

*Guidelines for
cost and cost-effectiveness analysis
of tuberculosis control*

DOCUMENT

2

DATA ENTRY SHEETS
FOR EXERCISES AND
PROTOCOLS

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1. EXERCISE 1 FROM CHAPTER 3

1. At which sites will the cost analysis be undertaken?

2. What question(s) is the cost and cost-effectiveness analysis addressing?

3. What will be the perspective of the evaluation?

4. What kind of evaluation is going to be undertaken?

5. Describe the existing approach to diagnosis and case management, and describe the alternatives (if any) with which this is to be compared

6. What evidence will be used to establish each alternative's effectiveness and what measure(s) of effectiveness will be used?

7. What are the costs to be identified?

8. Are there any costs that will not be assessed? If not, why not? Will this cause a problem?

9. How will costs be measured in appropriate physical units?

10. What type of costs are to be assessed?

11. How will shared/joint costs be allocated?

12. What discount rate is to be used?

13. Where can building cost data be found?

14. Where can data on the annual number of inpatient days in a hospital, and the annual number of visits to other facilities, be found?

15. In what year of prices will costs be valued?

16. How will costs in years prior to the most recent year for which costs are being assessed be converted into costs in the most recent year for which costs are being assessed?

17. In what currency will costs be valued?

DATA ENTRY SHEETS FOR CHAPTER 4

Protocol 1: The cost of a day in hospital, excluding drugs, laboratory tests and X-rays

Name of District on which data are based:

Type of hospital: government/mission/other NGO
(delete as appropriate)

Name of Hospital on which data are based:

Year on which data are based:

5

(a) Nursing staff costs

Type of nursing staff who work on the TB ward (e.g. professional and enrolled nurses)	Number who work on TB ward (a)	Annual cost (b)	Proportion of time (on average) spent working on the TB ward (c)	Total annual cost for work on the TB ward {i.e. (a) x (b) x (c)}	Who pays?

Total annual cost of nursing staff (all types) =

(b) Medical staff costs

Type of medical staff who work on the TB ward (e.g. doctors, clinical officers)	Number who work on TB ward (a)	Annual cost (b)	Proportion of time (on average) spent working on the TB ward (c)	Total annual cost for work on the TB ward {i.e. (a) x (b) x (c)}	Who pays?

Total annual cost of medical staff (all types) =

(c) Support staff costs

Type of support staff who work on the TB ward (e.g. cleaners, clerks)	Number who work on TB ward (a)	Annual cost (b)	Proportion of time (on average) spent working on the TB ward (c)	Total annual cost for work on the TB ward {i.e. (a) x (b) x (c)}	Who pays?

6

Total annual cost of support staff (all types) =

(d) Building costs

Cost to build TB ward new (a)	Annualized cost of TB ward {i.e. (a) ÷ 25.73}	Who pays?

1. Total annual costs of hospital staff not involved in direct patient care, excluding kitchen and laundry staff, laboratory and X-ray staff, and other support staff already included in part (c) =

2. Total annual cost of staff involved in administrative/general management duties =

3. Total annual cost of all hospital staff not involved in direct patient care *excluding* both kitchen/laundry staff *and* those involved in administration/general management *and* any support staff listed in part (c) *and* those who work in the laboratory and X-ray departments =

8

4. Fill in (i) and (ii) below

(i) Total annual cost of staff who typically work in inpatient services and are involved in direct patient care =

(ii) Total annual cost of staff who typically work in outpatient services and are involved in direct patient care =

5. Proportion of total overhead staff costs to be allocated to inpatient care¹ =

6. (i) Administrative/general management staff costs to be allocated to inpatient services =

(ii) General overhead staff costs (*excluding* staff involved in administration/general management, and excluding kitchen/laundry staff) to be allocated to inpatient services =

Note that in each case this is the proportion calculated in 5 multiplied by the appropriate total cost recorded in 2 and 3.

7. Total annual number of hospital inpatient days accounted for by tuberculosis patients =

¹ Note that this is $[4(i) \div \{4(i) + 4(ii)\}]$.

8. Total annual number of hospital inpatient days =

9. Proportion of all hospital inpatient days accounted for by tuberculosis patients =
 {Note that this is the total recorded in 7 ÷ the total recorded in 8}

10. Value of hospital-based administrative/general management staff overhead costs to be allocated to tuberculosis patients =

This figure gives the total administrative/general management staff overhead costs associated with tuberculosis patients.

11. Cost of general overhead staff *excluding those involved in administration/general management, and excluding kitchen/laundry staff, and excluding support staff already identified in section (c), and excluding staff who work in the laboratory and X-ray departments* to be allocated to tuberculosis patients =

This figure gives the total staff overhead costs (excluding staff involved in administration/general management) associated with tuberculosis patients.

(f) Kitchen and laundry service costs

1. The total annual cost of staff employed in kitchen/laundry services

Type of staff (e.g. job category, title, grade)	Annual cost (a)	Number employed in kitchen/laundry services (b)	Total annual cost {i.e. (a) x (b)}	Who pays?

2. Total annual cost of kitchen/laundry staff (all types) =

3. Cost to build kitchen and laundry buildings new =

4. Annualized cost of kitchen and laundry buildings =

5. Total non-staff annual recurrent expenditure for kitchen and laundry services =

Cost item	Annual cost	Who pays?
Staff		
Kitchen and laundry buildings		
Non-personnel recurrent expenditure (e.g. food)		
TOTAL		

10

6. Total annual costs of staff, buildings and non-staff recurrent expenditure associated with kitchen and laundry facilities =

7. Proportion of inpatient days for which tuberculosis patients account =

8. Total annual costs of kitchen and laundry services to be allocated to tuberculosis patients =

(g) General hospital recurrent overhead costs, excluding staff, items associated with drugs, laboratory tests and X-rays, kitchen and laundry facilities, and any other items clearly irrelevant to tuberculosis patients

1. (i) Total annual cost of general non-personnel recurrent hospital expenditure for all items except those associated with drugs, the laboratory and the X-ray department, kitchen and laundry facilities, and any other items clearly irrelevant to tuberculosis patients =

OR

(ii) Total annual cost of general non-personnel recurrent hospital expenditure *for inpatient services* for all items except those associated with drugs, the laboratory and the X-ray department, kitchen and laundry facilities, and any other items clearly irrelevant to tuberculosis patients =

OR

(iii) Total annual cost of general non-personnel recurrent *district* expenditure for all items except those associated with drugs, the laboratory and the X-ray department, kitchen and laundry facilities, and any other items clearly irrelevant to tuberculosis patients =

2. Proportion of total costs calculated in 1 to be allocated to inpatient services ² =

3. Total non-personnel overhead recurrent costs associated with inpatient services =

4. Proportion of inpatient days for which tuberculosis patients account =

5. Overhead non-personnel recurrent costs to be allocated to tuberculosis patients =

Total annual non-staff recurrent overhead costs to be allocated to tuberculosis patients =

Summary table for non-staff recurrent overhead costs to be allocated to tuberculosis patients

Total non-staff recurrent overhead costs to be allocated to tuberculosis patients	Who pays?

(h) General building and equipment costs

1. Buildings in the hospital which are used for general support services =

2. Cost to construct buildings used for general support services new =

3. Annualized cost of buildings used for general support services =

4. Estimated annualized cost of general equipment used by all services =

5. Total annualized cost of buildings and equipment =

6. Proportion of general building and equipment costs to be allocated to inpatient services =

² Note that this should be the same figure as that calculated in (e) step 5, unless this type of expenditure is recorded for the district as a whole rather than for the hospital only, or unless inpatient recurrent expenditure already recorded separately from outpatient services. See instructions for guidance.

7. Building and equipment costs associated with inpatient services =

8. Proportion of total inpatient days for which tuberculosis patients account =

9. Total annual building and equipment costs to be allocated to tuberculosis patients =

Total annual building and equipment costs to be allocated to tuberculosis patients =

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Summary table for the costs of general buildings and equipment to be allocated to tuberculosis patients

Item	Total annual cost	Who pays?
General buildings		
General equipment		

The average cost of a day in hospital excluding drugs, laboratory tests and X-rays

Cost item	Total annual cost	Average cost per day (% total)
Nursing staff		
Medical staff		
Support staff		
TB ward buildings		
Administrative/general management staff		
Staff overheads <i>excluding</i> administration/general management staff		
Kitchen and laundry services		
General non-personnel recurrent overheads		
General buildings and equipment		
TOTAL		

Note that to calculate the average cost per day, the total annual cost of each item needs to be divided by the total annual number of tuberculosis inpatient days.

