

Chapter 5: Directly Observed Therapy

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Summary

- This chapter represents an update of the Ministry of Health publication *Directly Observed Therapy (DOT) for Tuberculosis 2001*.
- Adherence to treatment is difficult for TB patients to maintain. Directly observed therapy (DOT) ensures adherence. The Tuberculosis Working Group of the Ministry of Health strongly supports the use of DOT and urges all medical officers of health to work with prescribing physicians to ensure that DOT is offered to all patients who need it.

Definition of DOT

- DOT refers to the procedure whereby a supervisor trained in the administration of DOT watches the patient swallowing the medication for all doses during the course of treatment. The DOT supervisor may be a health worker or a trained and supervised community member.
- It is not considered to be DOT if an untrained family or community member administers the treatment to the patient. It is very important that anyone providing DOT is well-trained. If a non-health worker (eg, a guardian) is asked to take responsibility for giving DOT, they must be given training so that they understand TB, the medications, the DOT process, documentation and the limits of their responsibility.
- For the purposes of surveillance, DOT is defined as receiving DOT throughout the course of treatment (see Chapter 1: The Epidemiology and Surveillance of Tuberculosis in New Zealand). People who receive DOT for only part of their course of treatment should not be classified on the case report form as having received DOT.

Effectiveness of DOT

- The DOT strategy is actively promoted by the World Health Organization for TB patients in an effort to control the global emergency of TB. DOT is being successfully implemented in many other countries.
- DOT produces superior treatment completion rates to those achieved by non-supervised interventions and leads to improved relapse and drug-resistance rates.
- However, *randomised trial* evidence for the effectiveness of DOT is limited, and DOT may not always lead to better treatment outcomes than self-administered treatment. Moreover, the published literature does not clearly distinguish the impact of DOT itself from co-interventions such as incentives, enablers, patient-centred programmes and many other programmatic factors that may have contributed to the improved outcomes in published accounts of DOT programmes.

Current use of DOT in New Zealand

Universal DOT is not necessary in New Zealand which has high rates of treatment completion and low rates of drug resistance and relapse.

Completeness of data on DOT in national TB surveillance is unacceptably low, so the proportion of cases who receive DOT is unknown. There is wide inter-district variation in the proportions of cases treated by DOT, but overall the proportion seems low (about 24% of new TB cases in 1999–2001).

Indications for DOT

- People with TB who should *always* be on DOT include all:
 - cases on intermittent regimens (twice- or thrice-weekly doses)
 - cases resistant to rifampicin
 - multidrug-resistant cases (resistant to isoniazid and rifampicin)
 - relapses/reactivations
 - cases that clearly demonstrate an inability or unwillingness to self-medicate
 - cases that have been placed under closer supervision (see Chapter 4: 'Adherence to Treatment') and who then fail to improve their commitment to treatment.
- People with TB should be *considered* for DOT when there is:
 - extensive disease and/or a high degree of infectiousness
 - weak or absent social support
 - a complex treatment regimen
 - serious multiple drug-resistance, or where side-effects necessitate the use of two or more second-line drugs.

Using DOT for treatment of latent tuberculosis infection (LTBI)

- DOT should *always* be used for intermittent regimens (twice- or thrice-weekly doses) for treatment of LTBI. DOT should also be *considered* if the client has risk factors for non-adherence and meets one or more of the following criteria:
 - can be given DOT at the same time as a case who is on full treatment by DOT in the same household or neighbourhood
 - has recently converted their Mantoux test following exposure to an infectious case
 - is under five years of age
 - has risk factors for progression from infection to disease (see Table 3.3, Chapter 3: 'Latent Tuberculosis Infection')
 - is a contact of a multi-drug-resistant case.

Practical problems during a DOT regimen

Temporary inability to give DOT: is self-medication acceptable?

- Self-administration of twice- or thrice-weekly treatment is *not acceptable*. If a case is going on holiday overseas and cannot be given DOT, they must change to daily treatment. If they are holidaying in New Zealand every attempt should be made to continue DOT through another public health office, or daily treatment should be prescribed.

