

## ORIGINAL RESEARCH

## TEN YEARS ON: HIGHLIGHTS AND CHALLENGES OF DIRECTLY OBSERVED TREATMENT SHORT-COURSE AS THE RECOMMENDED TB CONTROL STRATEGY IN FOUR PACIFIC ISLAND NATIONS

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## ABSTRACT

**Objectives:** The internationally recommended tuberculosis (TB) control strategy, Directly Observed Treatment, Short course (DOTS) was implemented in most Pacific Island countries and territories during the year 2000, with expansion of DOTS into outer islands and rural areas over the past ten years. The objective of this study was to better understand successful strategies and challenges faced in implementing DOTS in outer islands and rural areas of selected high burden Pacific countries from the perspective of National TB Program (NTP) staff. **Methods:** National TB Program Managers or Coordinators from four Pacific countries, Solomon Islands, Vanuatu, Kiribati and Tuvalu, were surveyed and participated in in-depth interviews exploring what had been particularly effective and what challenges had emerged during DOTS implementation in outer islands and rural areas. Information from the interviews was analysed for shared experiences with data coded inductively using a thematic coding scheme. **Results:** The positive aspects of DOTS implementation in outer islands and rural areas were in three main themes: support from health workers and the community; enablers and incentives; and better treatment completion. The challenges could be categorised in five main themes: working with volunteers; stigma; traditional healers; distance and communication; and financial challenges. Local health workers, pastors, church leaders, chiefs and traditional healers were all key players in the TB Program in outer islands. Local health workers are integral to effective TB control due to accessibility and being known by the community. **Conclusions:** Reviewing the highlights and challenges of implementing DOTS in outer islands and rural areas in four Pacific countries has revealed some important issues. Increasing support to local health workers, actively engaging with pastors, church leaders, chiefs and traditional healers and addressing the barriers to communication and transport for people living in the outer islands are particular issues to address. Much has been achieved in TB control in outer islands but if the burden of TB is to be reduced and drug resistant TB is to be prevented, additional and ongoing investment is required.

**Key Words:** Tuberculosis; DOTS; Pacific Islands; Outer islands; Program implementation; Australia; Solomon Islands; Vanuatu, Kiribati; Tuvalu.

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## INTRODUCTION

Tuberculosis (TB) remains an important cause of morbidity and mortality in a number of Pacific Island countries and territories (PICTs) in the Western Pacific Region (WHO, 2009). According to the World Health Organization (WHO), progress in global TB control during the past decade has been due in large part to the development and widespread implementation of the internationally recommended TB control strategy; Directly Observed Treatment, Short-course (DOTS) (WHO, 2009). DOTS includes the following components: political commitment with increased and sustained financing; case detection through quality-assured bacteriology; standardized treatment with supervision and patient support, effective drug supply and management; and a monitoring and evaluation system (WHO, 2006).

Although the rates of drug-resistant TB are currently low in most Pacific Islands, the emerging threats of drug-resistant TB are a serious concern to TB control in the Western Pacific Region, and around the globe (WHO, 2010; Raviglione & Smith, 2007). The threat of drug-resistant TB increases with incomplete detection of active TB cases and inadequate treatment of detected cases, using Directly Observed Therapy Short-course in a National TB Program (WHO, 2010; Reichman LB, 2009).

DOTS was implemented in most PICTs during the year 2000, with expansion of DOTS into outer islands and rural areas over the past ten years. DOTS is the cornerstone of the Stop TB Strategy, which aims to dramatically reduce the global burden of TB by 2015 in line with the Millennium Development Goal to halve TB related prevalence and mortality relative to 1990 levels (WHO, 2006). The World Health Assembly has set two important targets for international TB control, which are to detect 70% of sputum smear positive cases and to ensure that at least 85% of these cases successfully complete their treatment (WHO, 2006). This should result in a 5–10% reduction in TB incidence per year, facilitating sustained TB control (Lonnroth et al, 2010; Lonnroth et al, 2009).

The Strategic Plan for Tuberculosis Control in the Western Pacific Region 2006-2010 recognises regional progress in controlling TB and proposes three key objectives to further enhance TB controls, which are to:

- sustain and optimize the quality of DOTS and go beyond the '70/85' targets;
- ensure equitable access to quality TB care for all people with TB; and
- adapt DOTS to respond to MDR-TB and TB-HIV co-infection (WHO, 2006).

