



DG SANTE – **Together**

Healthy diets pilot project for
pregnant and lactating women

Literature review and best practices



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Table of contents

CHAPTER 1 Pregnancy, health and nutrition: a structured literature review.....	5
Executive summary.....	6
Key messages	7
Introduction	8
1. Methodology.....	9
2. Findings	13
3. Discussion – Application of findings	74
4. Conclusions	78
Chapter 1 References.....	79
Appendix A.....	84
CHAPTER 2 Communication initiatives for disadvantaged and vulnerable populations: what works?	85
Executive summary.....	86
Key messages	90
Introduction	92
1. Methodology	95
2. Findings.....	110
3. Discussion - Application of findings.....	131
4. Conclusion	139
Annex	141
Chapter 2 References.....	142
CHAPTER 3 Best practices compilation.....	149
Introduction	150
1. Communication interventions	150
2. Overview of the findings	153
3. Recommendations	155
4. Key messages.....	157

5. Framing the message..... 159

6. Lessons learnt..... 163

7. Suggested channels..... 166

Selected literature and resources..... 169

CHAPTER 1

Pregnancy, health and nutrition: a structured literature review

A rapid literature review in support of community projects to promote healthier nutrition choices among pregnant and breastfeeding women in Europe

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Executive summary

Background: This structured literature review examined the scientific literature on the nutritional requirements for women who are pregnant, and those who are breastfeeding, to aid the design of an education campaign for delivery in five European cities.

The study objectives for this review were as follows:

1. To synthesise evidence on dietary requirements and actual dietary intake for pregnant and lactating women
2. To synthesise evidence on nutritional awareness of a healthy diet for pregnant and lactating women
3. To explore women's awareness of resources available and investigate their effectiveness and acceptability (e.g. food labels)

Method: This rapid structured review involved titles and abstracts being screened by one reviewer, rather than multiple reviewers as in a systematic approach. Four databases were searched using PICO; MATERNITY AND INFANT CARE, MEDLINE, AMED and EMBASE. Restrictions included only articles published in the past five years and those written in the English language. Not included were clinical trials, food fortification/vitamin supplementation, behavioural campaign studies, guidance focusing on women with medical complications, studies presenting data on current nutritional intake and experiments showing the association between nutrition and health. Randomised controlled trials testing the efficacy of the dietary components of behavioural campaigns aiming to improve health in pregnancy and after birth were included, as were systematic reviews of such randomised controlled trials.

Findings: Included in this review were 65 resources; 19 randomised controlled trials, 15 web pages, 11 research studies, 10 reports and 10 literature reviews. All resources are presented in tabulated form to give details in terms of their nutritional content, women's experiences and findings regarding campaign design.

Discussion: The review suggests that a healthy eating project that targets women early in their pregnancy with consistent and clear diet and nutrition advice is desired by pregnant women. Suggestions are made in relation to the content and delivery of the project. Additional details required to inform about the project are included to facilitate future focus groups.

Key messages

The following key messages have been defined in relation to the three objectives and taking into account the larger project design.

- **The campaign must target women early in pregnancy and support those at risk of poor nutrition.**
- **Women want dietary advice in pregnancy, as they are currently receiving conflicting advice and are more motivated to make changes during pregnancy.**
- **The campaign should promote steady gestational weight gain and postnatal weight loss.**
- **Campaign content should include:**
 - **Food safety and foods to avoid (high fat and sugar)**
 - **Healthy eating - food groups / balanced diet / portion sizes (not eating for two) / eat more fruit and vegetables / what to eat (including fish information) / Advice on hunger control and cravings and eating for comfort**
 - **Healthy drinking - drink more water and avoid alcohol and caffeine**
 - **Increase nutrient and vitamin intake, in particular: *Folic acid* and *Vitamin D***
- **The campaign should encourage and promote breastfeeding – increase fluid intake and avoid caffeine / alcohol.**
- **Campaigns should look at perceived benefits of a healthy diet for mother and child. This could include the link between a woman eating healthily and her baby having a healthy diet.**
- **Advice on weight gain amounts can be given if the country follows the Institute of Medicine’s guidelines, but this must be applied selectively, as not all countries use these guidelines.**
- **The numerous resources already provided should be used to support women and health professionals.**
- **Supervised diet campaigns should be offered as group-based campaigns or individual sessions with a health professional. Practical sessions and written information should also be considered.**
- **Behaviour change techniques should be used, including: self-monitoring, goal setting and feedback. Taxonomy must be followed when reporting behaviour change techniques.**
- **Food diaries and routine weighing should be considered as possible ways to offer feedback and tailor the campaign, and act as a method for self-monitoring.**

Introduction

Research on improving women's physical health during pregnancy and after birth has increased in recent years. This may be due to the focus of governments around the world on the issue as a result of increasing maternal obesity rates and a greater understanding of the impact of maternal obesity and gestational weight gain on pregnancy outcomes for mother and baby.

Dietary components have been suggested as the most important elements to support antenatal and postnatal women to maintaining a healthy weight (Tanentsapf, Heitmann, & Adegboye, 2011). Campaigns to reduce weight in postnatal women found no extra benefit when combining physical activity with dietary advice than with dietary components alone (Bertz, Brekke, Ellegard, Rasmussen, Wennergren, & Winkvist, 2012). A systematic review of weight management campaigns with a dietary component is currently underway by a team of researchers in Australia, as there is still no agreement on the effectiveness of diet campaigns on antenatal and postnatal weight gain (Spencer, et al., 2015).

Maternity obesity literature has seen an increase in studies testing the efficacy of weight management campaigns. A recent systematic review of this evidence concluded that a focus on dietary or physical activity advice and not weight management is more acceptable to women (Johnson et al., 2013).

Therefore, this review focuses on the dietary advice received by antenatal and postnatal women, with the aim of informing a public health project to improve the health of pregnant and postnatal women in five European countries; Bulgaria, Czech Republic, Denmark, Spain and England.

Objective

This structured literature review examines existing scientific literature on the nutritional requirements for women who are pregnant and those who are breastfeeding. Moreover, it will cover aspects related to the health of the mother as well as that of the child. It will also look at inequalities and specific risks faced by women in disadvantaged groups. This review will meet these specific objectives:

- **To synthesise evidence on dietary requirements and actual dietary intake for pregnant and lactating women.**
- **To synthesise evidence on nutritional awareness of a healthy diet for pregnant and lactating women.**
- **To explore women's awareness of resources available and investigate their effectiveness and acceptability (e.g. food labels).**

1. Methodology

Traditionally, there are two main types of review: narrative and systematic. Narrative reviews are learned accounts often based on expert opinion, which are relevant to a specific research question but are less structured and more subjective than systematic reviews, making them more prone to bias. The advantage of narrative reviews, however, is that they can make recommendations for practice.

Systematic reviews are comprehensive accounts, which follow rigorous scientific principles to synthesise large amounts of literature in order to answer a specific research question. The advantage of systematic reviews is that the explicit methods facilitate replication and reduce bias and thus are considered more trustworthy. However, systematic reviews may not always present a balanced view of the evidence as they rely heavily on hierarchies of evidence that favour randomised controlled trials. This reductionist approach can oversimplify complex phenomena and result in evidence-based practice that fails to take potentially important factors into account.

A third option is to conduct a structured literature review, which is a pragmatic alternative that avoids the extremes of subjective versus objective views associated with narrative and systematic literature reviews. Structured reviews follow the underlying principles of a systematic review without being formally restrictive. This approach may be more practical for exploratory research where there are particular knowledge gaps on the topic or population in question and therefore little evidence available to synthesise.

The important issue is the critical appraisal of available literature, which examines the research evidence in an organised and methodical manner, judging its value, trustworthiness and relevance. Therefore, this rapid review will follow a structured approach, and titles and abstracts will be screened by one reviewer, rather than following a systematic approach with multiple reviewers.

1.1. Search strategy

***Electronic databases:* An initial scoping search of MATERNITY AND INFANT CARE was undertaken to identify keywords and index terms used in publications on the topic. Search terms were refined by a scoping exercise. Following modification of these terms, an adaptation of the PICO framework was used to find relevant papers with key words truncated and synonyms of key search terms used (see table 1). Four databases were searched through OVID using a standardised search strategy to ensure rigor and flexibility; MATERNITY AND INFANT CARE, MEDLINE, AMED and EMBASE. Due to large numbers of returned papers and a number of papers containing out-dated advice, the following restriction was applied to the OVID search: past five years only. The search was not restricted by country of origin, due to the authors being aware that much research on this topic comes from around the globe (e.g., Australia, Canada, Sweden and the USA) but had to be written in English to be included. All journal articles that relate to the review objectives**

were included, along with evidence-based policy and guidance documents. Clinical trials and food fortification/vitamin supplementation studies aiming to improve health in pregnancy and after birth were not included, as they do not meet the objectives of this review; instead, these papers were searched for the guidance upon which the campaign content was based. Behavioural campaign studies aiming to improve health in pregnancy and after birth were included if they had a dietary component and if they were randomised controlled trials. Likewise, systematic reviews of randomised controlled trials of behavioural campaign studies with a dietary component were included. Studies or guidance focusing on women with specific medical complications (e.g., gestational diabetes or preeclampsia) were excluded due to the tailored nutritional needs of these women. Furthermore, studies and guidance for teenage parents and studies outlining nutritional needs of women from small sub-groups were excluded for the same reasons. Studies presenting data on current nutritional intake and experiments demonstrating the association between nutrition and health were excluded for not meeting the review objectives. Opinion papers and papers where only the abstract is available were excluded, as were PhD dissertations and conference abstracts.

Table 1. PICO search strategy (P AND [I AND O]).

Search terms	
Population	(Pregnant* OR Antenatal OR Postnatal OR prenatal OR Lactant* OR breastfeed*) AND women
Intervention	(Diet* OR Nutrition*)
Comparison	-
Outcome	Aware* OR Requirement* OR Resource OR Advice OR Intake

[(Pregnant* OR Antenatal OR Postnatal OR prenatal OR Lactat* OR breastfeed*) AND women] AND

[(Diet* OR Nutrition*) AND (Aware* OR Requirement* OR Resource OR Advice OR Intake)]

Additional searches: Due to the authors' prior knowledge of the subject area, and in order to ensure that all relevant material was included in the review, the following strategies were also employed: internet search, area scanning (the authors have expertise on this topic), citation search and author search (as suggested by Booth, 2008). The search terms for the Internet search were adapted from those in Table 1 and the abovementioned restrictions were applied.

1.2. Quality appraisal

Following the application of the search strategy and inclusion criteria to the electronic databases, all articles were reviewed by one reviewer first by title, then abstract and full text. Critical appraisal was conducted, using an adaption of the generic appraisal and scoring tool developed by Hawker et al (2002; see Appendix A). Hawker et al.'s tool was developed to assess the quality of disparate data that has been collected systematically. The tool consists of several forms but the one used here is the data extraction form that assesses methodological rigour. For further information on the classification of each of the nine categories, please see Appendix D in Hawker et al., 2002. The assessment criteria require articles to be rated using a scale from 'Very poor' to 'Good'. The review questions and rating criteria to assess the methodological rigour of evidence will enable each paper to receive an overall score for comparison purposes.

1.3. Results

Database search: The search was run and after duplicates were removed, 1588 studies were identified. Of these, 1530 were excluded at the title review stage. A large number of these excluded papers were clinical trials, which were reviewed in terms of the guidance upon which the campaign was based. A full text review resulted in a further 48 studies being excluded; the main two reasons were as follows: they only gave a nutrition status of a group or were basic science papers explaining what role nutrition has in pregnancy. The 25 included journal articles (12 randomised controlled trials, 9 research studies, two report summaries and two reviews) included were all assessed for quality and were rated 'Good' or 'Fair' for all criteria in the Hawker et al., 2002 tool.

Additional searches: An additional 17 journal articles (seven randomised controlled trials, eight reviews and two research studies), and eight reports were identified via Internet search, area scanning, citation and author search. In addition, the Internet search and area scanning highlighted 15 web pages that were written in English were accredited by a reputable source (including governments, governing bodies, charities and universities), and were aimed at increasing women with a normal pregnancy, and/or breastfeeding women's knowledge of healthy diets and/or physical activity. Five of the eight reports were pre-2010, however, as no further modifications of the guidance made in the reports were found, these reports were included in this literature review.

Table 2 shows a breakdown of all the included resources in this review and the source from which they were located.

Table 2. Breakdown of included resources by source (n=68).

Type of resource	Electronic database search	Additional searches (including internet search, area scanning, citation and author search)	Total
Randomised controlled trials	12	7	19
Web pages	0	15	15
Research studies	9	2	11
Reports	2	8	10
Literature reviews	2	8	10
Total	25	40	65

2. Findings

The resources located through the two-step search process totalled 65; 19 randomised controlled trials, 15 web pages, 11 research studies, 10 reports and 10 literature reviews. These were split into two groups for discussion in relation to the literature review objectives; a. papers that present guidance regarding dietary requirements (objective 1) and b. papers that present information on women's actual dietary intake and/or nutritional awareness of pregnant and breastfeeding women (objectives 1 and 2).

2.1. Papers that present guidance regarding dietary requirements

The majority of evidence to meet this objective came from the additional searches; namely the citation searches of excluded campaign studies and Internet searches. Eight reports and two journal articles presenting a report were included from the additional searches (namely the citation searches of the excluded campaign studies). All were produced by a government, or by independent bodies (National Institute of Clinical and Health Excellence, UK, World Health Organisation and British Nutrition Foundation, UK). These were from four countries (and one global): Australia, UK, Canada and USA. In most cases, the reports were aimed at health professionals. A summary of the advice given in these reports is presented below (see Table 3). There were six main messages in these reports for pregnant women:

- **Food safety – preparation and storage**
- **Food to avoid e.g., raw and unpasteurised**
- **Steady weight gain or loss recommended**
- **Eat healthy:**
 - **Eat food from the five food groups**
 - **Balanced diet (Eatwell Plate, UK and example recipes, Australia)**
 - **Drink more water**
 - **Avoid alcohol**
 - **Portion sizes**
 - **Eat more fruit and vegetables**
 - **Healthy eating must be discussed with women early in pregnancy**
 - **Must support women at-risk of poor nutrition (e.g., Healthy Start Initiative)**
- **Increase calorie intake – 350 in second trimester and 450 in third trimester (Canada)**
- **Increase nutrient and vitamin intake, in particular:**

- **Folic acid – 400-600 micrograms per day**
 - **Canada – 400 micrograms with no time limit stated and 0.4-1 milligram per day**
 - **UK – 400 micrograms or 5 milligrams if diabetes / history of neural tube defects until 12 weeks gestation**
 - **USA – 600 micrograms**
- **Iodine – 150-250 micrograms per day throughout pregnancy**
 - **150 micrograms – Australia**
 - **250 micrograms – World Health Organization**
- **Vitamin D – 10 micrograms throughout pregnancy (UK). At-risk women outlined: those with darker skin and those not exposed to sunlight**
- **Iron – needed in their diet (Canada) but not increased (UK)**
- **Protein – increase by 6 grams per day (UK)**
- **Calcium – none (UK) to increase (USA).**

There were three main messages in these reports for postnatal women:

- **Encourage and promote breastfeeding**
 - **Baby Friendly (www.babyfriendly.org.uk)**
- **Eat healthy**
 - **Three more servings of fruit and vegetable per day (Australia)**
- **Eat/take 10 micrograms of vitamin D per day (UK).**

Please see Table 3 on next page

Table 3.
Characteristics of included reports presenting guidance regarding dietary requirements.

Reference	Country	Funding / source	Aimed at	Key advice regarding diet during pregnancy for women	Key advice regarding diet following birth
<p>Health Canada (2007) Eating well with Canada's food guide: A resource for educators and communicators 2007. http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/pubs/res-educat-eng.pdf</p>	Canada	Government	Health professionals	<ul style="list-style-type: none"> • Take a folic acid supplement to increase intake (400 micrograms recommended) • Increase calorie intake as pregnancy continues (350 extra in second trimester and 450 extra in third trimester) • Iron supplements recommended. 	

<p>Healthy Eating during your pregnancy: Advice for eating for you and your baby. (n.d.) https://www.nhmrc.gov.au/files_nhmrc/publications/attachments/n55h_healthy_eating_during_pregnancy.pdf</p>	<p>Australia</p>	<p>Government</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • Achieve and maintain a healthy weight eating food from the five groups. • Drink plenty of water. • Prepare and store food safely. • Limit sugary, salty, fatty foods and drinks (examples of foods given). • Avoid alcohol. • Foods to avoid in pregnancy. • Importance of steady weight gain and not too much. • Pictorial depiction of portion sizes for the 5 food groups. Healthy recipe link. • Benefits of eating well for lifelong health, as well as pregnancy. 	<ul style="list-style-type: none"> • Encourage, promote and support breastfeeding.
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<p>IOM (1990; Committee on nutritional status during pregnancy and lactation, subcommittee for a clinical application guide). Nutrition during pregnancy and lactation: an implementation guide. Washington DC: National Academy Press. http://www.mchlibrary.info/pubs/PDFs/nutritionupdate.pdf</p>	<p>USA</p>	<p>Government – Institute of Medicine</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • If lose or gain weight do so slowly • Eat a healthy diet • Folate recommendations (600 micrograms) • Calcium recommendations. 	
<p>National Health and Medical Research Council (NHMRC): Food for health. Dietary guidelines for Australian adults. A guide to healthy eating. Canberra: NHMRC; 2003. https://www.nhmrc.gov.au/files_nhmrc/publications/attachments/n33.pdf</p>	<p>Australia</p>	<p>Government</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • Eat one more serving of fruit and one of vegetables - to provide extra folate, vitamin C and other micro-nutrients recommended. 	<ul style="list-style-type: none"> • Health benefits of breastfeeding outlined • Eat three more servings of fruit and two of vegetables to provide increases in vitamin A, folate, vitamins C and E, and other micro-nutrients at that time.

