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Cost-effectiveness of chemoprophylaxis with a single dose of rifampicin in contacts

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Risk groups for leprosy

- Close contacts of leprosy patients are at increased risk for leprosy, including household contacts, relatives, neighbours and social contacts
- The general population in a highly endemic area (cluster) can also be considered as a risk group for leprosy
- High risk groups for leprosy are potential targets for chemoprophylaxis
- What is the cost-effectiveness of chemoprophylaxis?

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Design COLEP study

- Chemoprophylaxis with **Rifampicin**
 - Bangladesh, 2001-2007 (COLEP study)
 - RCT with >21,000 participants
 - ❖ contacts of 1037 PB and MB patients
 - **Single dose rifampicin (SDR)**
 - ❖ Given after the second MDT dose of index patient (6 weeks)
 - ❖ 300-600 mg based on age and weight
- Overall reduction of leprosy **57%** (overall NNT: 265)
 - ❖ Result after 2 years, no further reduction after 4 years

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Cost-effectiveness of SDR

Average costs (US\$) per patient in contacts for standard MDT treatment and for the chemoprophylaxis intervention (COLEP study Bangladesh)

Cost category	Standard	Intervention
Programme:		
Personnel	237.56	237.56
Transport	28.01	28.01
Overhead	27.93	27.93
Medical:		
Treatment of leprosy	8.51	81.10
Management complications	5.12	0.24
Total cost	307.13	374.84

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Cost-effectiveness of SDR

Number of leprosy patients arising from contacts after 2 years according to physical distance of the contacts to the index patient, by intervention.

Physical distance of contact to index	Standard treatment			Chemoprophylaxis		
	Total contacts	With leprosy		Total contacts	With leprosy	
		MB	PB		MB	PB
Household contacts (KR + R)	1660	7	11	1642	2	11
Next door neighbours (K + N1)	2787	2	15	2552	2	6
Neighbours of neighbours and social contacts (N2 + S)	5591	0	32	5800	0	8
Total	10038	9	58	9994	4	25

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Cost-effectiveness of SDR

Cost-effectiveness of SDR in terms of leprosy cases prevented


Incremental cost effectiveness ratio's (ICER) per case prevented

Contact level	Average cost-difference (US \$)	Difference in cases detected	Average ICER (US \$)
All contacts	- 8932	- 35.5	252
Household contact	- 637	- 4.7	136
Neighbour	- 2015	- 8.4	240
Social	- 6281	- 22.4	280

Total cost of chemoprophylaxis – Total cost of standard treatment

ICER = $\frac{\text{Leprosy cases with chemoprophylaxis} - \text{Leprosy cases with standard treatment}}{\text{Leprosy cases with chemoprophylaxis} - \text{Leprosy cases with standard treatment}}$


Chemoprophylaxis with rifampicin saves money per case prevented


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Cost-effectiveness of SDR


Cost-effectiveness of SDR in terms of leprosy cases prevented
Incremental cost effectiveness ratio's (ICER) per case prevented for different distributions of the MB:PB ratio among newly detected leprosy cases


MB:PB	Average cost-difference in US\$	Difference in number of cases detected		Average ICER* per case prevented
		Absolute	Discounted	
13:86 (COLEP)	-\$ 8932	- 38	- 35.5	252
20:80	-\$ 8986	- 38	- 35.5	253
50:50	-\$ 9199	- 38	- 35.5	259
90:10	-\$ 9486	- 38	- 35.5	267

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- ### Strategies
- Intervention strategies with SDR:
 - Individual approach
 - Population approach

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- ### Strategies
- Individual approach:**
 - Contact tracing after finding new leprosy case
 - Comparable to TB, Hepatitis B, meningitis
 - Contact survey (after 6 weeks) and treatment of new leprosy cases in contacts (70 / 10,000!)
 - Contacts are checked for tuberculosis and other contra-indications for receiving rifampicin
 - Informed consent!

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- ### Strategies: Individual approach
- Advantages:
- Feasible
 - Cheap
 - Cost saving
 - Contacts likely to accept intervention
 - Drug resistance negligible
 - Useful in every endemic situation

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- ### Strategies: Individual approach
- To be considered:
- How far should contact level be extended?
(still effect with neighbours and social contacts)
 - Acceptability may differ per country
(privacy, especially among neighbours en social contacts)
 - How to deal with close household members?
 - Highest risk, lowest effect SDR
 - Observation? Test for infection? Full treatment?

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- ### Strategies
- Population approach:**
 - Blanket treatment of whole population in a defined geographic area (e.g. sub-district, village, island)
 - Our cost-effectiveness calculation does not apply to this strategy
 - Problematic and possibly not realistic, but probably very (cost) effective to reduce transmission of *M. leprae*

Conclusions

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- SDR is highly effective (overall 57%) in preventing leprosy in contacts
- Effect SDR depends on contact level, ranging from 25% in close blood relatives to 75% in social contacts
- Effect SDR is additive to BCG, together 80%, and both interventions should be encouraged in leprosy control
- SDR is cost saving (overall \$ 250 per prevented leprosy case)

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american leprosy missions



Thank you!

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