mid-September 2015, 12 Syrian TB patients were reported to the Netherlands Tuberculosis Register (up until June 30, 2016). Two patients were included in the previous analysis since they had an abnormal chest radiograph at entry screening (one arrived in August 2015 and one in September 2015) and were confirmed by a positive *M. tuberculosis* culture in the fourth quarter of 2015. Six patients arrived in the Netherlands before discontinuation of screening and were diagnosed between 6–14 months after arrival. Four patients arrived in the Netherlands after discontinuation of screening: three of them were diagnosed with pulmonary TB 0–5 months after arrival, and one with pulmonary TB more than 6 months after arrival. If we assume that the three pulmonary TB patients identified after less than 6 months in the Netherlands potentially could have been identified by radiographic screening this would have resulted in a TB prevalence of 18.4 per 100 000 screened persons (95% CI 4.8–50.0), which is similar to the TB prevalence in our study.

In conclusion, we would like to state that our analysis of entry screening was robust and that close monitoring of the TB situation among Syrian asylum seekers after discontinuation of screening also indicates that their risk for TB is relatively low. The Belgian and Dutch studies on screening (Syrian) asylum seekers show the importance of collecting migrant screening data in a more uniform and systematic way, and reporting on countries' TB screening data and experiences, to better understand screening effectiveness and differences in results between countries. In the recently awarded project, E-Detect TB, by the European Commission several European Union countries are collaborating to pool their screening data together and analyse it [4]. European Union countries not participating in the project will also be invited to join this initiative in a later stage.

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There is need to collect, analyse and compare TB screening data from migrants in EU countries more systematically <http://ow.ly/x2eQ303k2CK>

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Received: May 03 2016 | Accepted: June 07 2016

Conflict of interest: None declared.

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Eur Respir J 2016; 48: 1255–1256 | DOI: 10.1183/13993003.01617-2016 | Copyright ©ERS 2016

Comprehensive cost of treating one patient with MDR/pre-XDR-TB in Wellington, New Zealand

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To the Editor:

DIEL and co-workers [1, 2] have reported the estimated cost of treating tuberculosis (TB) and multidrug-resistant (MDR)-TB in Germany and the European Union, which, along with estimated and modelling cost data from the USA, Asia and South Africa [3, 4], confirm the huge economic burden to

range between 40 and 200 times higher than treating fully sensitive TB cases. We describe the full costs of treatment of a person who was treated in 2014–2015 in Wellington, New Zealand. He had MDR-TB plus ofloxacin resistance but marginal moxifloxacin susceptibility (*i.e.* MDR/pre-extensively drug-resistant (XDR)-TB). This case highlights the key drivers of cost in a high-income country.

In 2013, 276 cases of TB were notified in New Zealand (6.6 per 100 000 population); three (1.4%) cases were MDR-TB [5]. All treatment including hospital admission, investigations and medication for TB is free to patients in New Zealand through a publicly funded health system.

A 33-year-old Indian male presented with dry cough, malaise and night sweats. Born in India, he immigrated to New Zealand 6 years earlier. Unemployed, with no prior history of TB, he presented with a body mass of 56 kg, fever, sinus tachycardia, cervical lymphadenopathy, a small pleural effusion and delusional ideation. Radiology confirmed pulmonary, pleural and mediastinal lymph node changes consistent with TB. An HIV test was negative. Sputum, induced sputum, pleural fluid aspirate, lymph node aspirate, cerebrospinal fluid and urine were direct smear negative for acid-fast bacilli (AFB), as were subsequent bronchoscopy washings, but a post-bronchoscopy sputum sample showed two or more AFB. Daily antituberculous therapy (ATT) was started with isoniazid, rifampicin, pyrazinamide and ethambutol, but there was persistence of systemic symptoms after 3 weeks' treatment. Genotypic resistance testing (GeneXpert (Cepheid, Banksmeadow, Australia) and HAIN (Hain Lifescience GmbH, Nehren, Germany)) and susceptibility testing (BACTEC MGIT 960 SIRE (BD, Franklin Lakes, NJ, USA)) was performed in local and national reference laboratories. Resistance was demonstrated to isoniazid (high level), rifampicin, para-aminosalicylic acid (PAS) and ethionamide in both laboratories. Fluoroquinolone susceptibility testing provided discordant results for ofloxacin (resistant) and moxifloxacin (marginal susceptibility, MIC₉₀ 2 mg·L⁻¹). Susceptibility to pyrazinamide, ethambutol, amikacin and linezolid was demonstrated. Genotypic resistance mutations included isoniazid (*katG*), rifampicin (*rpoB* S531 L), ethambutol (M3601) and moxifloxacin/ofloxacin (*gyrA* D94G).