Missed DOT doses

- The medical officer of health should be advised if the patient misses:
 - more than one DOT dose per month (for intermittent DOT)
 - more than one dose per week (for daily DOT).

The medical officer of health should meet the patient and discuss any obstacles to adherence (see Chapter 4: 'Adherence to Treatment'). If the patient has missed any doses of DOT, these must be added on at the end of treatment. This does not apply to doses delayed for a day or two because the patient missed a DOT appointment but the dose was finally given late.

Discontinuing DOT and transferring to self-administered treatment

- Occasionally a patient's understanding and commitment to treatment improves to such an extent that DOT is no longer considered necessary. If a switch is made to self-administered treatment it must be prescribed as daily treatment.

Community DOT workers

- Extensive experience overseas has shown that lay DOT workers with appropriate training and supervision can provide DOT reliably. (See Appendix 5.1 for information on establishing a community DOT worker programme.)

Health professionals outside the public health workforce as DOT workers

- It may be appropriate to recruit and train health professionals from outside the public health workforce to administer DOT to some clients.

Incentives and enablers

- Measures other than DOT that have been shown to promote adherence include reminder cards, help by health workers, financial incentives, health education, and intensive supervision of staff in TB clinics. These interventions may be more appropriate in the first instance for a patient with questionable adherence.

Future developments

- Complete DOT information should be recorded in EpiSurv by public health offices.
- ESR should establish longitudinal reporting on the proportion of cases that relapse over time.

Introduction

This chapter represents an update of the Ministry of Health publication *Directly Observed Therapy (DOT) for Tuberculosis*.¹

Detection and cure of cases are the cornerstones of TB control. Cure and the prevention of drug resistance are contingent on patients' adhering to an appropriate anti-TB treatment regimen. Proponents of DOT argue that in the case of TB, a global pandemic of a drug-resistant disease with public health implications, it is the medical practitioner's responsibility as much as the patient's to ensure cure.²

Adherence is difficult for TB patients to maintain. People always need assistance and support to stay on anti-TB medication because:

- everybody finds it difficult to remember to take long courses of treatment without support
- the pills prescribed are sometimes hard to swallow
- large numbers of pills have to be taken, especially during the initiation phase of treatment
- there are sometimes unpleasant side-effects from the medication
- abstinence or reduced intake of alcohol is necessary while on medication
- there may be difficulties filling prescriptions because not all pharmacies are aware of the fact that anti-TB medications are fully government-subsidised
- the stigma associated with TB often affects the patient's treatment and illness from co-morbid conditions may result in the total number of tablets becoming intolerable
- drug interactions compound the difficulties already faced by the patient and their family.

Adherence is also difficult for health care providers to predict and measure.³ (For a detailed discussion of adherence see Chapter 4: 'Adherence to Treatment'.) DOT ensures adherence. The Tuberculosis Working Group of the Ministry of Health strongly supports the use of DOT and urges all medical officers of health to work with local medical practitioners to ensure that DOT is offered to all patients who need it.

5.1 Using DOT

5.1.1 Definition

DOT refers to a procedure whereby a supervisor trained in the administration of DOT watches the patient swallowing the medication for all doses over the course of treatment. This ensures that a TB patient takes the correct drugs, the correct dose, at the correct times. DOT may happen on an inpatient or outpatient basis. The DOT supervisor may be a health worker or a trained and supervised community member. There is some evidence that DOT by guardians can be just as effective as health-centre-based DOT.⁴ However, there must be a clearly defined line of accountability between the TB control staff and the person administering DOT.

It is not considered to be DOT if an untrained family or community member administers the treatment to the patient. It is very important that anyone providing DOT is well trained. If a non-health worker (eg, a guardian) is asked to take responsibility for giving DOT, they must be given training so that they understand TB, the medications, the DOT process, the documentation and the limits of their responsibilities. It is crucial that the prescribing clinician and the supervising public health nurse have absolute confidence in the ability of the DOT giver to carry out the role dependably.

DOT may be prescribed and taken daily or intermittently. Regimens of proven efficacy are available for twice- or thrice-weekly administration. These are detailed in Chapter 16: ‘Treatment of Tuberculosis’.

