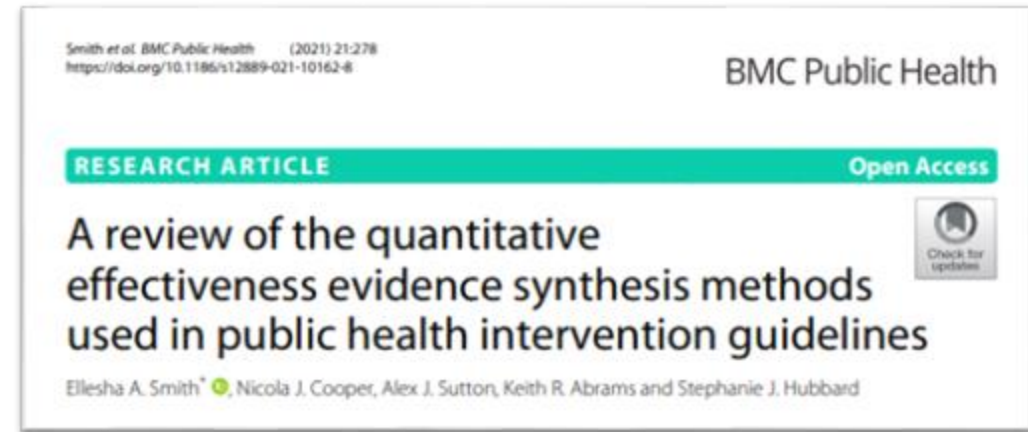# Synthesis methods used in recent NICE public health guidelines

NIHR Complex Reviews Support Unit (CRSU) Webinar
Evaluation of complex and multi component interventions

23rd September 2021

Introduction

RESEARCH ARTICLE

Open Access

A review of the quantitative effectiveness evidence synthesis methods used in public health intervention guidelines

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- Important to have a clear framework for synthesising good quality evidence on the effectiveness and cost-effectiveness of health interventions.

- Broad range of methods available, e.g. narrative review, meta-analysis.

- Many challenges faced in the synthesis of public health interventions:
  - Increased methodological heterogeneity due to different study designs
  - Poorly described interventions – variation within groups
  - Wide range of outcomes, and surrogate outcomes
  - Complex interventions

- Recent guidance documents have focused on the synthesis of complex interventions.

Research Aims

- A review by Achana et al. (2014) performed a methodological review of NICE public health guidelines.

- The aim was to update the review to:
  - Find out what methods are now being used.
  - Find out reasons for not using meta-analysis methods.
  - Compare to the original review.

NICE Guidelines

- NICE provides recommendations based on effectiveness and cost effectiveness to ensure a transparent process of allocating NHS resources.

- Remit for NICE guideline production was extended to public health in 2006.

- NICE published '*Developing NICE guidelines: the manual*' in 2006, which has been updated since, with the most recent in 2020.