<p>Secretariat World Health Organisation, Andersson, N., de Benoist, B et al. (2007). Prevention and control of iodine deficiency in pregnant and lactating women and in children less than 2-years-old: conclusions and recommendations of the technical consultation. <i>Public health, 10</i>, 1601-1611.</p>	<p>Global</p>	<p>World Health Organization</p>	<p>Health professionals</p>	<ul style="list-style-type: none"> • Iodine recommendation for pregnant women is 250 g/d as opposed to 150 g/d as recommended for adults. 	
<p>The Society of Obstetricians & Gynaecologists of Canada (2009). Folic Acid for preconception and pregnancy. http://sogc.org/wp-content/uploads/2013/02/09FolicAcid_WebVersionE.pdf</p>	<p>Canada</p>	<p>Professional body – The Society of Obstetricians & Gynaecologists of Canada</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • Explains the important role of folic acid (folate or B9) in pregnancy • Gives examples of folic acid rich foods (e.g., asparagus and spinach) • Tells women to take a multivitamin with 0.4-1 milligrams of folic acid in. 	

<p>The National Health and Medical Research Council (NHMRC) Public Statement (2010). Iodine supplementation for pregnant and breastfeeding women. http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new45_statement.pdf</p>	<p>Australia</p>	<p>Government</p>	<p>Health professionals</p>	<p>• Recommendation of 150 micrograms of iodine per day.</p>	
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<p>The National Institute of Health and Clinical Excellence (NICE) (2010) Maternal and child nutrition (NICE Public Health Guidance 11). http://www.nice.org.uk/guidance/ph11/resources/guidance-maternal-and-child-nutrition-pdf</p>	UK	Independent body	Health professionals	<ul style="list-style-type: none"> • Recommend that all pregnant and breastfeeding women supplement with 10 micrograms of vitamin D daily. • Certain women are most at risk and thus vitamin D is needed (referenced the additional report ‘Vitamin D: Increasing supplement use amongst at-risk groups – PH56’: • Darker skin and those who cannot go into the sunlight. • Focus on women from groups with complex socio-demographic needs – outlines Healthy Start Initiative (women aged 18 or under, on income-support or income based job seekers allowance or earning under £14,495 per year). • Women must eat/take 400 micrograms per week of folic acid for the first 12 weeks of pregnancy. • If women are diabetic, they or 	<ul style="list-style-type: none"> • Recommend that all pregnant and breastfeeding women supplement with 10 micrograms of vitamin D daily. • Breastfeeding to be promoted exclusively for first six months and recommended to continue for as long as both mother and baby want it to. • Baby Friendly Initiative (www.babyfriendly.org.uk) is outlined. • Benefits of Breastfeeding described.
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				<p>their partner have a neural tube defect (NTD), they have had a baby with NTD or have a NTD family history need to take an additional 5 milligrams of folic acid.</p>	
<p>National Institute for Health and Care Excellence (2014). <i>Antenatal care: routine care for the healthy pregnant woman (CG62)</i>. London NICE, 2014</p>	<p>UK</p>	<p>Independent body</p>	<p>Health professionals</p>	<ul style="list-style-type: none"> • Nutrition and diet must be discussed with women at the booking appointment. • Foods to avoid are outlined (including raw and unpasteurised foods). • Women should eat/take 400 micrograms of folic acid per day for the first 12 weeks of pregnancy. • Women should eat/take 10 micrograms per day of vitamin D • Particularly women with darker skin and low exposure to sunlight. • Women should not have too much vitamin A (more than 700 micrograms) • Iron should not be routinely offered to women. 	

<p>Williamson C. & Wyness L. (2013). Nutritional requirements in pregnancy and use of dietary supplements. <i>Community Practitioner</i> 86 (8), 44-47.</p>	<p>UK</p>	<p>Summary of: Saunders, T.A. (2013). Maternal nutrition and infant feeding: Current practice and recommendations (pages 28-74). British Nutrition Foundation (2013) Nutrition and development: Short- and Long-term consequences for health. London: Wiley-Blackwell.</p>	<p>Health professionals</p>	<ul style="list-style-type: none"> • Women should follow a healthy diet in pregnancy – the ‘Eatwell Plate’ is referenced as a source of a varied diet (www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx) • Women should consume plenty of iron and folate-rich foods • No recommendations for extra calcium are made • Increased protein (6g per day) is required but most women currently eat more than this so no extra intake is needed. • Need to eat/take 400 micrograms of folic acid per day until 12 weeks gestation. • Need to eat/take 10 micrograms of Vitamin D per day • Details about women in at-risk groups are outlined (www.gov.uk/government/publications/vitamin-d-advice-on-supplements-for-at-risk-groups). 	<ul style="list-style-type: none"> • Need to eat/take 10 micrograms of Vitamin D per day.
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				<ul style="list-style-type: none">• Healthy start initiative (www.healthystart.nhs.uk)	
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The Internet search found 15 websites where dietary advice was offered (Table 4 summarises the key advice for women presented on the included websites). Ten of these were created by government organisations or departments. They came from a number of countries: USA, UK, Canada, Australia and New Zealand. In most cases, they were aimed at pregnant and postnatal women, but some were aimed at just pregnant women and at pregnant women, postnatal women and health professionals. A summary of the advice provided on these websites is presented below (for more information on each website, see Table 4).

11 key dietary advice messages were provided for pregnant women:

- Food safety in terms of what to avoid and the storage/preparation of food was given
- Foods to avoid were stated, including those high in sugar, salt and fat, caffeine (UK – no more than 200 mg per day) and alcohol (UK – no more than 1-2 units once or twice per week)
- The link between a woman eating healthy and her baby having a healthy diet was outlined
- Portion size advice was given, and the message that women are not eating for two was highlighted
- Drink plenty of water
- Eat food from all food groups (four in some countries and five in others)
- Eat 4-5 portions of fruit and vegetables per day
- Increase nutrient and vitamin intake, in particular:
 - **Folic acid** – 400-800 micrograms per day
 - Australia and Canada – 400 micrograms with no time limit stated
 - UK – 400 micrograms until 12 weeks gestation
 - USA – between 400-800 micrograms throughout pregnancy
 - New Zealand – 800 micrograms until 12 weeks gestation
 - **Iodine** – 150 micrograms per day throughout pregnancy (Australia and New Zealand only)
 - **Vitamin D** – 10 micrograms throughout pregnancy (UK only)
 - **Vitamin A** - 770 micrograms per day (USA. UK – do not increase vitamin A intake by much)
 - **Vitamin B₁₂** – 2.6 micrograms per day (USA only)
 - **Calcium** – 1,000 milligrams per day (USA only)
 - **Iron:**

- **Canada – 16-20 micrograms**
- **USA – 27 milligrams**
- **Omega 3- and 6- fatty acids – 12 oz. of fish per week (USA only).**
- **Increase calorie intake, in particular:**
 - **By 200 in last three months of pregnancy (UK)**
 - **By 300 in last six months (USA)**
 - **Do not increase calorie intake (Australia)**
- **Advice on weight gain amounts was given in all countries except the UK. This used the IOM guidance (IOM, 2009) and advised women to lose weight slowly and not to diet**
- **Numerous resources were provided to support women and health professionals, including:**
 - **Food plans and recipes**
 - **Food group diagrams (including ‘The Food Plate’ in the UK: www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx)**
 - **Links to local support and schemes (e.g., healthy start vouchers in the UK: www.healthystart.nhs.uk)**
 - **Tips for women regarding eating healthy on a budget and how to relax while avoiding alcohol**
 - **Body Mass Index calculators**

There were four main key dietary advice messages for postnatal women:

- **Gradual weight loss is recommended. This can be achieved by breastfeeding, healthy eating and being physically active**
- **If breastfeeding, avoid alcohol and caffeine, and increase fluid and vitamin intake**
- **Healthy eating is important for the whole family**
- **Get support from health professionals to lose weight**

Please see Table 4 on next page

Table 4.
Included web pages presenting guidance regarding dietary requirements for pregnant and postnatal women.

Name of website	Web link	Country	Funding / source	Aimed at	Key advice regarding diet during pregnancy for women	Key advice regarding diet following birth
Pregnancy and diet	http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/pregnancy_and_diet?open	Australia	Deakin University	Pregnant women and postnatal women	<ul style="list-style-type: none"> • Need to eat nutritious diet for healthy pregnancy and baby. • Importance of healthy weight gain. • Recommendation for healthy weight gain amount. • Foods to avoid, reduce foods high in sugar, salt and fat. • Eat food from the five groups. • Drink plenty of water. • Portion size. Do not eat for two. • Do not crash diet in pregnancy. • Avoid alcohol. • Food hygiene. • Boost nutrient not calorie intake. • Eat/take 400 micrograms of folic acid – examples of food high in folic acid given. • Eat/take 150 micrograms of iodine a day. • Do not need extra calcium intake. 	<ul style="list-style-type: none"> • Sensible diet is the best way to lose weight slowly after pregnancy and birth. • Eat/take 150 micrograms of iodine a day.

Health and nutrition information	http://www.choosemyplate.gov/pregnancy-breastfeeding.html	USA	Government - United States Department of Agriculture	Pregnant women and postnatal women	<ul style="list-style-type: none"> • Avoid food packed with empty calories. • Five food groups explained and accompanied by pictures. • Weight gain should be gradual. Calculator to work out optimal pregnancy weight gain based on pre-pregnancy height and weight. • Avoid alcohol, reduce high fat/sugar/salt content foods. • If too much weight gained, it is more difficult to lose post-natally. • Daily Food Plan for Moms tracks diet. 	<ul style="list-style-type: none"> • Benefits of breastfeeding for mum and baby. Great aid to weight loss. • If breastfeeding, increase fluids, need for certain vitamins and minerals increases. • Caution re caffeine and alcohol if breastfeeding. • Importance of safe preparation and storage of food.
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<p>Healthy eating you're pregnant or breastfeeding</p>	<p>http://www.eatforhealth.gov.au/eating-well/healthy-eating-throughout-all-life/healthy-eating-when-you%E2%80%99re-pregnant-or-breastfeeding</p>	<p>Australia</p>	<p>Government – eat for health</p>	<p>Pregnant women, postnatal women and health professionals</p>	<ul style="list-style-type: none"> • Risks from gaining too much pregnancy weight. Institute of Medicine recommendations for weight gain. Alternative weight gain table for Asian women. Do not lose weight in pregnancy. • Enjoy foods from the five groups and reduce/avoid foods high in sugar/salt/fat/alcohol. • Food safety including mercury in fish is mentioned (links given for more information). • Women should check what their nutritional needs are in case they need supplements. • Increase nutrient not calorie intake. • Lots of links to other pages and resources. 	<ul style="list-style-type: none"> • Avoid alcohol when breastfeeding. • Encourage and support breastfeeding.
<p>Food safety for Moms-to-be</p>	<p>http://www.fda.gov/Food/ResourcesForYou/HealthEducators/ucm081785.htm</p>	<p>USA</p>	<p>Government</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • Food safety. • Foodborne illnesses. 	

<p>Pregnancy and breastfeeding</p>	<p>http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/choose-choix/advice-conseil/women-femmes-eng.php</p>	<p>Canada</p>	<p>Government - Health Canada</p>	<p>Pregnant women and postnatal women</p>	<ul style="list-style-type: none"> • Gaining a healthy pregnancy weight can help baby have best start, improve long-term health and reduce complications. • Body Mass Index (BMI) calculator provided. Discusses low and high BMI implications. Institute for Medicine recommendations for weight gain given. Risks of insufficient weight gain discussed. • Do not eat for two. • Need to eat/take 400 micrograms of folic acid • Need to eat/take 16-20 micrograms of iron. 	<ul style="list-style-type: none"> • Gradual weight loss through breastfeeding and healthy and active lifestyle is encouraged.
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<p>Healthy start</p>	<p>http://www.healthystart.nhs.uk/food-and-health-tips/healthy-eating-in-pregnancy/</p>	<p>UK</p>	<p>Government</p>	<p>Pregnant women, postnatal women and health professionals</p>	<ul style="list-style-type: none"> • Eat Well plate for advice on food groups. • Reduce foods high in fat or sugar. • Foods to avoid. • Food safety, i.e. preparation and storage. • Link to healthy recipes. • Caffeine (no more than 200mg per day) and alcohol (no more than 1 or 2 units per week) recommendations. • Do not eat/take too much vitamin A. • Need to eat/take 400 micrograms of folic acid until 12 weeks gestation. • Need to eat/take 10 micrograms of vitamin D. 	<p>Benefits of breastfeeding for mum and baby.</p>
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<p>Pregnancy</p>	<p>http://www.health.govt.nz/your-health/healthy-living/pregnancy</p>	<p>New Zealand</p>	<p>Government - Ministry of Health</p>	<p>Pregnant women and postnatal women</p>	<ul style="list-style-type: none"> • Healthy weight gain in pregnancy and risks of putting too much weight on. • Body Mass Index calculator. • Do not diet. • Recommendations for healthy weight gain. • Do not eat for two. • Eat fruit and vegetables every day (four portions) and home cook food. • Healthy snacks (examples given). • Need to eat/take 800 micrograms of folic acid until 12 weeks gestation. • Need to eat/take 150mg of iodine. 	<ul style="list-style-type: none"> • Gradual weight loss in the postnatal period and this will help prior to further pregnancies. • Breastfeeding as an aid to weight loss. • Establish healthy eating before becoming pregnant again. • Need to eat/take 150mg of iodine.
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Have a healthy diet in pregnancy	http://www.nhs.uk/conditions/pregnancy-and-baby/pages/healthy-pregnancy-diet.aspx	UK	Government – National Health Service	Pregnant women and postnatal women	<ul style="list-style-type: none"> • Importance of a healthy diet. • No need to eat for two. • Eat Well plate. • Portion sizes explained. • Reduce foods high in salt, sugar and fat. • Safe food preparation and storage. • Healthy Start vouchers (more deprived families only). 	<ul style="list-style-type: none"> • Make eating well a priority for you and your family. • Talk to GP if you need to lose weight and don't crash diet. • Advice for time saving healthy options. • If breastfeeding and overweight, eat regular, healthy meals.
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<p>Nutrition4Baby</p>	<p>www.nutrition4baby.co.uk</p>	<p>UK – British Nutrition Foundation (based on 2013 report)</p>	<p>British Nutrition Foundation</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • What not to eat – e.g., raw and unpasteurised foods. • Food safety – preparation, cooking and storing. • Alcohol – limit to one or two units once or twice a week. • Eat/take 400 micrograms of folic acid per day up till 12 weeks gestation. • Eat/take 10 micrograms of vitamin D per day throughout pregnancy. • Do not drink more than 200mg of caffeine per day. • Healthy recipe ideas. • Advice on nausea and what to eat. • Snack tips. • Importance of omega 3 and omega 6 fatty acids outlined in weeks 13-16 and amount contained in fish presented. • Importance of iron in weeks 17-20 outlined and foods high in iron presented. 	
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Obesity prevention	http://www.hsph.harvard.edu/obesity-prevention-source/diet-lifestyle-to-prevent-obesity/	USA	University – Harvard Public Health	Pregnant women and postnatal women	<ul style="list-style-type: none"> • Pregnant woman’s weight is a modifiable factor that shapes foetal nutrition and health in later life. • Institute of Medicine recommendations for optimal pregnancy weight gain. • Start pregnancy at a healthy weight. • Aim for reasonable weight gain in pregnancy. 	<ul style="list-style-type: none"> • How rapidly baby gains weight, sleeps and how long it breastfeeds likely impacts on long term health. • Help children gain weight at a healthy rate.
Healthy eating, exercise and weight gain – before and during pregnancy	http://sogc.org/publications/healthy-eating-exercise-and-weight-gain-beforeand-duringpregnancy/	Canada	Professional governing body - Society of Obstetricians and Gynaecologists Canada	Pregnant women	<ul style="list-style-type: none"> • Body Mass Index calculator. • Recommended weight gain and risks for pregnancy for mum and baby. • Foods to avoid. 	

<p>Start for life</p>	<p>http://www.nhs.uk/start4life/</p>	<p>UK</p>	<p>Government – National Health Service</p>	<p>Pregnant women, postnatal women and health professionals</p>	<ul style="list-style-type: none"> • Eating healthily in pregnancy means baby eats healthy – focus on baby. • Don't eat for two. • Foods to avoid. • Portion size advice. • Links for recipes and healthy eating in pregnancy tips. • Healthy recipes on a budget. • Avoid alcohol and alternatives to help unwind, e.g. walk, and read. • Need to eat an extra 200 calories per day in the final three months of pregnancy. 	<ul style="list-style-type: none"> • If breastfeeding, limit alcohol consumption. Eat 5 a day, cut back on sugar, salt and fat. • Benefits of breastfeeding for mum and baby.
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<p>Tommy's</p>	<p>http://www.tommys.org/page.aspx?pid=295</p>	<p>UK</p>	<p>Charity</p>	<p>Pregnant women</p>	<ul style="list-style-type: none"> • Aim for five different colours of fruit and vegetables a day. • Avoid alcohol. • Reduce sugary/salty/fatty foods and swap for healthy options. • Examples of healthy power snacks. • Eat Well plate. • Meal examples. • Manage weight by eating healthily and keeping active. • Body Mass Index calculator provided. • Do not eat for two. • Foods to avoid. • Eat/take 400 micrograms of folic acid. • Eat/take 10 micrograms of vitamin D. 	
<p>What you need to know about mercury in fish and shellfish</p>	<p>www.epa.gov/fishadvisories/advice/</p>	<p>USA</p>	<p>Government – Environmental Protection Agency</p>	<p>Pregnant women, postnatal women and Health Professionals</p>	<ul style="list-style-type: none"> • It is safe to eat up to 12oz per week of fish and shellfish (that are low in mercury). 	<ul style="list-style-type: none"> • It is safe to eat up to 12oz per week of fish and shellfish (that are low in mercury).