Estimated average incremental cost per day =

Estimated marginal cost per day =

Utilization

1. Bed occupancy rate for the hospital as a whole =

2. Bed occupancy rate for the TB ward (or the main ward on which TB patients are cared for) =

3. Hospital appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

4. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 2: The cost of a hospital outpatient visit, excluding drugs, laboratory tests and X-rays

Name of District on which data are based:

Type of hospital: government/mission/other NGO
(delete as appropriate)

Name of Hospital on which data are based:

Year on which data are based:

14

(a) Nursing staff costs

Type of nursing staff who work in the outpatient department (e.g. professional and enrolled nurses)	Number who work in the outpatient department (a)	Annual cost (b)	Proportion of time (on average) spent working in the outpatient department (c)	Total annual cost for work in the outpatient department {i.e. (a) x (b) x (c)}	Who pays?

Total annual cost of nursing staff (all types) =

(b) Medical staff costs

Type of medical staff who work in the outpatient department (e.g. doctors, clinical officers)	Number who work in the outpatient department (a)	Annual cost (b)	Proportion of time (on average) spent working in the outpatient department (c)	Total annual cost for work in the outpatient department {i.e. (a) x (b) x (c)}	Who pays?

Total annual cost of medical staff (all types) =

1. Total annual costs of hospital staff not involved in direct patient care, excluding kitchen and laundry staff, laboratory and X-ray staff, and other support staff already included in part (c) =

2. Total annual cost of staff involved in administrative/general management duties =

3. Total annual cost of all hospital staff not involved in direct patient care *excluding* both kitchen/laundry staff *and* those involved in administration/general management *and* those who work in the laboratory and X-ray departments =

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4. Fill in (i) and (ii) below

(i) Total annual cost of staff who typically work in inpatient services and are involved in direct patient care =

(ii) Total annual cost of staff who typically work in outpatient services and are involved in direct patient care =

5. Proportion of total overhead staff costs to be allocated to outpatient services³ =

6. (i) Administrative/general management staff costs to be allocated to outpatient services =

(ii) General overhead staff costs (*excluding* staff involved in administration/general management, and excluding kitchen/laundry staff, and excluding laboratory/X-ray department staff) to be allocated to outpatient services =

Note that in each case this is the proportion calculated in 5 multiplied by the appropriate total cost recorded in 2 and 3.

³ Note that this is $[4(ii) \div \{4(i) + 4(ii)\}]$.

(f) General hospital recurrent overhead costs, excluding staff and items associated with drugs, laboratory tests and X-rays, laundry and kitchen services, and excluding any items clearly irrelevant to tuberculosis patients

1. (i) Total annual cost of general non-personnel recurrent hospital expenditure for all items except those associated with drugs, the laboratory and the X-ray department, laundry and kitchen services, and excluding any other items clearly irrelevant to tuberculosis patients =

OR

(ii) Total annual cost of general non-personnel recurrent hospital expenditure *for outpatient services* for all items except those associated with drugs, the laboratory and the X-ray department, laundry and kitchen services, and excluding any items clearly irrelevant to tuberculosis patients =

OR

(iii) Total annual cost of general non-personnel recurrent *district* expenditure for all items except those associated with drugs, the laboratory and the X-ray department, kitchen and laundry facilities, and excluding any other items clearly irrelevant to tuberculosis patients =

2. Proportion of total recurrent costs calculated in 1 to be allocated to outpatient services⁴ =

3. Total non-personnel overhead recurrent costs associated with outpatient services =

Total annual non-staff recurrent overhead costs to be allocated to outpatient services =

Summary table for non-staff recurrent overhead costs to be allocated to outpatient services

Total non-staff recurrent overhead costs to be allocated to hospital outpatient services	Who pays?

⁴ Note that this should be the same figure as that calculated in (e) step 5, unless this type of expenditure is recorded for the district as a whole rather than for the hospital only, or unless inpatient recurrent expenditure is already recorded separately from outpatient services. See instructions for guidance.

(g) General building and equipment costs

1. Buildings in the hospital which are used for general support services =

2. Cost to construct buildings used for general support services new =

3. Annualized cost of buildings used for general support services =

4. Estimated annualized cost of general equipment used by general support services =

5. Total annualized cost of buildings and equipment =

6. Proportion of general building and equipment costs to be allocated to outpatient services =

7. Building and equipment costs associated with outpatient services =

Total annual building and equipment costs to be allocated to outpatient services =

Summary table for the costs of general buildings and equipment to be allocated to outpatient services

Item	Total annual cost	Who pays?
General buildings		
General equipment		

The average cost of a hospital outpatient visit, excluding drugs, laboratory tests and X-rays

Cost item	Total annual cost	Average cost per day (% total)
Nursing staff		
Medical staff		
Support staff		
Outpatient department buildings		
Administrative/general management staff		
Staff overheads <i>excluding</i> administration/general management staff		
Kitchen and laundry services		
General non-personnel recurrent overheads		
General buildings and equipment		
TOTAL		

Note that to calculate the average cost per visit, the total annual cost for each item needs to be divided by the total annual number of hospital outpatient visits. It may be assumed that the cost per visit for a tuberculosis patient is the same as that for any other outpatient.

Estimated average incremental cost per visit =

Estimated average incremental cost per visit for a tuberculosis patient =

Estimated marginal cost per visit =

Utilization

1. Hospital outpatient department appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		

Protocol 3: The cost of an outpatient visit to a clinic or health centre (or similar non-hospital facility), excluding drugs, laboratory tests and X-rays

Name of District on which data are based:

Year on which data are based:

Approach 1

1. Total annual cost of staff employed in clinics/other non-hospital facilities that exist =
2. Total annual non-staff related recurrent expenditure for clinics/other non-hospital facilities, excluding drugs, laboratory tests and X-rays =
3. Cost to build, new, the clinics/other non-hospital facilities that exist =
4. Annualized cost of clinics/other non-hospital facilities =
5. Estimated annual cost of equipment used in clinics/other non-hospital facilities =
6. Total cost for staff, buildings and equipment, and non-personnel recurrent expenditure =
7. Total annual number of visits made to clinics/other non-hospital facilities =
8. Average cost of a visit to a clinic/other non-hospital facility = (6) ÷ (7) =

Cost item	Total cost	Who pays?
Staff		
Buildings and equipment		
Non-staff recurrent expenditure, excluding drugs, laboratory tests and X-rays		
TOTAL		

Approach 2

Nursing staff costs

Type of staff who work in clinics/other non-hospital facilities	Annual cost (a)	Number employed in clinics/other non-hospital facilities (b)	Total annual cost {i.e. (a) x (b)}	Who pays?

(a) Total annual cost of nursing staff who work in clinics/other non-hospital facilities =

Medical and other staff costs

Type of medical staff and other staff who work in clinics/other non-hospital facilities	Annual cost (a)	Number of medical staff/other types of staff who work in clinics/other non-hospital facilities (b)	Estimated proportion of time spent working in clinics/other non-hospital facilities (c)	Total annual cost of medical/other types of staff who work in clinics/other non-hospital facilities {i.e. (a) x (b) x (c)}	Who pays?

