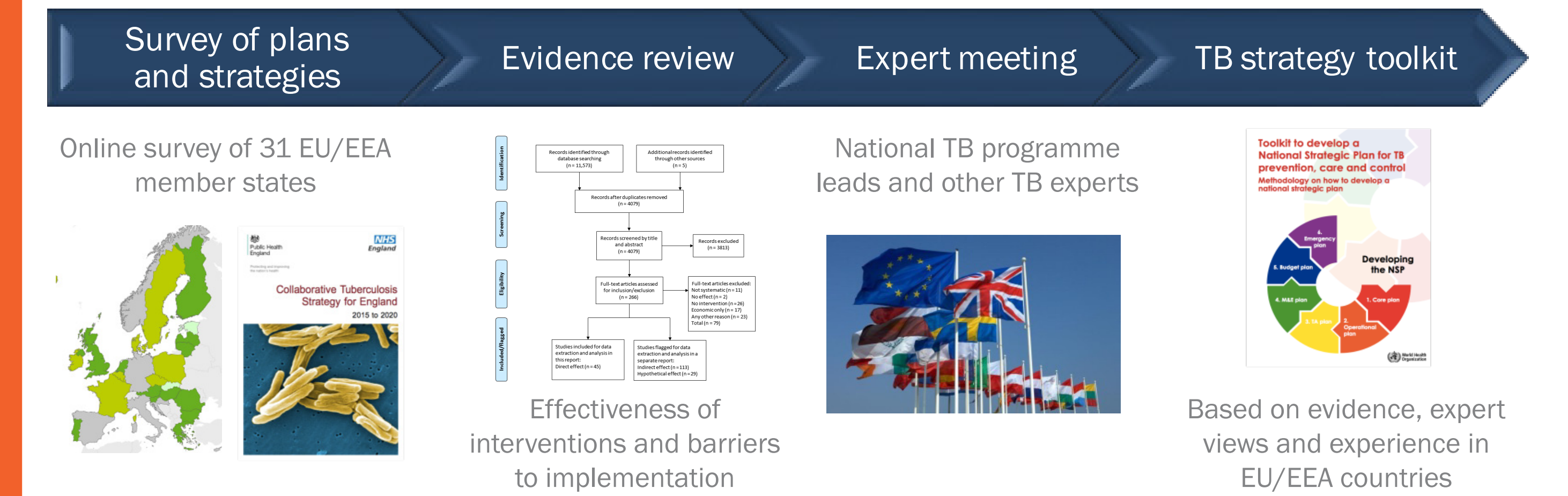
find out more about our project at
e-detecttb.eu

Work package 7: Supporting national TB control programmes

The aim of this work package is to support the development of action plans in EU/European Economic Area (EEA) member states by surveying TB control plans and strategies, and reviewing evidence for actions to control and prevent TB. Information from the survey and reviews will inform an expert meeting to develop a TB strategy toolkit.

Our main objectives are:

- To gather information from national TB programme leaders across the EU/EEA regarding: 1) availability, implementation and content of national TB control plans and 2) prioritisation of action areas and barriers to the implementation of interventions.
- To conduct systematic reviews of 1) the evidence base for interventions to control and prevent TB and 2) barriers and facilitators to TB control strategies in EU/EEA countries.
- Hold a meeting of national TB programme leads and other TB experts to 1) prioritise the summarised evidence within the context of EU/EEA countries and 2) arrive at a consensus regarding best approaches to TB control & prevention.
- Develop a toolkit to aid national TB plan development and implementation based on evidence, expert views and experience in EU/EEA countries.



Key achievements to date

- We have obtained up-to-date information on the development and implementation of national TB action plans and strategies across the EU/EEA by means of a web-based survey, with a 100% response rate from the 31 EU/EEA member states. A peer reviewed publication is being finalised.
- We have completed a systematic review of reviews of interventions for TB control and prevention in countries with low to medium TB incidence. A peer reviewed publication is being finalised.
- We are reviewing evidence of barriers and facilitators to the implementation of TB control programmes in EU/EEA countries and have started the quality assessment phase for the final pool of articles that meet inclusion criteria.
- We are organising an expert stakeholder meeting for October 2018, where evidence will be summarised and collated to assist EU/EEA member states develop or improve their TB control and prevention strategies or TB action plans. This meeting will involve representation from national TB programmes from EU/EEA member states and key stakeholder groups.