WEEKLY EPIDEMIOLOGICAL REPORT

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Evidence-Based Medicine (Part I)

This is the first in a series of two articles on Evidence-Based Medicine (EBM)

Introduction

EBM is the process of systematically reviewing, appraising and using clinical research findings in providing optimum clinical care to patients. Increasingly, financial controllers are examining the strength and weight of scientific evidence on clinical practice and cost effectiveness when allocating resources. They are using this information to encourage healthcare professionals to use treatments that have been proven clinically and which are cost-effective, while discouraging the use of practices which do not meet these objectives.

This is a part of the multifaceted process of assuring clinical effectiveness. The main elements of this are:

- Production of evidence through research and scientific review
- Production and dissemination of evidence-based clinical guidelines
- Implementation of evidence-based, cost-effective practices through education and management of change
- Evaluation of compliance with agreed practice guidance through clinical audit and outcome focused incentives.

Background

Although formal assessment of medical interventions using controlled trials was becoming established in the 1940s, it was not until 1972 that Professor Archie Cochrane, Director of the Medical Research Council Epidemiology Research Unit in Cardiff, UK, expressed what later came to be known as evidence-based medicine (EBM) in his book *Effectiveness and Efficiency: Random Reflections on Health Services.*

These concepts were developed into a practical methodology by the work of several groups in the late 1980s and early 1990s.

In 1992, the UK government funded the establishment of the Cochrane Centre with the objective to facilitate the preparation of systematic reviews of randomized controlled trials of healthcare. The following year it expanded into an international collaboration of centers which coordinates the activities of several thousand researchers. The establishment of the Cochrane Collaboration should be considered as one of the critical factors in spreading the concept of EBM worldwide.

The impact of EBM

The basic principle of EBM – that we should treat where there is evidence of benefit and not treat where there is evidence of no benefit (or harm) – is of relevance at all levels of health care. EBM focused organizations (in conjunction with health economists) issue guidelines as to which drugs and which treatment modalities should be made available to the public. Individually, an understanding of the evidence base allows the clinician to tailor treatment to the circumstances and risk–benefit profile of the individual patient.

Rationale

To make EBM more acceptable to clinicians and to encourage its use, it is best to turn a specified problem into answerable questions by examining:

- The person or population in question
- The intervention given
- The comparison (if appropriate)
- The outcomes considered

Next, it is necessary to refine the problem into explicit questions and then check to see whether evidence exist. But where can we find the information to help us make better decisions? Common sources include:

- Personal experience – for example, a bad drug reaction
- Reasoning and intuition
- Colleagues
- Published evidence

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It is only by educating health care professionals and making them aware of the strength of published evidence in contrast to more traditional – and less rigorous – sources of information, that the use of ineffective, costly or potentially hazardous interventions can be reduced.

Accessing information

There are many sources of information to inform clinical practice. The website –Netting the Evidence– includes a comprehensive listing of internet resources for the clinician, in addition to a virtual library and tools to assist with critical appraisal and evidence implementation. Probably the most valuable single access point is the Cochrane Library. The Cochrane Library contains high-quality, independent evidence to inform health care decision-making.

Analyzing information

In using the evidence it is necessary to:

- Search for and locate it
- Appraise it
- Interpret it in context
- Implement it
- Store and retrieve it
- Ensure it is updated
- Communicate it.

Every clinician strives to provide the best possible care for patients. However, given the multitude of research information available, it is not always possible to keep abreast of current developments or to translate them into clinical practice. One must also rely on published papers, which are not always tailored to meet the clinician's needs.

Databases included in the Cochrane Library

- The Cochrane Database of Systematic Reviews
- The Database of Abstracts of Reviews of Effects (DARE)
- The Cochrane Central Register of ControlledTrials
- The Health Technology Assessment Database
- The NHS Economic Evaluation Database

Levels of evidence

Evidence is presented in many forms, and it is important to understand the basis on which it is stated. The value of evidence can be ranked according to its potential for bias. The classification used by the Scottish Intercollegiate Guidelines Network (SIGN) when grading evidence for its clinical guidelines is as follows:

- 1++ High-quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
- 1+ Well-conducted meta-analyses, systematic reviews or RCTs with a low risk of bias
- 1– Meta-analyses, systematic reviews or RCTs with a high risk of bias
- 2++ High-quality systematic reviews of case-control or cohort studies, High-quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
- 2+ Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
- 2– Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
- 3 Non-analytic studies; for example, case reports, case series
- 4 Expert opinion

Although classification of this type provides a useful focus when reading clinical trial data, it is important to recognize that accurate grading requires a clear understanding of what predisposes a study to bias

Critical appraisal

For any clinician, the real key to assessing the usefulness of a clinical study and interpreting the results to an area of work is through the process of critical appraisal. This is a method of assessing and interpreting the evidence by systematically considering its validity, results and relevance to the area of work considered.

The Cochrane Collaboration, which coordinates an international network of researchers involved in systematic review, has evolved a generic approach to appraising a clinical trial, allowing the reader to make an objective assessment of study quality and potential for bias.

Systematic review and meta-analysis

Sometimes an RCT may fail to give a clear result, or results from multiple studies may yield different estimates of treatment effect. However, by identifying all published information in a given clinical area (systematic review) and pooling the results in a statistically valid fashion (meta analysis), it is possible to arrive at a more precise estimate of treatment effect. This approach is very attractive as it allows all evidence in the field of interest to be taken into account. However, the danger exists that a poorly executed systematic review and meta analysis may give deceptive results. It is therefore important to critically appraise the paper in just the same way as one would an RCT. The following are critical issues to be aware of.