(b) Total annual cost of medical and other staff who work in clinics/other non-hospital facilities =

(c) Total annual recurrent expenditure excluding staff costs and any costs associated with drugs, laboratory tests and X-rays =

(d) Cost to build clinics/other non-hospital facilities new =

(e) Annualized cost of clinic/other non-hospital facility buildings =

(f) Estimated annualized cost of equipment used in clinics/other non-hospital facilities =

(g) Total annual costs of staff, recurrent expenditure (excluding staff, and any items associated with drugs, laboratory tests, and X-rays), buildings and equipment $\{(a) + (b) + (c) + (e) + (f)\} =$

Cost item	Total cost	Who pays?
Nursing staff		
Medical staff		
Non-staff recurrent expenditure, excluding drugs, laboratory tests and X-rays		
Buildings and equipment		
TOTAL		

(h) Total annual number of visits to clinics/other non-hospital facilities =

Average cost per visit to a clinic/other non-hospital facility = (g) ÷ (h) =

Average incremental cost per visit =

Average incremental cost per visit for a TB patient =

Marginal cost =

Utilization

1. Clinic/other non-hospital outpatient services appear:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 4: The cost of a visit to a community health worker

Name of District on which data are based:

Year on which data are based:

Approach 1

1. Payment to CHW per visit =

26

Approach 2

1. Average annual cost of a CHW =

2. Proportion of the time a CHW spends on individual consultations/visits =

3. Annual cost for CHW time spent on individual consultations/visits =

4. Average number of visits/consultations done by a CHW in a year
(estimate if necessary) =

5. **Average cost of a CHW visit (i.e. 3 ÷ 4) =**

Average incremental cost =

Marginal cost =

Utilization

1. Community health workers appear:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 5: The cost of a drug regimen

Year on which data are based:

Cost of regimen for a new smear-positive pulmonary tuberculosis patient =

Cost of regimen for a new smear-negative pulmonary tuberculosis patient =

Cost of regimen for a new extra-pulmonary tuberculosis patient =

Cost of regimen for a re-treatment tuberculosis patient =

28

Cost of regimen for =

Cost of regimen for =

Cost of regimen for =

Average cost of regimen for a new smear-positive pulmonary tuberculosis patient =

Average cost of regimen for a new smear-negative pulmonary tuberculosis patient =

Average cost of regimen for a new extra-pulmonary tuberculosis patient =

Average cost of regimen for a re-treatment patient =

Average cost of regimen for an adult tuberculosis patient =

Average cost of regimen for a child tuberculosis patient =

Note that the average cost of a regimen for (a) an adult patient and (b) a child patient will depend on (i) the weight distribution of patients and (ii) the proportion of patients who are new or re-treatment patients, and the proportions who are smear-positive/smear-negative/extra-pulmonary etc.

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 6: The cost of a sputum smear

Name of District and department on which data are based:

Year on which data are based:

Approach 1

1. Quoted average cost per smear =

2. Source of quote =

29

3. Source of financing for sputum smears =

Approach 2

(a) Staff costs

Table 1

Type of laboratory staff	Number of staff (a)	Annual cost (b)	Total annual cost {i.e. (a) x (b)}	Who pays?

2. Total annual cost of laboratory staff (all types) =

3. Total annual number of sputum smears analysed =

4. Total annual number of laboratory tests done (ALL tests) =

5. Estimated proportion of laboratory staff time spent on sputum smears =

6. Total annual staff costs to be allocated to sputum smears = {i.e. 5 x 2}

(b) Equipment costs**Table 2a**

Equipment used for sputum smears	Purchase price new	Expected years of useful life when new	Annualized cost
Microscope (light)			
Microscope (UV)			
Safety cabinet			
Ducting for safety cabinet			
Filter for safety cabinet			
Shipping and installation of safety cabinet			

30

Table 2b

Equipment used for sputum smears	Annualized cost (a)	Number of each piece of equipment that exists (b)	Proportion of time equipment is used for sputum smears (c)	Total annualized cost for sputum smears {(a) x (b) x (c)}	Who pays?
Microscope (light)					
Microscope (UV)					
Safety cabinet					
Ducting for safety cabinet					
Filter for safety cabinet					
Shipping and installation of safety cabinet					
TOTAL					

Total annualized cost of equipment used for sputum smears =

(c) Supplies costs

Laboratory managers, especially at national/provincial level, should be able to quote a supplies cost per smear. Laboratory staff at individual facilities should also be able to assess the cost of supplies per smear.

1. Supplies cost per smear =
2. Annual number of smears done =

3. Total annual cost of supplies =

4. Source of funding for supplies =

31

(d) Building costs

1. Cost of building a new laboratory =
2. Annualized cost of building a new laboratory =
3. Proportion of total laboratory tests accounted for by sputum smears =
4. **Annual building costs to be allocated to sputum smears =**
5. Source of funds for building costs =

(e) Transport costs**Simple approach**

1. Estimated number of vehicles and drivers that would be required if their sole purpose was collection and delivery of sputum specimens =
2. Total annual costs of drivers estimated to be required =
3. Annualized cost of vehicles assumed to be required for collection/delivery of sputum specimens =
4. Estimated annual distance to be travelled for collection/delivery of sputum specimens =

5. Annual distance to be travelled x rate paid for vehicle usage per km/mile =

6. Total cost for staff, vehicle and fuel/maintenance =

Total annual cost of transport associated with collection/delivery of sputum specimens =

7. Source of funding for transport associated with collection/delivery of sputum specimens =

More Complicated Approach

1. Purposes for which transport is used when sputum smears are delivered/collected =

2. Number of purposes =

3. Estimated number of days per year that a vehicle is used for collection and delivery of sputum smears =

4. Estimated number of km/miles travelled, on average, per day when a vehicle is used for sputum smear collection/delivery =

5. Rate paid per km/mile for vehicle usage =

6. Number of miles travelled per day multiplied by rate per km/mile i.e. cost per day for vehicle =

If the rate identified in 5 is designed to cover all costs associated with vehicle use (fuel, maintenance, depreciation etc.), the total given in 6 gives the total costs for vehicle usage per day. Steps 7 to 11 can then be ignored.

If the rate covers only fuel costs, the capital costs associated with the vehicle need to be estimated separately as follows:

7. Purchase price new of the type of vehicle typically used for sputum collection/delivery =

8. Expected years of useful life of the vehicle =

9. Annualized cost of the vehicle =

10. Number of days per year vehicle would be expected to be used (all purposes) =

11. Vehicle cost per day =

12. Annual cost of a driver =

13. Number of days per year a driver would typically be expected to work =

14. Driver cost per day =

33

15. Total cost per day for the vehicle, driver, fuel and maintenance
{i.e. 6 + 14 OR 6 + 11 + 14, depending on which km/mile rate was used} =

16. { Total cost per day (all items) x number of days a vehicle is used for collection/delivery of sputum smears } ÷ number of different purposes for which vehicle is used when sputum smears are delivered/collected =

This figure gives the total transport costs associated with sputum smears

17. Source of funding for transport for sputum smears =

The average cost of a sputum smear

Cost item	Total annual cost	Average cost per smear
Staff		
Equipment		
Supplies		
Buildings		
Transport		
TOTAL		

Note: *Estimated average cost = {Total annual cost of all items ÷ total annual number of sputum smears done⁵} =*

⁵ Note that the total annual number of smears done should have been recorded in (c) on page 31

Average incremental cost =

Marginal cost =

Utilization

1. Laboratory services for sputum smear microscopy appear:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 7: The cost of a sputum culture

Name of District and department on which data are based:

Year on which data are based:

1. Quoted cost of a sputum culture =

2. Source of quote =

3. Source of funds for sputum cultures =

OR:

1. Estimated average cost of a sputum culture = average cost of a sputum smear x 1.6 =

2. Source of funds for sputum cultures =

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 8: The cost of an X-ray**Name of District and department on which data are based:****Year on which data are based:****Approach 1**

1. Quoted average cost of an X-ray =

2. Source of average cost figure =

3. Source of funds for X-rays =

Approach 2**(a) Staff costs**

Type of X-ray department staff	Number of staff (a)	Annual cost (b)	Total annual cost {(a) x (b)}	Who pays?

Total annual cost of X-ray department staff (all types) =**(b) Equipment costs**

Equipment used for X-rays	Purchase price new	Expected years of useful life	Annualized cost	Who pays?
X-ray machine				

Total annualized cost of equipment used in X-ray department =

(c) Supplies costs

1. Annual cost of supplies used by X-ray department =

2. Source of funds for X-ray supplies =

(d) Building costs

1. Cost to build the X-ray department new =

2. Annualized cost of the X-ray department building =

3. Source of funds for X-ray department building =

Annual number of X-rays done =

The average cost of an X-ray

Cost item	Total cost (a)	Annual number of X-rays done (b)	Average cost {i.e. (a) ÷ (b)}
Staff			
Equipment			
Supplies			
Buildings			
TOTAL			

Average cost =

Average incremental cost =

Marginal cost =

Utilization of X-ray department

1. X-ray department appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 9: The cost of outpatient supervision of patients/ health staff/supervisors of DOT to encourage compliance with treatment

Name of District on which data are based:

Year on which data are based:

1. Inputs required for outpatient supervision =

(a) Staff Costs

Table 1

Staff who undertake or are involved in organising supervision	Annual cost (a)	Proportion of time spent on supervision/ organisation of supervision (b)	Total annual cost of staff involved in supervision (c)	Who pays?