<p>Women' s health. Pregnancy: Staying healthy and safe</p>	<p>http://womenshealth.gov/pregnancy/you-are-pregnant/staying-healthy-safe.html</p>	<p>USA</p>	<p>Government – Office on Women's Health, US Department of Health and Human Services.</p>	<p>Pregnant women and postnatal women</p>	<ul style="list-style-type: none"> • Need to increase nutrients and calories (300 more calories in last six months). • Sensible, balanced meals combined with regular physical fitness are still the best recipe for good health during your pregnancy. • Institute of Medicine guidelines for pregnancy weight gain. • Increased risk of obesity in later life if weight not lost by 6 months postpartum. • Eat from five food groups based on pre-pregnancy Body Mass Index and activity level. • Foods to avoid. • Safe food storage and preparation. • Recommendations re alcohol and caffeine intake. • Need to eat/take 400-800 micrograms of folic acid per day through pregnancy. • Need to eat/take 27 milligrams of iron per day. • Need to eat/take 1,000 milligrams of calcium per day. 	<ul style="list-style-type: none"> • Ask at 6 week postnatal check about eating to help return to a healthy weight. • Gradual weight loss over several months is the safest way. • Advice re avoiding alcohol if breastfeeding, avoiding high fat/sugar/salt content food. • Breastfeeding women can lose a moderate amount of weight without affecting milk supply.
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					<ul style="list-style-type: none">• Need to eat/take 770 micrograms of vitamin A per day.• Need to eat/take 2.6 micrograms of vitamin B₁₂ per day.	
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2.2. Papers that present information on women's actual dietary intake and/or nutritional awareness of pregnant and breastfeeding women

There were many papers in the search that presented data on pregnant women's nutritional status, but they tended to be relevant only to specific groups of women, none of which were the target groups for the larger project. Thus, papers were selected that:

- **Provided insight into women's nutritional awareness and the reasons for their diet in pregnancy;**
- **Constitute systematic reviews of randomised controlled trials containing a dietary component; or**
- **Constitute randomised controlled trials of a campaign containing a dietary component.**

Papers that provided insight into women's nutritional awareness and the reasons for their diet in pregnancy

11 relevant journal articles were included; nine from the database search and two from the additional searches. Table 5 summarises the characteristics of included studies presenting information on women's actual dietary intake and/or nutritional awareness of pregnant and postnatal women. Seven of the 11 included articles were qualitative studies, with six being focus group studies. The 11 papers were from five countries; USA, UK, Australia, Japan and Sweden. All but one study (Olander et al., 2012) used a sample of women who were currently pregnant. However, four of these had extra pregnancy-related criteria (e.g., Wennberg et al., 2013 included women with a previous stillbirth). The studies had a mix of aims to understand; pregnant women's knowledge of dietary advice; pregnant women's experience of dietary advice and factors influencing pregnant women's dietary behaviours.

There are four key findings across the 11 papers (each paper has been given a code RS1 – RS11, which corresponds to the reference study numbers in the Table 5 – see it in the next pages-):

- **Content of required dietary advice**
 - **Suggestions regarding dietary advice;**
 - **Quantity and type of fish (RS1)**
 - **What to eat (RS2)**
 - **Portion sizes (RS2)**
 - **Advice on hunger control and cravings (RS2, RS3, RS7)**
 - **Eating for comfort (RS3)**
 - **Address women's self-belief regarding weight and diet (RS10)**
 - **Include information on the body's dietary needs (RS7)**
 - **Include information about the perceived benefits for a healthy diet on mother and child (RS6)**

- **Delivery of required dietary advice**
 - **Suggestions as to how to best deliver the dietary advice women wanted were;**
 - **Written information (RS4)**
 - **Tailored advice for ethnicity (RS5)**
 - **Experts to deliver advice (RS8)**
 - **Group sessions (RS3 and RS9)**
 - **Other pregnant women delivering the sessions (RS9)**
 - **Practical session i.e. cooking demonstrations (RS9)**
 - **Early in pregnancy (RS4)**

- **Changes to food intake in pregnancy**
 - **Women reported changing their food intake in pregnancy, this included lower fish intake (RS1) and cravings of unhealthy foods (RS3 and RS7)**

- **Women demonstrated a lack of knowledge**
 - **Women report a lack of information about a healthy diet (RS2, RS4 and RS11) and in particular fish intake (RS1).**

Please see Table 5 on next page

Table 5.
Characteristics of included research studies presenting information on women’s actual dietary intake and/or nutritional awareness of pregnant and postnatal women following quality appraisal

Reference [study number]	Country	Study aim	Study design	Sample	Findings	Implications / conclusion
Bloomingtondale, et al. (2010). [RS1]	USA	To understand women’s fish intake in pregnancy. Including their knowledge of the health benefits and where they got this information.	Qualitative – focus group study. Immersion-crystallization approach	Adverts used to recruit women in Boston area, pregnant and aged 18 or older who consumed less than two portions of fish per week (not due to medical reasons). N=22 13 – white, 5 – black, 2 – Hispanic and 2 – other 10 – pregnant for the first time 19-35 years old 18 – some college education.	<p>Knowledge</p> <ul style="list-style-type: none"> • Most knew fish contained mercury • Most knew mercury is dangerous <p>Advice</p> <ul style="list-style-type: none"> • Most did not have advice regarding fish intake or diet with health care professional • Most women did not listen to advice from friends and family <p>Behaviours</p> <ul style="list-style-type: none"> • Women decreased sushi and tuna intake in pregnancy <p>Barriers</p> <ul style="list-style-type: none"> • Barriers to fish intake were: a lack of knowledge, expense and pregnancy-related nausea <p>Facilitators</p> <ul style="list-style-type: none"> • If they were aware of what 	<ul style="list-style-type: none"> • Women are aware of fish containing mercury but have less knowledge about the nutritional benefits of eating fish. • Women would eat more fish if they had accessible advice regarding what and how much is safe.

					<p>they could eat and how much</p> <ul style="list-style-type: none"> • If their partner likes fish <p>Emotions</p> <ul style="list-style-type: none"> • Confusing messages around fish • Scary eating fish <p>Diet philosophies</p> <ul style="list-style-type: none"> • Better to be safe than sorry • Women in other countries eat fish. 	
<p>Brown & Avery (2012). [RS2]</p>	<p>UK</p>	<p>Explore the gestational weight management information and advice given to women.</p>	<p>Questionnaire – mixed methods.</p> <p>Mann-Whitney U and chi-squared tests.</p> <p>Thematic content analysis</p>	<p>Women recruited through National Childbirth Trust; online and at classes in one area of UK. Women had to be pregnant with a singleton birth</p> <p>N=59</p> <p>Mean age = 32.7</p> <p>First pregnancy = 42.</p>	<p>Quantitative findings:</p> <ul style="list-style-type: none"> • 43 women received information/advice about diet and/or exercise in pregnancy • The majority were from health care professionals • Most of the information/advice was about diet • Information/advice was limited. <p>Qualitative findings (4 themes):</p> <ul style="list-style-type: none"> • Weight gain advice wanted • Diet and exercise advice wanted (i.e. what foods to eat, portion sizes and advice on controlling hunger) 	<ul style="list-style-type: none"> • Women want advice about diet but are not getting it. • Many women ‘self-study’ for the advice they want. • Advice should be personalised, detailed and consistent.

					<ul style="list-style-type: none"> • Lack of advice and support • Anxiety about weight gain. • 	
Chang, et al (2014). [RS3]	USA	<p>Identify factors that influence healthy eating in pregnancy.</p> <p>Concepts from two models of behaviour were used: Social Cognitive Theory and Self-Determination Theory.</p>	<p>Qualitative focus groups – content analysis.</p>	<p>Women were recruited through an invitation. They were from low-income groups and were part of a children’s nutrition programme. They had to have a body mass index of 25 or more, be 18 or older, understand English and be African American or non-Hispanic white.</p> <p>N=96 (7 focus groups)</p> <p>African American (n=44) or non-Hispanic white (n=52)</p> <p>Mean age = 25.9</p> <p>40 = high school or less education.</p>	<p>Barriers and facilitators for healthy eating:</p> <p>Self-control</p> <ul style="list-style-type: none"> • Craving for unhealthy foods • Eating foods for comfort • Eating for two was encouraged <p>Situation</p> <ul style="list-style-type: none"> • Ate fast foods (e.g., time) • Expense of healthy food • Healthy food is more perishable <p>Behavioural capacity</p> <ul style="list-style-type: none"> • Substitute unhealthy food for healthy foods • Remind themselves to not overeat • Stop eating in the car <p>Autonomous Motivation</p> <ul style="list-style-type: none"> • Need to pick food more carefully. 	<ul style="list-style-type: none"> • Women wanted support from peers as withdrew from social lives but found attending face-to-face groups hard due to time and childcare. • Interventions addressing healthy eating must take into account: • Women over eat as emotional eaters, uncontrollable cravings and were ‘eating for two’ • Women did not like cooking, had no time to cook, liked eating out and thought home cooked meals were expensive.
de Jersey et	AUSTRALI	Describe the	Self-	Women were	<ul style="list-style-type: none"> • Low number reported the 	<ul style="list-style-type: none"> • Health professionals

<p>al (2013). [RS4]</p>	<p>A</p>	<p>nutrition behaviours and knowledge of overweight and healthy pregnant women and outline their experience of early pregnancy advice from health professionals.</p>	<p>administered semi-quantitative survey</p>	<p>recruited through a teaching hospital if attending for antenatal care via post or face-to-face. Women were excluded if they had diabetes or were not fluent in English. N = 582 Mean age = 29 60% = first time mothers</p>	<p>recommended daily amount of fruit and vegetable intake (8 and 36%)</p> <ul style="list-style-type: none"> • 80% would attend sessions to find out more amount nutrition • Written information (45%), individual sessions (25%) and group/individual sessions (26%) were favoured • 55% wanted information when they first found out they were pregnant and 35% when they first came to clinic • Dietary recommendation knowledge was poor • Advice from health professionals was limited. 	<p>have an important role in advising and supporting pregnant women with healthy diet information.</p> <ul style="list-style-type: none"> • Women want advice from health professionals so campaign delivery needs to be targeted.
<p>Ferrari et al (2013). [RS5]</p>	<p>USA</p>	<p>To gain understanding of pregnant women's experiences of diet advice from health professionals.</p>	<p>Qualitative focus groups.</p>	<p>Women were recruited via flyers and clinics. They had to be between 18-35 years old, 27-40 weeks gestation, speak English or Spanish and be non-Hispanic African American / Hispanic / non-</p>	<ul style="list-style-type: none"> • Women reported confusing advice as not tailored to their needs and changes (not for Hispanic women) • Women reported overwhelming advice and worried they would not meet the guidelines as they were so specific • Women didn't follow dietary advice as didn't agree with it, didn't want to or couldn't 	<ul style="list-style-type: none"> • Women need clearer, more consistent dietary advice • Dietary advice is needed at several points in pregnancy • Difference by ethnic group in terms of views of advice.

				<p>Hispanic white. N=58 Mean age = 26 Some college / college = 30.</p>	<p>follow it.</p>	
<p>Gardner et al (2012). [RS6]</p>	<p>UK</p>	<p>Assessed women's attitudes and motivations regarding their diet and aimed to model intentions to eat a healthier diet.</p>	<p>Cross-sectional questionnaire study (based on the Health Belief Model and Subjective Norms)</p>	<p>Women were recruited in antenatal clinic. N=103 Mean age = 33 Between 8 and 40 weeks gestation 66% were first time mothers 74 had a university education 70% white British.</p>	<ul style="list-style-type: none"> • Perceived benefits for mother and baby increased intentions to eat more fruit and vegetables and reduce sugar intake. • There was no effect of threat, barriers or subjective norms. 	<ul style="list-style-type: none"> • Healthy diet campaigns should put emphasis on positive outcomes for mother and baby.
<p>Groth & Morrison-Beedy (2013). [RS7]</p>	<p>USA</p>	<p>Understand the dietary views of African-American pregnant women with a low-income.</p>	<p>Qualitative focus groups.</p> <p>Content analysis.</p>	<p>Women had to be African-American pregnant women with a low income and were recruited through clinics and a community supplementary programme for children.</p>	<p>Themes</p> <ul style="list-style-type: none"> • Despite best intentions, appetite, taste and cravings drive eating behaviour • What they wanted was more important than what they knew was good for them • I'll decide for myself what to eat 	<ul style="list-style-type: none"> • Campaigns should contain information about managing pregnancy effects, cravings and look at what tastes good that is healthy. • Their body's needs must be taken into account.

				<p>N=26 50 = 21-29 years of age 7% = college education</p>	<ul style="list-style-type: none"> • They felt their bodies knew best not anyone else • Eating out is a way of life. 	
<p>House & Coveney (2013). [RS8]</p>	<p>AUSTRALIA</p>	<p>Understand the factors that influence women's trust in food and sources of information about food safety.</p>	<p>Qualitative – interviews.</p>	<p>Study information sheet was given out to pregnant women at many locations. Women had to be over 18 years of age and pregnant. N=13</p>	<ul style="list-style-type: none"> • Nutrition and food quality was the most common influence on food choice – freshness was key • Believed that foods offered for sale must be safe and wholesome • Multiple sources of information: experts, literature, lay persons and internet • Risks are taken and high-risk foods consumed 	<ul style="list-style-type: none"> • Women need more information about food safety from experts.
<p>Olander, et al (2012). [RS9]</p>	<p>UK</p>	<p>Identify which characteristics women think are important in support services to help them eat healthily.</p>	<p>Qualitative – focus groups. Thematic analysis.</p>	<p>All recruited following children's centre antenatal and postnatal groups from one area in The Midlands, England. Women had to be pregnant or</p>	<p>Themes:</p> <ul style="list-style-type: none"> • Early information leading to routine formation of healthier eating habits • More time pre-partum • The delivery of practical sessions to increase information 	<ul style="list-style-type: none"> • Women want dietary advice early in pregnancy to set up a routine. • Women want to interact with other women. • Practical sessions are needed to help them

				<p>postnatal. N=23 (n=9 prenatal and n=14 postnatal) No demographics provided.</p>	<ul style="list-style-type: none"> • Practical session needed • Sessions delivered by mothers • Group sessions • Health professionals providing support and signposting to services • Should be advertised through midwife. 	<p>cook inexpensive meals.</p>
<p>Takimoto et al., (2011). [RS10]</p>	<p>JAPAN</p>	<p>To understand the role of self-belief, attitudes towards pregnancy related physical changes and dieting behaviour in women.</p>	<p>Quantitative questionnaire.</p>	<p>Pregnant women in one prenatal clinic in Tokyo were given the questionnaire. N=248 Mean age = 31</p>	<ul style="list-style-type: none"> • 36% were currently dieting • 78% based on self-judgement • 15% following advice • 69% believed that smaller babies would lead to easier delivery. 	<ul style="list-style-type: none"> • Women's self-beliefs in relation to weight and eating must be considered and included in campaigns.
<p>Wennberg et al (2013). [RS11]</p>	<p>SWEDEN</p>	<p>To describe pregnant women's experience of dietary information and changes to their diet.</p>	<p>Qualitative study – focus groups.</p>	<p>Women having their first baby who had previously had a stillbirth were recruited through antenatal classes in five areas in Sweden.</p>	<p>Themes:</p> <ul style="list-style-type: none"> • Dietary information gain • They had to find out information for themselves • Only received health professional support when they had a problem 	<ul style="list-style-type: none"> • Women had trouble with dietary advice but managed alone as seek their own advice – they do want support • Midwives need dietary

				<p>N=23 Mean age = 29 16 = University degree.</p>	<ul style="list-style-type: none"> • Reactions to dietary information • They were confused by the advice • They felt they were being monitored • Dietary management • Common sense, body signals and checking food. 	<p>knowledge and counselling skills to support women early in pregnancy with healthy eating advice.</p>
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Systematic reviews of randomised controlled trials containing a dietary component.

Ten systematic reviews of randomised controlled trials were included (see Table 6). Seven conducted a meta-analysis of the findings and one also did a thematic analysis of qualitative papers. The majority had the primary outcome measure of gestational weight gain; two had postnatal weight gain, and one maternal and foetal risk. The reviews encompassed a range of included papers; 9-44 (median of 12) and most were from developed and high-income countries. The review papers did not contain detailed information on the campaign components for each, and included randomised controlled trials, so this information differed between reviews. Seven of the 10 reviews found that campaigns with dietary components had a significant impact on women. The one review that included qualitative papers gives us some insight into the mechanism of change (R2), and concluded three themes; pregnancy as a time for change, conflicting messages and a lack of control. There are three main conclusion points to these reviews:

- **The findings of these reviews should be considered with caution, as the quality of the studies they include tend to be of poor to medium quality (RCT5). One review reported on-going studies, making interpretation difficult (R4) and only one review included qualitative findings that provide some insight into the mechanisms of change (R3).**
- **Self-monitoring is an important behaviour change technique, which when used in dietary campaigns helps women to make changes to their behaviours (R7).**
- **Supervised physical activity and diet campaigns may be successful in changing behaviour and thus restricting weight gain (R3). This would offer support for more group-based campaigns or individual sessions with a health professional.**

Table 6.
Characteristics of systematic reviews of randomised controlled trials of antenatal and postnatal campaigns containing dietary components.

