

Evidence for Policy and Practice Information and Co-ordinating Centre

Information systems for conducting systematic reviews: a case study

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Background

Systematic reviews of social research can entail the storage, classification and analysis of large quantities of electronic data and the management of these data across many reviewers working in different sites. This presents many challenges to the management of the review because, unless effective systems are developed to manage these data, reviews may become 'unsystematic' by losing studies or failing to track which studies originated from which search and the reasons for their inclusion/exclusion. The growth in the internet has made it easier for people to collaborate on projects without necessarily working in the same place. However, few software tools support distributed working throughout the life cycle of the review.

One solution to this problem is presented here. It depicts some of the major information management challenges in reviews and shows how a bespoke software application, EPPI-Reviewer, assists in each stage of the review.



Sometimes, many tens of thousands of references are screened for inclusion in a review. If these references are stored in one place, together with decisions on their inclusion into the review, the chances of losing important references are reduced.



Citations can be screened on titles and abstracts by one or more people. If references are being 'double-screened', kappa statistics are available to measure inter-reviewer reliability.

References are allocated for screening and then screened by reviewers

Again, following the principle that nothing should be lost to the review, software can aid the process of retrieving full papers by, for example, keeping track of which papers still need to be retrieved, which are on order and which are available in specified libraries.

Categorical data can be summarised using simple frequencies and crosstabs...

Crosstabs report							
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Implicit (please specify)	0	0	4	1	0	3	0

...as well as being combined with free-text data in tables.

The full papers of relevant studies are obtained and screened for inclusion

Data extraction strategies are developed and agreed

They are imported into **EPPI-Reviewer** and checked for duplicates

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A.2 How was this report found on this occasion?	 A.2.1 Electronic Database - AIDSLINE A.2.2 Electronic database - Australian/British Education Index A.2.3 Electronic database - CABhealth A.2.4 Electronic Database - CINAHL A.2.5 Electronic Database - Cochrane Library A.2.6 Electronic Database - EMBASE A.2.7 Electronic Database - Health Planning A.2.8 Electronic database - Health Planning A.2.9 Electronic database - Health Planning A.2.9 Electronic database - MEDLINE A.2.10 Electronic Database - PsycINFO A.2.11 Electronic database - PsycINFO A.2.13 Electronic Database - SIGLE A.2.14 Electronic Database - Social Science Citation Index A.2.15 Electronic database - Other database (specify) A.2.17 Handsearch A.2.18 Referenced in another report A.2.19 Personal contact 	2	specific' data extraction strategies (or protocols). The 'generic' strategies capture general information about a study such as its population, topic area, methodology. 'Review specific' strategies are used to capture specific information which is
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			relevant to a particular review.

Categorical, free-text and numeric data are extracted for use in the later synthesis.

Reviewers can create new strategies on the database for their reviews, or adopt existing ones.

Generic data extraction strategies are important because over time a consistently coded database of studies is created with no additional effort.

Data extraction takes place of

Welcome J	Jeff Brunton	EPPI-Reviewer 2.5.6		Current datab	ase: EPI(
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		Summary Report			
		Across the whole review			
ltem ID	Item	Type of behaviour (please specify further in all categories)	Is this a 'views' study?	Does this study contain information inequalities?	relating t
T20390	Abernethy L;MacAuley D; (2003 Aug) Impact of school sports injury	Sports activity rugby, hockey, football,netball,pe,games,other sports	No correlation	No	
1720391	Albery IP;Guppy A: (1995 Feb 1) Drivers' differential perceptions of legal and safe driving consumption	Unsafe road behaviours (eg speeding, drunk driving) URB: car Alcohol impaired behaviour	Yes (specify) Perceptions of drink- driving consumption levels Attitudes to drink- driving Attitudes to drink- driving interventions (e.g. laws/breath tests)	No	
IT21508	Arblaster,L.; Lambert,M.; Entwistle,V.; Forster,M.; Fullerton,D.; Sheldon,T.; Watt,I.; (1996) A Systematic Review of the Effectiveness of Health Service Interventions Aimed at Reducing Inequalities in Health				
IT19615	Attewell RG;Glase K;McFadden M; (2001) Bicycle helmet efficacy: a meta-analysis	Use or non-use of protective road safety equipment (eg wearing cycle helmet) effects of use of cycle helmet in preventing head injury URE: pedal cycle	No	No	
T20992	Bagnall G; (1983) Use of Alcohol, Tobacco and Illicit Drugs Among 13-year-olds in Three Areas of Britain	Alcohol impaired behaviour	No although study illicited views on alcohol, unclear whether any views related to alcohol and accidental	No	