In the Pacific context, there is little published information on the experience of implementing the Stop TB Strategy and/or DOTS. A single report indicated that a computerized TB register improved the DOTS program in the Solomon Islands (Carroll & Malefoasi, 2004). National TB Programs (NTPs) staff often have a good understanding of what has worked well in their setting, and what the challenges have been. Developing an understanding of the successes and challenges faced when implementing DOTS in the Pacific may assist in identifying strategies for improving TB control.

The objective of this study was to better understand successful strategies and challenges faced in implementing DOTS in outer islands and rural areas in selected high burden TB PICTs from the perspective of National TB Program (NTP) staff.

#### METHOD

Based on Secretariat of the Pacific Community (SPC) data (Viney et al, 2010) the six Pacific countries with the highest rates of TB disease, in descending order, were Kiribati, Republic of the Marshall Islands, Federated States of Micronesia, Tuvalu, Solomon Islands and Vanuatu. National TB Program managers or coordinators were asked to be co-authors and participate in the quality improvement project. The co-authors were asked to complete a semi-structured survey to describe how their NTP functioned, in particular how DOTS had been implemented in outer islands and rural areas.

In-depth interviews were then conducted with the same NTP managers or coordinators, who had agreed to take part in the quality improvement project, to explore their experience in implementing DOTS, particularly in outer islands and rural areas. The interviews were conducted by telephone and explored the country's specific model of DOTS implementation, what components had been particularly effective and what

challenges had emerged during DOTS implementation in outer islands and rural areas.

Information from the interviews was analysed together for shared experiences with data coded inductively using a thematic coding scheme (Minichiello, 2008). The researchers identified and defined themes and recurring ideas or concepts based on hermeneutic principles (Gerber, 1999). Data from each country were explored for common and contrasting themes. As the combined themes and concepts emerged, further data reduction and interpretation occurred, this involved grouping like themes and concepts and defining the central or main issues. The like themes were grouped under the main components of the review, which were highlights and challenges. The many themes under these headings were then condensed to describe the main issues that participants spoke about. The initial data analysis and data reduction were conducted by three authors (PM, KV, and TK). Interpretation and confirmation of the findings occurred by all authors.

Descriptive information on the epidemiology of TB was accessed from the SPC 2009 TB surveillance report.

As this is a quality improvement project with the co-authors voluntarily providing information on aspects of the operation of a TB program, ethical clearance was not required.

#### RESULTS

Staff from four of the six identified countries, Solomon Islands, Vanuatu, Kiribati and Tuvalu, representing each of the Pacific subregions of Melanesia, Micronesia and Polynesia, participated in the study. The 2007 TB case notification rates for these countries ranged from 54 to 340 per 100,000 inhabitants (Table).

Table: Notification rates of TB (all forms) for Pacific Island countries and territories, 2007.

Pacific subregion	Pacific Island country/territory	Estimated total population (2007)	Number of TB cases notified (all forms)	Notification rate (all forms / 100,000 pop)
Melanesia	Solomon Islands	496,878	397	80
	Vanuatu	224,932	121	54
Micronesia	Kiribati	95,424	324	340
Polynesia	Tuvalu	9,660	16	166

Each of these countries implemented DOTS on the main island and/or main centre during the years 1998-2000 and implementation of DOTS in the outer islands and rural areas followed. The National TB Program in each country is based on the main island with a network of health services involved in TB control.

The Solomon Islands consist of ten provinces, six main islands and 986 outer islands. Eighty-five percent of the population live in rural areas or outer islands. Most of the TB cases come from rural areas and outer islands. The NTP is based in the capital, Honiara, and each province has a TB coordinator. Vanuatu has 83 outer islands where approximately 80% of the population live, and 80% of TB cases come from the outer islands. The NTP is based in the capital, Port Vila and the NTP coordinator works with TB staff in the six provinces. Most provinces have a Provincial TB Officer, Provincial TB Laboratory Officer and TB Nurses. Kiribati has 32 outer islands where approximately half of the population live. Increasingly, local people are moving to the main island (Tarawa), including people with TB who move to Tarawa for TB diagnosis, treatment and care. The National TB Program is based in Tarawa and works with the 21 island councils to provide TB services. One case of multi-drug

resistant TB was diagnosed in Kiribati in 2006. Tuvalu consists of nine islands and the eight outer islands are home to approximately 50% of the population. The NTP is based in the capital, Funafuti. The TB coordinator works with clinic nurses in the outer islands to provide TB services, but when patients live in an outer island that is a long distance by sea from Funafuti, they are transferred to the Hospital (in Funafuti) for TB care.