Reference [study number]	Aim	Method	Dietary components campaign	Results	Conclusion
Agha, M., Agha, R.A., & Sandell, J. (2014). [R1]	Examine the efficacy of pre-conceptual and antenatal behavioural campaigns to manage gestational weight gain in women who have a BMI≥25.	<p>Systematic review and Meta-analysis.</p> <p><i>Included:</i> English language, weight management campaigns with a parallel group, pregnant or women planning to be pregnant.</p> <p><i>Excluded:</i> Studies with co-morbid conditions.</p> <p><i>Primary outcome measure:</i> gestational weight gain.</p>	<p>Eight = advice on diet and physical activity – regular feedback and motivational talks about weight gain.</p> <p>Three = provision of nutrients and food and physical activity</p> <p>Two = provides diet and physical activity</p> <p>One = Diet advice and feedback.</p>	<p>15 studies (n=3426)</p> <p>-14 pregnancy and 1 pre-conception.</p> <p>Campaign group had a lower gestational weight gain compared to the control group (14 study groups, n=1771, mean difference = 1.66kg, 95% confidence interval – -3.12 to -0.21).</p>	<p>Antenatal behavioural campaigns may be effective in reducing gestational weight gain for obese women.</p> <p><i>Limitations:</i> All high income countries studied and not all used Intention to Treat analysis.</p>

<p>Campbell et al., (2011). [R2]</p>	<p>Examine the effectiveness of behavioural campaigns aiming to prevent excessive gestational weight gain and to explore influential factors.</p>	<p>Systematic review, Meta-analysis and thematic-synthesis.</p> <p><i>Included:</i> Women must be 18 or over, have a BMI of 18 or more, OECD countries only, dietary components included and qualitative or quantitative studies.</p> <p><i>Excluded:</i> Underlying medical conditions.</p> <p><i>Primary outcome measure:</i> Weight related outcomes.</p>	<p>4 = diet and PA advice and 1 = diet advice only. Delivered by a health professional, contact time ranged from one hour to 10 x one hour sessions. Food principles = ≥5 portions of fruit and vegetables a day, high fibre bread and low intake of high energy / low nutritional content snacks. Delivery included: face-to-face, phone calls, software, monitoring of weight, feedback on weight and food diaries.</p>	<p>8 – Qualitative studies and 5 – RCTs.</p> <p><i>RCTs:</i> No significant evidence that dietary campaigns (with or without PA) reduced gestational weight gain.</p> <p><i>Qualitative findings:</i> Three themes – pregnancy as a time for change, conflicting messages and a lack of control.</p>	<p>Dietary campaign had no significant effect on gestational weight gain. The conflicting messages reported by women must be addressed in campaigns. Many types of campaigns are needed including community based one.</p>
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<p>Choi, Fukuoka, & Lee (2013). [R3]</p>	<p>To examine the effectiveness of PA and PA and diet campaigns for overweight and obese women to manage their pregnancy and postpartum weight.</p>	<p>Systematic review and Meta-analysis. <i>Included:</i> RCTs, women had a BMI ≥ 25 and pregnant or postpartum, campaigns targeted increasing physical activity and measured weight. <i>Primary Outcome Measure:</i> Weight change.</p>	<p>Nine of the 11 studies had a PA and diet campaign (two were PA only). Mix of group and individual sessions. The pregnancy face-to-face contact ranged from once to three times. The delivery methods used were; phone calls, feedback, prompts, food diaries, counselling and low fat and low calorie meal provision.</p>	<p>11 studies: 7 with pregnant women and 4 with postpartum women. Women who were given PA and diet campaigns had a significantly lower average gestational weight gain (-1.17kg) and a higher average postpartum weight reduction (-1.50kg) than the control group.</p>	<p>PA plus diet campaigns were the most effective in terms of impact on weight. These campaigns may need more than just advice, including supervised programmes or tailored goals.</p>
<p>Dodd, J.M., Grivell, R.M., Crowther, C.A., & Robinson, J.S. (2010). [R4]</p>	<p>Assess the benefits and harm of antenatal campaigns for overweight and obese women.</p>	<p>Systematic review. <i>Included:</i> Dietary / lifestyle campaign was provided to women who are overweight or obese. Published RCTs. <i>Primary outcome measure:</i> Large for gestational age infants.</p>	<p>Content of the dietary advice was: Dietician information and feedback, Dietician and written feedback, Calorie-restricted diet, Dietician contact and no diet advice.</p>	<p>Nine on-going studies (n=743) -7 = dietary campaign No significant difference for large for gestational age babies or gestational weight gain between campaign and control group.</p>	<p>The impact of campaigns on gestational weight gain is unclear. <i>Limitations:</i> On-going studies so poor quality and little data</p>

<p>Oteng-Ntim, E., Varrna, R., Croker, H., Poston, L., & Doyle, P. (2012). [R5]</p>	<p>Assess the efficacy of antenatal campaigns on overweight and obese women in improving outcomes</p>	<p>Systematic review and Meta-analysis.</p> <p><i>Inclusion:</i> RCTs and non-RCTs testing the effectiveness of antenatal dietary/lifestyle campaigns on pregnant women with a BMI\geq25.</p> <p><i>Exclusion:</i> Systematic reviews, observational studies, pre-conceptual campaigns, postpartum campaigns and studies including women with existing gestational diabetes.</p> <p><i>Primary outcome measure:</i> Gestational weight and gestational diabetes.</p>	<p>Content of the dietary advice was; Nutrition information, Individualised nutritional plans, dietician visits, dietary counselling, written information and record dietary information.</p>	<p>19 studies all from developed countries. 13 RCTs (n=1,228) and 6 non-RCTs (n=1,534).</p> <p>10 RCTs measured gestational weight gain, a significant difference was found compared to the control group (10 RCTs, n=1,228; -2.21kg [95% CI, -2.86 to -1.57kg]). A trend towards a reduction in gestational diabetes was also found.</p>	<p>Antenatal lifestyle campaigns for obese and overweight women significantly restrict gestational weight gain.</p> <p><i>Limitations:</i> Poor-medium (5 RCTs) quality of the included studies.</p>
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<p>Skouteris, H., et al., (2010). [R6]</p>	<p>Identify the variables designed to reduce excessive weight gain.</p>	<p>Systematic review. <i>Inclusion:</i> English papers and campaign to prevent gestational weight gain. <i>Exclusion:</i> Adolescents, postpartum women and campaigns targeting diabetes. <i>Primary outcome measure:</i> gestational weight gain.</p>	<p>Dietary campaigns contain: written and oral information on health, dietary counselling and written materials with nutritional counselling.</p>	<p>10 studies; 5 diet and PA and 1 = diet only. Only one study found a reduction in gestational weight gain in campaign group for all BMIs. Other studies found campaigns had impacts on subgroups of women only (e.g., different BMIs).</p>	<p>Inconsistent findings regarding the impact of dietary campaigns on gestational weight gain were found. Psychological factors must be considered.</p>
<p>Streuling, L., Beyerlein, A., & von Kries, R. (2010). [R67]</p>	<p>Review published data to understand if diet and PA campaigns reduce gestational weight gain.</p>	<p>Meta-analysis. <i>Inclusion:</i> English and German papers, campaign for healthy women, singleton pregnancies, control group of no campaign and campaign containing PA and diet components. <i>Primary outcome measure:</i> gestational weight gain.</p>	<p>Dietary campaigns contain: nutritional counselling (40% carbohydrates, 30% protein and 30% fat), information about nutrition (e.g., lower high energy/low nutritional content foods and drinks, lower saturated fat intake and high fibre), cooking demonstrations, self-monitoring of diet in a diary, tips in a newsletter and pregnancy goals to reduce fat intake and increase fruit and vegetable intake.</p>	<p>Nine studies included; 4 RCTs and 5 non-RCTS (n=1,549). A significantly lower gestational weight gain was found in the campaign groups (mean difference of -0.22, 95% CI: -0.38, -0.05 units).</p>	<p>Diet and PA campaigns with self-monitoring components are successful at lowering gestational weight gain.</p>

<p>Tanentsapf I., Heitmann B.L. & Adegboye A.R.A., (2011). [R8]</p>	<p>Evaluate the effect of antenatal dietary campaigns on gestational weight gain and maternal outcomes.</p>	<p>Systematic review and Meta-analysis.</p> <p><i>Inclusion:</i> RCTs and QCTs with a control group assessing the effect of dietary campaigns on gestational weight gain for women over 18.</p> <p><i>Exclusion:</i> women taking medication, at risk for insufficient weight gain or women with a BMI<18.5.</p> <p><i>Primary outcome measure:</i> percentage of women gaining weight over IOM guidelines.</p>	<p>Seven had physical activity and diet and four had an extra component: motivational phone calls and written information.</p> <p>Dietary campaigns contain: educational feedback on weight gain, face-to-face counselling and dietary advice (low energy diet – 1220-2000 kcal/day or dietary intake – 40-60% carbohydrates, 10-30% protein and 30% fat).</p>	<p>13 studies: 10 trials, 11 were in Western countries.</p> <p>10 trials (n=1434) = A significantly lower gestational weight gain was found in the campaign group compared to the control group (weighted mean difference = -1.92kg; 95% CI=-3.65/-0.19, p=0.03).</p>	<p>Antenatal dietary advice is effective in reducing gestational weight gain.</p>
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<p>Thangaratnam, S., et al. (2012). [R9]</p>	<p>Examine the effects of antenatal dietary and lifestyle campaigns on maternal and foetal weight.</p>	<p>Systematic review and Meta-analysis.</p> <p><i>Inclusion:</i> RCTs evaluating antenatal dietary or lifestyle campaigns to influence maternal and foetal weight.</p> <p><i>Exclusion:</i> women who have a BMI<18.5.</p> <p><i>Primary outcome measure:</i> weight related changes in mother and baby.</p>	<p>Three types of campaigns: diet (n=13), PA (n=18) and mixed (n=13).</p> <p>Dietary components are: balanced diet advice (carbohydrates, protein and fat) and a food diary.</p>	<p>44 RCTs (n=7278). 34 RCTs (n=5481) measured gestational weight gain. In comparison to the control group, women in the campaign group had a reduction of weight gain of 1.42kg (95% CI; 0.95kg to 1.89kg; r<0.001).</p> <p>Dietary campaigns had the largest reduction of 3.84kg (95% CI; 2.45kg to 5.22kg; p<0.001).</p>	<p>Antenatal dietary and lifestyle campaigns can reduce gestational weight gain.</p> <p>Diet campaigns are the most effective at reducing gestational weight gain.</p>
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<p>Van der Plight, P., et al., (2013). [R10]</p>	<p>Evaluate effectiveness of lifestyle campaigns to lower postnatal weight retention.</p>	<p>Systematic review. <i>Inclusion:</i> Campaign studies aimed at lowering postpartum weight retention. <i>Exclusion:</i> campaigns that started in pregnancy not aiming to reduce postpartum weight and non-singleton pregnancies. <i>Primary outcome measure:</i> Postpartum weight retention, loss or monitoring.</p>	<p>Nine contained a dietary component (2 = PA only). Two had theoretical underpinnings. Dietary content: diet counselling, written information, restriction of dietary intake, calorie restriction and dietary restriction (pre-weight food 35% energy deficit).</p>	<p>11 studies; 10=RCTs. Seven RCTs were successful in reducing postpartum weight retention (all had dietary components).</p>	<p>Individual diet and physical activity campaign are successful in lowering gestational weight gain.</p>
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Randomised controlled trials of a campaign containing a dietary component

19 randomised controlled trials testing the efficacy of campaigns with a dietary component were included. Fourteen campaigns were reported on, with three featuring in several papers (e.g., RCT2 and RCT4 / RCT5, RCT6, RCT7 and RCT15 / RCT9 and RCT 10 reported on the same campaigns).

The campaigns came from a range of developed countries; Australia, Belgium, USA, Canada, Denmark, Germany, Italy, Sweden and the Netherlands. The majority of these campaigns had samples of overweight and obese women, with only six studies recruiting women of all weights to the campaign.

All campaigns had gestational or postpartum weight gain as a primary or secondary outcome measure, the majority reported on more than one outcome (usually weight and eating/physical activity behaviour). Only four studies found non-significant results (two of these were studies of the same campaign and significant results were reported elsewhere). One of these studies was the only one to focus solely on postnatal weight with a postnatal campaign (RCT19) and the other involved telephone and face-to-face counselling (RCT1). The studies all differed in the quantity of details provided concerning the campaign and control groups, with one or two paragraphs outlining the campaign content. The key messages from the successful campaigns can be summarised as follows:

- **There are mixed results regarding dietary and physical activity advice: some campaigns advise on both, while others cover one or the other. The majority encompass both, and reveal a significant difference in recommendations regarding each component. One study found that dietary advice on its own was the only successful component (RCT2).**
- **Both group and individual sessions were run in successful campaigns.**
- **In most of the campaigns, the sessions were run by a health professional (e.g., midwife or dietician).**
- **Behaviour change techniques used in successful campaigns include: motivational interviewing techniques, food diaries, control strategies for emotional and binge eating, self-monitoring, goal setting and feedback.**
- **Food diaries featured in many campaigns, as a means by which to provide feedback and tailor campaigns (RCT15 and RCT16)**
- **Routine weighing and continuity of care was used in one successful campaign (RCT13)**
- **Information about diet and nutrition features in every successful campaign, in the form of written or verbal information. These typically contain information about energy balance, nutritional intake and food choices. One campaign actually put the women on a calorie restricted diet (RCT12)**
- **One campaign used an interactive resource to deliver the campaign (RCT11). This medium should be further explored**

See Table 7 on next page

Table 7.
Characteristics of included literature reviews presenting information on antenatal and postnatal campaigns containing dietary components

Reference [study number]	Aim and method	Country	Dietary components campaign	Findings	Conclusion
Althuisen, et al., (2013). [RCT1]	Evaluate the effects of a counselling campaign on excessive weight gain during pregnancy and postpartum weight retention. RCT: campaign (N=106) and control (N=113) groups. Sample: First time mothers and recruited at less than 13 weeks gestation.	The Netherlands	Five counselling modules discussing how to control weight gain during and after pregnancy and how to maintain and optimise a healthy lifestyle. 30 weeks, 5 sessions, lasting 15 minutes each. Face-to-face (4 sessions) and telephone (1 session)	Weight: no significant differences between groups found in weight change during pregnancy or postpartum.	Lifestyle counselling employed did not have an effect on weight gain during pregnancy or postpartum.

<p>Bertz, et a., (2012). [RCT2]</p>	<p>Produce dietary restriction and exercise in a long-term campaign in order to produce weight loss.</p> <p>RCT (N=68). 5 groups: usual care (C, n=17), dietary behaviour modification (D, n=17), physical exercise behaviour modification (E, n=18), diet and exercise group (DE, n=16)</p> <p>Sample: BMI 25-35, non-smoking, singleton pregnancy, intention to breastfeed for 6 months and no illness.</p>	<p>Sweden</p>	<p>D group: dietician explained dietary modification plan with 4 goals: limit snacks and sweets, substitute low-fat and low-sugar alternatives for regular food, cover one half of plate with vegetable and reduce portion size. With diet plan booklet. Total of 2.5 hours of individual counselling.</p> <p>E group: physical therapist explained exercise modification plan for 45 minute brisk walk 4 times a week at 60-70% max HR. duration of walks increased over first 4 weeks. 2.5 hours total of counselling.</p> <p>DE group: both of above. Total of 5 hours.</p>	<p>D group showed significant reduction in reported energy intake at week 12 (p<0.001). Not the case for E group. At 1 year, a reduction of reported energy intake as a main effect of the E treatment, but not the D treatment, was shown (p=0.023).</p> <p>D group indicated significant loss of weight and fat mass at 12 weeks and 1 year (p<0.001). Not the case for E group.</p>	<p>Combined treatment did not have an influence but the dietary treatment resulted in significant weight loss over time and a reduction in reported energy intake at 12 weeks.</p> <p>Exercise treatment did not have any significant effect.</p>
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<p>Bogaerts, et al., (2013). [RCT3]</p>	<p>Examine whether a prenatal lifestyle campaign programme in obese pregnant women reduces gestational weight gain and lowers anxiety and depressed mood in pregnancy</p> <p>RCT: 3 groups. Control/usual care (N=63), brochure group (N=58), campaign group (N=76)</p> <p>Sample: BMI≥29, non-medical complications and >15 weeks gestation.</p>	<p>Belgium</p>	<p>Brochure: nutritional advice and PA advice during pregnancy with info on gestational weight gain</p> <p>Campaign group: brochure and 4 prenatal lifestyle campaign sessions led by midwife. Sessions were based on motivational interviewing lasting 1.5-2 hours each. Group of up to 3 women. Focused on energy intake and expenditure, 7-day food diary, exercises in reading food labels and shopping methods. Methods for increasing PA discussed.</p>	<p>Gestational weight gain: significant difference between mean in control group (13.5 +/- 7.3kg) with brochure group (9.5 +/- 6.8kg) and campaign group (10.6 +/- 7kg).</p>	<p>Campaign and brochure resulted in significantly less gestational weight gain than controls.</p>
<p>Brekke, et al., 2014. [RCT4]</p>	<p>Examine the 12 week and 1 year effects of diet and exercise on cardiovascular risk factors.</p> <p>RCT: as per Bertz et al. (2012)</p> <p>Sample: as per Bertz et al (2012)</p>	<p>Sweden</p>	<p>as per Bertz et al. (2012)</p>	<p>Main effect for reducing waist circumference in dietary group at 12 weeks (p=0.001) and 1 year (p<0.001).</p>	<p>Dietary campaign effective in reducing waist circumference.</p>