- The guidance manual provides recommendations across all topics covered by NICE; there is currently no guidance in the manual that focuses specifically on public health.
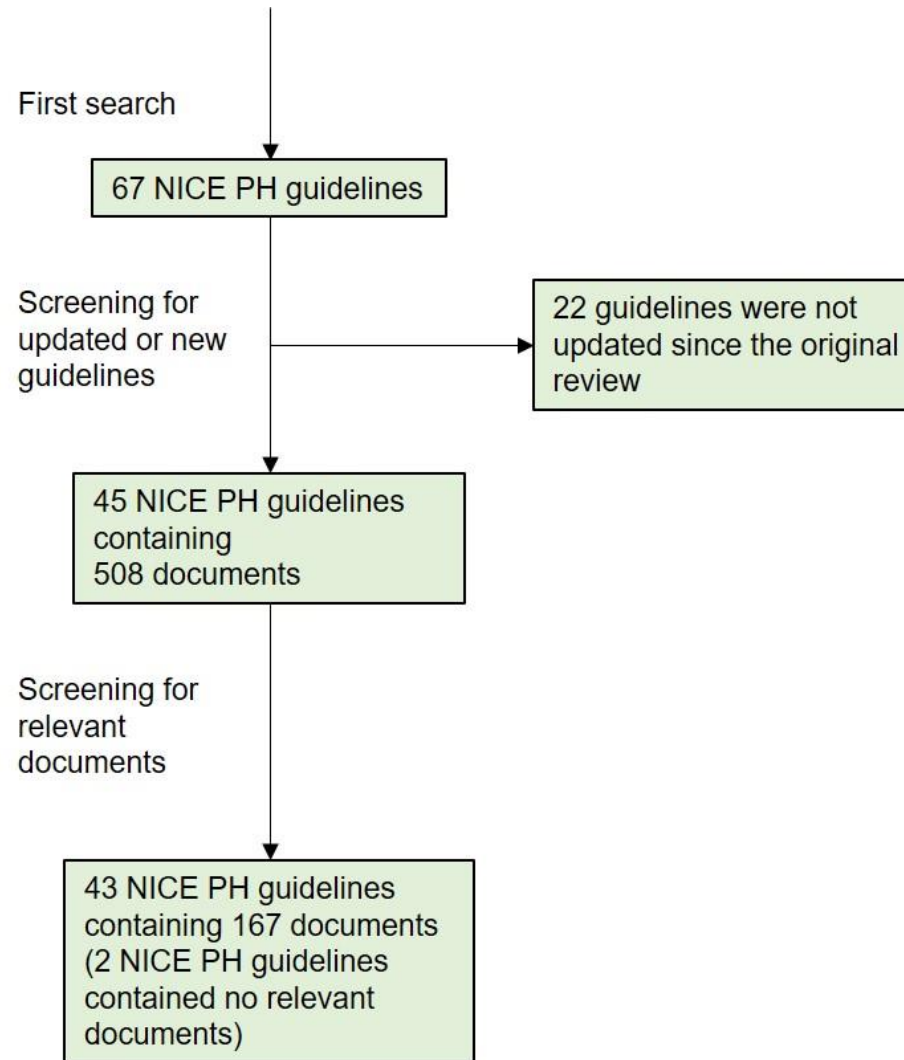
Background to the previous review

- Achana et al. (2014)[1] explored the use of evidence synthesis methodology in NICE public health guidelines published between 2006 and 2012.

- They found that only 23% of the NICE public health guidelines used pairwise meta-analysis as part of the effectiveness review and the remainder used a narrative summary or no synthesis of evidence at all.

- The authors concluded that uptake of methods in public health intervention evaluation is lower than other fields, including clinical treatment evaluation.

- More sophisticated methods should be considered to aid in decision making in the public health context.

[1]Achana F, Hubbard S, Sutton A, Kendrick D, Cooper N. An exploration of synthesis methods in public health evaluations of interventions concludes that the use of modern statistical methods would be beneficial. Journal of clinical epidemiology. 2014 Apr 1;67(4):376-90.

Methods

- Search conducted through the NICE website (https:// www.nice.org.uk/guidance).

- Some of the guidelines had been updated with new documents or merged so search criteria included all documents that had been published from inceptions (March 2006) until August 2019.

- The guidelines contained multiple documents that were assessed for relevance:
  - Systematic review of quantitative effectiveness
  - Systematic review of cost-effectiveness evidence
  - Decision modelling reports

- Extracted type of reviews, type of synthesis, details of the synthesis if they performed meta-analysis, lumping, complex interventions.

- Reasons for not using the meta-analysis in effectiveness evidence synthesis, where it was not performed.

