WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health
231, de Saram Place, Colombo 01000, Sri Lanka
Tele: + 94 11 2695112, Fax: +94 11 2696583, E mail: epidunit@sltnet.lk
Epidemiologist: +94 11 2681548, E mail: chepid@sltnet.lk
Web: http://www.epid.gov.lk

WER SRI LANKA - 2012

Vol. 39 No.24 **09th – 15th June 2012**

Cost-Effectiveness (Part II)

This is the second of two articles on Cost-effectiveness. The first article described the calculation of both independent and mutually exclusive events and this article describes the application of cost-effectiveness analysis.

The negative ICER for P2 means that by adopting P2 rather than P1 there is an improvement in life-years gained and a reduction in costs. The ICER for P3 works out to be 120,which means that it costs 120 to generate each additional life-year gained compared with P2.Alternatives that are more expensive and less effective are excluded. In Table 3 (refer Part I of this article) both P1 and P3 are followed by programmes that have increased effectiveness and reduced costs. In other words, P2 and P4 are associated with a negative ICER. P1 and P3 are therefore excluded. Having excluded P1 and P3, ICERs are recalculated for P2, P4 and P5 and are as shown in Table 4. P2 is dominated by P4, as the latter is more effective and costs less to produce an additional unit of effect (57.14compared to 66.67). The dominated alternative is then excluded and the ICERs are recalculated again(Table5).In this example, programmes P4 and P5 would be the cost-effective programmes. In deciding between them, the size of the available budget must be brought to bear. If the available budget is 140,000,all patients should receive intervention P4, while, if the available budget is 170,000, all patients should receive the more effective P5.However,if the budget is, say, 150,000, then, since the cost difference betweenP4 and P5 is 30,000 and the budget surplus is 10,000, it is possible to switch one third of patients to P5 and still remain within budget.

Table 4. Exclusion of more costly and less effective alternatives

Programme	Costs [C]	Effects (life - years gained) [E]	Incremental cost [ΔC]	Incremental effect [ΔE]	ICER [ΔC/ΔE]
P2	100,000	1,500	100,000	1,500	66.67
P4	140,000	2,200	40,000	700	57.14
P5	170,000	2,600	30,000	400	75.00

Table 5. Exclusion of dominated alternative

Programme	Costs [C]	Effects (life-years gained) [E]	Incremental cost [ΔC]	Incremental effect [ΔE]	ICER [ΔC/ΔE]
P4	140,000	2,200	40,000	700	63.64
P5	170,000	2,600	30,000	400	75.00

Contents | ***Page***

Applications of cost-effectiveness analysis

The assessment of cost-effectiveness is an essential component in determining whether a therapy is approved for reimbursement and for formulary inclusion. Health technology assessment agencies place considerable weight on the relative cost effectiveness of therapies in making their judgments. The National Institute for Health and Clinical Excellence of United Kingdom (NICE) requires the use of cost–utility analysis, in which the outcome measure is expressed as a QALY and which enables comparisons to be made across therapeutic c areas – using the QALY as the' common currency'. In cost–utility analysis the ICER therefore becomes the cost per QALY gained and can be compared with those of other interventions, or with a notional threshold value of what is considered to represent cost-effectiveness. Cost-effectiveness analysis (or cost–utility analysis) is far from being a precise science and there is often considerable uncertainty associated with the findings and wide variation around the estimate generated. For example, one of the early technology appraisals undertaken by NICE was on interferon beta and glatiramer acetate for the treatment of multiple sclerosis. Estimates of the cost-effectiveness varied enormously due to differing assumptions related to the duration of treatment, the number, severity and impact on quality of life (QoL) of relapses that occurred and the extent to which progression was compromised by the interventions. It is therefore imperative that the assessment of cost-effectiveness should be subjected to a sensitivity analysis to enable decision -makers to be fully aware of the range of possible eventualities.