<p>Dodd J.M., et al., (2014). BMJ. [RCT5]</p>	<p>Evaluate whether provision of antenatal advice to overweight and obese pregnant women was effective in improving maternal and infant health outcomes.</p> <p>RCT multicentre: campaign (N=1018) and control group (N=1104)</p> <p>Sample: BMI ≥25, singleton pregnancy and at 10-20 weeks gestation.</p>	<p>Australia</p>	<p>Delivered by a research dietician and trained research assistants. Dietary advice consistent with guidelines and PA advice of encouraging increase in amount of walking and incidental activity. Individualised information, meal plans, healthy recipes, food substitutes, guidelines for food prep. Behaviour Change Techniques: goal setting, self-monitoring, identifying barriers, problem solving, contingency plans.</p>	<p>Obstetric outcomes provided (primary outcome = large for gestational age).</p> <p>Post-hoc analysis indicates there was no difference in total gestational weight gain between groups: campaign (9.39 +/- 5.74), control (9.44 +/- 5.77).</p>	<p>Campaign not successful in reducing gestational weight gain.</p>
<p>Dodd., et al (2014). BMC Medicine 12 (1): n.p. [RCT6]</p>	<p>Investigate the effect of antenatal dietary and lifestyle advice to overweight and obese women on maternal diet and physical activity.</p> <p>RCT: as per Dodd et al. (2012, BMJ). Nested randomised trial</p> <p>Sample: as per Dodd et al. (2012, BMJ)</p>	<p>Australia</p>	<p>as per Dodd et al. (2014, BMJ). Plus further randomisation of those in the campaign group to: written or verbal information about physical health (n=295 in lifestyle group and n=287 in the walking group).</p>	<p>Women in the campaign ate significantly more portions of fruit and vegetables per day, more fibre and less saturated fats (p<0.05 for all).</p>	<p>Antenatal lifestyle advice had a positive impact on maternal diet and physical activity. Walking group was not well used.</p>

<p>Dodd J.M., 2014. Annals of Nutrition and Metabolism. [RCT7]</p>	<p>Evaluate the provision of antenatal dietary and lifestyle advice to women who were overweight or obese on a range of secondary neonatal health outcomes.</p> <p>RCT: as per Dodd et al. (2014, BMJ)</p> <p>Sample: as per Dodd et al. (2014, BMJ).</p>	<p>Australia</p>	<p>as per Dodd et al. (2014, BMJ)</p>	<p>No statistically significant differences were identified between 2 groups with regard to maternal antenatal, labour or birth outcomes.</p>	<p>No risks of campaign</p>
<p>Guelinckx., (2010). [RCT8]</p>	<p>What degree of campaign is required to improve dietary habits, increase PA and control gestational weight gain.</p> <p>RCT: control/usual care (N=65), passive group (N=65), active group (N=65).</p> <p>Sample: white women with a BMI >29 before 15 gestation.</p>	<p>Belgium</p>	<p>Passive group: brochure with advice on nutrition and PA with tips to limit gestational weight gain.</p> <p>Active group: brochure plus 3 group counselling sessions with trained nutritionist. 3x 1 hours sessions addressing recommendations for balanced diet, energy balance, PA, behavioural techniques for controlling emotional eating and preventing binge sessions.</p>	<p>Lower energy intake in passive (p=0.016) and active groups (p=0.004) compared to control.</p> <p>Vegetable intake was higher in the passive (p=0.002) and active (p=0.021) groups than the control.</p> <p>No difference between groups for gestational weight gain or PA.</p>	<p>Passive and active campaigns improved antenatal dietary behaviours but not PA or gestational weight gain.</p>

<p>Hui, et al. (2012). [RCT9]</p>	<p>Assess the efficacy of the lifestyle campaign on excessive gestational weight gain, food intake, and PA.</p> <p>RCT: campaign (N=112), control (N=112).</p> <p>Sample: non-diabetic women <26 weeks gestation.</p>	<p>Canada</p>	<p>Two part campaign:</p> <p>PA: instructed exercise class once per week with fitness instructor. Fitness video for home use. Focus on floor aerobics, stretching and strength exercises.</p> <p>Diet: 2 interview/counselling sessions with registered dietician. Food choice map used (map of foods)</p>	<p>Two months post enrolment (note significant drop out N=53 campaign N=53 control for diet info): campaign group consumed significantly less total calories, fat, saturated fat, cholesterol (p=0.00004-0.002) and fat ratio (p=0.001).</p> <p>No difference between groups for gestational weight gain.</p>	<p>Campaign good for diet but not PA or GWG</p>
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<p>Hui, et al., (2014). [RCT10]</p>	<p>Examine the impact of a lifestyle campaign programme on pregnant women in normal and above normal pre-pregnancy BMI.</p> <p>RCT: campaign group (N=57 of which 29 BMI over 25), control group (N=56 of which 27 BMI over 25).</p> <p>Sample: non-diabetic women <26 weeks gestation.</p>	<p>Canada</p>	<p>Two part campaign as per Hui et al (2012)</p>	<p>Normal weight women had lower gestational weight gain (20%) and a lower rate of excessive gestational weight gain (10% compared to 37%) in the campaign group compared to the control group (p<0.05).</p> <p>There were significant differences between campaign and control group for normal weight women in dietary intake; total calorie intake, total fat, saturated fat, cholesterol intake (p<0.03-0.008).</p> <p>For women with a pre-pregnancy BMI over 25 there were no significant differences.</p>	<p>Lifestyle programme has an impact on normal weight women but not overweight or obese women.</p>
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<p>Jackson R.A., et al (2011). [RCT11]</p>	<p>Determine whether the video doctor campaign would improve women's diet and exercise behaviours during pregnancy.</p> <p>RCT: Campaign (N=158), control (N=163).</p> <p>Sample: English-speaking women aged 18 or older who were <26 weeks gestation.</p>	<p>USA</p>	<p>Interactive video doctor using teaching and counselling regarding nutrition, exercise and weight gain, tailored using inputted information on behaviour. Motivational interviewing strategies.</p>	<p>No difference in gestational weight gain between groups. Significant increase in campaign compared to control for fruit and veg intake, whole grain intake, percentage whole grain intake and fish/avocado/nuts intake (p<0.05 for all). There were also significant decreases in fat intake, intake of sugary foods and high fat meals (p<0.5).</p>	<p>A video Doctor campaign can improve antenatal diet, specifically increasing consumption of certain foods.</p>
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<p>Petrella, et al., (2014). [RCT12]</p>	<p>To determine whether changes in lifestyle in women with BMI > 25 could decrease gestational weight gain and unfavourable pregnancy outcomes.</p> <p>RCT: 33 women in campaign group and 28 women in control group.</p> <p>Sample: Women aged 18 or over, BMI > 25 and singleton pregnancy. Excluded if twins, chronic disease, smoking, bariatric surgery and medication that affects weight.</p>	<p>Italy</p>	<p>Control: received a nutritional booklet about lifestyle (Italian Guidelines for a healthy diet during pregnancy).</p> <p>Campaign group: Given a diet of 1500 kcal/day (three main meals and snacks with kcal/day edited for obese and overweight women). The diet had a target macronutrient composition of 55% carbohydrate, 20% protein and 25% fat.</p>	<p>Gestational weight gain in obese women in the campaign was lower (6.7 ± 4.3 kg) than the controls (10.1 ± 5.6 kg, p = 0.047). Significant differences also found in the campaign group compared to the control for lower rates of gestational diabetes mellitus (p=0.014), gestational hypertension (p=0.031) and preterm delivery (p=0.001) were also significantly lower.</p>	<p>The campaign that restricted calorie intake was successful in reducing gestational weight gain and complications such as diabetes in obese women.</p>
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<p>Quinlivan, Lam, & Fisher, (2011). [RCT13]</p>	<p>To evaluate whether an antenatal campaign (four-step multidisciplinary care) for women with a BMI >25 would reduce gestational diabetes.</p> <p>RCT: 63 in the campaign group and 61 in the control group.</p> <p>Sample: Pregnant women with a healthy singleton pregnancy who had a BMI >29.9.</p>	<p>Australia</p>	<p>Control: These women continued with routine antenatal care.</p> <p>Campaign: The four-step multidisciplinary care protocol was (i) continuity of obstetric provider; (ii) routine weighing at each visit; (iii) a five-minute session with a food technologist about their eating habits. Given information on reading food labels, shopping lists of affordable foods and healthy pregnancy recipes; and (iv) clinical psychology assessment of depression and anxiety, stressful life events to determine whether psychological factors are involved in eating patterns.</p>	<p>The campaign was associated with a significant reduction in gestational diabetes (6% versus 29%, OR 0.17 95% CI 0.03–0.95, P = 0.04) and reduced gestational weight gain (7.0 versus 13.8 kg, P < 0.0001).</p>	<p>The campaign successfully reduced the rate of gestational diabetes in obese women.</p>
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<p>Rauh, et al (2013). [RCT14]</p>	<p>Test the effectiveness of an antenatal lifestyle campaign to reduce gestational weight gain.</p> <p>RCT: 83 women in the control group and 167 in the campaign group.</p> <p>Sample: Pregnant women aged 18 or older having a singleton pregnancy with a BMI≥18.5 who could speak German.</p>	<p>Germany</p>	<p>Control: Routine antenatal care including a leaflet with 10 statements about a healthy pregnancy.</p> <p>Campaign: Women attended two counselling modules at the 20th and 30th week of gestation. Three topics were covered; nutrition, physical activity and gestational weight gain. Women received feedback on their nutrition and physical activity. Nutrition advice was based on “Deutsche Gesellschaft für Ernährung” (DGE) (German Nutrition Society) and aimed to decrease the intake of energy-dense foods and high-fat foods (e.g. fast food, sweets, and sugar-sweetened beverages) and increase fruit, vegetables, and whole grain intake. Physical activity advice followed the American and Canadian Obstetricians and Gynaecologists societies.</p>	<p>A significantly lower proportion of women in the campaign group exceeded the Institute of Medicine guidelines (38%) compared with the control group (60%) (odds ratio (OR): 0.5; 95% confidence interval (CI): 0.3 to 0.9). Women in the campaign group had a significantly lower weight gain than those in the control (-1.7kg. 95%; CI: -3.0—0.3kg). Only 17% of the campaign group had postpartum weight retention of more than 5 kg compared with 31% of the control group (OR: 0.5; 95% CI: 0.2 to 0.9). There were no significant differences in obstetric and neonatal outcomes.</p>	<p>The antenatal lifestyle counselling campaign was effective in reducing the proportion of women who had excessive gestational weight gain.</p>
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<p>Szmeja, et al, (2014). [RCT15]</p>	<p>as per Dodd et al. (2014, BMJ)</p> <p>RCT: Nested RCT in LIMIT (as per Dodd et al. (2014, BMJ). 543 women in DVD group and 565 in standard materials group.</p> <p>Sample: as per Dodd et al. (2014, BMJ)</p>	<p>Australia</p>	<p>The dietary advice was consistent with Australian standards. (balanced diet of carbohydrates, fat and protein, to reduce intake of saturated fats, increase intake of fibre, and eat two servings of fruit, five servings of vegetables, and three servings of dairy each day).</p> <p>Individualised plans were given to women and feedback was given from a health professional. Women were encouraged to set goals and self-monitor their achievement.</p>	<p>Women in the DVD group had a higher mean Healthy Eating Index at 36 weeks gestation than the standard materials group (73.6 vs. 72.3; adjusted mean difference 1.2; 95% CI 0.2 to 2.3; p = 0.02). There was no difference at 28 weeks gestation (73.2 vs. 73.5; adjusted mean difference -0.1; 95% CI -1.1 to 0.9; p = 0.82). There were no statistically significant differences in physical activity or gestational weight gain.</p>	<p>On-going attention to the delivery of information is required, particularly with the increased use and availability of digital and multi-media interactive technologies.</p>
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<p>Vesco et al., (2014). [RCT16]</p>	<p>Tested the effectiveness of a group-based weight management campaign for obese women to limit gestational weight gain.</p> <p>RCT: Campaign (n = 56) and usual care control conditions (n = 58).</p> <p>Sample: Pregnant women aged 18 or older who speak English and have a BMI ≥30.</p>	<p>USA</p>	<p>Control: one advice session from a dietician (including general information healthy diet, feedback about their food diaries and a recommendation to follow their health professional’s advice).</p> <p>Campaign: participants attended two counselling sessions. These were run by a dietician who tailored the diet and physical activity guidelines to the women's needs.</p> <p>Weekly group sessions (90 minutes) were run throughout pregnancy. Sessions included a nutrition and/or exercise topic, a behaviour change topic, and a goal-setting activity.</p>	<p>Women in the campaign had gained less weight at 34 weeks gestation than those in the control (5.0 vs. 8.4 kg, mean difference = -3.4 kg, 95% CI [-5.1-1.8]), and at 2 weeks postpartum (-2.6 vs. +1.2 kg, mean difference = -3.8 kg, 95% CI [-5.9-1.7]). These women also had a lower proportion of large for gestational age babies (9 vs. 26%, odds ratio = 0.28, 95% CI [0.09-0.84]).</p>	<p>The campaign successfully saw lower gestational weight gain and lower prevalence of large for gestational age newborns in the campaign group women.</p>
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<p>Vinter, Beck-Nielsen, Jensen, Jorgensen, & Ovesen, (2011). [RCT17]</p>	<p>Examine the effectiveness of a lifestyle campaign on gestational weight gain and obstetric and neonatal outcomes in obese pregnant women.</p> <p>RCT: Control = 154 and campaign = 150.</p> <p>Sample: Pregnant women aged 18-40 with a BMI 30-45 at 10-14 weeks gestation.</p>	<p>Denmark</p>	<p>Control: Information about the study and a link to a website with dietary and physical activity in pregnancy advice. Routine care.</p> <p>Campaign: Dietary counselling by trained dieticians at 15, 20, 28, and 35 weeks' gestation. The aim was to limit gestational weight gain to 5 kg. The counselling included dietary advice based on Danish recommendations. Personal coaching and free membership to the gym to encourage physical activity.</p>	<p>Women in the campaign had a significantly lower gestational weight gain mean (7kg) compared with those in the control 8.6 kg (p=0.01).</p> <p>35.4% of campaign women exceeded the Institute of Medicine (IOM) gestational weight gain guidelines compared with 46.6% of control women (P = 0.058).</p> <p>No significant differences in obstetric outcomes between the two groups.</p>	<p>The lifestyle campaign was successful in limiting gestational weight gain in obese pregnant women with more women adhering to the Institute of Medicine's guidelines. However, a number still exceeded the guidelines.</p>
<p>Wilkinson & McIntyre, (2012). [RCT18]</p>	<p>Evaluate the effectiveness of a low-intensity early antenatal health promotion programme</p> <p>RCT: campaign (N=178), control (N=182)</p> <p>Sample: Pregnant women aged 18 or older who could speak English.</p>	<p>Australia</p>	<p>Control: usual care plus brochure of nutrition and PA</p> <p>Campaign: brochure plus 60 minute session with dietician discussing health behaviour guidelines, goal setting, self-monitoring, links to support.</p>	<p>Campaign group women at follow up increased their fruit intake (p=0.004), vegetable intake (p=0.006) and met fruit guidelines (p<0.001). No significant differences for any other behaviours.</p>	<p>Campaign effective in addressing fruit consumption only</p>

<p>Wilkinson, van der pligt, Gibbons, & McIntyre, (2013). [RCT19]</p>	<p>The effectiveness of a postpartum weight management programme for women with a body mass index (BMI) > 25.</p> <p>RCT: 36 = control and 35 in campaign.</p> <p>Sample: Pregnant women aged 18 or older with a BMI > 25 who could speak English.</p>	<p>Australia</p>	<p>Control: Healthy eating for breastfeeding' sheet given at 36 weeks.</p> <p>Campaign: Six-month campaign, including 1-1 nutrition assessment, goal setting, counselling session, nutritional information (Australian Dietary Guidelines) and self-monitoring. Delivered by a research dietician.</p>	<p>No significant differences were observed between any outcomes.</p>	<p>Future campaigns must engage women by tailoring programmes to support their behaviour change.</p>
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3. Discussion – Application of findings

65 resources were used in this review as they met the review objectives; 44 articles (19 randomised controlled trials, 13 studies, 10 reviews and two reviews of reports), eight reports and 15 web pages. The main findings from these 65 resources will be discussed here, in relation to the review objectives and the future healthy eating project that is to be based on this review.

3.1. Content

The research studies give us some insight into what women want. As stated above, women appear to make changes to their diet in pregnancy, but report a lack of knowledge regarding healthy diet information. They want to receive advice from health professionals, and they want this advice early in pregnancy. This was supported by the guidance, which suggested that dietary advice should be provided early in pregnancy and then repeated at different points and via different sources. Advice given in written form and in groups proved especially popular.

The review papers and randomised controlled trials mostly reported outcome measures which were results and not behaviours (e.g., restricted weight gain is the outcome of behaviours such as eating and physical activity), so little judgement can be made about which campaign components were key in making these changes to weight. The one review that included qualitative papers gives us some insight into the mechanism of change (Campbell et al, 2011).

These themes suggest that campaigns must focus on women in the antenatal period when they are more motivated to make change and dispel any conflicting messages and help them to increase feelings of self-efficacy. Women’s increased motivation in pregnancy to make changes to their behaviours is well documented in the literature (Phelan, 2010; Smith & Lavender, 2011) and thus again offers support for an antenatal programme which offers women dietary advice for pregnancy and after the birth.

The research studies, webpages and reports highlighted content that should be included in the project as guidance for the target audiences. This includes advice about vitamin intake (e.g., vitamin D and folic acid), cravings and comfort eating, portion sizes and what to eat to be healthy. It has also been suggested that the information given in the project should be portrayed in terms of the perceived benefits for a healthy diet on mother and child (Gardner et al., 2012).

Advice must be tailored in terms of demographics that impact on dietary needs or intake. Ethnicity was highlighted in this review as a demographic factor that needs to be considered when tailoring dietary campaigns to meet women’s needs (Ferrari et al., 2013). Likewise, differences in dietary intake have been found for parity (Goni, Cuervo, Santiago, Zazpe, & Martinez, 2014), age, education and country of origin (Rodriguez-Bernal et al., 2013). The need for tailored advice was reflected in the nutrition guidance, as it was

specific to 'at risk' groups. For example, vitamin D was highlighted as being most important for those with darker skin and those who do not have exposure to sunlight. The demographics of the populations of the five cities should be examined while preparing for the focus groups, and the possible impact on dietary behaviour will need to be explored in the focus group.

3.2. Behaviour change techniques

The randomised controlled trials and systematic reviews give a low level of information about each campaign, which makes it hard to understand the delivery methods and content that were used, and why. This information is essential if we are to understand the key components of campaigns and appreciate how they create a change in behaviour.

