

Dans le contexte de revues systématiques, une méta-analyse des conclusions n'est pas toujours possible. Lorsque c'est le cas, ou lorsqu'une revue de la mise en œuvre est nécessaire, on fait généralement une synthèse narrative des données. Sur la base de directives récemment élaborées ciblant les personnes qui entreprennent la synthèse des données – et l'information sur la mise en œuvre des détecteurs de fumée – nous présentons les conclusions d'une démonstration des outils et des techniques qui peuvent être utilisés dans une synthèse narrative. Le travail démontre comment on peut rendre ce processus plus transparent, et suggère que l'utilisation des outils et des techniques peut améliorer la qualité de la synthèse narrative.

**Español** En el contexto de análisis sistemático, los meta análisis estadísticos de resultados no son siempre posibles. Ya sea este el caso o si se requiere un análisis de evidencia de implementación, la síntesis de datos es típicamente emprendida. Basándonos en una guía desarrollada recientemente apuntada a la síntesis de datos emprendida - y en la información de la implementación de los





In qualitative research, the potential for generalising from a single study arises from the extent to which researchers link their analysis to wider theoretical understandings. For example, Hilary Graham (1993) linked her analysis of qualitative data on white working-class women's smoking behaviour to theories about coping behaviour, arguing that smoking provides a coping mechanism in difficult life circumstances. While this provides the basis for generalising to other white working-class women, Graham's later work (Graham and Blackburn, 1998) suggests that the findings do not apply across ethnic groups.

On the basis of his review of the literature on implementation studies, Brock (2003) concludes that the field as a whole lacks cohesion, with no consensus having been reached over what a good-quality implementation study should look like. Consequently, with regard to systematic reviews, implementation research raises at least three methodological challenges: how best to search for relevant studies and what inclusion criteria to use; how to assess the methodological quality and therefore the reliability of studies using multiple methods; and how to approach the synthesis of findings from what may be very heterogeneous studies.

This article describes methodological work on a potentially useful approach to the synthesis of findings from multiple implementation studies, which we term 'narrative synthesis'. This approach relies primarily on the use of words and text to summarise and explain the findings of the synthesis (Popay et al, 2006). Given that it is focused on only the synthesis stage of a systematic review, the approach does not address the other methodological questions highlighted: how to search for and quality appraise mixed method implementation studies.

## Method

### *Identifying studies*

Most of the studies included in the NS were drawn from an earlier exploratory review of evidence on the implementation of interventions aiming to reduce accidents among children and young people (Popay et al, 2003; Arai et al, 2005; Roberts et al, 2006; Roen et al, 2006). This earlier review included primary studies identified in a Cochrane review (DiGiuseppi and Higgins, 2000) as well as new studies found via a comprehensive search strategy. The demonstration synthesis was restricted to evidence on the implementation of interventions aiming to improve the uptake and functioning of domestic smoke alarms. A limited search was also undertaken to identify any new studies published since the original review was undertaken. Time and resources did not permit a synthesis of all of the studies identified so a purposive sample was taken on the basis of the 'thickness' of the data on factors influencing implementation (see Roen et al, 2006, for more detail). As a result of this process, two members of the review team conducted a NS based on seven papers. Details of these seven papers, and the interventions reported on, are shown below in Table 1.

## The main elements of NS

The guidance used for this demonstration (Popay et al, 2006) identifies four elements to the process of NS:

- developing a theory of how the intervention works, why and for whom;
- developing a preliminary synthesis;
- exploring relationships within and between studies;
- assessing the robustness of the synthesis.