For the purposes of the Case Report Form, DOT is defined as ‘Receiving DOT throughout the course of treatment’ (see Chapter 1: ‘The Epidemiology and Surveillance of Tuberculosis in New Zealand’). Therefore people who receive DOT for only part of their course of treatment should not be classified on the case report form as having received DOT.

DOT has been successfully administered by videophone.⁵

5.1.2 Current use of DOT in New Zealand

The proportion of patients managed by DOT in New Zealand is described in Chapter 1: ‘Epidemiology and Surveillance’. Completeness of data on DOT in national TB surveillance is, however, unacceptably low, so the proportion of cases who receive DOT is unknown. There is wide inter-district variation in the proportions of cases treated by DOT, but overall the proportion seems low (about 24% of new TB cases in 1999–2001).

5.2 Effectiveness of DOT

The DOT strategy is actively promoted by the World Health Organization (WHO) for TB patients in an effort to control the global emergency of TB. The World Bank considers DOT to be one of the ‘most cost-effective of all health interventions’. DOT is more cost-effective than self-administered treatment.^{6 7}

Favourable reports of the use of DOT in the US have been published in Texas,⁸ Baltimore,⁹ San Francisco,¹⁰ New York City,^{11 12} and Haiti.¹³ DOT is also being successfully implemented in many other countries.¹⁴

DOT produces superior treatment completion rates to those achieved by non-supervised interventions. Median treatment completion rates with DOT range from 78.6% to 91.0% (depending on the degree to which incentives and enablers are used), compared to 61.4% for non-supervised therapy.¹⁵ DOT also leads to improved relapse and drug-resistance rates.^{8 16 17}

However, randomised trial evidence for the effectiveness of DOT is limited,^{18 19 20} and DOT may not always lead to better treatment outcomes than self-administered treatment.^{21 22 23} There is not enough evidence to compare fully intermittent, rifampicin-containing short-course chemotherapy and similar daily therapy in patients with pulmonary TB, and larger randomised studies are required.²⁴ Moreover, the published literature does not clearly distinguish the impact of DOT itself from co-interventions such as incentives, enablers, patient-centred programmes and many other programmatic factors that may have contributed to the improved outcomes in published accounts of DOT programmes.²⁵

Programme acceptability and confidentiality are important.²⁶ An unpopular programme might deter patients from seeking care, resulting in reduced programme effectiveness.²⁷ High levels of patient satisfaction with DOT programmes can be achieved.²⁸

5.3 Selective versus universal DOT

The merits of *selective* versus *universal* DOT (DOT for all TB patients) are debated. WHO espouses DOT for all smear-positive cases. Universal DOT may be unnecessary for communities with low relapse rates and proven high treatment completion rates.^{29 30 31}

Universal DOT is not necessary in New Zealand as long as we have high rates of treatment completion and low rates of drug resistance and relapse. Of these three measures, we have quality data only on drug resistance. Drug-resistance rates are low in New Zealand (see Chapter 1: 'Epidemiology and Surveillance'). Treatment completion rates have not been published but are thought to be high.

The percentage of New Zealand-treated cases that relapse has not been determined by a published longitudinal follow-up study. However, since TB incidence in New Zealand has changed little in the past 20 years, a reasonably accurate estimate of the relapse rate may be obtained by determining the percentage of each year's cases that are relapses. Such data are available for the last few years in New Zealand.

The proportion of Auckland notifications that are relapses and were originally New Zealand-treated seems to be small. Of 36 relapses/reactivations notified in Auckland from September 1995 to July 1997, only eight had been treated in New Zealand. This constitutes 2.2% (8/358) of all cases notified. Four of these had clear indicators of non-adherence in their documentation and would now be put on DOT at their first diagnosis.

Thus, of the relapses currently occurring in Auckland, at most 1.1% (4/358), or two cases per year, would not have been prevented by our current (selective) DOT policy. This suggests that universal DOT would not be cost-beneficial, since to increase our DOT numbers from (currently) 32% to 100% would cost \$486,880 (122 more DOT cases x \$4000 per DOT). This means that each of the two cases per year prevented by universal DOT would have to cost \$243,440 for universal DOT to be cost-beneficial in Auckland.