Total annual cost of staff involved in supervision (all members) =

(b) Fuel costs/ALL costs associated with vehicles/motorbikes usage* (delete as appropriate, depending on the km/mileage rate data available and what costs these rates cover)

1. Number of km/miles travelled by vehicles per year for supervision of patients/their supervisors =

2. Rate per km/mile paid for fuel OR rate per km/mile paid for all costs associated with vehicle usage* (delete as appropriate) =

3. Annual cost for fuel/ALL costs associated with vehicle usage* (delete as appropriate) {i.e. 1 x 2} =

4. Number of km/miles travelled by motorbikes per year for supervision of patients/their supervisors =

5. Rate per km/mile paid for fuel OR rate per km/mile paid for all costs associated with motorbike usage* (delete as appropriate) =

6. Annual cost for fuel/ALL costs associated with motorbike usage* (delete as appropriate) {i.e. 4 x 5} =

7. Total annual cost of fuel/ALL costs associated with use of vehicles and motorbikes* (delete as appropriate) for overall supervision =

8. Source of funds for fuel/ALL costs associated with vehicle usage* (delete as appropriate) associated with use of vehicles and motorbikes =

(c) Vehicles/motorbikes/other transport costs**Table 2**

Vehicles/motorbikes/ other transport used for supervision	Purchase price new	Expected years of useful life when new	Annualized cost

Table 3

Vehicles/ motorbikes/ other transport used for supervision	Annualized cost (a)	Number of days used for supervision each year (b)	Total number of days used per year, all purposes (c)	Cost of supervision of tuberculosis patients/their supervisors [i.e. {(b)÷(c)} x (a)]	Who pays?

Total annual cost of vehicles/motorbikes etc. =
(this is the sum of the totals entered in column 5 of table 3)

(d) Maintenance costs

- 1. Estimated annual cost for maintenance =

- 2. Source of funds for maintenance costs =

(e) Other costs

Other costs =

Source of funds for “other costs” =

Table 4

Cost item	Annual cost
Staff	
Vehicles/motorbikes etc.	
Fuel/ALL costs associated with vehicle usage	
Maintenance	
Other	
TOTAL	
Annual number of patients being treated in the area	
Average cost per patient	

Average cost per patient =

Average incremental cost per patient =

Marginal cost per patient =

Utilization

1. Outpatient supervision of patients/health staff/supervisors of DOT appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 10: The cost of TB programme management at district level

Name of District on which data are based:

Year on which data are based:

(a) Staff costs

Staff involved in district TB programme management	Annual cost (a)	Proportion of time spent on district TB programme management (b)	Annual cost of time spent on district TB programme management i.e. {(a) x (b)}	Who pays?

Total cost of staff involved in district TB programme management =

(b) Building costs

Cost to build those buildings used for district TB programme management new	Annualized cost of buildings used for district TB programme management {i.e. (a) ÷ 25.73}	Who pays?

c) Fuel costs/ALL costs associated with vehicle usage* (delete as appropriate, depending on the mileage/km rate available and what this rate covers)

1. Total miles/kilometres travelled by district vehicles for TB programme management each year =

2. Rate paid per km/mile for vehicle usage =

3. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of district vehicles for TB programme management =

44

4. Total miles/kilometres travelled by district motorbikes each year for district TB programme management =

5. Rate paid per km/mile for motorbike usage =

6. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of district motorbikes for TB programme management =

7. Total annual cost for fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) associated with use of district vehicles and motorbikes for district TB programme management =

8. Source of funds for fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of district vehicles and motorbikes for TB programme management =

(d) Vehicles/motorbikes/other transport costs

Table 1a

Vehicles/motorbikes/ other transport used for district TB programme management	Purchase price new	Expected years of useful life when new	Annualized cost

Table 1b

Vehicles/ motorbikes/ other transport used for district TB programme management	Annualized cost (a)	Number of days used for district TB programme management each year (b)	Total number of days used per year, all purposes (c)	Cost of vehicles/ motorbikes/ other transport used for district TB programme management [i.e. {(b)÷(c)} x (a)]	Who pays?

Total annual cost of vehicles/motorbikes etc. =
(this is the sum of the totals entered in column 5 of table 1b)

(e) Maintenance costs

1. Estimated annual cost for maintenance =

2. Source of funds for maintenance costs =

(f) Other costs

1. Other costs (e.g. supplies, stationery etc.) =

2. Source of funds for “other costs” =

The cost of district tuberculosis programme management

Cost item	Total annual cost
Staff	
Buildings	
Fuel	
Vehicles and motorbikes	
Maintenance	
Other general recurrent costs	
TOTAL	

Annual number of tuberculosis patients treated in the district =

Average cost of district TB programme management per patient =

Average incremental cost of district TB programme management per patient =

Marginal cost of district TB programme management per patient =

Utilization

1. District TB programme management appears:

- Very over-utilized
- Over-utilized to some extent
- Relatively optimally utilized
- Under-utilized to some extent
- Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 11: The cost of TB programme management at regional/provincial level

Name of Region/Province on which data are based:

Year on which data are based:

(a) Staff costs

Staff involved in regional/provincial TB management	Annual cost (a)	Proportion of time spent on regional/provincial TB programme management (b)	Annual cost of time spent on regional/provincial TB programme management i.e. {(a) x (b)}	Who pays?

Total cost of staff involved in regional/provincial TB programme management =

(b) Building costs

Cost to build those buildings used for regional/provincial TB programme management new	Annualized cost of buildings used for regional/provincial TB programme management {i.e. (a) ÷ 25.73}	Who pays?

(c) Fuel costs/ALL costs associated with vehicle/motorbike usage* (delete as appropriate, depending on the mileage/km rate available and what this rate covers)

1. Total miles/kilometres travelled by regional/provincial vehicles for TB programme management each year =

2. Rate paid per km/mile for vehicle usage =

3. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of regional/provincial vehicles for TB programme management =

48

4. Total miles/kilometres travelled by regional/provincial motorbikes each year for regional/provincial TB programme management =

5. Rate paid per km/mile for motorbike usage =

6. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of regional/provincial motorbikes for TB programme management =

7. Total annual cost for fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) associated with use of regional/provincial vehicles and motorbikes for regional/provincial TB programme management =

8. Source of funds for fuel/ALL costs* (delete as appropriate, depending on the mileage/km rate available and what this rate covers) that are associated with use of regional/provincial vehicles and motorbikes for TB programme management =

(d) Vehicles/motorbikes/other transport costs**Table 1a**

Vehicles/motorbikes etc. used for regional/provincial TB programme management	Purchase price new	Expected years of useful life when new	Annualized cost

Table 1b

Vehicles/ motorbikes/ other transport used for regional/ provincial TB programme management	Annualized cost (a)	Number of days used for regional/ provincial TB programme management each year (b)	Total number of days used per year, all purposes (c)	Cost of vehicles/ motorbikes/ other transport used for regional/ provincial TB programme management [i.e. {(b)÷(c)} x (a)]	Who pays?

Total annual cost of vehicles/motorbikes etc. =
(this is the sum of the totals entered in column 5 of table 1b)

(e) Maintenance costs

1. Estimated annual cost for maintenance =

2. Source of funds for maintenance costs =

(f) Other costs

1. Other costs (e.g. supplies, stationery etc.) =

2. Source of funds for “other costs” =

The cost of regional/provincial tuberculosis programme management

Cost item	Total annual cost
Staff	
Buildings	
Fuel	
Vehicles and motorbikes	
Maintenance	
Other general recurrent costs	
TOTAL	

Annual number of tuberculosis patients treated in the region/province =

Average cost of regional/provincial TB programme management per patient =

Average incremental cost of regional/provincial TB programme management per patient =

Marginal cost of regional/provincial TB programme management per patient =

50

Utilization

1. Regional/provincial TB programme management appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 12: The cost of TB programme management at national level

Country on which data are based:

Year on which data are based:

(a) Staff costs

Staff involved in national TB management	Annual cost (a)	Proportion of time spent on national TB programme management (b)	Annual cost of time spent on national TB programme management i.e. {(a) x (b)}	Who pays?

