

Institution: University College London
Unit of Assessment: 2 - Public Health, Health Services and Primary Care
Title of case study: Improving control of tuberculosis in hard-to-reach groups
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Research by led Dr Andrew Hayward and Dr Alistair Story (UCL Research Department of Infection and Population Health) on tuberculosis in hard-to-reach groups (particularly homeless people, problem drug users and prisoners) has led to the introduction of mobile X-ray screening for tuberculosis in London, screening 8-10,000 homeless people and drug users annually. A pan-London street outreach team has been developed to support hard-to-reach patients with tuberculosis, and social care workers are now a core part of multidisciplinary TB teams. A static digital teleradiology TB screening network has been established in key prisons and, most recently, the research has influenced NICE Public Health Programme Guidelines.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>Research underpinning these impacts began in 2003 with the TB Link Project which aimed to improve patient outcomes by addressing social needs. Interventions mainly involved supporting access to housing (36%), income/benefits (34%) and immigration entitlement issues (7%). Over 80% of cases successfully completed treatment. The research was carried out by Dr Andrew Hayward in collaboration with Alistair Story (Health Protection Agency (HPA) at that time, now UCL/UCLH) [1].</p> <p>In 2003/4 the London TB Patient Profile worked with all TB nurses in 35 clinics across London to look at social as well as clinical factors affecting patient outcomes. The study included 1,941 patients (over 95% of London TB patients) and showed the importance of three risk factors in particular: homelessness, drug use and imprisonment. It demonstrated that these groups had extremely high prevalence of tuberculosis (higher than recent migrants from high incidence countries) and that these factors were strong independent predictors of drug resistance, poor adherence and loss to follow up [2]. Subsequent work based on this data showed that Crack Cocaine Users were substantially more likely than others to have smear positive (infectious) forms of tuberculosis than other cases, posing a great transmission risk [3]. The work also demonstrated substantial missed opportunities for diagnosis and early treatment of HIV (only 50.8% of TB patients aged > or =20 years without previous testing were offered HIV testing) [4].</p> <p>The first work to evaluate mobile X-ray screening started in collaboration with colleagues in Holland who were working on a similar project. In 2004 Story and Hayward led a three-day screening pilot across several of the larger homeless hostels in London, and in a prison. One case of TB was found in a prison, and one among the homeless. This proof-of-concept study demonstrated the potential of such a scheme, and prompted the Department of Health to fund a demonstration project entitled Evaluation of Targeted Mobile X Ray Screening for tuberculosis in high risk groups. Over 21 months the project undertook 23,881 chest X-rays and led to 43 patients starting treatment. Screening shortened delay to diagnosis three-fold. Modelling suggested this would prevent around 87 active cases and 389 infections per year by 2013 and that the intervention was cost-saving [5]. Nevertheless it highlighted that because patients were being lost between initial screening and diagnosis at a clinic, investment was also needed to support people through confirmation of diagnosis and treatment. The report also noted that high turnover of inmates in prisons prevented high screening coverage with a mobile unit.</p> <p>A subsequent evaluation of an expanded Find & Treat service (Abubaker, then HPA now UCL and Aldridge, UCL) showed the cost effectiveness of the service in identifying hard to reach patients and supporting their care [6].</p>