- There should be a focused clinical question agreed prior to examination of the literature.
- Search strategies should include multiple sources, to reduce the risk of publication bias and should not be subject to artificial limitations (for example, English language only).
- Each individual study needs to be quality appraised to limit the chance of biased results being entered into the analysis.
- If patient populations, interventions, comparisons or outcomes vary significantly, it may be inappropriate to pool study results.
- Equally, even if studies appear similar, if there is significant heterogeneity in the results, this may also raise the question of whether it is reasonable to carry out a statistic aggregation. Where heterogeneity exists, use of an appropriate pooling method (for example, random effects pooling, meta regression analysis) may help mitigate the risk of reaching a biased conclusion.
- Finally, the results need to be presented in a meaningful fashion that enables clinical decisions to be taken.

Compiled by Dr Madhava Gunasekera of the Epidemiology Unit

Source-

What is evidence-based medicine? available from www.medicine.ox.ac.uk/bandolier/painres/download/whatis/ebm.pdf

to be continued

Table 1: Vaccine-preventable Diseases & AFP

25th – 31st August 2012 (35thWeek)

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	01	00	00	00	00	00	01	00	00	02	02	54	62	- 12.5 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Measles	00	00	01	00	00	00	00	00	01	02	03	41	104	- 60.6 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	08	16	- 50.0 %
Whooping Cough	00	00	01	00	00	00	02	00	00	03	00	67	27	+ 148.1 %
Tuberculosis	139	00	00	00	10	00	31	00	00	180	69	6085	6157	- 01.2 %

Table 2: Newly Introduced Notifiable Disease

25th – 31st August 2012 (35thWeek)

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	04	04	03	00	04	04	01	02	04	26	56	3142	3016	+ 04.2 %
Meningitis	00	01 KD=1	00	01 MN=1	01 AM=1	00	00	00	00	03	14	518	603	- 14.1 %
Mumps	12	03	07	00	14	05	02	01	04	48	06	3374	2203	+ 53.15 %
Leishmaniasis	00	00	18 MT=4 HB=14	00	02 TR=2	00	08 AP=8	00	00	28	06	727	513	- 41.7 %

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

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them free of water collection.

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

25th – 31st August 2012 (35thWeek)

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	78	6807	1	97	0	8	0	142	0	31	1	126	0	3	2	82	0	3	**77**
Gampaha	51	5533	2	69	0	12	1	44	0	23	5	166	0	16	4	234	0	0	**47**
Kalutara	33	2009	2	74	0	2	1	35	0	26	2	172	0	3	1	27	0	2	**85**
Kandy	28	1793	3	81	0	2	0	17	2	56	0	52	2	91	1	54	0	0	**91**
Matale	15	382	3	69	0	5	0	8	0	7	0	33	0	3	0	32	0	0	**83**
Nuwara	1	259	1	143	0	3	0	22	0	8	0	30	0	55	0	16	0	1	**62**
Galle	25	1155	2	94	0	6	0	10	0	17	1	91	4	53	0	2	0	0	**84**
Hambantota	11	425	0	26	0	2	0	6	2	27	0	62	0	37	2	18	0	0	**100**
Matara	28	1190	1	55	0	8	0	15	0	19	4	108	1	64	10	98	0	0	**94**
Jaffna	5	320	3	134	0	13	1	291	1	70	0	2	0	250	2	13	0	0	**100**
Kilinochchi	2	67	0	10	0	2	0	28	0	40	0	4	0	29	0	4	0	1	**25**
Mannar	4	125	2	53	0	4	0	21	2	16	2	20	0	43	0	2	0	0	**80**
Vavuniya	0	48	0	22	0	21	0	8	0	15	0	18	0	2	0	1	0	0	**50**
Mullaitivu	0	20	0	15	0	1	0	7	0	2	0	3	0	5	0	0	0	0	**25**
Batticaloa	2	599	2	152	0	2	0	14	0	306	0	8	0	0	0	6	0	4	**64**
Ampara	2	107	1	65	0	2	0	5	0	9	0	23	0	0	0	2	0	0	**100**
Trincomalee	0	123	5	128	0	2	0	16	1	10	0	36	1	17	0	4	0	0	**75**
Kurunegala	17	1649	3	134	0	14	0	75	0	33	1	115	0	23	2	108	0	4	**69**
Puttalam	11	777	5	48	0	6	0	10	0	6	0	31	0	13	1	4	0	2	**42**
Anuradhapu	4	260	3	59	0	6	0	12	2	18	0	71	0	21	0	51	0	1	**53**
Polonnaruw	0	185	0	38	0	1	0	2	0	1	0	44	0	2	0	36	0	1	**43**
Badulla	5	250	1	88	0	3	0	45	0	3	0	31	3	82	0	36	0	0	**82**
Monaragala	6	192	0	48	0	4	0	18	0	7	0	55	0	63	0	148	0	2	**82**
Ratnapura	52	2764	3	158	0	25	0	42	1	12	4	219	1	35	1	83	0	1	**50**
Kegalle	32	2101	1	46	0	9	0	20	0	10	0	137	2	48	24	443	0	0	**100**
Kalmune	0	172	5	199	0	1	0	5	0	77	0	2	0	0	0	7	0	3	**69**
SRI LANKA	**412**	**29312**	**49**	**2105**	**00**	**164**	**03**	**918**	**11**	**849**	**20**	**1659**	**14**	**958**	**50**	**1511**	**0**	**25**	**73**

Source: Weekly Returns of Communi49cable Diseases WRCD). 137
***Dengue Fever / DHF** refers to Dengue Fever / Dengue Haemorrhagic Fever.
****Timely** refers to returns received on or before 27thAugust, 2012 Total number of reporting units 329. Number of reporting units data provided for the current week: 244
A = Cases reported during the current week. **B** = Cumulative cases for the year.

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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.**

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