Sensitivity analysis

The need for sensitivity analysis arises because of a number of factors. These include:

- Methodological issues arising from different approaches and methods employed in the evaluation
- Potential variations in the estimates of costs and effects used in the evaluation
- Extrapolation from observed events overtime or from intermediate to final health outcomes
- Transferability of results and the validity of results from different populations/patient groups.

ICERs therefore require some indication of the confidence that can be placed in them. What would happen, for example, if the 'true cost' of one of the treatment strategies was somewhat higher or lower than the estimate used in the investigation or if there were significant changes in the life-years gained or other parameters used? Sensitivity analysis tests all the assumptions used in the model and enables the impact of changes on the baseline estimates to be investigated.

The use of probabilistic sensitivity analysis is now recognised as the appropriate format for undertaking and reporting sensitivity analysis, via a cost-effectiveness plane and acceptability curve. These are generated by costs and effects data being simulated repeatedly (usually1,000 times) to generate a vector of CERs, which are plotted on the cost-effectiveness plane and from which the cost-effectiveness acceptability curve is derived. This indicates the likelihood that the CER lies below a certain threshold (ceiling), which represents a benchmark against which to assess whether the intervention can be regarded as representing value for money. There are obviously a number of issues that surround the use of such explicit approaches to informing what therapies are made available, many of which are contentious and controversial .

Implications of cost-effectiveness analysis

While cost-effectiveness analysis is a useful technique for assisting in the decision-making process, there are important issues to consider.

Cost-effectiveness analysis can indicate which one of a number of alternative interventions represents the best value for money, but it is not as useful when comparisons need to be made across different areas of healthcare, since the outcome measures used maybe very different. As long as the outcome measure is life years saved or gained, comparisons can be made, but even in such situations cost-effectiveness analysis remains insensitive to the QoL dimension. In order to know which areas of healthcare are likely to provide the greatest benefit in improving health status, a cost–utility analysis needs to be undertaken using a' common currency' for measuring the outcomes across healthcare areas. If information is needed as to which interventions will result in overall resource savings, a cost–benefit analysis has to be done, although both cost–utility analysis and cost–benefit analysis have their own drawbacks.
The quality of cost-effectiveness analyses is highly dependent on the quality of effectiveness data used and all cost effectiveness analyses should include a detailed sensitivity analysis to test the extent to which changes in the parameters used in the analysis may affect the results obtained**.**

Cost-effectiveness is only one of a number of criteria that should be employed in determining whether interventions are made available. Issues of equity, needs, priorities and so on should also form part of the decision-making process.

Compiled By Dr. Madhava Gunasekera of the Epidemiology Unit

Source-What is Cost-effectiveness –

available from

http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/Cost-effect.pdf

Table 1: Vaccine-preventable Diseases & AFP

02nd – 08th June2012 (23rd Week)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	01	00	01	00	00	00	00	00	02	05	38	44	+ 13.6 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Measles	00	00	00	00	00	00	00	00	00	00	04	20	67	- 235.0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	01	05	10	- 50.0 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	01	33	16	+ 106.3 %
Tuberculosis	06	00	00	21	54	00	00	06	00	88	258	3756	3932	+ 04.5 %

Table 2: Newly Introduced Notifiable Disease

02nd – 08th June2012 (23rd Week)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	03	00	00	01	02	04	00	00	00	10	65	2065	2268	-08.7 %
Meningitis	00	01 ML=1	00	00	01 TR=1	00	00	00	00	02	14	245	412	- 40.5 %
Mumps	01	01	01	01	01	01	01	00	00	07	69	1951	1157	+ 68.8 %
Leishmaniasis	00	00	00	00	00	01 KN=1	01 AP=1	00	00	02	16	263	305	+ 13.8 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

DPDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Dengue Prevention and Control Health Messages

Reduce, Reuse or Recycle the plastic and polythene collected in your home and help to minimize dengue mosquito breeding.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