Of 97 relapses/reactivations notified in New Zealand between January 1995 and May 1998, only 29 were documented to have been previously treated in New Zealand. This constitutes 2.5% (29/1164) of all cases notified during that period. (However, 33 other cases had no information collected about where they had received their previous treatment and some of these may also have been treated in New Zealand).

We cannot be too complacent over our apparently low relapse rates, however. We have only been collecting analysable data on relapses in recent years, and relapses due to poor adherence may not occur for years after the primary treatment. In addition, the Auckland relapse rate may be low because in the past most cases in New Zealand were treated as inpatients for much longer than is the fashion nowadays. This meant they received DOT for a substantial part of their treatment, and had prolonged exposure to education about TB and its treatment. Therefore, ironically and despite the recent interest in DOT, we may in effect be managing fewer patients with DOT than we did in past decades.

5.4 Indications for DOT

As emphasised in Chapter 4: ‘Adherence to Treatment’, a decision to administer DOT should follow a careful assessment of the patient by hospital and public health staff.

People with TB who should always be on DOT include all:

- cases on intermittent regimens (twice- or thrice-weekly doses)
- cases resistant to rifampicin
- multi-drug-resistant cases (resistant to isoniazid and rifampicin)
- relapses/reactivations
- cases that clearly demonstrate an inability or unwillingness to self-medicate
- cases that have been placed under closer supervision (see Chapter 4) and who then fail to improve their commitment to treatment.

People with TB should be considered for DOT when there is:

- extensive disease and/or a high degree of infectiousness
- weak or absent social support
- a complex treatment regimen
- serious multiple drug-resistance, or where side-effects necessitate the use of two or more second-line drugs.

5.5 Using DOT for treatment of latent tuberculosis infection (LTBI)

Treatment for LTBI requires a long course of treatment for a well person. Adherence may therefore be even more difficult to attain than in cases on full treatment for active TB disease. DOT has been shown to be cost effective for treatment for LTBI in drug users at high risk of TB.³²

It may be inappropriate to use DOT for everyone on treatment for LTBI. However, DOT should *always* be used for intermittent regimens (twice- or thrice-weekly doses). DOT should also be considered if the client has risk factors for non-adherence and meets one or more of the following criteria:

- can be given DOT at the same time as a case who is on full treatment by DOT in the same household or neighbourhood
- has recently converted their Mantoux test following exposure to an infectious case
- is under five years of age
- has risk factors for progression from infection to disease (see Table 3.3, Chapter 3)
- is a contact of a multi-drug-resistant case.

Non-adherent cases on full treatment should have priority for DOT resources ahead of people requiring DOT treatment for LTBI.

5.6 Practical issues during a DOT regimen

5.6.1 Temporary inability to give DOT: is self-medication acceptable?

Self-administration of twice- or thrice-weekly treatment is *not* acceptable. Only a medical officer of health or a clinical TB specialist may override this instruction. If a case is going on holiday overseas and cannot be given DOT, he or she must change to daily treatment. If he/she is holidaying in New Zealand, every attempt should be made to continue DOT through another public health office, or daily treatment should be prescribed.

The reason for this rigid instruction is that any missed doses from a DOT regimen constitute a much larger proportion of the regimen than if the same number had been missed from a daily treatment regimen. There is thus a greater potential for missed DOT doses to compromise cure.

5.6.2 Missed DOT doses

The medical officer of health should be advised if the patient misses:

- more than one DOT dose per month (for intermittent DOT)
- more than one dose per week (for daily DOT).

The above standards are not based on evidence from the literature. There are no published data (for daily or intermittent regimens) on how much treatment a person can miss and still be cured.

The medical officer of health should meet the patient and discuss any obstacles to adherence. Ultimately, detention under section 16 of the Tuberculosis Act 1948 may be needed. Alternative measures before this stage is reached are discussed in Chapter 4: 'Adherence to Treatment'.