Total cost of staff involved in national TB programme management =

(b) Building costs

Cost to build those buildings used for national TB programme management new	Annualized cost of buildings used for national TB programme management {i.e. (a) ÷ 25.73}	Who pays?

(c) Fuel costs/ALL costs associated with vehicle/motorbike usage* (delete as appropriate, depending on the km/mileage rate available and what this rate covers)

1. Total km/miles travelled by national vehicles for TB programme management each year =

2. Rate paid per km/mile for vehicle usage =

3. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the km/mileage rate available and what this rate covers) that are associated with use of national vehicles for TB programme management =

4. Total km/miles travelled by national motorbikes each year for national TB programme management =

5. Rate paid per km/mile for motorbike usage =

6. Total annual cost of fuel/ALL costs* (delete as appropriate, depending on the km/mileage rate available and what this rate covers) that are associated with use of national motorbikes for TB programme management =

7. Total annual cost for fuel/ALL costs* (delete as appropriate, depending on the km/mileage rate available and what this rate covers) that are associated with use of national vehicles and motorbikes for national TB programme management =

8. Source of funds for fuel/ALL costs* (delete as appropriate, depending on the km/mileage rate available and what this rate covers) that are associated with use of national vehicles and motorbikes for TB programme management =

(d) Vehicles/motorbikes/other transport costs

Table 1a

Vehicles/motorbikes etc. used for national TB programme management	Purchase price new	Expected years of useful life when new	Annualized cost

Table 1b

Vehicles/ motorbikes/ other transport used for national TB programme management	Annualized cost (a)	Number of days used for national TB programme management each year (b)	Total number of days used per year, all purposes (c)	Cost of vehicles/ motorbikes/ other transport used for national TB programme management [i.e. {(b)÷(c)} x (a)]	Who pays?

Total annual cost of vehicles/motorbikes etc. =
(this is the sum of the totals entered in column 5 of table 1b)

(e) Maintenance costs

1. Estimated annual cost for maintenance =

2. Source of funds for maintenance costs =

(f) Other costs

1. Other costs (e.g. supplies, stationery etc.) =

2. Source of funds for “other costs” =

The cost of national tuberculosis programme management

Cost item	Total annual cost
Staff	
Fuel	
Vehicles and motorbikes	
Maintenance	
Other general recurrent costs	
TOTAL	

Annual number of tuberculosis patients in the region/province =

Average cost of national TB programme management per patient =

Average incremental cost of national TB programme management per patient =

Marginal cost of national TB programme management per patient =

Utilization

54

1. National TB programme management appears:

- Very over-utilized
- Over-utilized to some extent
- Relatively optimally utilized
- Under-utilized to some extent
- Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

Protocol 13: The cost of training

District on which data are based:

Year on which data are based:

Training typically provided to staff involved in delivery of tuberculosis services in a year =

(a) Costs associated with staff providing training

Table 1

Staff involved in providing training	Annual cost (a)	Number of days spent providing training per year (b)	Total number of days staff work per year (c)	Cost per day (d) {i.e. (a) ÷ (c)}	Cost for provision of training {i.e. (b) x (d)}	Who pays?

Total costs associated with staff providing training =

(b) Costs associated with staff receiving training

Table 2

Staff type	Number who typically receive training each year (a)	Number of days per year spent receiving training (b)	Annual cost (c)	Number of days staff are expected to work per year (d)

Table 3

Staff type	Total number of days spent receiving training {i.e. column 2 x column 3 from Table 2} (a)	Cost per day (b) {i.e. (c) ÷ (d) in Table 2}	Subsistence rate + other payments made per day (c)	Total annual cost of training [(a) x {(b) + (c)}]	Who pays?

Total annual costs associated with staff being trained =

(c) **Other costs =**

Estimated total annual costs for all other costs associated with provision of training =

Table 4

Cost item	Annual cost
Staff providing training	
Staff receiving training	
Other costs	
TOTAL	

58

Total annual number of patients in the area for which training costs have been estimated =

Average cost of training per patient =

Average incremental cost per patient =

Marginal cost per patient =

Utilization

1. Training appears:

Very over-utilized

Over-utilized to some extent

Relatively optimally utilized

Under-utilized to some extent

Very under-utilized

(circle as appropriate)

2. Justification for choice:

Financing

Source of finance	Total funding	% of total funding that source accounts for
ALL SOURCES		100%

DATA ENTRY SHEETS FOR CHAPTER 5

Protocol 1: Analysis of patient cost questionnaire data

Name of District on which data are based:

Year on which data are based:

1. Average income among interviewed tuberculosis patients who are in paid employment or self-employment =

60

Estimated average income per hour =

2. Average income among all interviewed patients =

(note this is equivalent to valuing the cost of time of those who are not in paid employment as zero)

Estimated average income per hour =

3. Average wage in the area being studied =

Average income per hour =

Table 1: Average patient costs associated with tuberculosis diagnosis and treatment, assuming time is valued as the average income among tuberculosis patients who are in paid work (either employed or self-employed)

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day in hospital	N.A.			
Visit to hospital				
Visit to a health clinic/other non-hospital facility				
Visit to a volunteer for DOT, where volunteer chosen for supervision of therapy				
Visit to a CHW for DOT, where a CHW is chosen for supervision of therapy				
Visit to a health clinic/other non-hospital facility for DOT, where such a site is chosen for DOT				
Overall (i.e. across all sites) cost of a DOT visit*				

* Note that this overall average cost can be calculated as a weighted average, based on the average cost of a visit to each type of site used for DOT and the proportion of patients that use each site. For example, if 30% of patients use health clinics and the average cost is US\$ 1, if 50% of patients use a volunteer and the average cost is = US\$ 0.2, and the remaining 20% use the hospital outpatient department and the average cost for this is US\$ 0.5, the overall average cost of a DOT visit is calculated as $(0.3 \times 1) + (0.5 \times 0.2) + (0.2 \times 0.5) = 0.5$.

Table 2: Average patient costs associated with tuberculosis diagnosis and treatment, assuming time is valued as the average income among tuberculosis patients who are in paid work (either employed or self-employed), but as zero for those who are not in paid employment

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day in hospital	N.A.			
Visit to hospital				
Visit to a health clinic/other non-hospital facility				
Visit to a volunteer for DOT, where volunteer chosen for supervision of therapy				
Visit to a CHW for DOT, where a CHW is chosen for supervision of therapy				
Visit to a health clinic/other non-hospital facility for DOT, where such a site is chosen for DOT				
Overall (i.e. across all sites) cost of a DOT visit*				

* Note that this overall average cost can be calculated as a weighted average, based on the average cost of a visit to each type of site used for DOT and the proportion of patients that use each site. For example, if 30% of patients use health clinics and the average cost is US\$ 1, if 50% of patients use a volunteer and the average cost is = US\$ 0.2, and the remaining 20% use the hospital outpatient department and the average cost for this is US\$ 0.5, the overall average cost of a DOT visit is calculated as $(0.3 \times 1) + (0.5 \times 0.2) + (0.2 \times 0.5) = 0.5$.

Table 3: Average patient costs associated with tuberculosis diagnosis and treatment, assuming time is valued as the average wage rate in the area being studied

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day in hospital	N.A.			
Visit to hospital				
Visit to a health clinic/other non-hospital facility				
Visit to a volunteer for DOT, where volunteer chosen for supervision of therapy				
Visit to a CHW for DOT, where a CHW is chosen for supervision of therapy				
Visit to a health clinic/other non-hospital facility for DOT, where such a site is chosen for DOT				
Overall (i.e. across all sites) cost of a DOT visit*				

* Note that this overall average cost can be calculated as a weighted average, based on the average cost of a visit to each type of site used for DOT and the proportion of patients that use each site. For example, if 30% of patients use health clinics and the average cost is US\$ 1, if 50% of patients use a volunteer and the average cost is = US\$ 0.2, and the remaining 20% use the hospital outpatient department and the average cost for this is US\$ 0.5, the overall average cost of a DOT visit is calculated as $(0.3 \times 1) + (0.5 \times 0.2) + (0.2 \times 0.5) = 0.5$.