For each element of the synthesis process the guidance describes a number of tools and techniques (EMC (within) /SpanActualsF00200 0 10.5-ng

Some approaches to evidence synthesis – for example, realistic synthesis – focus entirely on testing theories of how an intervention works, why, for whom and in what circumstances (Pawson, 2006; Petticrew and Roberts, 2006;). Weiss calls this a ‘theory of change’ (Weiss, 1997). In systematic reviews, theory development and testing would be one element of the review process as a whole and, strictly speaking, should be undertaken early in a review before the synthesis proper begins. In the guidance we suggest that this process can inform decisions about the review question and the types of studies to include. In terms of the NS, a ‘theory of change’ can also contribute to the interpretation of the review’s findings and will be valuable in assessing how widely applicable those findings may be. We included theory development and testing in the NS framework as a result of reviewers’ comments on a full draft of the NS guidance – too late for it to be included in the demonstration review reported here. For this reason, the demonstration review focused only on the latter three elements of the NS framework: the preliminary synthesis; exploring relationships; and assessing robustness.

The NS was carried out separately by two members of the study team, each

be made about descriptions of the intervention itself. These are also rarely available in detail in peer-reviewed journals, which limits comparison of the effectiveness





the way information is presented – with the first reviewer, for example, highlighting key words. The type and amount of information included in the two examples also varies. Reviewers should develop a standard format to ensure consistency of reporting in these types of descriptions.

*Example 1:*

In McConnell et al (1996), the target population was new heads of households in

working smoke detector. The 35-minute intervention (delivered during mandatory



### *Translating data: thematic analysis*

Thematic analysis is a common technique for the analysis of qualitative data in primary research. In a synthesis, it can be used to identify systematically recurrent or salient themes or concepts across a number of studies. In the demonstration synthesis, different reviewers, and the same reviewer at different times, identified different themes, on an inductive basis, by reading and rereading the papers. They fell into two categories: those themes identified by the authors from their qualitative data; and aspects of the interventions that seemed to act as barriers or facilitators, in the view of the authors or the reviewer. One example of each is given below.

#### *Example 1:*

This thematic analysis was originally presented as a table, which set out the themes developed on the basis of the evidence extracted from the included studies under three main headings: the smoke alarm, the individual and the community. The themes developed under each heading can be summarised as follows.

The smoke alarm:

- The design of smoke alarms has serious implications for their use.

The individual:

- Individuals perceive themselves to be invulnerable to fire.
- There is a general lack of awareness of fire safety and of the importance of smoke alarms.
- Cultural factors can have an effect on smoke alarm use and functioning.
- Factors such as age and poverty can affect smoke alarm installation.

The community:

- Landlords play a role in smoke alarm installation. Landlords as such a

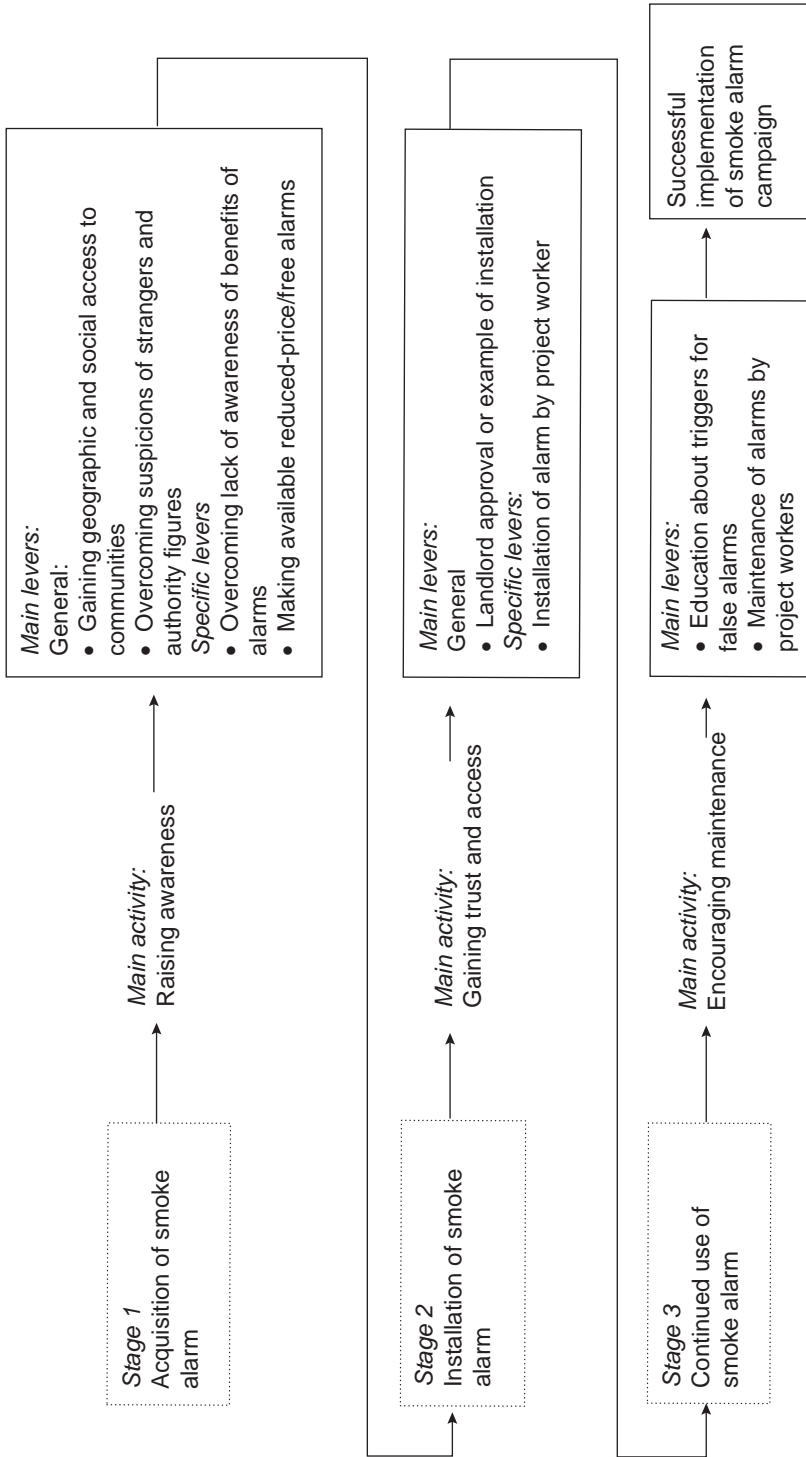
**Table 5: Barriers and levers to use/functioning of smoke alarms**

	Barriers	Levers
(1) Barriers and levers to acquisition of smoke alarms		
General	<ul style="list-style-type: none"> <li>• Problems accessing communities</li> <li>• Suspicion of 'authority' or local government</li> </ul>	<ul style="list-style-type: none"> <li>• Gaining trust of key community 'players' and leaders</li> <li>• Emphasising separation from distrusted authority/forming alliance with trusted partners</li> </ul>
Specific to smoke alarm campaigns	<ul style="list-style-type: none"> <li>• Lack of awareness of benefits of smoke alarms</li> <li>• Perceived cost of smoke alarms</li> <li>• Perception that household is not at risk of fire (due to type of house/characteristics of household members)</li> </ul>	<ul style="list-style-type: none"> <li>• Running well-coordinated, culturally appropriate awareness campaign</li> </ul>

groups and interviews with individual residents in which they were asked about the best approaches to be used. Although the research team evaluating the intervention

intervention presumably increased residents' estimates of their own risk but no information is provided about this. The third and less robust concept is residents' level of trust. In the McConnell study, residents were involved in the development of the intervention and presumably this generated a certain amount of trust (even though the education was mandatory). In the Roberts study, the fact that some residents were uncomfortable with strangers coming into their homes to test smoke alarms, and suspicious of anything offered free, suggests a lack of trust. These three concepts may just represent the potential for translation between the three studies. However, they