However, it was clear that several behaviour change techniques were used in the successful campaigns and cited by women as important in helping them make changes. These included: goal setting, self-monitoring and feedback. More research is needed to understand how these behaviour change techniques can be used with pregnant women, so that they can be implemented in maternity care.

At points, it was hard to fully appreciate how the campaigns aimed at changing behaviour, as the descriptions of the actual techniques used were poor. It is recommended that the initiative uses the behaviour change technique taxonomy version 1 when stating which behaviour change techniques it is using (Michie et al., 2013). This will ensure that the behaviour change techniques used include a clear definition, and will minimise confusion for future readers in understanding how they were used in a campaign.

3.3. Weight gain

Weight gain featured in most of the reports, webpages and articles, and the advice was consistent in terms of gradual loss or gain. Weight gain was also the primary outcome measure of the majority of randomised controlled trials and systematic reviews. Differences between countries depended on their use of the IOM weight gain guidance (USA, Australia and Canada used it, but the UK did not). The use of the IOM weight gain guidance depends on whether women are routinely weighed in pregnancy (they are not in the UK). The use of this guidance and routine weighing in the five countries in which the project is planned for launch must be examined to ensure that the advice women receive is consistent. The impact of maternal obesity and excessive gestational weight gain on pregnancy outcomes has become a key focus in maternity care research in recent years, so this focus is not surprising.

3.4. Postnatal advice

The advice for postnatal women focused on supporting and encouraging women to breastfeed (The WHO recommends six months of exclusive breastfeeding), and promoting gradual weight loss. To gradually lose weight, women are recommended to eat healthy (including increased fruit and vegetable intake) and increase water intake. Women are also encouraged in the UK to take vitamin D while breastfeeding. The Baby Friendly initiative was mentioned within this context, and the focus groups should explore if women and health professionals in all five countries are aware of this.

3.5. Health Professionals

The reviews and randomised controlled trials demonstrated that most campaigns (particularly those that were successful) were run by health professionals (including midwives and dieticians). There was no focus in this review on the health professionals delivering dietary advice, and thus little can be reported on the experience and knowledge of these health professionals. Literature suggests that midwives lack confidence and knowledge regarding dietary and nutritional advice (Heslehurst et al., 2013). In 2001, the WHO Regional Office for Europe put together a training package for health professionals to advise women about nutrition in pregnancy and for their children (WHO, 2001). This training package outlines the nutritional recommendations of amounts of nutrients and minerals. The focus groups should ask the health professionals about their knowledge and experiences of offering dietary and nutritional advice.

3.6. Further information required

These findings support the need for a healthy diet project such as the one proposed. There was a lack of findings from four of the countries (Denmark, Spain, Bulgaria and the Czech Republic). This may be due to the limitation of filtering by English language text only in the search strategy. However, to inform the design of the proposed healthy eating project, a few pieces of information are required. In particular, the focus groups with the health professionals need to ask which guidelines they follow in terms of maternal and child nutrition. This will ensure that the project meets the maternal guidelines of the individual countries.

From the literature compiled in this report, it is evident that there are discrepancies between countries in terms of guidelines (e.g., folic acid intake and length of supplementation). The EUROpean micronutrients RECommendations Aligned (EURRECA) network was set up to identify and address differences in micronutrient guidelines between European countries. No relevant articles or reports from this group were found in the search. However, they may need to be contacted regarding the content of the project (Hall Moran, Lowe, Crossland, Berti, Cetin, Hermoso, Koletzko, & Dykes, 2010).

3.7. Limitations

This review was conducted as a rapid review, so only one reviewer reviewed all the titles and abstracts. However, the team of reviewers has a history of research on the topic of lifestyle campaigns for maternal obesity, and were therefore aware of most of the literature. Another limitation was language, as the team members were English speakers, which restricted the review to English language text. This meant that a few peer-reviewed papers and reports were not included; these tended to be from European countries such as those in the larger study, and may have provided some more targeted literature. Finally, the majority of the resources are from developed, high-income countries so their generalisation in regards to other countries must be considered.

4. Conclusions

This review suggests that a healthy eating project that targets women early in their pregnancy with consistent and clear diet and nutrition advice is desired by pregnant women. Based on the literature in the 65 sources included in this review, suggestions are made in relation to the content and delivery of the project. It appears from the limited literature, that multiple approaches to information provision may be required to influence behaviour change; this is likely to differ according to setting. Additional details about the project have been included for the purpose of facilitating the focus groups, which are to be conducted in the five cities in which the project will run.

Disclosure of interest

None declared.

Details of ethics approval

This is a review of the literature so no ethical approval was required.

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Chapter 1 References

1. Agha, M., Agha, R.A., & Sandell, J. (2014). Interventions to reduce and prevent obesity in pre-conceptual and pregnant women: A systematic review and meta-analysis. *PLOS One*, 9 (5), e95132.
2. Althuisen E., Van Der Wijden C.L., Van Mechelen W., Seidell J.C. & Van Poppel M.N.M., (2013). The effect of a counselling intervention on weight changes during and after pregnancy: A randomised trial. *British Journal of Obstetrics and Gynaecology*, 120 (1), 92-99.
3. Bertz, F., Brekke, H.K., Ellegard, L., Rasmussen, K.M., Wennergren, M., & Winkvist, A. (2012) Diet and exercise weight-loss trial in lactating overweight and obese women. *American Journal of Clinical Nutrition*, 96(4), 698-705.
4. Bloomingdale A., Guthrie L.B., Price S., Wright R.O., Platek D., Haines J. & Oken E. (2010). A qualitative study of fish consumption during pregnancy. *American Journal of Clinical Nutrition* 92 (5), 1234-1240.
5. Bogaerts, AFL., Devlieger, R., Nuyts, E., Witters, I., Gyselaers, W., & Van den Bergh, B.R.H. (2013). Effects of lifestyle intervention in obese pregnant women on gestational weight gain and mental health: a randomized controlled trial. *International Journal of Obesity*, 37, 814-821.
6. Booth, A. (2008). Using evidence in practice. Unpacking your literature search toolbox: on search styles and tactics. *Health Information and Libraries Journal*, 25, pp.313-317 DOI: 10.1111/j.1471-1842.2008.00825.x
7. Brekke H.K., Bertz F., Rasmussen K.M., Bosaeus I., Ellegard L. & Winkvist A., (2014). Diet and exercise interventions among overweight and obese lactating women: Randomized trial of effects on cardiovascular risk factors. *PLoS ONE*, 9(2), n.p.
8. Brown A. & Avery A., (2012). Healthy weight management during pregnancy: what advice and information is being provided. *Journal of Human Nutrition and Dietetics*, 25 (4), 378-387.
9. Campbell, F., Johnson, M., Messina, J., Guillaume, L., & Goyder, E., (2011). Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data. *BMC Public Health*, 11, 491.
10. Chang, M.W., et al (2014). I am pregnant and want to do better but I can't: Focus groups with low-income overweight and obese pregnant women. *Journal of Maternal and Child Health*, . doi: 10.1007/s10995-014-1605-x
11. Choi, J., Fukuoka, Y., & Lee, J.H. (2013). The effects of physical activity and physical activity plus diet interventions on body weight in overweight or obese women who are pregnant or in postpartum: A systematic review and meta-analysis of randomized controlled trials. *Preventive Medicine*, 56, 351-364.
12. de Jersey S.J., Nicholson J.M., Callaway L.K. & Daniels L.A.. (2013). An observational study of nutrition and physical activity behaviours, knowledge, and advice in pregnancy.

BMC Pregnancy and Childbirth, 13:115.

- 13. Dodd J.M. (2014). Dietary and lifestyle advice for pregnant women who are overweight or obese: The LIMIT randomized trial. *Annals of Nutrition and Metabolism, 64*, 197-202.**
- 14. Dodd, J.M., Grivell, R.M., Crowther, C.A., & Robinson, J.S. (2010). Antenatal interventions for overweight or obese pregnant women: a systematic review of randomised trials. *British Journal of Obstetrics and Gynaecology, 117*, 1316-1326.**
- 15. Dodd J.M., McPhee A.J., Turnbull D., Yelland L.N., Deussen A.R., Grivell R.M., Crowther C.A., Wittert G., Owens J.A. & Robinson J.S., (2014). The effects of antenatal dietary and lifestyle advice for women who are overweight or obese on neonatal health outcomes: The LIMIT randomised trial. *BMC Medicine, 12 (1)*, n.p.**
- 16. Dodd J.M., Turnbull D., McPhee A.J., Deussen A.R., Grivell R.M., Yelland L.N., Crowther C.A., Wittert G., Owens J.A. & Robinson J.S.. 2014. Antenatal lifestyle advice for women who are overweight or obese: LIMIT randomised trial. *BMJ (Online), 348*, n.p.**
- 17. Ferrari R.M., Siega-Riz A.M., Evenson K.R., Moos M.-K. & Carrier K.S.. (2013). A qualitative study of women's perceptions of provider advice about diet and physical activity during pregnancy. *Patient Education and Counseling 91 (3)*, 372-377.**
- 18. Gardner B., Croker H., Barr S., Briley A., Poston L., Wardle J. & UPBEAT Trial. (2012). Psychological predictors of dietary intentions in pregnancy. *Journal of Human Nutrition and Dietetics, 25 (4)*, 345-353.**
- 19. Goni L., Cuervo M., Santiago S., Zazpe I. & Martinez J.A.. (2014). Parity implications for anthropometrical variables, lifestyle behaviors and dietary habits in pregnant women. *Anales del Sistema Sanitario de Navarra 37 (3)*, 349-362.**
- 20. Groth S.W. & Morrison-Beedy D. (2013). Low-income, Pregnant, African American Women's Views on Physical Activity and Diet. *Journal of Midwifery and Women's Health 58 (2)*, 195-202.**
- 21. Guelinckx I., Devlieger R., Mullie P. & Vansant G., (2010). Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: A randomized controlled trial. *American Journal of Clinical Nutrition, 91 (2)*, 373-380.**
- 22. Hall Moran V., Lowe N., Crossland N., Berti C., Cetin I., Hermoso M., Koletzko B. & Dykes F. (2010). Nutritional requirements during lactation. Towards European alignment of reference values: The EURRECA network. *Maternal and Child Nutrition 6 (SUPPL. 2): 39-54.***
- 23. Hawker, S., Payne, S., Kerr, C., Hardey, M., & Powell, J. (2002). Appraising the evidence: Reviewing disparate data systematically. *Qualitative Health Research, 12 (9)*, 1284-1299.**
- 24. Health Canada (2007) Eating well with Canada's food guide: A resource for educators and communicators 2007. http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/pubs/res-educat-eng.pdf**
- 25. Healthy Eating during your pregnancy: Advice for eating for you and your baby. (n.d.) https://www.nhmrc.gov.au/files/nhmrc/publications/attachments/n55h_healthy_eating**

during_pregnancy.pdf

26. Heslehurst, N. et al. (2013). Midwives perspectives of their training and education requirements in maternal obesity: A qualitative study. *Midwifery*, 29, 736-744.
27. House E. & Coveney J. (2013). I mean I expect that it's pretty safe': Perceptions of food trust in pregnancy - Implications for primary health care practice. *Australasian Medical Journal* 6 (7), 358-366.
28. Hui A., Back L., Ludwig S., Gardiner P., Sevenhuysen G., Dean H., Sellers E., et al. (2012). Lifestyle intervention on diet and exercise reduced excessive gestational weight gain in pregnant women under a randomised controlled trial. *British Journal of Obstetrics and Gynaecology*, 119 (1), 70-77.
29. Hui, A., L., Back L., Ludwig S., Gardiner P., Sevenhuysen G., Dean H., Sellers E., et al. (2014). Effects of lifestyle intervention on dietary intake, physical activity level, and gestational weight gain in pregnant women with different pre-pregnancy body mass index in a randomised control trial. *BMC Pregnancy & Childbirth*, 14, 331.
30. Institute of Medicine (2009). *Weight Gain During Pregnancy: Re-examining the Guidelines*. Washington, District of Columbia: The National Academies Press.
31. Institute of Medicine (1990; Committee on nutritional status during pregnancy and lactation, subcommittee for a clinical application guide). *Nutrition during pregnancy and lactation: an implementation guide*. Washington DC: National Academy Press. <http://www.mchlibrary.info/pubs/PDFs/nutritionupdate.pdf>
32. Jackson R.A., Stotland N.E., Caughey A.B. & Gerbert B., (2011). Improving diet and exercise in pregnancy with Video Doctor counseling: A randomized trial. *Patient Education and Counseling*, 83 (2), 203-209.
33. Johnson, M., Campbell, F., Messina, J., Preston, L., Buckley Woods, H., & Goyder, E. (2013). Weight management during pregnancy: A systematic review of qualitative evidence. *Midwifery*, 29 (12), 1287-1296.
34. Michie, S., et al., (2013). The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behaviour change interventions. *Annals of Behavioral Medicine*, 46 (1), 81-95.
35. National Health and Medical Research Council (NHMRC): Food for health. Dietary guidelines for Australian adults. A guide to healthy eating. Canberra: NHMRC; 2003. <https://www.nhmrc.gov.au/files/nhmrc/publications/attachments/n33.pdf>
36. Olander, E., Atkinson, L., Edmunds, J.K., & French, D.P. (2012). Promoting healthy eating in pregnancy: what kind of support services do women say they want? *Primary Health Care Research & Development*, 13, 237-243.
37. Oteng-Ntim, E., Varrna, R., Croker, H., Poston, L., & Doyle, P. (2012). Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcome: a systematic review and meta-analysis. *BMC Medicine*, 10, 47.
38. Phelan, S. (2010). Pregnancy: a "teachable moment" for weight control and obesity prevention. *American Journal of Obstetrics & Gynaecology*, 202:135.e1-8.

39. Petrella E., Malavolti M., Bertarini V., Pignatti L., Neri I., Battistini N.C. & Facchinetti F., (2014). Gestational weight gain in overweight and obese women enrolled in a healthy lifestyle and eating habits program. *Journal of Maternal-Fetal and Neonatal Medicine*, 27(13), 1348-1352.
40. Quinlivan, J.A., Lam, L.T., & Fisher, J. (2011). A randomised trial of a four-step multidisciplinary approach to the antenatal care of obese pregnant women. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 51, 141-146.
41. Rauh, K., Gabriel, E., Kerschbaum, E, Schuster, T., von Kries, R., Amann-Gassner, U. & Hauner, H. (2013). Safety and efficacy of a lifestyle intervention for pregnant women to prevent excessive material weight gain: a cluster-randomized controlled trial. *BMC Pregnancy and Childbirth*, 13, 151.
42. Rodriguez-Bernal C.L., Ramon R., Quiles J., Murcia M., Navarrete-Munoz E.M., Vioque J., Ballester F. & Rebagliato M. (2013). Dietary intake in pregnant women in a Spanish Mediterranean area: as good as it is supposed to be? *Public Health Nutrition* 16 (8), 1379-1389.
43. Secretariat World Health Organisation, Andersson, N., de Benoist, B et al. (2007). Prevention and control of iodine deficiency in pregnant and lactating women and in children less than 2-years-old: conclusions and recommendations of the technical consultation. *Public health*, 10, 1601-1611.
44. Skouteris, H., Hartley-Clark, L., McCabe, M., Milgrom, J., Kent, B., Herring, S.J., & Gale, J. (2010). Preventing excessive gestational weight gain: A systematic review of interventions. *Obesity Reviews*, 11, 757-768.
45. Smith, D., & Lavender, T. (2011). The pregnancy experience for women with a body mass index >30kg/m²; a meta-synthesis. *British Journal of Obstetrics and Gynaecology*, 118, 779-789.
46. Spencer, L., et al., (2015). The effect of weight management interventions that include a diet component on weight-related outcomes in pregnant and postpartum women: a systematic review protocol. *JBI Database of Systematic Reviews and Implementation Reports*, 13, 1.
47. Streuling, L., Beyerlein, A., & von Kries, R. (2010). Can gestational weight gain be modified by increasing physical activity and diet counselling? A meta-analysis of intervention trials. *American Journal of Clinical Nutrition*, 92 (4), 678-687.
48. Szmaja, M.A. Cramp, C., Grivell, R.M., Deussen, A.R., Yelland, L.N., & Dodd, JM. (2014). Use of a DVD to provide dietary and lifestyle information to pregnant women who are overweight or obese: a nested randomised trial. *BMC Pregnancy and Childbirth*, 14, 409.
49. Takimoto H., Mitsuishi C. & Kato N.. (2011). Attitudes toward pregnancy related changes and self-judged dieting behavior. *Asia Pacific Journal of Clinical Nutrition* 20 (2), 212-219.
50. Tanentsapf I., Heitmann B.L. & Adegboye A.R.A., (2011). Systematic review of clinical trials on dietary interventions to prevent excessive weight gain during pregnancy among normal weight, overweight and obese women. *BMC Pregnancy and Childbirth*, 11,

81. doi:10.1186/1471-2393-11-81.