Results: search results

First search

67 NICE PH guidelines

Screening for updated or new guidelines

22 guidelines were not updated since the original review

45 NICE PH guidelines containing 508 documents

Screening for relevant documents

43 NICE PH guidelines containing 167 documents (2 NICE PH guidelines contained no relevant documents)

Results: Comparison of methods to original review

Number of guidelines (%)	Original review (39 guidelines)	Updated review (45 guidelines)
No review	1 (3%)	2 (4%)
Narrative review only	29 (74%)	27 (60%)
Meta-analysis	9 (23%) – 1 NMA	14 (31%) - 1 NMA
Cost effectiveness review	38 (97%)	33 (73%)
Decision model	35 (90%)	34 (76%)
Evidence from RCTs only	2 (5%)	4 (8%)
Study quality assessed	38 (97%)	42 (93%)

Results: guidelines using meta-analysis

- Original review found that within 9 NICE guidelines, there were 10 reports that presented a meta-analysis of quantitative effectiveness.

- Within the 14 guidelines, there were 24 reports that included a meta-analysis of quantitative effectiveness.

Number of guidelines (%)	Original review (39 guidelines)	Updated review (45 guidelines)
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Study quality assessed	38 (97%)	42 (93%)

Results: guidelines using meta-analysis – comparison to original review

	Original Review (10 reports)	Updated Review (24 reports)
RCTs only	4 (40%)	12 (50%)
Final outcomes	6 (60%)	20 (83%)
Lumping of interventions	7 (70%)	12 (50%)
Random effects meta-analysis	8 (80%)	19 (79%)
Fixed effects meta-analysis	1 (10%)	2 (8%)
Forest plots for presentation	9 (90%)	21 (88%)
Assessed publication bias	1 (10%)	3 (13%)

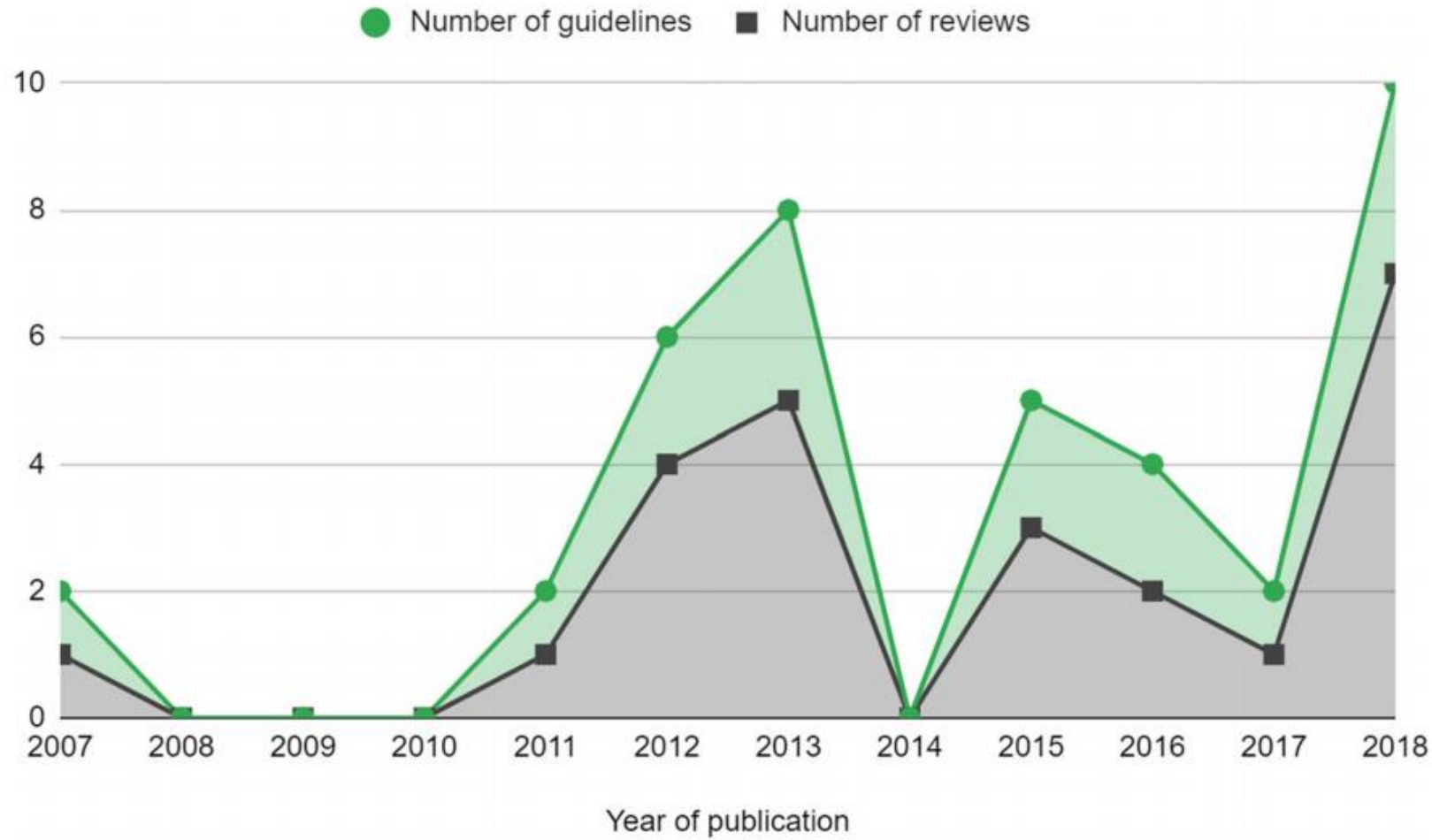# Results: guidelines using meta-analysis by year