Figure 3: Conceptual mapping





**Table 6: Synthesis tabulation**

Location and author	Context		Explanatory factors	
	Targeted stage of intervention	Level	Landlord commitment	Risk perception
Australia: Camit (1998, 2002); Young et al (1999)	Acquisition Installation	Community	Concerns about damage to rented property	Lack of perceived importance
US: McConnell (1996)	Maintenance	Heads of households (tenants)	Housing authority carried out intervention	Powerful video made in study setting
UK: Di Giuseppe et al (1999); Roberts et al (2004)	Acquisition Installation	Tenants/ community	Intervention supported by local authority and tenants' association	In disabling smoke alarms, tenants are aware of risk, but balance immediate and longer-term risks to well-being
US: Campbell DeLong (2003)	Maintenance	Tenants	Population vulnerable to negligent landlords; good property management will solve problem	Lack of understanding of purpose of smoke alarm

The reviewers' task was to bring together the preliminary synthesis product in such a way as to produce a coherent and evidence-based narrative.

Evans (2002) has argued, however, that it is important to distinguish between 'descriptive synthesis' and 'interpretive synthesis' and is critical of the heavy reliance placed by some reviewers on synthesis by tabulation. For commentators such as Evans, the relationship between the visual representation of data (the descriptive synthesis) and the narrative elaboration of the patterns identified (the interpretative synthesis) is critical to the quality of a NS. In this context, therefore, the reviewers produced a narrative account of the 'story' told by the tabulated synthesis findings, as follows:

The interventions described in these papers were all implemented in the context of disadvantaged populations, mostly living in rented property. The interventions were targeted at three different stages: acquisition, installation or maintenance of domestic smoke alarms. They were aimed at communities, individual tenants and other parties including landlords, estate agents and local shopkeepers. Two aspects of implementation appear to affect the success or otherwise of the interventions, although there are other relevant factors. The commitment of landlords is beneficial at all stages: by providing

alarms free of charge, or to overcome tenants' fears about damage to property; to support or pay for installation; and to encourage and/or enforce maintenance. Landlord commitment is insufficient on its own, but negligent landlords are a major obstacle at all stages. Tenants' appropriate perception of their own risk of domestic fires, which may be enhanced by a tailored and site-specific intervention, is necessary but insufficient at two stages: to motivate acquisition (in situations where the landlord does not supply smoke detectors); and to achieve maintenance. From these studies, it was not possible to reach a conclusion about the role of risk perception in the third stage, that of smoke alarm installation.

It is important to stress that this synthesis was conducted on a sample of studies rather than being the product of a comprehensive search. It is possible that a more comprehensive synthesis would have identified a wider range of factors shaping the outcome associated with smoke alarm interventions and, as a result, produced a more comprehensive explanatory account of these outcomes. In particular, this synthesis did not examine the often rational choices made by tenants in balancing risks, whether these are allowing a stranger into their home to test an alarm or trading off noise, nuisance and relationships with neighbours against an oversensitive alarm – choices revealed by a number of studies in this field. Additionally, this NS did not begin with the identification of a theoretical framework: if it had, this would have provided a structure for bringing together the various outputs from the tools and techniques used.

### ***Assessing the robustness of the synthesis***

#### *Comparison with earlier review findings*

In our original NS guidance we suggested that the results of the synthesis might be compared with those of an earlier related review (Popay et al, 2003). In the demonstration synthesis, this comparison was a useful contribution to the assessment of robustness. Differences between reviews may be explained in terms of difference in the synthesis process and/or included studies. The results of the demonstration NS reported here were compared with the earlier review of the same evidence base, which had involved a simple thematic analysis of the findings of included studies,

- some description of the specific factors affecting implementation. These might include an understanding of the people and the community receiving the intervention, and the role of community leaders and other key local figures to programme success.

These are useful, although rather general, insights into factors affecting implementation. In fact, this is less a synthesis than a list of insights about implementation drawn from the reports.

In comparison, the results of the NS reported here suggest potential explanatory factors in implementation that might account for the success or failure of particular interventions in different contexts. These explanatory factors were not identified in the earlier review but emerged in the process of using the various tools and techniques.

The NS guidance describes a number of tools that may aid in the assessment of the robustness of the synthesis results. These were not used in the synthesis described here for a number of reasons. The 'weight of evidence' and 'best evidence synthesis' approaches could not be used as they required information on the methodological quality of included studies, which was not available. The latter would also require a larger number of included studies.