#### DOTS implementation in outer islands and rural areas: highlights

Respondents spoke about the positive aspects of DOTS implementation in outer islands and rural areas in three main themes: Support from health workers and the community; enablers and incentives; and better treatment completion.

#### Support from Health Care Workers and the community:

Each of the respondents highlighted the importance of patient support by health care workers in rural health clinics, Nurse-Aid Posts or Village Health Posts. The health care workers or volunteers were considered vital in identifying TB suspects and subsequently commencing the appropriate investigations. "Almost every village has a Health Post. No problems with access to Health Post by most people," reported one

respondent. Another respondent said that "there is a Nurse-Aid in every village." The usual process for patient diagnosis is that "People go to Health Clinics if sick...passive case detection....Follow guidelines and use antibiotics [for respiratory infection], if not getting better, start investigations [for TB]....send over sputum." Then if the sputum is smear positive for TB "the patient goes to hospital."

Where DOTS is provided locally, having local people involved was seen as important. Patients are "happy to see someone come to [their] home, [they] already know her, [they are] from own village, not someone new." One respondent explained that if the patient is "staying close to the health facility then the Nurse provides treatment support." But another respondent said that the family may also have an important role as "family members really do care." The respondents thought that support of training was an important aspect of DOTS implementation in outer islands and rural areas. Training of the Village Health Workers, Nurse-Aids and Volunteers about TB and the DOTS program was thought to have helped to "support patient to stay on treatment." In addition "there has been a workshop for medical staff to explain the program, also side effects and supervision." One respondent described the success of the training in these terms "I think one of the things, when DOTS initiated in country, one of these indicators to train all the Village Health Workers, we did that."

In addition, treatment partners were considered vital to the success of the DOTS program in the outer islands setting. One respondent described how they "Normally use the chief or pastor, [as] they are respected, patients will listen to them." However, one respondent explained that "supervision does not really work for them; they say it is a medical job, but they really help a lot with campaigns."

There was strong agreement that the advocacy role of pastors and church leaders was "very helpful". One respondent explained that "Pastors allow us to go in during Sunday services to talk about TB." Another respondent said that the "community responds more positively to head of churches" and that they are "very useful, really good people." All respondents had "seen a positive impact" of working with pastors and church leaders.

**Enablers and incentives provided by the National TB Program:** Having DOTS centres accessible to people on outer islands and Island Councils was seen as a "good thing" as it was designed to have the "experts closer to the people in health and other things."

Respondents noted the advantages of fixed dose combination TB drugs, described as "very good" as they are "easier for us, better to use than loose drugs, all expire on same date not on different dates and then run out of medication."

Transport provided as part of the National TB Program was considered an enabler for facilitating diagnosis and completion of TB treatment "If we have patients with TB, the Provincial Government has to pay for travel expenses. Even [the] Hospital pays for transport back home after 2 months intensive phase." In another country the "nurses have bikes to go out to the people a bit further away, [as] islands are small."

Incentives, in particular money, were reported to have had a positive impact on the National TB Program. The "Special Duty Allowance" for Nurses and "the \$20 a fortnight for Nurse-Aids is good." In one country "we are paying patient to come

here....\$10 per day as a living allowances." Most other incentives "don't work, so money is good."

**Better treatment completion:** Another benefit of implementing DOTS in outer islands was the reported improved treatment completion. One respondent described it in these terms: "some of the staff did not follow up or medicine got lost on [the] way to island....It is much better now." Another respondent said "we have a smaller population and Nurses at each medical facility to carry out DOTS" so now the "whole country gets DOTS."

To highlight the change they had observed since DOTS was implemented in the outer islands, one respondent stated: "Most benefit, .....we don't have a default[er] case! In the past [patients in the] outer islands they would default."

#### **DOTS implementation in outer islands and rural areas: challenges**

Implementing a high quality DOTS was described as "quite a challenge," by one respondent. What the respondents described as the challenges faced in DOTS implementation in outer islands and rural areas fell into five main themes: Working with volunteers; stigma; traditional healers; distance and communication; and financial challenges.