Fig. 2 Number of meta-analyses in NICE PH guidelines by year. Guidelines that were published before 2012 had been updated since the previous review by Achana et al. (2014) [3]

Cases where network meta-analysis could have been used

Guideline	Review	Interventions description
NG48	Meta-analysis of dental plaque index	Sonicare toothbrush Education Chlorhexidine/ Xylitol gum Chlorhexidine mouthrinse Xylitol gum (All comparators included)
NG105	Meta-analysis of suicide prevention multi-agency partnerships	Army force Alliance against depression Multimodal community programme (Other interventions included as comparators)
NG103	Increasing flu vaccine uptake in children	Educational interventions SMS messaging interventions (usual care lumped with SMS basic) Provider prompts – community-base / secondary care (Other interventions included as comparators)

Cases where component network meta-analysis could have been used

Multiple components within the interventions

Guideline	Interventions description
Physical activity: exercise referral schemes (PH54)	Combination of counselling, written materials, super-vised exercise training.
Weight management: lifestyle services for overweight or obese adults (PH53)	Multi-component weight management programmes.
Smoking: acute, maternity and mental health services (PH48)	Pharmacological, psychological, behavioural, or self-help intervention components.
Type 2 diabetes: prevention in people at high risk (PH38)	Diet, physical activity, behaviour change intervention components.
Oral health for adults in care homes (NG48)	Assessments of oral health, maintaining access to dental services, staff training, oral health education, providing oral health resources.