Table 4: Average patient costs associated with tuberculosis diagnosis and treatment, assuming time is valued as zero for all patients

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day in hospital	N.A.		0	
Visit to hospital			0	
Visit to a health clinic/other non-hospital facility			0	
Visit to a volunteer for DOT, where volunteer chosen for supervision of therapy			0	
Visit to a CHW for DOT, where a CHW is chosen for supervision of therapy			0	
Visit to a health clinic/other non-hospital facility for DOT, where such a site is chosen for DOT			0	
Overall (i.e. across all sites) cost of a DOT visit			0	

* Note that this overall average cost can be calculated as a weighted average, based on the average cost of a visit to each type of site used for DOT and the proportion of patients that use each site. For example, if 30% of patients use health clinics and the average cost is US\$ 1, if 50% of patients use a volunteer and the average cost is = US\$ 0.2, and the remaining 20% use the hospital outpatient department and the average cost for this is US\$ 0.5, the overall average cost of a DOT visit is calculated as $(0.3 \times 1) + (0.5 \times 0.2) + (0.2 \times 0.5) = 0.5$.

Data entry sheets for analysis of family member costs

Name of District on which data are based:

Year on which data are based:

1. Average income among interviewed family members who are in paid employment or self-employment =

65

Estimated average income per hour =

2. Average income among all interviewed family members =

(note this is equivalent to valuing the cost of time of those who are not in paid employment as zero)

Estimated average income per hour =

3. Average wage in the area being studied =

Average income per hour =

Table 1: Data for the average costs associated with providing care for a tuberculosis patient, with time costs valued according to the average income of those family members who are in paid work (either employed or self-employed)

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day spent in hospital	Not applicable			
Visit to hospital				

66

Table 2: Data for the average costs of providing care for a tuberculosis patient, with time valued as the average income for those family members who are in paid work (either employed or self-employed) and as zero for those who are not

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day spent in hospital	Not applicable			
Visit to hospital				

Table 3: Data for the average costs of providing care for a tuberculosis patient, with the time of family members valued as the average wage rate in the area being studied

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day spent in hospital	Not applicable			
Visit to hospital				

Table 4: Data for the average costs of providing care for a tuberculosis patient, with the time of family members valued as zero

Cost item	Average travel cost (a)	Average time cost {in minutes/ hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
Day spent in hospital	Not applicable		0	
Visit to hospital			0	
			0	
			0	
			0	

Data entry sheets for analysis of volunteer costs

Name of District on which data are based:

Year on which data are based:

1. Average income among interviewed volunteers who are in paid employment or self-employment =

68

Estimated average income per hour =

2. Average income among all interviewed volunteers =

(note this is equivalent to valuing the cost of time of those who are not in paid employment as zero)

Estimated average income per hour =

3. Average wage in the area being studied =

Average income per hour =

Table 1: Data for the average costs associated with providing care for a tuberculosis patient, with time costs valued according to the average income of those volunteers who are in paid work (either employed or self-employed)

Cost item	Average travel cost (a)	Average time cost {in minutes/hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
DOT visit				
Training (per patient)				
Visit to a health facility for collection of drugs				

Table 2: Data for the average costs of providing care for a tuberculosis patient, with time valued as the average income for those volunteers who are in paid work (employed or self-employed) and as zero for those who are not

Cost item	Average travel cost (a)	Average time cost {in minutes/hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
DOT visit				
Training (per patient)				
Visit to a health facility for collection of drugs				

Table 3: Data for the average costs of providing care for a tuberculosis patient, with the time of volunteers valued as the average wage rate in the area being studied

Cost item	Average travel cost (a)	Average time cost {in minutes/hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
DOT visit				
Training (per patient)				
Visit to a health facility for collection of drugs				

70

Table 4: Data for the average costs of providing care for a tuberculosis patient, with the time of volunteers valued as zero

Cost item	Average travel cost (a)	Average time cost {in minutes/hours} (b)	Average time cost {estimated monetary value} (c)	Total average cost {(i.e. (a) + (c))}
DOT visit			0	
Training (per patient)			0	
Visit to a health facility for collection of drugs			0	
			0	
			0	

ILLUSTRATIVE DATA ENTRY SHEETS FOR CHAPTER 6

Protocol 1: Summary of the costs of individual components of diagnosis and treatment

**Name of District/
Districts on which data are based:**

Table 1: Average, average incremental and marginal costs associated with different components of tuberculosis services

(a) Health services (Provider) costs

Care component	Average cost	Average incremental cost	Marginal cost
Days in hospital (government facility)			
Day in hospital (mission/NGO facility)			
Hospital outpatient visit			
Visits to a clinic/similar non-hospital facility			
CHW visit			
DOT visit* (overall, across all sites used for DOT)			
Drug regimen (new sm+ pulmonary TB)			
Drug regimen (new sm- pulmonary TB)			
Drug regimen (extra-pulmonary TB)			
Drug regimen (retreatment patients)			
Sputum smear			
Sputum culture			
X-ray			
Overall patient follow-up/supervision (per patient)			
Programme management at district level (per patient)			
Programme management at regional/provincial level (per patient)			
Programme management at national level (per patient)			
Training (per patient)			
Visit to specialized TB clinic			

* This row is designed to show the average cost of a DOT visit overall. It should be calculated as a weighted average according to the proportion of patients who use clinics, hospitals, CHWs, and non-health workers for DOT, and the average costs associated with visits to each of these sites.

(b) Patient costs

Cost item	Average cost
Day in hospital	
Hospital outpatient visit	
Visit to a health clinic/similar non-hospital facility	
CHW visit	
DOT visit to hospital outpatient department, where hospital outpatient department chosen for DOT supervision	
DOT visit to a health clinic/similar non-hospital facility, where a health clinic/similar non-hospital facility chosen for supervision	
DOT visit to a CHW, where CHW chosen for DOT supervision	
DOT visit to a non-health worker, where a non-health worker chosen for supervision	
DOT visit (overall, across all sites used for DOT)*	

**see comment for provider costs above*

(c) Family costs

Cost item	Average cost
Day in hospital	
Visit to hospital	

(d) Volunteer costs

Cost item	Average cost
DOT visit	
Visit to a health facility to collect drugs	

Protocol 2: Calculating the cost of managing a tuberculosis patient to treatment completion, for any defined case management strategy and type of tuberculosis patient

1. Name of strategy:

2. Type of patient:

Table 2: Average cost of managing a patient to treatment completion

(a) Health services (Provider) costs

Care component	Number of days/visits/items required per patient (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
Days in hospital*			
Hospital outpatient visits for monitoring/collection of drugs			
Visits to a clinic/similar non-hospital facility for monitoring/collection of drugs			
DOT visits			
Drug regimen	1		
Sputum smears			
Sputum cultures			
X-rays			
Overall follow-up/supervision of patients			
Programme management at district level			
Programme management at regional/provincial level			
Programme management at national level			
Training			
TOTAL*	N.A.	N.A.	

* figure in brackets is the cost when mission/non-government facilities are used (if appropriate)

Total cost of managing a patient to treatment completion, government services =

Total cost of managing a patient to treatment completion, mission/other NGO services =

b) Patient costs

Care component	Number of days/visits required per patient (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
Days in hospital			
Hospital outpatient visits for monitoring			
Visits to a health facility for collection of drugs/ monitoring			
DOT visits			
TOTAL	N.A.	N.A.	

74

(c) Family costs

Care component	Number of days/visits per patient (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
Day in hospital			
Visit to hospital			
Other items			
TOTAL	N.A.	N.A.	

(d) Volunteer costs

Care component	Number of visits/items required per patient {average, across all patients} (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
DOT visits			
Visits to health facilities for collection of drugs			
Training (per patient)			
TOTAL	N.A.	N.A.	

Name of strategy:

Type of patient:

Table 3a: Average incremental health services (provider) cost of managing a patient to treatment completion

Care component	Number of days/visits/items required per patient (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
Days in hospital*			
Hospital outpatient visits for monitoring/collection of drugs			
Visits to a clinic/ similar non-hospital facility for monitoring/ collection of drugs			
DOT visits			
Drug regimen			
Sputum smears			
Sputum cultures			
X-rays			
Overall follow-up/ supervision of patients			
Programme management at district level			
Programme management at regional/provincial level			
Programme management at national level			
Training			
TOTAL*	N.A.	N.A.	

