Social Values and Health Priority Setting Case Study

Title of Case Study	**Microscopic-Observation Drug-susceptibility *(*MODS*)* Testing for Multi-Drug Resistant and Extreme Drug Resistant Tuberculosis in Thailand**
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Case Summary (approx. 350 words) Please include information here about why the case is of particular interest	The case of MODs testing for Multi-Drug Resistant and Extreme Drug Resistant Tuberculosis in Thailand is one which raises issues of equity in the context of an intervention which provides benefits to both individual patients and to the wider population in terms of preventative public health benefits. A cost benefit analysis showed that MODs cost the same but provided greater benefits than the current standard TB testing practice, most notably with regard to its ability to identify extreme drug resistant forms of the disease (XDRTB) very quickly, thereby not only helping to ensure that individual patients are given the correct treatments but also helping to prevent the spread of the disease and to limit the very high per-patient costs of treating XDRTB. However, a policy decision was taken not to adopt the new testing regime based on grounds of limited system capacity but also on grounds that the number of patients currently affected by drug resistant forms of TB is very small (although the cost of treating that small population is extremely high).
1. Facts of the case	**Facts of the case**
Please include information on as many of the following as are relevant to the case: • At what condition is the intervention, program or service aimed? • What are its effects? Eg. Is it curative, preventative, palliative, life-prolonging, rehabilitative? • Is there a relevant comparator? If so how does this intervention, service or program compare to the alternative? Include ICER estimates/QALY costs if relevant. • What are the significant features about the condition and/or about the patient population in this case? Eg. patient population is very young, very old, condition is rare, life-threatening, life-limiting etc. • How are the benefits of the intervention distributed across the patient population and/or across time?	Microscopic-observation drug-susceptibility (MODS) is a relatively new diagnostic tool (first available in 2006) which can be used to test for tuberculosis (TB), multi-drug resistant tuberculosis (MDRTB) and Extreme Drug Resistant Tuberculosis (XDRTB). MODS has been described as a "low-cost, low-tech tool for high-performance detection of TB and MDRTB" (Moore et al, 2006). MDRTB is the form of TB which is resistant to drugs usually used to treat TB - Rifampicin and Isoniazid. XDRTB is resistant to both of these drugs as well as to Quinolone and at least one injectable antibiotic (kanamycin, capreomycin or amikacin). The incidence of MDRTB in Thailand is 2,900 new cases per year (Wongphan et al, 2012). 5% of cases of MDRTB develop into XDRTB. The cost of treatment of MDRTB is somewhat higher than for normal TB, but the cost of treating the extreme drug resistant form can be up to 100 times that of treating normal pulmonary TB: normal TB can be treated for around 2,300 THB (Thai Baht) per patient; MDRTB costs around 2900 THB; XDRTB costs around 1 million THB (ibid). The number of cases of XDRTB is very small - currently estimated at around 150 per year, but the cost of treatment is extremely high compared to treatment of other forms of the disease. XDRTB always develops from MDRTB, which in turn always develops from normal TB, so from the point of view of costs, preventing the

• What is the cost or budget impact of the intervention/service/ programme? • What is the nature and strength of the evidence about the outcomes of the intervention, service or programme? Eg. randomized clinical trials, evidence on patient-related outcomes. • How did the issue about this case arise - for example, from clinical practice, from a policy setting, from a topic selection process?	progression especially of MDRTB to XDRTB is highly advantageous, as is preventing the spread of the disease to others (ibid). The MODS test involves culturing samples in a semi-liquid medium, with daily microscopic examination. It relies on three principles: (1) TB bacteria grows faster in liquid medium than in solid medium; (2) TB grows in characteristic tangles or coils and these characteristic formations can be more easily seen microscopically in liquid medium; and (3) the ability to incorporate drugs permits rapid drug-susceptibility testing at the same time as the detection of bacterial growth in order to identify drug resistant forms of TB (Moore et al, 2006). Time to culture positivity which indicates whether TB or MDRTB is present is around 6 days. The technique is not a complex one, although it requires different equipment to the conventional test and therefore some training in correct use. The comparator test is where sputum is cultured in the Lowestein-Jensen semi-solid medium. Because TB bacteria grows more slowly and is less visible in semi-solid mediums, time to culture positivity is considerably slower in this test: it takes between 4-8 weeks to assess whether TB or MDRTB is present. This is partly because subcultures are needed in this approach in order to perform drug susceptibility tests, whereas drugs can be incorporated directly into the MODS test to allow for simultaneous direct detection of MDRTB as well as TB (ibid.). Studies have found that MODS detects TB in sputum with greater sensitivity and speed and reliably identifies multidrug-resistant tuberculosis strains in significantly less time than the Löwenstein–Jensen test (Moore et al, 2006). In Thailand, often the approach is to simply test for non-drug resistant TB, give the conventional treatments and then monitor treatment outcomes and wait for treatment success or failure (known as Direct Observation of Therapy or DOTS) (Wongphan et al, 2012). Treatment failure is then used to prompt testing for MDRTB. However, this approach misses half of all drug resistant forms of TB in Thailand as a result of a number of possible factors: poor patient compliance with treatment and doctors reluctance to expend energy and resources on re-testing, patients not returning for re-testing, doctors not performing tests and simply continuing with the existing regime, or as a result of the disincentive effect of waiting 6 weeks for results once MDRTB tests are carried out (ibid; and personal communication with Phusit Prakongsai at the Thai International Health Policy Program (IHPP)). Multidrug-resistant tuberculosis increases morbidity and mortality and, through treatment failure, facilitates continuing transmission by patients who are under the false belief that they are being effectively treated. In Thailand, 1 extra case of drug resistant TB is expected for each 5 week period during which an infected person is undiagnosed or inappropriately treated. Naturally, there is also then the spreading effect of that 1 extra case infecting another person within a 5 week time period and so on (ibid; and personal communication with Phusit Prakongsai, IHPP). Additionally treatment for drug resistant forms of TB is more effective and shorter lived (and therefore less costly) the earlier the disease is diagnosed. Moreover, given that XDRTB always develops from MDRTB, diagnosing