If the patient has missed any doses of DOT, these must be added on at the end of treatment. This does not apply to doses that were delayed for a day or two because the patient missed a DOT appointment but the dose was finally given late.

5.6.3 Discontinuing DOT and transferring to self-administered treatment

Occasionally a patient's understanding and commitment to treatment improves to such an extent that DOT is no longer considered necessary. This should be a decision involving the patient, the public health nurse and the clinical staff. If a switch is made to self-administered treatment it must be prescribed as daily treatment.

5.6.4 Community DOT workers

Lay DOT workers (personnel without formal health care training) are referred to as 'community DOT workers'. Extensive experience overseas has shown that community DOT workers with appropriate training and supervision can provide DOT reliably.^{9 10 11 23 13 4 33}

Using community DOT workers may:

- help contain the costs of providing DOT
- facilitate communication and rapport with patients in some instances
- facilitate provision of DOT by workers who may be more culturally or linguistically suitable for TB clients
- increase personal skills in affected communities
- help to develop a suitable workforce for similar projects
- provide a greater choice for clients over the settings in which DOT is provided.

See Appendix 5.1 for information on establishing a community DOT worker programme.

5.6.5 Health professionals outside the public health workforce as DOT workers

It may be appropriate to recruit and train health professionals from outside the public health workforce to administer DOT to some clients. Examples include:

- practice nurse
- pharmacist
- district nurse
- occupational health nurse
- school nurse
- dental nurse
- Plunket nurse
- hospital staff.

5.6.6 Incentives and enablers

Measures other than DOT that have been shown to promote adherence include reminder cards, help by health workers, financial incentives, health education, and intensive supervision of staff in TB clinics.³⁴ These interventions may be more appropriate in the first instance for a patient with questionable adherence.

Overseas experience has shown that using incentives and enablers (things that help the client to overcome barriers) will increase adherence with DOT.^{9 10 11 35 36} In a US randomised study of drug users with LTBI, incentives achieved higher adherence rates than outreach workers.³⁷

Examples of incentives include:

- money
- books
- birthday party
- vouchers
- English lessons

- star chart
- celebration at the midpoint and end of treatment.

Examples of enablers include:

- transport to the clinic or DOT appointments
- taxi chits
- thinking creatively about convenient sites for DOT
- reducing the stigma of the disease
- addressing psychological and cultural barriers
- helping the client address other problems (eg, alcohol abuse).

5.7 Future developments

It is recommended that:

- complete DOT information be recorded in EpiSurv by public health offices
- ESR should establish longitudinal reporting on the proportion of cases that relapse over time.

Appendix 5.1: Establishing a community DOT worker programme

Material in this appendix is provided courtesy of Otara Health Inc and Auckland Public Health.

Attributes needed by a DOT worker

Suitable people may include ethnic community health workers, or a church minister, teacher or employer. DOT workers should:

- have patience, tact, maturity, good judgement and honesty
- be flexible regarding times and settings to suit the client
- have the ability to communicate information, and the skill to listen and answer relevant questions
- understand the client's and family's right to confidentiality and privacy
- recognise the limitation of their role and knowledge, and know when to ask for help
- be tidily presented
- be able to manage a workload and accurately record the work done
- not have a criminal record
- be safe with children and young people
- give authority to obtain police clearance
- be fluent in speaking languages commonly spoken by TB clients (this is desirable but not essential)
- be able to accept the client's beliefs and values and not try to change or influence them (eg, religion)
- be able to attend training programmes and review meetings
- be physically fit, reliable and punctual
- have their own car and current driving licence
- know the community and be able to access clients or other key people
- have time to be present for the entire time needed for the client to swallow the medication
- feel comfortable working with people who have an infectious disease.