* figure in brackets represents the costs when mission/non-government facilities are used (if appropriate)

Total cost of managing a patient to treatment completion, government services =

Total cost of managing a patient to treatment completion, mission/other NGO services =

Name of strategy:

Type of patient:

Table 3b: Marginal health services (provider) cost of managing a patient to treatment completion

Care component	Number of days/visits/items required per patient (a)	Average cost of care component (b)	Average cost to manage a patient to treatment completion {(a) x (b)}
Days in hospital*			
Hospital outpatient visits for monitoring/collection of drugs			
Visits to a clinic/ similar non-hospital facility for monitoring /collection of drugs			
DOT visits			
Drug regimen	1		
Sputum smears			
Sputum cultures			
X-rays			
Overall follow-up/ supervision of patients			
Programme management at district level			
Programme management at regional/provincial level			
Programme management at national level			
Training			
TOTAL*	N.A.	N.A.	

* figure in brackets represents costs when mission/non-government facilities are used (if appropriate)

Total cost of managing a patient to treatment completion, government services =

Total cost of managing a patient to treatment completion, mission/other NGO services =

Name of strategy:

Type of patient:

Table 4: Summary of the average, average incremental and marginal cost of managing a patient to treatment completion

Type of cost	Average cost	Average incremental cost	Marginal cost
Health Services (Provider)*			
Patient			
Family			
Volunteer			
TOTAL*			

** Figure in brackets represents costs when mission/non-government facilities are used (if appropriate)*

DATA ENTRY SHEETS FOR CHAPTER 7

Protocol 1: Cost-effectiveness analyses for smear-positive pulmonary tuberculosis patients

Name of District/

Districts on which data are based:

Type of strategy for which cost-effectiveness being assessed =

Protocol 1a: Cost per patient cured

Table 1: Standard treatment outcomes for smear-positive pulmonary tuberculosis patients

Type of health service provider	% of patients cured (a)	% of patients who completed treatment but for whom cure was not confirmed (b)	% of patients who failed treatment (c)	% of patients who died during treatment (d)	% of patients who defaulted from treatment (e)	% of patients who transferred out of the district during treatment (f)
Government services						
Mission services						

(i) Government services

1. *Minimum* cure rate achieved, government services = (a) + (b)

=

2. *Maximum* cure achieved, government services =
 $a + b + \left[\frac{(a + b)}{(100 - e - f)} \times (e + f) \right]$

=

=

(ii) *Mission services*

3. *Minimum* cure rate achieved, mission services = (a) + (b)

=

4. *Maximum* cure rate achieved, mission services =
 $a + b + \left[\frac{(a + b)}{(100 - e - f)} \right] \times (e + f)$

=

=

Table 2: The average cost of managing a patient to treatment completion and the effectiveness of treatment

Type of health service provider	Average cost to manage a patient to treatment completion	Minimum cure rate	Maximum cure rate
Government services			
Mission services			

5. Estimated cure rate that would apply without the availability of tuberculosis treatment =
 $\{ (\text{estimated \% of patients who are HIV+} \times 0) + (\text{estimated percentage of patients who are HIV-} \times 20) \} \div 100$

=

(i) Government services

6. *Minimum* cost per patient cured, government services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, government services}) \times 100\}}{(\text{maximum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

7. *Maximum* cost per patient cured, government services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, government services}) \times 100\}}{(\text{minimum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

80

(ii) Mission services

8. *Minimum* cost per patient cured, mission services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, mission services}) \times 100\}}{(\text{maximum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

9. *Maximum* cost per patient cured, mission services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, mission services}) \times 100\}}{(\text{minimum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

Protocol 1b: Cost per death averted

(i) Government services

1. Estimated *minimum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{"percentage of patients who died during treatment ÷ (100 – e – f)} x (percentage of patients who defaulted from treatment + percentage of patients who transferred during treatment)]

=

81

2. Estimated *minimum* death rate that would apply in the absence of treatment⁶ =

(0.6 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

3. Estimated *maximum* death rate that would apply in the absence of treatment⁷ =

(0.7 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

⁶ Note that 0.6 and 0.7 represent the range in the proportion of cases estimated to die in the absence of treatment for HIV- patients, based on Murray et al 1990; 1 is the proportion of HIV+ patients estimated to die in the absence of treatment, based on the figure used in a recently published modelling study (Dye et al, 1998).

⁷ See footnote 6.

4. Estimated *maximum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{" maximum death rate in the absence of treatment estimated in 3 x (percentage of patients who defaulted from treatment + percentage of patients who transferred out of the district during treatment)} ÷ 100]

=

5. *Minimum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (maximum estimated death rate in the absence of treatment estimated in 3 – minimum death rate in presence of treatment estimated in 1)

=

6. *Maximum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (maximum⁸ death rate in the absence of treatment estimated in 3 – maximum death rate in presence of treatment estimated in 4)

=

(ii) Mission services

7. Estimated *minimum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{" percentage of patients who died during treatment ÷ (100 – e – f)} x (percentage of patients who defaulted from treatment + percentage of patients who transferred out of the district during treatment)]

=

⁸ The maximum is used in this case, rather than the minimum, because it would be inconsistent to use a different assumed death rate among those defaulting/transferring from the death rate assumed in the absence of treatment.

8. Estimated *minimum* death rate that would apply in the absence of treatment⁹ =

(0.6 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

9. Estimated *maximum* death rate that would apply in the absence of treatment¹⁰ =

(0.7 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

83

10. Estimated *maximum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{"maximum death rate in the absence of treatment estimated in 3 x (percentage of patients who defaulted from treatment + percentage of patients who transferred out of the district during treatment)} ÷ 100]

=

11. *Minimum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (maximum estimated death rate in the absence of treatment – minimum death rate in presence of treatment estimated in 1.)

=

12. *Maximum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (maximum¹¹ death rate in the absence of treatment estimated in 9 – maximum death rate in presence of treatment estimated in 10.)

=

⁹ Note that 0.6 and 0.7 represent the range in the proportion of cases estimated to die in the absence of treatment for HIV- patients, based on Murray et al 1990. 1 is the proportion of HIV+ patients estimated to die in the absence of treatment, based on the figure used in a recently published modelling study (Dye et al, 1998).

¹⁰ See footnote 9.

¹¹ The maximum is used in this case, rather than the minimum, because it would be inconsistent to use a different assumed death rate among those defaulting/transferring from the death rate assumed in the absence of treatment.

Protocol 1c: Cost per DALY gained

1. Estimated number of DALYs gained per death averted for HIV- patients =

2. Estimated *net* number of DALYs gained per death averted for HIV- patients =

84

3. Estimated number of DALYs gained per death averted for HIV+ patients =

4. Estimated *overall net number* of DALYs gained per death averted =

[(Estimated percentage of patients who are HIV- x estimated *net* number of DALYs gained per death averted in HIV- patients) + (Estimated percentage of patients who are HIV+ x 3)]
 ÷ 100

=

(i) Government services

5. *Minimum* estimated cost per DALY gained in government services =

Estimated minimum cost per death averted in government services ÷ estimated *overall net number* of DALYs gained per death averted

=

6. *Maximum* estimated cost per DALY gained in government services =

Estimated maximum cost per death averted in government services ÷ estimated *overall net number* of DALYs gained per death averted

=

85

(ii) Mission services

7. *Minimum* estimated cost per DALY gained in mission services =

Estimated minimum cost per death averted in mission services ÷ estimated *overall net number* of DALYs gained per death averted

=

8. *Maximum* estimated cost per DALY gained in mission services =

Estimated maximum cost per death averted in mission services ÷ estimated *overall net number* of DALYs gained per death averted

=

Protocol 2: Cost-effectiveness analyses for smear-negative pulmonary and extra-pulmonary tuberculosis patients

Name of District/

Districts on which data are based:

Type of strategy for which cost-effectiveness being assessed =

Protocol 2a: Cost per patient cured

86

Table 1: Standard treatment outcomes for smear-negative/extra-pulmonary tuberculosis patients

Type of health service provider	% of patients who completed treatment (a)	% of patients who died during treatment (b)	% of patients who defaulted from treatment (c)	% of patients who transferred out of the district during treatment (d)
Government services				
Mission services				

(i) Government services

1. *Minimum* cure rate achieved, government services = (a)

=

2. *Maximum* cure rate achieved, government services =

(a) + [{"a ÷ (100 - c - d)} x {c + d}]

=

=

(ii) Mission services

3. *Minimum* cure rate achieved, mission services = (a)