	and effectively treating MDRTB prevents the disease developing further into XDRTB. There are also important gains in terms of quality of life for patients– they know they are being treated correctly from early on if they are tested and found to have drug resistant forms, and by receiving treatment earlier they therefore suffer symptoms for a shorter amount of time and become disease-free more quickly. Correct treatment from the outset also avoids the side effects which can be caused by the wrong drugs being prescribed - these include hepatitis and inflammation of the eye. Where they occur, these side effects also have to be treated and drug regimes changed (potentially to another incorrect one), thereby adding further to the potential costs associated with failure to diagnose correctly when a patient first presents with symptoms (ibid; see also Moore et al, 2006). In the cost benefit analysis carried out the by the International Health Policy Program in Thailand (a semi-autonomous government policy and research institute) the cost of MODs was found to be the same as the conventional Lowensen-Jensen regime: both cost around 4.65 million Thai Baht per year. However, the MODs regime provided significantly greater benefits: the benefits of the Lowensen-Jensen regime were calculated at 2.38-3.30 million Bahts and the benefits of MODs at 4.42-6.13 million Bahts (Wongphan et al, 2012).
2. Policy decision: process	**Policy decision: process**
Please include information on as many of the following as are relevant to this case: • What stages/institutions were involved in the decision making process? • Is legal context important in this case? If so, in what way? • Who was involved? Eg. key stakeholders, the public, professionals, industry, patients, governmental or non-government policy actors. • How were they involved, and at what stages of the process? • Was there disagreement between any of the parties involved in the decision process? • Do any rules or frameworks exist to guide decision making? If so, were they followed in this instance? • Do mechanisms exist for challenging the decision at any stage of the process? • How, if at all, is the decision process or the decision itself publicized?	The International Health Policy Program carried out the cost benefit analysis and recommended to the National Health Security Office that the MODs test should be publicly funded and should become the first line of testing for all suspected TB cases (Wongphan et al, 2012). The National Health Security Office in Thailand has responsibility for deciding what interventions will be publicly funded and available under the Universal Coverage program. Whilst the IHPP publishes its research where possible, and its methodologies are available on its website, the decision processes of the NHSO are not publicly available. Its committee meetings are closed and only brief summaries of the decisions themselves are published - these do not include any information as to the reasons behind decisions. Information included here on the reason for the decision in this case was provided by an attendee at the meeting.
3. Policy decision: content	**Policy decision: content**
Please include information on as many of the following as are relevant to this	The IHPP recommended that the MODs regime be adopted into policy on