**Working with volunteers:** In working with volunteer treatment partners, challenges arise when the "patient lives a long way from clinic," and the TB staff "have to decide whether to give volunteers the treatment." Ensuring that both the volunteer and the patient come to the clinic for follow up appointments was also reported as challenging, "we encourage both of them to come so we can check how they are doing at home," described one respondent. Financial support was also seen as a barrier; "not all communities are willing to do DOTS as volunteers, some want sort of payment, [and we] can't sustain payments."

**Stigma:** Stigma associated with a diagnosis of TB was described by respondents. Sometimes patients could not receive full supervision of treatment as no treatment supporters could be found "because of stigmatisation like HIV and STI, so we keep [DOT] to health professionals." Another respondent said, "stigmatisation of the patient is a problem." The result is that patients "stay in hospital for long time because of shame and embarrassed to take meds at home." Respondents also described that some patients are "in denial about TB....even when I show them the evidence." The problem is that "they are making themselves more sick by prolonging the duration of DOT."

**Traditional healers:** Most respondents said that traditional healers were "quite another challenge." A respondent reported that some people believe that "TB is said to be by magic and treated with traditional medicine." Another respondent said that "the traditional healer say they know, they have their own name for TB and own treatment." The result can be a "delay in diagnosis" and even "sometimes we have lost them [patient died] because they are too advanced." This challenge is "not [in] every place," but for example "far inland" where people are "living primitively."

Some NTP staff reported trying to engage with the traditional healers, "we invite them to come along to campaigns, we point out to them, we have most of them trained." It was noted that, "as soon as DOTS starts traditional healer has no say." In one country traditional healers "go to more non-infectious things.... [and] don't like to hold onto someone with TB as they don't have the treatment."

**Distance and communication:** Distance and communication, were identified by all respondents as the biggest challenges in the implementation of DOTS in the outer islands and rural areas. One respondent summarised this as: "if patient very far from health facility, according to my experience it doesn't work." With "islands scattered around" and at times "hardly any means of communication, no phone lines, transport only once a week" and "internet not reliable" means that implementing the DOTS "is quite difficult." In response to the challenges of distance and communication one respondent said that: *"This makes us want to work more. Makes it more interesting and more exciting."*

Respondents described strategies to reduce the impact of distance including the "Provincial TB Officers... have to share [transport] with other programs," and "we can use radio phones or satellite phones if emergency."

Respondents also described patient mobility as a challenge to TB care. "Sometimes we tend to lose one or two patients, they move around a lot, we lose track when they move," said a respondent. Another respondent reported, "sometimes the patient does not tell the nurse when they move to other island." One respondent commented that adolescent patients on TB treatment move often and were "very cunning". To better support highly mobile patients and ensure an uninterrupted treatment course, one respondent described how they "liaise with family, if missed doses have to prolong treatment...[families] have to play their part as well," to support the patient on TB treatment if they are moving about.

Assuring high-quality DOTS on outer islands was considered challenging: "supervise once a week is not DOT" and "we need to be more strict on DOT." The inability to provide DOT on weekends and the difficulties for DOT nurses to locate patients at home, were identified as issues to address, but as one respondent said, "we are happy to try ways to improve this."

The respondents described ongoing training as a particular challenge for outer island staff, also due to distance. "Now we have lots of new people, this is something we need to do is train again," said one respondent when referring to Village Health Workers.

Providing supervision and feedback to Nurse-Aids and Village Health Workers was seen as "more important than ever." But "monitoring of how they perform their work is difficult," especially in the outer islands. A respondent commented that "supervision visits once a year or so, not really done sometimes." Transport for the supervisors was identified as a challenge, "most of time not able to go out and see how they are doing, mostly we depend on treatment partners to report back."

Respondents identified that laboratory facilities and the need to conduct sputum smear examinations were significant challenges to the diagnosis of TB and ongoing follow up. "There is limited [lab] resources," noted a respondent speaking about the outer islands. Another respondent said: *"Nurses [are] too busy to do smears, this is a challenge when transport is problem of specimens especially from very remote clinics. We are still training on smears. If they can't do it, the specimens get destroyed. Very big issues. We need to have specimen, we don't know if person is cured or complete."*

As a result of the challenges of distance many of the outer island people with TB who move to an hospital for treatment

subsequently do not return home. An example of this is in Tarawa, Kiribati; people move to Tarawa from the outer islands for various reasons and subsequently household crowding is becoming an issue for TB disease control.