=

4. *Maximum* cure rate achieved, mission services =

(a) + [$\{a \div (100 - c - d)\} \times \{c + d\}$]

=

Table 2: The average cost of managing a patient to treatment completion and the effectiveness of treatment

Type of health service provider	Average cost to manage a patient to treatment completion	Minimum cure rate	Maximum cure rate
Government services			
Mission services			

5. Estimated cure rate that would apply without the availability of tuberculosis treatment = $\{(\text{estimated \% of patients who are HIV+} \times 0) + (\text{estimated percentage of patients who are HIV-} \times 20)\} \div 100$

=

(i) Government services

6. *Minimum* cost per patient cured, government services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, government services}) \times 100\}}{(\text{maximum cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

7. *Maximum* cost per patient cured, government services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, government services}) \times 100\}}{(\text{minimum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

88

(ii) Mission services

8. *Minimum* cost per patient cured, mission services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, mission services}) \times 100\}}{(\text{maximum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

9. *Maximum* cost per patient cured, mission services =

$$\frac{\{(\text{average cost to manage a patient to treatment completion, mission services}) \times 100\}}{(\text{minimum estimated cure rate} - \text{estimated cure rate that would apply without treatment})}$$

=

Protocol 2b: Cost per death averted

(i) Government services

1. Estimated *minimum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{"percentage of patients who died during treatment ÷ (100 – c – d)} x (percentage of patients who defaulted from treatment + percentage of patients who transferred during treatment)]

=

89

2. Estimated death rate that would apply in the absence of treatment¹² =

(0.4 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

3. Estimated *maximum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{"death rate in the absence of treatment estimated in 2 x (percentage of patients who defaulted from treatment + percentage of patients who transferred during treatment)} ÷ 100]

=

¹² Note that 0.4 represents the proportion of patients who would be expected to die in the absence of treatment and in the absence of HIV infection (see DeJonghe E, Murray CJL et al, 1994). 1 is the proportion of HIV+ patients estimated to die in the absence of treatment.

4. *Minimum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (estimated death rate in the absence of treatment – minimum death rate in presence of treatment estimated in 1)

=

5. *Maximum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (estimated death rate in the absence of treatment – maximum death rate in presence of treatment estimated in 3)

=

90

(ii) *Mission services*

6. Estimated *minimum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{percentage of patients who died during treatment ÷ (100 – c – d)} x (percentage of patients who defaulted from treatment + percentage of patients who transferred during treatment)]

=

7. Estimated death rate that would apply in the absence of treatment¹³ =

(0.4 x estimated percentage of patients who are HIV-) + (1 x estimated percentage of patients who are HIV+)

=

¹³ Note that 0.4 represents the proportion of patients who would be expected to die in the absence of treatment and in the absence of HIV infection (see DeJonghe E, Murray CJL et al, 1994). 1 is the proportion of HIV+ patients estimated to die in the absence of treatment.

8. Estimated *maximum* death rate that applies when tuberculosis treatment is available =

(percentage of patients who died during treatment) + [{" death rate in the absence of treatment estimated in 2 x (percentage of patients who defaulted from treatment + percentage of patients who transferred during treatment)} ÷ 100]

=

9. *Minimum* estimated cost per death averted =

(average cost to manage a patient to treatment completion x 100) ÷ (estimated death rate in the absence of treatment – minimum death rate in presence of treatment estimated in 6)

=

91

10. *Maximum* estimated cost per death averted =

(average cost per patient treated x 100) ÷ (estimated death rate in the absence of treatment – maximum death rate in presence of treatment estimated in 8)

=

Protocol 2c: Cost per DALY gained

1. Estimated number of DALYs gained per death averted for HIV- patients =

2. Estimated *net* number of DALYs gained per death averted for HIV- patients =

3. Estimated number of DALYs gained per death averted for HIV+ patients =

4. Estimated *overall net number* of DALYS gained per death averted =

[(Estimated percentage of patients who are HIV- x estimated *net* number of DALYs gained per death averted in HIV- patients) + (Estimated percentage of patients who are HIV+ x 3)]
 ÷ 100

=

(i) Government services

5. *Minimum* estimated cost per DALY gained in government services =

Estimated minimum cost per death averted in government services ÷ estimated *overall net number* of DALYs gained per death averted

=

6. *Maximum* estimated cost per DALY gained in government services =

Estimated maximum cost per death averted in government services ÷ estimated *overall net number* of DALYs gained per death averted

=

(ii) Mission services

7. *Minimum* estimated cost per DALY gained in mission services =

Estimated minimum cost per death averted in mission services ÷ estimated *overall net number* of DALYs gained per death averted

=

8. *Maximum* estimated cost per DALY gained in mission services =

Estimated maximum cost per death averted in mission services ÷ estimated *overall net number* of DALYs gained per death averted

=

Protocol 3: Summary of cost-effectiveness indicators

1. Strategy for which cost-effectiveness is being assessed:

Table 1: Summary of cost-effectiveness results, smear-positive pulmonary tuberculosis patients (US\$)

Type of provider	Cost per patient cured	Cost per death averted	Cost per DALY gained
Government services			
Mission services			

Table 2: Summary of cost-effectiveness results, smear-negative pulmonary and extra-pulmonary tuberculosis patients (US\$)

Type of provider	Cost per patient cured	Cost per death averted	Cost per DALY gained
Government services			
Mission services			

Protocol 4: Incremental cost-effectiveness analysis

Protocol 4a

Incremental cost per case cured =

Protocol 4b

Incremental cost per death averted =

Protocol 4c

Incremental cost per DALY gained =

DATA ENTRY SHEETS FOR CHAPTER 8

Protocol 1: Estimates of the total cost of tuberculosis services at district level

Table 1a: Estimated total annual cost of tuberculosis services provided through government facilities

Name of District	Average cost to manage a patient to treatment completion (a)	Total annual number of patients diagnosed and treated in government services (b)	Total annual cost of government tuberculosis services {(a) x (b)}

Table 1b: Estimated total annual cost of tuberculosis services provided through mission/other NGO facilities

Name of District	Average cost to manage a patient to treatment completion in mission/other NGO facilities (a)	Total annual number of patients diagnosed and treated in mission/other NGO facilities (b)	Total annual cost of mission/other NGO tuberculosis services {(a) x (b)}

Table 2: The estimated total costs of tuberculosis services (both government and mission/other NGO) at district level

Name of District	Total annual cost of tuberculosis services

Protocol 2: Estimates of the total cost of tuberculosis services at regional/provincial level

1. Average cost of managing a patient to treatment completion across all districts in the region/province for which costs were assessed, *government* services =

OR

Average cost of managing a patient to treatment completion in the district most representative of the region/province, *government* services =

(Name of district considered most representative =)

96

2. Average cost of managing a patient to treatment completion across all districts in the region/province for which costs were assessed, *mission/other NGO* services =

OR

Average cost of managing a patient to treatment completion in the district most representative of the region/province, *mission/other NGO* services =

(Name of district considered most representative =)

3. Annual number of tuberculosis patients diagnosed in the region/province in government facilities =

4. Annual number of tuberculosis patients diagnosed in the region/province in mission/other NGO facilities =

5. Estimated total cost of tuberculosis services provided through government facilities =

6. Estimated total cost of tuberculosis services provided through mission/other NGO facilities =

7. Total overall estimated cost of tuberculosis services in the region/province =

Protocol 3: Estimates of the total cost of tuberculosis services at national level

1. Average cost of managing a patient to treatment completion across all districts in which costs were assessed, *government* services =

OR

Average cost of managing a patient to treatment completion in the district most representative of the country as a whole, *government* services =

(Name of district considered most representative =)

2. Average cost of managing a patient to treatment completion across all districts in which costs were assessed, *mission/other NGO* services =

OR

Average cost of managing a patient to treatment completion in the district most representative of the country as a whole, *mission/other NGO* services =

(Name of district considered most representative =)

3. Annual number of tuberculosis patients diagnosed in the country as a whole in government facilities =

4. Annual number of tuberculosis patients diagnosed in the country as a whole in mission/ other NGO facilities =

5. Estimated total cost of tuberculosis services provided through government facilities =

6. Estimated total cost of tuberculosis services provided through mission/other NGO facilities =

7. Total overall estimated cost of tuberculosis services in the country as a whole =