Checking with the authors of primary studies was not undertaken because of limited time. Checking with authors is potentially valuable but it does depend on the accessibility and generosity of authors in providing further information. Our experience of this in other studies has been almost entirely positive (Popay et al, 2003).

## Critical reflection and conclusion

The synthesis reported here was based on a small number of studies selected purposively on the basis that they provided 'thicker' evidence on implementation (Popay et al, 2003). This approach to inclusion was better suited to an exercise like this one where we were testing the processes of NS rather than seeking to provide a definitive synthesis product or 'answer'. However, it should be remembered that at present, many, perhaps most reviews are based on small numbers of studies with similarly scant data on implementation; normally, however, this would be because more studies have not been found. Methodological work such as this does not claim to be an exhaustive synthesis and there are several other factors that may be expected to impinge on the uptake and functioning of domestic smoke alarms, such as the level of community engagement and the effect of policy or legislation on installation.

The work reported here demonstrates how the process of NS can be made more transparent and suggests that using some of the tools and techniques described in the guidance produced by the authors of this article can improve the quality of this type of synthesis. It has also highlighted a number of other issues in the conduct of NS. For example, combining the work of two reviewers can provide information on inter-researcher differences. The reviewers in the demonstration synthesis used the different tools and techniques in parallel ways, not necessarily identifying precisely

the same themes or concepts. Indeed, one of the reviewers carried out two thematic analyses at different times, and identified different themes in her later reflections. This could be seen as leading to a lack of reliability in conclusions, although here the use of tools and techniques allowed greater transparency than is usually possible.

The product of the synthesis will reflect the experience of the reviewers as well as

## Acknowledgements

The research reported here was funded by the ESRC (grant reference number H33250019) within the ESRC Methods Programme. We are grateful to Professor Angela Dale, the director of the programme, for her support throughout the project. We are also grateful to the international panel of experts in research synthesis. We would also like to pay tribute to Professor Sally Baldwin, who developed the proposal for this work with us, and who died as a result of an accident in October 2003.

## Notes

<sup>1</sup> At the time of writing this article, Lisa Arai and Helen Roberts were based in the Child Health Research and Policy Unit, City University, London.

<sup>2</sup> The word 'intervention' is used here to refer to a wide range of policies and practices that seek to change the circumstances of individuals and/or groups. These may include interventions aiming to improve health status as well more complex programmes aiming to improve a wide range of outcomes including, for example, social and economic circumstances or educational attainment.

## References

- Arai, L., Roen, K., Roberts, H. and Popay, J. (2005) 'It might work in Oklahoma but will it work in Oakhampton? Context and implementation in the effectiveness literature on domestic smoke detectors', *Injury Prevention*, vol 11, no 3, pp 148-51.
- Audit Commission (2007) *Better safe than sorry: Preventing unintentional injury to children*, London: Audit Commission, [www.healthcarecommission.org.uk/nationalfindings/publications.cfm](http://www.healthcarecommission.org.uk/nationalfindings/publications.cfm)
- Brock, T. (2003) *Developing a methodological framework for the design of implementation studies*, New York, NY: MDRC.
- Camit, M. (1998) *Smoke alarms wake you up if there is a fire: Report on the Arabic, Chinese and Vietnamese communities smoke alarm purchase and installation program 1998*, Gladesville, NSW, Australia: NSW Multicultural Health Communication Service.
- Camit, M. (2002) 'Smoke alarms wake you up if there's a fire: a smoke alarm campaign targeting Arabic, Chinese, and Vietnamese communities in New South Wales', *Social Marketing Quarterly*, vol 8, no 1, pp 52-4.
- Campbell DeLong Resources Inc (2003) *Barriers to maintaining working smoke alarms: Service area demographic study and interview research*, Portland, OR: Campbell DeLong Resources Inc, [www.tvfr.com/dept/cs/campaigns/smokealarm/CDRI\\_Smoke%20Alarm%20Research%20Report.pdf](http://www.tvfr.com/dept/cs/campaigns/smokealarm/CDRI_Smoke%20Alarm%20Research%20Report.pdf)
- Denzin, N.K. and Lincoln, Y.S. (1994) *Handbook of qualitative research*, London: Sage Publications.
- DiGiuseppi, C. and Higgins, J.P.T. (2000) 'Systematic review of controlled trials of interventions to promote smoke alarms', *Archives of Disease in Childhood*, vol 82, no 5, pp 341-8.