51. Thangaratinam, S., et al. (2012). Effects of intervention in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *British Medical Journal*, *344*, e2088.
52. The Society of Obstetricians & Gynaecologists of Canada (2009). Folic Acid for preconception and pregnancy. http://sogc.org/wp-content/uploads/2013/02/09FolicAcid_WebVersionE.pdf
53. The National Health and Medical Research Council (NHMRC) Public Statement (2010). Iodine supplementation for pregnant and breastfeeding women. http://www.nhmrc.gov.au/files/nhmrc/publications/attachments/new45_statement.pdf
54. The National Institute of Health and Clinical Excellence (NICE) (2010) Maternal and child nutrition (NICE Public Health Guidance 11). <http://www.nice.org.uk/guidance/ph11/resources/guidance-maternal-and-child-nutrition-pdf>
55. National Institute for Health and Care Excellence (2014). *Antenatal care: routine care for the healthy pregnant woman (CG62)*. London NICE, 2014.
56. Van der Plight, P., et al., (2013). Systematic review of lifestyle interventions to limit postpartum weight retention: implications for future opportunities to prevent maternal overweight and obesity following childbirth. *Obesity Reviews*, *14*, 792-805.
57. Vesco K.K., Karanja N., King J.C., Gillman M.W., Leo M.C., Perrin N., McEvoy C.T., Eckhardt C.L., Smith K.S. & Stevens V.J., (2014). Efficacy of a group-based dietary intervention for limiting gestational weight gain among obese women: A randomized trial. *Obesity*, *22* (9), 1989-1996.
58. Vinter, C.A., Beck-Nielsen, H., Jensen, D.M., Jorgensen, J.S., & Ovesen, P. (2011). The LIP (Lifestyle in Pregnancy) study. *Diabetes Care*, *34*, 2502-2507.
59. Wennberg A.L., Lundqvist A., Hogberg U., Sandstrom H. & Hamberg K. (2013). Women's experiences of dietary advice and dietary changes during pregnancy. *Midwifery* *29* (9), 1027-1034.
60. Williamson C. & Wyness L. (2013). Nutritional requirements in pregnancy and use of dietary supplements. *Community Practitioner* *86* (8), 44-47.
61. Wilkinson S.A. & McIntyre H.D., (2012). Evaluation of the 'healthy start to pregnancy' early antenatal health promotion workshop: a randomized controlled trial. *BMC Pregnancy and Childbirth*, *12*, n.p.
62. Wilkinson S.A., van der plight, P., Gibbons, K.S., & McIntyre, H.D., (2013). Trial for reducing weight retention in new mums: a randomised controlled trial evaluating a low intensity, postpartum weight management programme. *Journal of Human Nutrition and Dietetics*, *28*(10), 15-28.
63. World Health Organisation (WHO). Regional Office For Europe. Regional Office For Unicef. Geneva, Central and Eastern Europe and the Commonwealth of Independent States and the Baltics, (2001). *Healthy food and nutrition for women and their families. Training Course for Health Professionals*. http://www.euro.who.int/data/assets/pdf_file/0020/152237/E73470.pdf

Appendix A

Author and title: _____

Date: _____

Reviewer: _____

	Good	Fair	Poor	Very poor	Comment
Abstract and title					
Introduction and aims					
Method and data					
Sampling					
Data analysis					
Ethics and bias					
Findings / results					
Transferability / generalizability					
Implications and usefulness					
Total					

CHAPTER 2

Communication initiatives for disadvantaged and vulnerable populations: what works?

A rapid literature review in support of community projects to promote healthier nutrition choices among pregnant and breastfeeding women in Europe

Dr Franklin Apfel

Ms Sabrina Cecconi

18 April 2015

Executive summary

Background: This rapid literature review identifies analyses and categorises available knowledge on the effectiveness of mass media and other communication projects in addressing the needs of vulnerable populations. The review is organized around two key questions:

- **What are the characteristics of, and approaches taken by health communication campaigns that lead to healthier behaviours and choices among vulnerable populations?**
- **How can these be applied to promote healthier diet and nutrition to/with pregnant and breastfeeding women living in disadvantaged ethnic groups in the pilot study settings?**

Method: A five-step rapid search methodology was applied, which yielded 80 systematic reviews, key texts, guidelines and promising practice articles for full data extraction.

A strong consensus in the data shows a consistent association between the use of effective communication project design principles, and impact on health knowledge, attitudes and behaviours of vulnerable populations. Key design principles identified and reviewed include:

- **Setting behavioural change goals: using formative research;**
- **Using theories to guide the choice of behaviour change strategy and overcome barriers;**
- **Segmenting audiences into meaningful sub-groups;**
- **Tailoring and framing messages for action and to spark interpersonal discussions;**
- **Adapting interventions and materials for contextual/cultural utility;**
- **Using multiple channel approaches to address individual, community and societal factors shaping behaviours;**
- **Evaluating and learning from project processes and outcomes.**

Findings: The findings of this review are presented as insights gathered on application of the seven key design principles identified.

1. Setting behavioural change goals

Effective goals tend to be expressed and measured in terms of impact upon reduction of risky behaviours (e.g. smoking during pregnancy), adoption and/or maintenance of healthier behaviours (e.g. exclusive breastfeeding, physical activity, taking folic acid).

Formative studies with low-income or ethnic minority populations identify target group specific needs, barriers and facilitators to nutrition-related behaviour change (e.g. food

marketing and pricing and/or lack of access to fresh food and vegetables).

2. Using theories

Most reviews, guidelines and texts emphasise the importance of using behavioural theories (e.g., the Health Belief or Trans-theoretical model) to help identify strategies to address determinants and stages of behaviour change. They also ensure that the incentives and barriers associated with both ‘problematic behaviour’ and ‘desired behaviour’ are fully understood.

Nevertheless, the reviews indicate that most studies do not make an explicit link between theoretical models (especially those focused on community and societal influences), expected outcomes, and the process of change. There is general agreement about the need for strengthening theoretically informed campaigns, in order to facilitate a better understanding of why particular campaigns do or don’t work when applied to different contexts, populations and behaviours.

3. Segmenting audiences

Only 12% of this study’s communication-related search results focused on disadvantaged populations. Several systematic reviews noting this lack of “segmented” research on disadvantaged/vulnerable populations identify it as an area that requires greater investment. Nevertheless, several systematic nutrition-related reviews provide useful insights that can inform segmentation strategies for community-based campaigns.

For example, factors known to be associated with not breastfeeding and with early breastfeeding cessation including smoking, exposure to environmental tobacco smoke (ETS), maternal medication use, physical and mental problems such as obesity and depression, and circumstances that make breastfeeding difficult, such as going back to work or school.

4. Tailoring and framing messages

Several reviews, guidelines and texts point to the benefits framing core messages in ways that reflect an understanding of existing values and beliefs motivating behaviour(s) related to public health [behaviour] change being sought (e.g., the importance of people-centric communication approaches, and of relationship building in supporting a woman to breastfeed), and how such messaging can help public health practitioners compete more effectively with “adversaries” in public debate (e.g., formula companies).

Most studies note that the widespread use of interactive technologies (e.g., social media, mHealth) has the potential to facilitate tailored messages and deliver them to target audiences based on the feedback recipients provide about themselves. Advocacy messaging targeting those who can create or influence policies that support opportunities to change or discourage unhealthy behaviours (e.g. company policies designating space and time for

breast feeding, regulations controlling the distribution of infant formula, etc.) can make healthier choices become easier choices. This provides additional motivation for change.

5. Adapting campaigns

While all the reviews in this study describe communication campaigns, few provide process and procedural details. This, in turn, makes comparisons and reliable analysis difficult. Nevertheless, several reviews provide specific recommendations on approaches that community-based developers and implementers can take to adapt health promotion and communication tools, materials and campaigns for work with vulnerable groups — especially ethnic minorities.

For example, personal “word-of-mouth” delivery (vs. written materials) and group format (vs. individual counselling) including extended and adopted family members; seeing women as central figures in behaviour change and as agents of change due to their role in the family; and considering the multiple dimensions of individuals’ real-life experiences — including their minority status, socially disadvantaged position, cultural and religious beliefs, and affiliations.

6. Using multiple channel approaches

A key message that emerges from many reviews is that campaigns must be *experienced* (i.e. seen, heard or read about) by the target audience in order to be effective. Scope and exposure are strongly tied to the number of channels used to reach target audiences. Some studies and guides indicate the importance of combining information projects with related products and services, both as a motivation and as a way of addressing potential barriers to action, e.g., breast feeding advice and support, smoking cessation programmes, etc.

Social media and mHealth are identified as useful elements in a comprehensive approach to curative and preventive services — through the enhanced dissemination of information and promotion of healthy behaviours. However, the literature review revealed a scarcity of project evaluation, and a general lack of management and policy frameworks for guiding and coordinating the adoption of social media and mHealth services within the broader health system.

7. Evaluating and learning

All studies confirm that communication projects can positively influence healthy behaviours, including nutrition-related choices of disadvantaged pregnant and breastfeeding women. Mixed-method research and evaluation based on a clear theory of change notably offer the most robust evidence.

Most reviews call for clearer standards for evaluation reporting; greater investment in rigorous formative and summative evaluations, and implementation research; greater efforts to collate, comprehensively review and share existing evidence. They note that

many impact questions, particularly those which seek to understand how and why change happens, cannot be answered in purely quantitative ways. Indeed, some impact questions can only be measured qualitatively. Several reviews call attention to publication bias and encourage all campaigns to report findings, rather than just those with good results.

Discussion: The study has identified a wide range of insights that community-based managers and practitioners and other stakeholders can use when planning campaigns to promote healthier nutrition among disadvantaged pregnant and breastfeeding women. It will be essential for these pilot projects to document their processes and outcomes, in order to strengthen what is currently a weak evidence base in this area. Of particular importance, will be the evaluation of “new” and increasingly important communication channels, like YouTube and mHealth, which do not currently figure prominently in the peer-reviewed literature.

Key messages

The following key messages in relation to project design were identified from the literature review:

Communication works!

Communication projects undertaken as part of comprehensive public health campaign strategies can positively impact health behaviours among vulnerable populations and others.

Intervention design is key

Effective communication projects:

- **Use formative research to set behavioural change goals;**
- **Use theories to guide choice of behaviour change strategy and overcome barriers;**
- **Segment audiences into meaningful sub-groups;**
- **Tailor and frame messages for action and to spark interpersonal discussions;**
- **Adapt campaigns and materials for appropriate contextual/cultural application;**
- **Use multiple channel approaches to maximise message exposure and address individual, community and societal factors shaping behaviours;**
- **Evaluate and learn from campaign process and outcomes.**

Pregnancy is a receptive communication time

Pregnant women perceive pregnancy-specific nutrition information as important because it is one of the few elements that they can apply in their daily lives to protect the health of their babies.

Multi-level interventions work best

Communication initiatives focused on multiple “ecological” levels of intervention work better than those that operate on a single level. Direct and indirect effects are cumulative. Messages directly enhance individual health literacy and motivate behaviour changes; they can also catalyse interpersonal discussion, set “new” social norms, and influence policy makers to create environmental changes to make “healthier choices easier” and counter negative influences.

Each ethnic minority requires its own tailored/targeted communication approaches

No two groups are the same. All campaigns, must be informed, monitored and evaluated

with genuine end-user insights.

New media is a game changer

Web 2.0 and its interactive technologies (e.g., social media, mHealth) facilitate the effective and affordable delivery of direct, customised messages based on feedback the target provides about themselves. It helps foster the development of relationships and provides on-going support for behaviour change.

Current evidence base reveals a publication bias

There is a clear lack of reporting about failed programmes. All programmes should be required to monitor, evaluate and report results.

Introduction

Historically, health communication has focused on individual acquisition of knowledge. Evaluation has been based on evidence of increased awareness and recall. Over time, greater attention has been paid to attitude and behaviour change objectives, as multiple studies have shown that knowledge alone is not enough to improve health outcomes (McQueen & Carter, unpublished 2014). The concepts of health communication have evolved to encompass an even broader view that focuses on community-level and/or social-cultural changes, and incorporates advocacy for policy change and settings approaches to enhance health literacy and health (Apfel, 2013).

Health communication has increasingly been acknowledged as a determinant of health, and one integral to effective public health response in European Union (EU) and European Economic Area (EEA) Member States and beyond (Apfel, 2013; Sixsmith, Doyle & Barry, 2014). Public health practitioners, managers and other stakeholders planning community-based interventions can benefit from enhancing their knowledge of the strengths, weaknesses and potential added value of health communication campaigns. Such knowledge can help them gain evidence-based insights into what may work in their own communities.

This is of particular importance in addressing vulnerable groups and inequities in health³. On one hand, health communication can enhance health literacy⁴ of vulnerable populations and improve capacities to access, understand and use information to improve health (Kickbusch, Apfel & Tsouros, 2013). On the other, poorly designed communication projects have been shown to widen health equity gaps by disproportionately enhancing the status of higher social classes (Whitehead & Göran Dahlgren, 2006).

Objective

This rapid literature review identifies, analyses and categorises evidence concerning communication-related campaigns addressing vulnerable populations in Europe and beyond. The review aims to summarise existing knowledge on the effectiveness of mass media and other communication projects in addressing the needs of vulnerable populations. Then aim would then be to provide this knowledge and practical evidence-based advice to managers and implementers of community-based communication

³ The term “inequities in health” is used to describe unfair systematic differences in health between social groups that are avoidable by reasonable means.

⁴ Health literacy is linked to literacy and entails people’s knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgments and take decisions in everyday life concerning health care, disease prevention and health promotion to maintain or improve quality of life during the life course (7. Kickbusch I PJ, Apfel F, Tsouros A. "Health literacy. The solid facts." Copenhagen, Denmark: . WHO Regional Office for Europe 2013.)

initiatives focused on promoting healthier diets and lifestyle among disadvantaged pregnant and breastfeeding women. The review is organised around two key questions:

- 1. What are the characteristics of and approaches taken by health communication interventions that lead to healthier behaviours and choices among vulnerable populations?**
- 2. How can these be applied to promote healthier diet and nutrition to/with pregnant and breastfeeding women living in disadvantaged ethnic groups in the initiative settings?**

Disadvantaged ethnic groups by city, region, and/or country	
Czech Republic	Roma
Manchester, UK	South Asians and Black Africans
Murcia, Spain	Moroccans and South Americans
Varna, Bulgaria	Roma and Turks
Region of Southern Denmark	Turks, Iraqis and Bosnians

In answering these questions, we aim to provide a comprehensive, user-friendly report that gathers available knowledge and research in an accessible format, which can be used in the planning and implementation of new communication initiatives in the selected European communities. To this end, we have taken a dual track approach to this rapid literature review:

- The first track applied a rapid systematic review search strategy (NCCMT) to identify existing systematic and meta-analytic reviews focused primarily on the social behavioural change impact/effect of communication campaigns with vulnerable populations. Taking these as a basis, we have compiled practical recommendations regarding enablers and barriers to communicating with the project’s primary target audiences - disadvantaged pregnant and breastfeeding women.**
- The second track identifies what we consider to be useful guidelines, which could serve as support tools for community-based actions; and studies, which we consider to represent promising practices. The guidelines were identified from webpage searches (e.g. ECDC, CDC, WHO, NICE (UK) etc.) and input from communication experts. The studies are reported campaigns that emerged from our peer-reviewed and grey literature searches that did not meet the rigorous evaluation and review standards of systematic reviews, but nevertheless offer insights and inspiration.**

Definitions and concepts

Health communication interventions in this context are understood to be “multifaceted and multidisciplinary approaches to reach different audiences and share health-related information with the goal of influencing, engaging, and supporting individuals, communities, health professionals, special groups, policymakers and the public to champion, introduce, adopt, or sustain a behaviour, practice or policy that will ultimately improve health outcomes” (Schiavo, 2013). These are not one-way communicative acts but iterative social processes that unfold over time (Obregon & Waisbord, 2012). Health communication encompasses a wide variety of approaches including: health journalism, blogs, entertainment-education, interpersonal communication, media advocacy, organisational communication, risk and crisis communication, social media, marketing and mobilisation. It can take many forms, such as mass multi-media, interactive communications (including mobile telephones and the internet) and traditional and culture-specific communication such as storytelling, puppet shows and songs (Apfel, 2013) .

Disadvantaged and vulnerable populations ⁵ in this context are understood to be those [pregnant and lactating women] that are at greater risk for poor health status, health behaviours, choices and healthcare access; experience significant disparities in illnesses and life expectancy; and, have less access, understanding and ability to use health information (health literacy). “Vulnerable” population health and health information needs are complex, intersecting with social and economic conditions they experience. This population is also likely to have one or more physical and/or mental health conditions. Vulnerable [pregnant and lactating women] populations include the economically disadvantaged, migrants, racial and ethnic minorities, the uninsured, the homeless, those with human immunodeficiency virus (HIV), and those with other chronic health conditions, including severe mental illness. It may also include rural residents, who often encounter barriers to accessing healthcare services. The vulnerability of these individuals is enhanced by social factors, including poor housing, poverty, unemployment and low education levels.

Ethnic minority groups are defined as a population group with an ethnic origin different from that of the majority population of the host country (Bulmer, 1991). Ethnic minorities tend to be vulnerable populations because of poor “cultural competences” and the failure of “individuals and systems to respond respectfully and effectively to people of all cultures, languages, classes, races, ethnic backgrounds, religions, and other diversity factors in a manner that recognises, affirms, and values the worth of individuals, families, and communities and protects and preserves the dignity of each” (Mizrahi et al, 2001).

⁵<http://www.ajmc.com/publications/supplement/2006/2006-11-vol12-n13suppl/nov06-2390ps348-s352/2>

1. Methodology

The methodology chosen for this study was a rapid assessment of the literature rather than a systematic literature review. In this study, the most relevant articles were selected through a rapid screening of titles and abstracts by one reviewer, rather than in a systematic manner with multiple reviewers. In order to ensure that the search was as inclusive as possible, a search for articles was performed using a systematic review method.

1.1. Search strategy

A five-step search strategy was used to identify and analyse published empirical studies as well as guidelines and “promising practice” reports.

Step 1: An initial scoping search of Ovid MEDLINE was undertaken to identify keywords and index terms used in publications on the topic. Preliminary searches were also conducted to determine the volume of material available under different search combinations, and to specifically determine the feasibility of extending the search to look at communication AND vulnerable groups more generally, as well as focusing on diet/nutrition in disadvantaged pregnant and lactating women. Initial results showed this extension was feasible if the search concentrated on finding and synthesising data from existing systematic and meta-analytic reviews (i.e., a review of reviews).