Job description for a DOT worker

The community DOT worker should:

- carry the correct medication for the client
- administer the correct dose
- observe the medication being taken
- sign the drug sheet (held with the drugs)

- arrange the date for the next DOT
- contact the public health nurse (PHN) to give a weekly progress report – and at other times as necessary (eg, to discuss side-effects, advocacy, problems and queries)
- let the PHN know if they are unavailable to give a DOT dose (in plenty of time for an alternative arrangement to be made)
- complete logs and timesheets neatly and punctually
- negotiate with the PHN before offering any incentives or rewards to clients
- arrive punctually for DOT appointments with clients
- follow up any client who does not attend promptly
- identify and document all adverse events promptly, and report them to the supervising PHN.

Administration

Administration will vary with each organisation, but consider:

- a job description
- a person specification
- a contract
- remuneration
- clear lines of accountability
- performance appraisal
- administrative support
- a timesheet
- DOT visit logs and mileage claim records
- a confidentiality agreement.

Training

When developing a training course for community DOT workers, the following should be considered.

- 1 Background training in TB infection, disease, and treatment.
- 2 Videos such as *TB: The forgotten plague* and *You Can Beat TB*.
- 3 Administering DOT. This includes:
 - how cases are allocated
 - selecting suitable clients for DOT workers
 - being sure who the supervising PHN is for each case
 - case loads
 - negotiating a written contract
 - documentation
 - when to report non-adherence back to the PHN

- when to arrange a three-way interview with the PHN
 - when and how to transfer a client back to the PHN
 - side-effects to watch out for
 - occupational health risks such as TB, violent clients.
- 4 Building relationships with the DOT client. This includes:
- accepting their norms and environment
 - getting to know people and their habits
 - being patient
 - meeting the client with the PHN before starting DOT
 - meeting the client's family/whānau (or other people involved with the client)
 - remembering you are a visitor to the family/whānau
 - recognising that the client may have different time constraints
 - use of motivation and incentives
 - privacy.
- 5 Role play.
- 6 Getting practical field experience with PHNs before working alone.
- 7 The legality of the administration of medicines. DOT workers do not prescribe or dispense medicines. They administer them in the same way as any family member might do for a child. There is no legal obstacle to this. Blister packs may facilitate the work.
- 8 Having the community worker undergo a two-step baseline Mantoux test before starting work.

A manual for training community DOT workers has been developed by the Auckland District Health Board's public health service. Copies are available at a cost (contact Public Health, Community Services, Auckland District Health Board, Private Bag 92-605, Symonds Street, Auckland, ph 09 262 1855).

Criteria for clients suitable for management by a community DOT worker

These are as follows:

- the DOT worker can communicate well with the client
- the client is stabilised on treatment, has had a period on DOT and has displayed no side-effects (for at least a month)
- the client accepts the need for TB treatment.

The role of the public health nurse

The PHN is fully accountable for client care, and remains the case manager who:

- has the primary key worker role and is accountable for resource utilisation and outcome
- assesses needs and plans interventions
- co-ordinates (eg, medical officer) as necessary and requests assistance from PHN colleagues to provide input
- monitors progress and achievement of goals
- modifies plans
- evaluates outcomes.

The PHN introduces the DOT worker to the client personally and discusses with the DOT worker the client's history, characteristics, contract, access to the client, drugs and record-keeping. The hand-over phase needs to continue until the client, PHN and DOT worker are comfortable.

The PHN must receive and acknowledge weekly reports from the DOT worker (even if there is nothing unusual to report). The PHN continues to communicate relevant issues to the clinician responsible for the patient.

The PHN:

- can make a decision to resume responsibility for a DOT client if concerned about continuity, broken contracts, dynamics, etc
- must let the community DOT worker know of the alternative PHN who will act as case supervisor if he/she is away for any reason
- must advise his/her supervisor if the DOT worker fails to carry out any contracted duties
- conducts a monthly check for each DOT client to ensure that visits take place as claimed by the DOT worker (frequent checks may be necessary if the patient is on a complex or difficult regimen, or when the DOT worker is inexperienced).

PHNs may need training if they have no experience in the supervision and monitoring of work delegated to non-health professionals. They must be aware that a non-health professional may not detect or report details of clinical significance, including drug side-effects. This adds another dimension to case management. *The Health Service Assistant and the Registered Nurse*³⁸ is a useful paper that addresses these issues.

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