- DiGiuseppi, C., Slater, S., I., Adams, L., Sculpher, M., Wade, A. and McCarthy, M. (1999) 'The "Let's Get Alarmed!" initiative: a smoke alarm giveaway programme', *Injury Prevention*, vol 5, no 3, pp 177-82.
- Evans, D. (2002) 'Systematic reviews of interpretive research: interpretive data synthesis of processed data', *Australian Journal of Advanced Nursing*, vol 20, no 2, pp 22-6.
- Graham, H. (1993) *When life's a drag: Women, smoking and disadvantage*, London: HMSO.
- Graham, H. and Blackburn, C. (1998) 'The socio-economic patterning of health and smoking behaviour among mothers with young children on income support', *Sociology of Health and Illness*, vol 20, no 2, pp 215-40.
- McConnell, C.F., Dwyer, W.O. and Leeming, F.C. (1996) 'A behavioral approach to reducing fires in public housing', *Journal of Community Psychology*, vol 24, no 3, pp 201-12.
- Noblit, G.W. and Hare, R.D. (1988) *Meta-ethnography: Synthesizing qualitative studies*, Newbury Park, CA: Sage Publications.
- Pawson, R. (2002) *Does Megan's law work? A theory-driven systematic review*, Working Paper 8, London: ESRC UK Centre for Evidence Based Policy and Practice, <http://evidencenetwork.org/Documents/wp8.pdf>
- Pawson, R. (2006) *Evidence-based policy: A realist perspective*, London: Sage Publications.
- Petticrew, M. and H., (2006) *Systematic reviews in the social sciences: A practical guide*, Oxford: Blackwell.
- Popay, J., Arai, L., H. and Roen, K. (2003) *Exploring methodological and practical issues in the systematic review of factors affecting the implementation of child injury prevention initiatives*, London: Health Development Agency.
- Popay, J., H., Sowden, A., Petticrew, M., Arai, L., Britten, N., Rodgers, M. and Britten, N. with Roen, K. and Duffy, S. (2006) *Guidance on the conduct of narrative synthesis in systematic reviews: Final report*, Swindon: ESRC Methods Programme, [www.esrc.ac.uk/ESRCInfoCentre/index.aspx](http://www.esrc.ac.uk/ESRCInfoCentre/index.aspx)
- H., Arai, L., Roen, K. and Popay, J. (2006) 'What evidence do we have on implementation?', in A. Killoran, C. Swann and M.P. Kelly (eds) *Public health evidence: Tackling health inequalities*, Oxford: Oxford University Press, pp 299-308.
- Roberts, H., Curtis, K., Liabo, K., Rowland, D., DiGiuseppi, C. and Roberts, I. (2004) 'Putting public health evidence into practice: increasing the prevalence of working smoke alarms in disadvantaged inner city housing', *Journal of Epidemiology and Community Health*, vol 58, no 4, pp 280-5.
- Rodgers, pp 280-5.

van Meter, D.S. and van Horn, C.E. (1975) 'The policy implementation process: a conceptual framework', *Administration and Society*, vol, 6, no 4, pp 445-88.

Weiss, C.H. (1997) 'How can theory-based evaluation make greater headway?', *Evaluation Review*, vol 21, no 4, pp 501-24.

Young, M., Camit, M. and Mihajlovic, M. (1999) 'A smoke alarm campaign in Arabic, Chinese and Vietnamese communities', *NSW Public Health Bulletin*, vol 10, no 10, pp 133-5