**Financial challenges:** Respondents felt that there were financial challenges in implementing a DOTS across their countries. The respondents described that the direct costs to the Ministry of Health for transport and incentives were challenging. Respondents described that their national Governments struggled to dedicate sufficient funds for the NTP or that the program was not a high priority. "Apart from global funds, Government funding is not big. They don't see TB as really important," commented one respondent.

## DISCUSSION

If the burden of TB is to be reduced and drug resistant TB is to be prevented optimal DOTS in outer islands of higher burden countries is essential. Treatment of TB in line with the Stop TB Strategy, along with development and research, can accelerate the decline of the TB burden (Lönnroth K et al, 2010). This study has revealed important opportunities for strengthening National TB programs in the Pacific to further reduce the burden of TB.

Local health workers, pastors, church leaders, chiefs and traditional healers are all key players in the National TB program in the outer Western Pacific islands. Local health workers are vital personnel in TB control due to their accessibility, acceptability and their standing in the community. Pastors, church leaders and chiefs were identified as important community people for effective TB control in the Pacific. It was reported that they are respected and people will listen to them. Pastors, church leaders and chiefs in outer islands are supporting the TB program as treatment supervisors, advocates, and by providing access to their congregations for education. The church has been described as an integral part of life for many people in the Pacific and churches have been an effective link into communities for other health programs, such as diabetes and obesity (Simmons D et al, 2004; Shultz J et al, 2007). Exploring how the TB program in Pacific islands and territories could collaborate with the church to enhance TB control would be of value.

In the area of addressing stigma, pastors, church leaders and chiefs in the Pacific may have substantial influence on community attitudes and norms towards TB and DOTS. Fear of infection may be the most common cause of TB related stigma, leading to delays in diagnosis and treatment non-compliance (Courtwright & Turner, 2010). The most promising approach to reducing TB-associated stigma, along with HIV and mental illness, may be to empower individuals with TB to resist stigmatising external judgments, while working to change community norms about the disease (Courtwright & Turner, 2010). Pastors, church leaders and chiefs may play a pivotal role in facilitating this paradigm shift.

The opportunity for engaging further with traditional healers in outer islands is a strategy worthy of further exploration to reduce delays in TB diagnosis. A systematic review found that the some of the main factors in delayed TB diagnosis and treatment were rural residence, geographical access barriers and attending a traditional healer first before attending the health care service (Storla et al, 2008). Further it has been reported that patients who visited traditional healers took longer to access anti-tuberculosis chemotherapy, were in worse

clinical condition by the time they presented and were more likely to die after they had presented with TB (Barker et al, 2006). But traditional healers might make good DOTS supervisors or treatment supporters, as they are, by the nature of their chosen professions, concerned with the health of their communities (Colvin et al, 2003). Further research to determine effectiveness or acceptability of engaging with the potential role of traditional healers in Pacific TB programs needs further close consideration.

Inadequate transport and communication links to outer islands are substantial barriers to access to health services, supervision of medications and education (White et al, 2008; Binns et al, 2010). The NTP managers or coordinators involved with this project emphasised the extent of this issue for implementing and supporting DOTS in the outer islands. Some innovative ways of reducing the access issues in a resource limited program were discussed, including sharing transport and the expanded use of the Internet. But with PICTs such as Kiribati, which is spread over thousands of kilometres, providing high-quality DOTS will require further innovation and investment.

Some PICTs may continue to choose relocating suspected TB patients from outer islands to hospitals in the main centres for the full 6 months of treatment, until reliable strategies to address distances across the Pacific Ocean are developed and funded. Community based DOTS by a village health worker, nurse or volunteer is the preferred model of care, but significant challenges remain to implement this model in outer island communities.

### Conclusions

Reviewing the highlights and challenges of implementing DOTS in outer islands and rural areas in four Pacific countries has revealed some important issues. Increasing support to local health workers, actively engaging with pastors, church leaders, chiefs and traditional healers and addressing the barriers to communication and transport for people living in the outer islands are particular issues to address.

Much has been achieved in TB control in outer islands but if the burden of TB is to be reduced and drug resistant TB is to be prevented, additional and ongoing investment is required.

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