3. References to the research (indicative maximum of six references)

- [1] Craig GM, Booth H, Hall J, Story A, Hayward A, Goodburn A, Zumla A. Establishing a new service role in tuberculosis care: the tuberculosis link worker. *J Adv Nurs*. 2008 Feb;61(4):413-24. <http://dx.doi.org/10.1111/j.1365-2648.2007.04498.x>
- [2] Story A, Murad S, Roberts W, Verheyen M, Hayward AC; London Tuberculosis Nurses Network. Tuberculosis in London: the importance of homelessness, problem drug use and prison. *Thorax*. 2007 Aug;62(8):667-71. <http://dx.doi.org/10.1136/thx.2006.065409>
- [3] Story A, Bothamley G, Hayward A. Crack cocaine and infectious tuberculosis. *Emerg Infect Dis*. 2008 Sep;14(9):1466-9. <http://dx.doi.org/10.3201/eid1409.070654>
- [4] Rodger AJ, Story A, Fox Z, Hayward A; London Tuberculosis Nurses Network. HIV prevalence and testing practices among tuberculosis cases in London: a missed opportunity for HIV diagnosis? *Thorax*. 2010 Jan;65(1):63-9. <http://dx.doi.org/10.1136/thx.2009.122754>
- [5] Mobile targeted digital chest radiography in the control of tuberculosis among hard to reach groups – report to Department of Health 2007 (copy available on request)
- [6] Jit M, Stagg HR, Aldridge RW, White PJ, Abubakar I; Find and Treat Evaluation Team. Dedicated outreach service for hard to reach patients with tuberculosis in London: observational study and economic evaluation. *BMJ*. 2011 Sep 14;343:d5376. <http://dx.doi.org/10.1136/bmj.d5376>

4. Details of the impact (indicative maximum 750 words)

London is now the 'TB capital' of Europe and has more cases annually than the Netherlands, Belgium, Greece and Norway combined. TB is curable in virtually all cases and can be effectively controlled provided cases are found early and patients can complete treatment. The research described above has resulted in new services to improve control of tuberculosis in hard-to-reach groups.

The Find&Treat Project

The original TB profile study provided justification for London Region to invest in a large demonstration project of mobile X-ray screening in homeless people, drug users and prisoners. Our initial evaluation of the demonstration project led the Department of Health (DH) to invest in continued funding of mobile X-ray screening in homeless shelters and drug services and the expansion of the service to include workers to support patients through diagnosis and treatment. This has now become the Find&Treat service - a specialist outreach team that works alongside over 200 NHS and third sector front-line services to tackle TB among homeless people, drug or alcohol users, vulnerable migrants and people who have been in prison. The multidisciplinary Find&Treat team takes TB control into the community, finds cases of active TB early and supports patients to take a full course of treatment and get cured. The service spans the TB pathway from detection, to diagnosis and onward care. To 'Find' TB cases early the team raises awareness among service users and frontline professionals and screen almost 10,000 high risk people every year using a mobile digital X-ray unit (MXU) as recommended by the National Institute of Health and Clinical Excellence (NICE). The screening service covers every London Borough and supports Public Health England (PHE) to manage outbreaks of TB nationally. Our subsequent evaluation of the expanded service contributed to decisions for NHS to take over the funding of the service which is now hosted by UCLH on behalf of London [a].

Analysis of service data shows that between January 2008 and June 2013, Find&Treat undertook 45,385 X-rays leading to 385 referrals, 84 of which resulted in treatment being commenced for pulmonary tuberculosis (detection rate 247 per 100,000 individuals screened). 84% successfully completed treatment within 12 months (higher than the proportion of cases who complete TB treatment nationally). Since 2008 Find&Treat have worked with 1,379 suspected and active TB

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cases including 780 cases with active TB (696 referred from TB and allied services in London and Birmingham and 84 found on the MXU). Of the culture confirmed cases 33% were drug resistant including 59 multidrug-resistant (MDR) and 4 extensively drug-resistant (XDR) cases. 371 of the referrals to Find&Treat were because of loss to follow up and deemed un-contactable by local services. The outreach team recontacted 74% (275) of whom 73% have completed treatment (154) or are well established and expected to complete treatment (46). The team also support Directly Observed Therapy (where a responsible adult watches every dose of treatment being swallowed to improve adherence) and have pioneered the use of Video Observed Therapy (VOT) using laptops and smartphones. VOT is now being evaluated as part of a randomised trial funded within the UCL-led TB Reach NIHR Programme grant [b].

Public Health England is now developing a project to expand the service nationally, creating a National Infection & Inequality System (NIIS) to provide integrated testing, treatment, health and social care for vulnerable populations disproportionately affected by serious public health infections, in particular TB, Hepatitis C and HIV. This service will be directly modelled on the successful model of Find&Treat [c].