02nd – 08th June2012 (23rd Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	70	3157	0	48	0	5	1	86	0	24	0	65	0	2	0	25	0	2	**08**
Gampaha	0	2202	0	31	0	5	0	32	0	13	0	80	0	6	0	101	0	0	**00**
Kalutara	0	805	0	35	0	2	0	17	0	3	0	94	0	2	0	10	0	1	**00**
Kandy	0	700	0	37	0	1	0	11	0	11	0	26	0	64	0	13	0	0	**09**
Matale	0	185	1	38	0	4	0	7	0	4	0	19	0	2	0	10	0	0	**08**
Nuwara	0	125	0	57	0	1	0	17	0	1	0	13	0	31	0	8	0	0	**00**
Galle	0	453	0	36	0	3	0	6	0	10	0	59	0	21	0	1	0	0	**00**
Hambantota	4	212	0	18	0	1	0	2	0	10	1	27	1	22	0	5	0	0	**08**
Matara	0	580	0	30	0	4	0	9	0	16	0	64	0	36	0	48	0	0	**00**
Jaffna	0	200	2	84	0	6	2	173	0	19	0	2	0	235	0	4	0	0	**17**
Kilinochchi	0	20	0	6	0	1	0	18	0	39	0	3	0	26	0	4	0	1	**00**
Mannar	0	73	0	11	0	2	0	13	0	13	0	15	0	35	0	1	0	0	**00**
Vavuniya	0	26	0	6	0	18	1	5	0	4	0	14	0	0	0	1	0	0	**50**
Mullaitivu	0	5	0	8	0	1	0	4	0	1	0	2	0	5	0	0	0	0	**25**
Batticaloa	8	543	6	61	0	2	0	11	1	30	0	4	0	0	0	4	1	3	**43**
Ampara	1	37	0	40	0	0	0	3	0	5	0	16	0	0	0	1	0	0	**29**
Trincomalee	2	85	1	74	0	1	0	15	1	2	1	29	0	3	0	2	0	0	**33**
Kurunegala	15	539	0	52	0	6	0	43	0	9	2	63	0	16	2	33	0	2	**17**
Puttalam	0	336	0	23	0	4	0	5	0	1	0	19	0	8	0	1	0	0	**00**
Anuradhapu	2	152	0	28	0	1	0	4	0	1	2	47	0	18	0	33	0	1	**16**
Polonnaruw	0	81	0	11	0	0	0	1	0	0	0	18	0	2	0	26	0	1	**00**
Badulla	0	87	0	31	0	2	0	16	0	1	0	17	0	24	0	19	0	0	**00**
Monaragala	2	79	0	31	0	4	0	9	0	0	0	36	0	37	2	99	0	1	**9**
Ratnapura	40	740	1	90	0	23	0	29	0	2	0	118	0	19	0	48	0	1	**17**
Kegalle	0	620	0	27	0	6	0	12	0	5	0	53	0	28	0	204	0	0	**0**
Kalmune	0	123	1	83	0	1	0	5	1	27	0	2	0	0	0	6	0	1	**15**
SRI LANKA	**144**	**12165**	**12**	**996**	**00**	**104**	**04**	**553**	**03**	**251**	**06**	**903**	**01**	**642**	**04**	**707**	**01**	**14**	**11**

Source: Weekly Returns of Communicable Diseases WRCD).
***Dengue Fever / DHF** refers to Dengue Fever / Dengue Haemorrhagic Fever.
****Timely** refers to returns received on or before 08th June, 2012 Total number of reporting units 329. Number of reporting units data provided for the current week: 35
A = Cases reported during the current week. **B** = Cumulative cases for the year.

PRINTING OF THIS PUBLICATION IS FUNDED BY THE WORLD HEALTH ORGANIZATION (WHO).

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk.**

ON STATE SERVICE

Dr. P. PALIHAWADANA
CHIEF EPIDEMIOLOGIST
EPIDEMIOLOGY UNIT
231, DE SARAM PLACE
COLOMBO 10