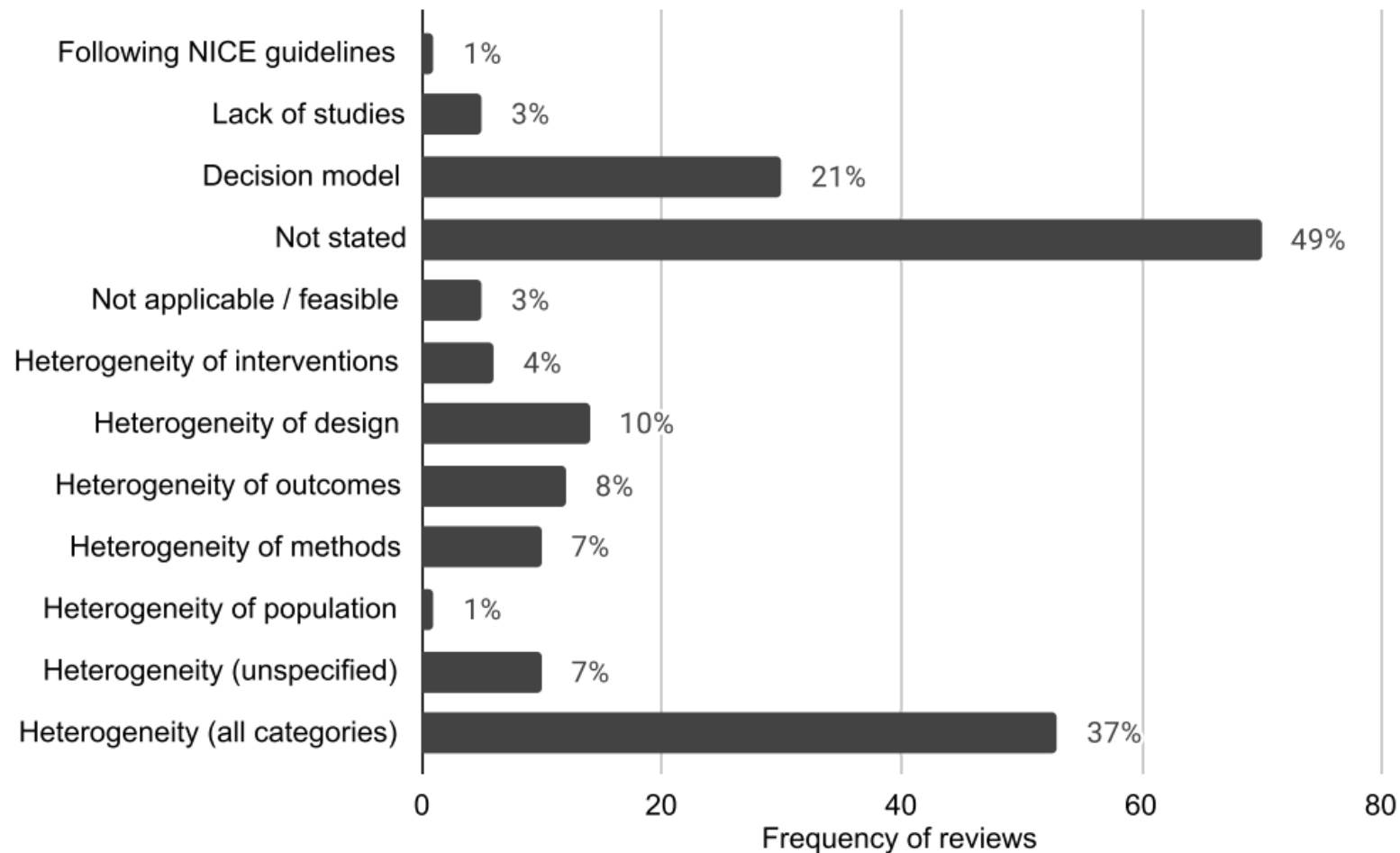# Results: reasons for not using meta-analysis

Fig. 1 Frequency and proportions of reasons reported for not using statistical methods in quantitative evidence synthesis in NICE PH intervention reviews

Conclusions (1)

- NICE guidelines containing meta-analysis remains low.

- The majority of the reviews presented only narrative summaries.

- Only one guideline used network meta-analysis and the rest used pairwise meta-analysis, often lumping different interventions together.

- This review demonstrated examples where more sophisticated methods, such as NMA and CNMA could be .

Conclusions (2)

- A high proportion of NICE guideline reports did not provide a reason for not applying quantitative evidence synthesis methods.

- The most common reason was heterogeneity.

- Meta-analytic methods can be used to investigate the sources of heterogeneity.

- Quantitative synthesis methods provide a stronger basis for making decisions than narrative accounts.