Introduction of static screening in prisons

Our research demonstrated that turnover of prisoners was too high for a mobile unit to provide sufficient coverage to pick up cases and recommended the installation of static digital X-ray units (DXR) in key prisons. In March 2008, the Chief Medical Officer announced the intention of DH to fund the installation of static DXR machines in five London prisons at a cost of £10m. This decision was explicitly linked by the CMO to our MXU evaluation project (ref 5 above) [d]. The X-ray units were all installed and in operation by March 2012. PHE's Director of Health and Justice reports that "*I have no doubt that the MXU project has had a direct and positive influence on policy and programmes relating to active case finding for pulmonary TB among people in prisons and other places of detention.*" A new national partnership agreement just signed between PHE, NHS England and the National Offender Management Service (NOMS) has made further commitments to ensuring the service is fully utilised, and furthermore, following a successful trial of the Find&Treat service at a large Immigration Removal Centre (IRC) near London, proposals are now being made to extend the service permanently for use in this setting [e].

Broader influence on control of tuberculosis in hard to reach groups

In July 2009 NICE received the following referral from DH: "*Produce programme guidance on the effectiveness and cost effectiveness of interventions based on active case finding among hard-to-reach groups (find and treat model) for reducing transmission of tuberculosis and related mortality and implications for service development.*" The guideline development group was chaired by Hayward and considered a wide range of evidence including the research described above and expert testimony from the Find&Treat service. This resulted in the publication of *NICE Public Health Guidance (37) on Identifying and managing tuberculosis among hard-to-reach groups* [f]. Key recommendations based on our findings included: mobile radiographic screening to expand to other higher incidence areas outside London; screening for TB in prisons; screening for latent TB in drug users; NHS to provide funds for housing of homeless TB patients with no other recourse to support; multidisciplinary teams to include social care workers to support care; directly observed therapy to become routine for homeless people, prisoners and drug users; cohort review (a service quality improvement model based on international experience and the London TB profile) to become routine across TB services nationally.

Simultaneously the Royal College of Nursing, British Thoracic Society, Health Protection Agency, National Treatment Agency for Substance Misuse produced detailed practical guidance for tuberculosis case management and cohort review. In addition to the above this guidance includes a risk assessment tool modelled on our original TB patient profile form. This helps to systematically identify patients in need of enhanced case management [g].

The approach of adding the support of allied health professionals to work alongside TB services

which we pioneered in the TB Link project, is now in use in at least 18 TB services across London alone. A support workers' forum coordinated by Find&Treat has recently been established, and the roles of those who attend vary considerably [h].

5. Sources to corroborate the impact (indicative maximum of 10 references)

- [a] Outline of Find&Treat service on the UCLH website:
<http://www.uclh.nhs.uk/ourservices/servicea-z/htd/pages/mxu.aspx>
BMJ video describing the service: <http://www.bmj.com/multimedia/video/2011/07/24/find-and-treat>
- [b] Letter giving service data from Clinical Lead and Manager for Find&Treat. Copy available on request.
- [c] National Infections and Inequalities Service submission. See in particular p. 2 "*The plan is to model NIIS on the successful template of Find&Treat*" and p. 5 for involvement of the UCL team in planning the new service. Copy available on request.
- [d] http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1207035533566 See p.3.
- [e] Prison screening – letter of support from Director of Health and Social Justice, Public Health England. Copy available on request.
- [f] PH37: Identifying and managing tuberculosis among hard-to-reach groups. National Institute of Health and Clinical Excellence <http://publications.nice.org.uk/identifying-and-managing-tuberculosis-among-hard-to-reach-groups-ph37>
- [g] Royal College of nursing, British Thoracic Society, Health Protection Agency, National Treatment Agency for Substance Misuse. Tuberculosis Case Management and Cohort Review. Guidance for Health Professionals. 2012
http://www.rcn.org.uk/_data/assets/pdf_file/0010/439129/004204.pdf
- [h] Report on the forum provided by its co-ordinator. Copy available on request, and the co-ordinator can be contacted for corroboration. Contact details provided.