case: • What decision was made about the intervention, service or program, if any? • What values were relevant in the case or in the decision itself? For example, values of cost-effectiveness, clinical effectiveness, justice/equity, solidarity or autonomy. How did they affect the decision itself? • Was the way in which these values were balanced affected by any specific features of the case? For example, end of life considerations, age of patients, impact on carers, disease severity, innovative nature of the intervention, social stigma or cultural sensitivity? • Did the case challenge established guidance or 'decision rules'? Eg. on cost-effectiveness, cost thresholds, age discrimination etc. If so, in what way? • Were any health system-wide considerations influential in the decision? For example, displacement of old technologies, professional practice issues, or infrastructure/feasibility considerations.	the grounds of its cost-benefit analysis - ie. on the basis that it was much quicker to detect drug-resistant TB, and thereby lessened the risk of patients with drug resistant forms of the disease going undiagnosed and untreated (or incorrectly treated) for 6 weeks or longer during which time they could infect others. Consequently, MODs appeared to provide greater benefits both from the perspective of public health as well as from that of the individual patient (Wongphan et al, 2012). However, the National Health Security Office did not approve a change to the MODs technique. Whilst they recognized the benefits of this approach to TB testing, and that the costs were similar to that of the existing testing regime, they considered that limited capacity in the health system meant that it was not feasible to introduce a new approach for TB testing. Although the MODs approach is relatively simple, nonetheless some new equipment and staff training would be required to bring it into use and the NHSO considered that it was not feasible to do this currently (Wongphan et al, 2012; personal communication with Phusit Prakongsai). Additionally, the NHSO was reluctant to invest resources in the MODs testing regime when its benefits obtained to relatively small numbers of patients with drug-resistant forms of the disease (ibid). The NHSO decided to continue with the existing practice of testing with the Lowensen-Jensen test (ibid).
4. Discussion	**Discussion**
Please use this space to reflect on, for example: • The reasons or values explicitly used in making the decision. Do these reflect any institutional decision rules or statements of value, for example commitments to equality, non-discrimination or fairness? Do they reflect wider social, moral, cultural, religious values, and if so how? • Considerations not explicitly taken into account in the decision, but which may nonetheless have been important 'background' factors. These might include, for example, public opinion, political sensitivity, moral sensitivity, and international reputation, as well as cultural, social, moral, religious or institutional norms. • The impact of the decision making process on the decision itself, if any. • Any issues relating to	Several issues of social values arise in this case, most notably that of equity. One rationale for the NHSO decision was that the numbers of patients with extreme drug resistant TB was very small, and they were unwilling to make the additional investment in equipment and training for the MODs technique if only a small number of patients would benefit. This appears to show a utilitarian preference for interventions which benefit the greatest number rather than, in this case, those which benefit small numbers of people (those with XDRTB), even where those small numbers have a life-limiting (and ultimately fatal) illness which also presents a public health hazard. This is an interesting take on a public health issue, however, since public health interventions are often thought to be those which can benefit the greatest number in terms of prevention and are therefore commonly considered to be relatively utilitarian in their nature. Additionally, TB is a disease which tends to disproportionately affect the poor, given that it is spread most easily in crowded living conditions. Preventative public health measures in regard to TB could also therefore be seen as promoting equity in the sense of prioritizing interventions that would benefit the economically worst off in society. It seems that the NHSO were less concerned about the *future* public health

implementation. For example, whether access may be restricted by capacity issues, even if the intervention, service or programme is provided on a 'universal' basis. • Anything else you think significant or interesting about the decision.	implications of the disease - the potential for an increase in the numbers of XDRTB if its spread is not prevented - than with the size of the *current* patient population. This could also be seen as indicating a certain myopia in relation to future risk with regard to the spread of XDRTB - and the increasing costs of treating those patients. Recall that the cost of treating even small numbers of patients with the most extreme forms of drug resistant TB is huge: it is estimated that there are 93000 cases of normal TB, treated at a cost of around 2,391 Thai Bahts per patient - giving an overall cost of around 222 million; although there are only an estimated 145 cases of XDRTB, the cost of treating each case is around 1 million Thai Baht - giving an overall cost of around 150 million. So if the number of cases of XDRTB were to increase by only 20 per year, the increase in costs of treatment would be 20 million Thai Baht. However, the NHSO decision seems to indicate that they are willing to take the risk of an increase in these highly drug resistant forms of the disease rather than invest in new diagnostic technologies which might identify them earlier, prevent their spread, and prevent increasing costs of treatment. More generally, however, this case is indicative of priority-setting problems which are particularly acute in low to middle income countries where new health technologies are coming to market but where the infrastructure is not yet available to make such interventions available on a large scale (even where the cost of the interventions themselves may not be a barrier) thus raising great challenges around issues of equity. This is a case in which the balance of costs and benefits were quite clearly shown to tip in favour of the intervention in question, but where the limitations of system capacity, and reluctance to make initial investment in the new technology - combined with disinvestment in the old technology - proved to be a barrier to policy change, even though cost-benefit analysis had shown the superiority of the new technology. This shows how economic analyses alone are often insufficient in guiding practical policy decisions where other issues relating to implementation are so pressing. Given that limited system capacity appears to be one of the primary issues in this case, the question also arises of how to deal with 'hard facts' in terms of justifying restrictions on access to interventions. Whilst there is *any* capacity, it could be argued that decisions about who gets access to those limited resources must be justified in terms of equitable prioritizing and that allocating resources to intervention X rather than intervention Y is always a judgement that the opportunity costs foregone by patients not provided with intervention Y are less than those that would be foregone if intervention X was not provided to the relevant patient group. So there seem to be questions around the process wherein the reason of 'limited system capacity' alone is given to justify a prioritizing decision. Such limited capacity may be one *reason* in the decision -making process, but it is not perhaps sufficient as a *justification*.
5. References/Links to relevant documents	
	David A.J. Moore, Carlton A.W. Evans, Robert H. Gilman, Luz Caviedes, Jorge Coronel, Aldo Vivar, Eduardo Sanchez, Yvette Piñedo, Juan Carlos Saravia, Cayo Salazar, Richard Oberhelman,

	Maria-Graciela Hollm-Delgado, Doris LaChira, A. Roderick Escombe, and Jon S. Friedland (2006) Microscopic-Observation Drug-Susceptibility Assay for the Diagnosis of TB, *New England Journal of Medicine* 355(15): pp 1539–1550 Wongphan, T, Saonuam, O, Lertiendumrong, J, and Prakongsai, P (2012) Policy decision on Multi-Drug Resistant and Extreme Drug Resistant Tuberculosis Screening; unpublished presentation given at *The First Annual Conference of HTAsia Link*, Petchaburi, Thailand, May 2012