TABLE 1 Summary of costs over 18 months of treatment

Item	Unit cost NZD	Units	Total NZD
Inpatient costs			
Bed day cost [#]	1653 per day	99 days [¶]	163 647
Radiology and laboratory ⁺			11 367
Total inpatient costs			175 014
Outpatient costs[§]			
Outpatient medical including all tests ^f		15 visits	6844
Public health nurses ^{##}	75.80 per visit	541 visits	41 008
District nurses ^{¶¶}	121.68 per visit	287 visits	34 922
Total outpatient costs			82 774
Interdisciplinary individual case management meetings⁺⁺	300	12 meetings	3600
Medications^{§§}			
First line			
Isoniazid/rifampicin ^{ff}			121
Pyrazinamide			1132
Ethambutol			1401
Total first-line medication costs			2654
Second line			
Amikacin			27 942
PAS			12 043
Moxifloxacin			6289
Clofazamine			4500
Linezolid			11 941
Total second-line medication costs			62 715
Total medication costs			65 369
Total cost of treatment			326 757

NZD 1.00=USD 0.69 = € 0.61. PAS: para-aminosalicylic acid. #: infection control room; ¶: total inpatient stay; +: biochemistry, haematology, viral panel, amikacin serum levels, computed tomography (CT) of the chest, CT head, bronchoscopy and tuberculosis (TB) testing, audiometry, and vision tests; §: excluding medication; f: biochemistry, haematology, amikacin serum levels, follow-up sputum TB testing, audiometry, ophthalmology consultation and medical; ##: directly observed therapy (DOT); ¶¶: intravenous equipment, and DOT at weekends and on public holidays; ++: prior to and after discharge, ensuring successful transition to the community; §§: inpatient and outpatient; ff: first 4 weeks only.

In accordance with the World Health Organization (WHO) consensus approach to regimen make-up [6], second-line ATT comprised daily intravenous amikacin, oral moxifloxacin, PAS, linezolid and clofazimine in addition to pyrazinamide and ethambutol. PAS was included on expert recommendation despite the sensitivity result. Cycloserine was avoided because of the psychiatric comorbidity. Bedaquiline was available on compassionate grounds but not prescribed given the increased risk of QTc prolongation when co-administered with moxifloxacin, clofazimine and antipsychotic medication [7].

Induced sputum and pleural aspirate samples taken at 6 weeks after starting second-line agents were TB culture negative, and he was discharged from hospital after 99 days. The hospital stay was complicated by the new diagnosis of paranoid schizophrenia with depression requiring treatment with olanzapine, aripiprazole and sertraline.

The patient developed hearing impairment, presumed due to amikacin, necessitating a shortened intravenous course (5.75 months). Treatment was stopped at 17 months when he developed severe bilateral visual impairment. Follow-up, 6 months after treatment cessation, confirmed he was well, with a body mass of 68 kg, and his (induced)sputum culture remained negative. Visual acuity had recovered to 6/9 bilaterally, hearing was sufficient for ordinary conversation without augmentation and mental health problems were stable on treatment.

Treatment costs were retrospectively obtained from the District Health Board and counted in New Zealand dollars (NZD 1.00 = USD 0.69 = € 0.61), detailed in table 1.

Reported estimated and modelled costs for treating MDR-TB range from € 1097 to € 75 066 [1–4], correlating with country's wealth, and influenced by variability of local public health policies, pharmacological prices, and patient comorbidities and drug side-effects.

The cost of treating this patient in New Zealand was almost NZD 327 000 (approximately USD 225 000/€ 200 000). The cost for treating fully susceptible TB in New Zealand was previously estimated at NZD 17 000 per patient [8]. Most of the cost in this case was from an extended inpatient stay (54% of total, 99 days), the large number of domiciliary visits for directly observed therapy, and intravenous therapy (23% of total). Medication costs were significant, particularly for second-line agents (19% of total patient cost).

The prolonged inpatient stay reflected concerns about fluoroquinolone susceptibility, concordance with treatment given the acute psychiatric illness and regional public health policy. Inpatient days could have been reduced by up to 3 weeks (saving up to NZD 34 700) if genotypic resistance testing had been performed on the initial samples. We estimate that his psychiatric comorbidity inflated costs by a maximum of NZD 16 530 (up to 10 extra inpatient days), together reducing the total to NZD 275 527 (€ 168 000).

The extreme, but affordable, cost of this single case highlights the global challenge of the WHO End TB plan [9] to mitigate the financial consequences of the treatment of MDR-, pre-XDR- and XDR-TB on the health systems of low-resource countries as well as for the patients themselves [10].

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€ 200 000: the full cost of treating a single MDR/pre-XDR-TB patient in New Zealand

<http://ow.ly/NkGT301B5KN>

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Received: May 03 2016 | Accepted: June 07 2016

Conflict of interest: None declared.

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Eur Respir J 2016; 48: 1256–1259 | DOI: 10.1183/13993003.00876-2016 | Copyright ©ERS 2016