Sophisticated Boolean searches can be conducted

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ome Jeff	Brunton	EPPI-Reviewer 2.5.6		Current database: EPI
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elect	Search #	Search	No. of hits	View
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	2	Yes, good (please specify)	6	View items
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The results of the studies are synthesised

Fixed and random effects meta-analyses can be conducted and forest plots can be produced to summarise the results.

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	exed papers 3.503	0.477		
Heterogeneity explained by Residual heterogeneity with	subgroups: 0.527 df = in groups: 16.639 df = Effect (CI)	1 p = 0.468 12 p = 0.16 Weight %	Size	
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Anderson et al (2003)	0.47(0.01, 0.93)	1.6	120	
Auld GW et al (1998b)	0.35(-0.11, 0.80)	1.6	445	2-
Auld GW et al (1999)	0.26(-0.38,0.91)	0.8	647	_
Baranowski T et al (2000)	0.10(-0.08, 0.28)	10.7	1172	-
Henry et al (2001)	0.11(-0.50, 0.71)	0.9	42	_
Moore (2001)	0.02(-0.10, 0.14)	22.9	1924	-
Perry et al (1998)	0.23(0.01, 0.46)	6.5	408	
Perry et al (1998b)	0.01(-0.12, 0.14)	20.9	1186	-
Perry et al (1998b) Reynolds et al (2000)	0.01(-0.12, 0.14)	20.9	1186 1512	-
Perry et al (1998b) Reynolds et al (2000) Sahota et al (2001)	0.01(-0.12, 0.14) 0.33(0.12, 0.53) 0.00(-1.24, 1.24)	20.9 7.9 0.2	1186 1512 634	

studies which meet the review's inclusion criteria

Data extraction is usually undertaken by two researchers who work independently and then meet to discuss their findings. EPPI-Reviewer facilitates this process by enabling reviewers to work concurrently on their individual 'data extractions' and then producing a report detailing potential discrepancies.

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tatistical outcome data are being extracted, software can calculate standardised mean ferences from a wide range of published ormation (such as means and standard iations, standard errors, confidence intervals, and t-values) and odds ratios, risk ratios, risk ferences from 2×2 tables.

spider-web or radar graphs are available for ordinal variables.

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ITT11973	Friel S.Kelleher C.Camobell P.Nolan G. (1999) Evaluation of the Nutrition Education at Primary School (NEAPS) programme	A	B		

The database of studies becomes part of the

This poster illustrates the benefits of a system containing consistently coded data across a series of reviews. The studies from more than 90 systematic reviews are stored on the database, the majority classified with one of three classification systems. This supports the identification of studies for future reviews and is a resource which offers users far more information about the research it contains than a database containing only basic bibliographic information.



REFERENCES

1. Thomas J (2006) Information systems for conducting systematic reviews: a case study. Presented at the Sixth International Campbell Colloquium, Los Angeles, 22–24 February.

2. http://dublincore.org/

3. http://www.icpsr.umich.edu/DDI/

dissemination process



Because all health promotion reviews at the EPPI-Centre have used the same tool for more than 10 years, we have developed a database of studies with detailed and consistently applied codes which can be made available online as a resource to others working in the field. This shows the benefits of the generic data extraction tool in action.

Current thinking in e-social science suggests that an important area for future work involves the standardised 'tagging' of online information. Systematic reviewers could both contribute to, and benefit from, this activity - something which requires the development of appropriate systems more than it requires any additional work in the actual task of reviewing. With the increased adoption of core meta-tagging frameworks (such as Dublin Core² and the Data Documentation Initiative³, organisations involved in supporting systematic reviews need to consider carefully how to support and promote the adoption of international standards for the classification and identification of research.

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