Step 2: The strategy included an extensive list of keywords (see Table 1) and related MeSH/subject headings in an effort to capture systematic and meta analytic reviews that addressed topics relevant to the two levels of enquiry planned; i.e., communication impact on health of vulnerable populations generally and on nutrition promotion to disadvantaged pregnant and breastfeeding women, in particular. A number of databases were searched to locate published academic literature for the review: Google Scholar; Pub-med; Embase; AMED; Medline; PsycINFO; BNI; CINAHL; Cochrane collaboration; and, the Communication Initiative. Additionally the complete archive of the Journal of Health Communication was searched on its own website. The searches were performed across all databases during the period 12-20 March 2015.

Step 3: Papers, conference presentations, reports and technical documents, and other types of grey literature were identified through general internet searches (using Google) as well as targeted searches of selected websites, for example: Health Canada; National Institute for Health and Care Excellence (NICE) and HPA (UK); Centers for Disease Control and Prevention (US); European Centre for Disease Prevention and Control (ECDC); BBC Media Action; and World Health Organization. In addition, various experts in the field were

contacted with a request to identify relevant literature⁶. This added 104 articles to the screening review (including 16 additional peer-reviewed publications identified by experts).

Step 4 Initial searches on terms communicat* (OR related phrases see Table 1) AND vulnerable (OR related phrases see Table 1) groups yielded 556,566 and 72,258 articles, respectively. Adding Europe (OR EU OR pilot project country names see Table 1) reduced the number to 9816 articles. Selecting “Reviews” only yielded 756 articles. A second screening was generated by adding in terms related to “nutrition OR diet” promotion /intervention to disadvantaged pregnant and breastfeeding women. This did not use a “Review only” modifier and yielded 99 articles. All articles (756+99+ 101= 956) from these two searches and from the grey literature review were then screened by one reviewer using exclusion/inclusion criteria (See Boxes 1-2).

Step 5 Based on this screening, 200 articles (from peer reviewed search and recommendations plus “grey” literature items) were then selected for full article review by 2 reviewers. Review questions and rating criteria were used to finalise the selection (see Annex 2). The overall aim was to select material that would inform community-based project developers and implementers. From these 42 Reviews/Articles, 23 Guidelines and 15 Promising Practices were selected for full data extraction and analysis (see Tables 2-5).

Table 1. Keywords for the search strategy

Communicat* initiative		Vulnerable groups		Pregnant		Nutrition		Europe		Roma
Communicat*	A N D	Disadvantage populations	A N D	Breastfeeding	A N D	Diet	A N D	EU	A N D	Somali
Social marketing		Low social economic status		Lactating women		Lifestyles		UK OR United Kingdom		Immigrants
Behav* Communicat*		Low SES				Obesity		Czech Republic		Migrants

⁶ The reviewers had an opportunity to attend a “Media for development” evidence conference with BBC Media Action group and the Communication Initiative in London 16 March 2015. Conference papers and participants (70) provided a rich source of recommendations, which have helped shape this paper.

Health Literacy					Bulgaria	Moroccans
Health Promotion					Spain	Turks
Social media					Denmark	Iraqis

1.2. Quality appraisal

The following inclusion and exclusion criteria were applied to the articles reviewed.

Inclusion criteria to be applied to peer-reviewed studies:

- **Articles that:**
 - **Include research on the following: health communication (broadly defined including mass media, health education, promotion, literacy, social marketing and social media) with vulnerable or disadvantaged groups in general, and specifically on nutrition/diet/obesity/lifestyles in pregnant or lactating women.**
 - **Have the following keywords: intervent*, campaign, evaluation, approach, program* in title or abstract**
 - **Suggest/describe or evaluate communication intervention(s) addressing vulnerable or disadvantaged populations; or evaluated studies or reports, in systematic way, needed to relate to primary and/or secondary outcomes of interest. Primary outcome indicated a change in behaviour (such as exclusive breastfeeding uptake) and secondary outcome indicated a change in knowledge/awareness or attitude are systematic, meta-analytic or literature reviews or texts [or were considered by reviewer to be promising practices]**
- **Level of intervention-: Could cover individual behaviour, interpersonal, community/organisational, societal levels or any combination of these.**
- **Location: Europe with specific searches for UK, Spain, Czech Republic, Bulgaria and Denmark.**
- **Publication scope: 10 years**
- **Populations: All for general search. Women of childbearing age and from designated ethnic groups for specific searches.**
- **Languages: English**

Exclusion criteria for core evidence texts

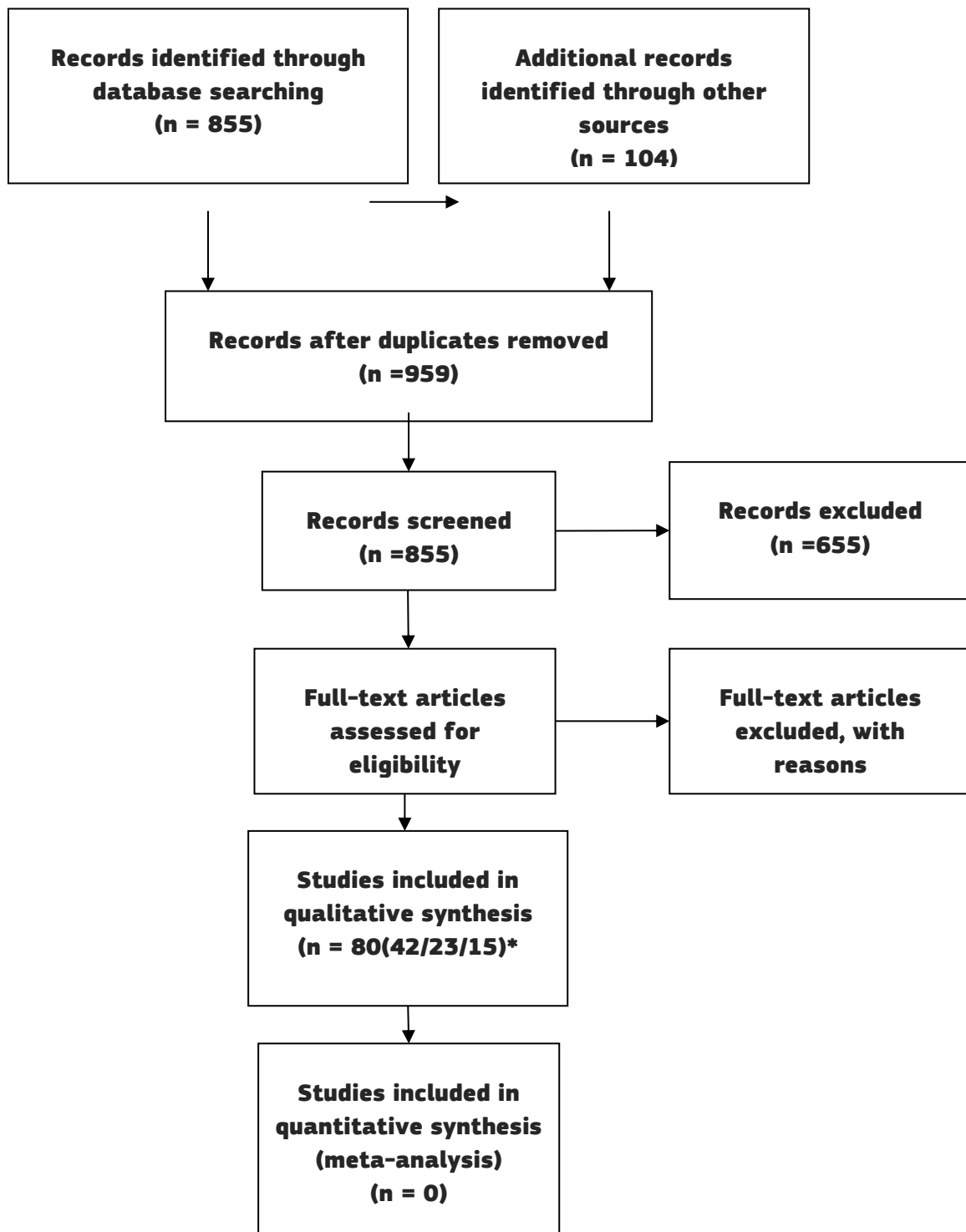
- **Not about communication initiatives**
- **Campaign with no evidence**
- **Lack of quality of evidence or no evidence of effect**
- **Clinical drug and surgical interventions**
- **Not theory based or evaluated**
- **Not systematic review**
- **Not about impact and outcomes**

Inclusion criteria applied to grey literature studies:

- **Keywords**

- **Grey literature research publication years: open**
- **Languages: English**
- **Non-peer reviewed literature**
- **Guidance or training materials focused on developing, implementing and evaluating communication projects for vulnerable populations, ethnic minorities, community based-project, pregnant and/or breastfeeding women.**
- **Positive answer to the question: Is this something that would be helpful to community developers in the five project cities?**

Figure 1. PRISMA Diagram



***24 Communication Reviews/18 Nutrition/Breastfeeding Reviews; 23 Guides and Background documents; 15 Promising practices**

1.3. Results

The following tables outline the resulting articles that were reviewed. They are categorised into three groups: Reviews and textbooks; nutrition and breastfeeding in disadvantaged women – reports, reviews and studies; and guidelines and background.

Table 2. Reviews and textbooks

Nr	Author	Title	Yr. pub	Studies reviewed	Country	Topic
1.	Abraham-Dowsing, K et al (14) BBC Media Action	Reframing the evidence debates: a view from the media for development sector plus appendices	2014	16	UK	Evidence review
2.	Angus, K et al (15) ECDC Research Consortium	Systematic literature review to examine the evidence for the effectiveness of interventions that use theories and models of behaviour change: towards the prevention and control of communicable diseases Insights into health communication	2013	61	Europe and beyond	Communicable diseases-behaviour change theory
3.	Bertrand, J et al (16)	Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviours in developing countries	2006	24	Global	HIV/AIDS
4.	D'Eath M, et al (17) ECDC Research Consortium	A rapid evidence review of health advocacy for communicable diseases Insights into health communication	2014	25	EU/EEA countries	Communicable diseases-Advocacy
5.	Everson-Hock, E.S. et al (18)	Community-based dietary and physical activity interventions in low socioeconomic groups in the UK: A mixed methods systematic review	2013	35	UK	Diet and Physical activity
6.	Glanz K, et al (19)	Health behaviour and health education: theory, research, and practice.	2008	Textbook	Global	Theories of change
7.	Glazier, R, et al (20)	A Systematic Review of Interventions to Improve Diabetes Care in Socially Disadvantaged Populations	2006	17	Industrialised countries	Diabetes

8.	Grilli R et al (21) Cochrane review	Mass media interventions: effects on health services utilisation (Review)	2009	20	Italy/UK	Health services
9.	LaCroix, JM et al (22)	Effectiveness of Mass Media Interventions for HIV Prevention, 1986–2013: A Meta-analysis	2014	72	Global mostly developing countries	HIV
10.	Liu, JJ et al (23)	Adapting health promotion interventions to meet the needs of ethnic minority groups: mixed-methods evidence synthesis	2012	111	Global	Multiple – mainly NCDs
11.	McQueen, D et al (1) IUHPE /WHCA/ECDC study	The added value of health promotion and health education methods and concepts in the prevention of communicable diseases (ECDC report in press) Research informed - McQueen, David V., et al. "The Transferability of Health Promotion and Education Approaches Between Non-communicable Diseases and Communicable Diseases—an Analysis of Evidence." <i>AIMS Public Health</i> 1.4 (2014): 182-198.	2014	Concept review	EU and beyond	NCDs and IDs
12.	Michie S, et al (24)	Low-income groups and behaviour change interventions: a review of intervention content, effectiveness and theoretical frameworks. <i>Journal of epidemiology and community health</i>.	2008	13	UK, Canada, USA, NED	Smoking cessation, increasing physical activity and promoting healthy diet
13.	Naugle, et al (25) USAID Evidence Review	Commissioned Review Article Systematic Review of the Effectiveness of Mass	2014	106	Low- or middle-	Child survival

		Media Interventions for Child Survival in Low- and Middle-Income Countries			income country;	
14.	Netto, G, et al (26)	How can health promotion interventions be adapted for minority ethnic communities? Five principles for guiding the development of behavioural interventions	2010	18	EU/US	CHD (Coronary Heart Disease)
15.	NICE Guideline (27)	Behaviour change: the principles for effective interventions	2007	70 interviews	UK	Behaviour change
16.	Noar, S (28)	A 10-year Retrospective of Research in Health Mass Media Campaigns: Where do we go from here?	2006	120	Global	Multiple topics
17.	Robinson, M et al (29) CDC study	Mass Media Health Communication Campaigns Combined with Health-Related Product Distribution A Community Guide Systematic Review	2014	22	U.S. and Australia, Canada, Belgium, and Israel	NCDs
18.	Schein, R, et al (30)	Literature review on effectiveness of the use of social media: a report for peel public health.	2010	39 reviews	Canada and global	Web 2.0
19.	Sixsmith, J, et al (31) ECDC Research Consortium	A literature review on health communication campaign evaluation with regard to the prevention and control of communicable diseases in Europe	2014	35	EU/EEA countries	Communicable diseases - Campaigns
20.	Sixsmith J, et al (6) ECDC Research Consortium	Health communication and its role in the prevention and control of communicable diseases in Europe Current evidence, practice and future developments	2014	9	EU/EEA countries	Communicable diseases
21.	Smith, W. (32) In Hornik R textbook	Public Health Communication Evidence for behaviour Chapter 18- Change From Prevention Vaccines to Community Care: New Ways to look at program	2002	Textbook area review	Global	Multiple topics

		success				
22.	Snyder, L, et al (33)	Health Communication Campaigns and Their Impact on behaviour	2007	441	Global	Nutrition
23.	Wakefield, M et al (34) Lancet Review	Use of mass media campaigns to change health behaviour	2010	594	Global, mostly developed Europe, US, Australia	18 different topics including breastfeeding and nutrition
24.	Zeh, P. et al (35)	The impact of culturally competent diabetes care interventions for improving diabetes-related outcomes in ethnic minority groups: a systematic review	2012	11	Global most developed countries	Diabetes

Table 3.
Nutrition and breastfeeding in disadvantaged women – reports reviews and studies

Nr	Author	Title	Yr. pub	Study or review	Country	Topic
1.	Alive&Thrive (36)	Strategic design of mass media: promoting breastfeeding in Viet Nam. Washington, D.C., USA: Alive & Thrive. 2014	2014	Report	Vietnam	No water/only breastfeeding
2.	Balaam MC, et.al (37)	A qualitative review of migrant women's perceptions of their needs and experiences related to pregnancy and childbirth.	2013	16	EU	Migrant women's views
3.	Dorfman L, et al (38)	Talking about breastfeeding: Why the health argument isn't enough. Berkeley Media Studies Group. 2010;18.	2010	Study	USA	Framing messages
4.	Dyson L, et al (39)	Interventions for promoting the initiation of breastfeeding.	2005	5	USA	Breastfeeding
5.	Entwistle F, et al (40)	The promotion of breastfeeding among low-income women: midwives' knowledge and attitudes following a WHO/UNICEF breastfeeding ma.	2009	Study	UK	Breastfeeding
6.	Fairbank L, et al (41)	A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding: Core Research; 2000.	2000	59	UK	Breastfeeding
7.	Gardner B, et al (42)	Behaviour change among overweight and socially disadvantaged adults: a longitudinal study of the NHS Health Trainer Service.	2012	Study	UK	Use of trainers - Diet and physical activity

8.	Gazmararian J et al (43)	Text4baby program: an opportunity to reach underserved pregnant and postpartum women?	2014	Study	USA	m-health - Maternal and child health education
9.	Green, C. (44)	Improving Breastfeeding behaviours: Evidence from Two Decades of Intervention Research	1999	25	Developing countries	Breastfeeding
10.	MacGregor E, et al (45)	Breastfeeding experiences of mothers from disadvantaged groups: a review.	2010	9	Global	Breastfeeding
11.	Mclnnes RJ, et al. (46)	Independent predictors of breastfeeding intention in a disadvantaged population of pregnant women.	2001	Study	Scotland	Predictors of breastfeeding
12.	NICE (47)	Breastfeeding for longer: what works? Systematic review summary.	2005	80 eligible studies	UK and global	Breastfeeding
13.	Quinn GP, et al (48)	Promoting pre-conceptional use of folic acid to Hispanic women: a social marketing approach.	2006	Study	USA Hispanic women	Folic acid
14.	Renfrew M, et al(49)	Rethinking research in breast-feeding: a critique of the evidence base identified in a systematic review of interventions to promote and support breast-feeding.	2007	80	UK international	Breastfeeding
15.	Schmied, V, et al.(50)	"Women's perceptions and experiences of breastfeeding support: a metasynthesis."	2011	31	Global	
16.	Sumar N, et al (51)	Impact on social inequalities of population strategies of prevention for folate intake in women of childbearing age.	2011	6	The Netherlands, Norway, Australia, Israel, and the United States	Folic acid

17.	Szwajcer, E et al (52)	Nutrition-related information-seeking behaviours before and throughout the course of pregnancy: consequences for nutrition communication	2005	Study Interviews/focus groups	The Netherlands	Nutrition during pregnancy
18.	Tamrat T, et al(53)	Special delivery: an analysis of mHealth in maternal and newborn health programs and their outcomes around the world.	2012	34	Global	Health Prenatal and neonatal

Table 4. Guidelines and background

Nr	Author	Title	Yr. pub	Topic
1.	Apfel, F. (2)	Health communication (p. 141 -158) in Cragg, L., Davies, M., McDowall, W., Health Promotion Theory	2013	Health communication
2.	Apfel, F (54)	Promoting health advocacy guide for health professionals. ICN, 2008	2008	Health advocacy
3.	Armstrong, R et al (55) Cochrane Review	Guidelines for Systematic Reviews of Health promotion and Public Health interventions	2007	Health promotion reviews
4.	Bauman A.(56)	Precepts and principles of mass media campaign evaluation in Australia. Health Promotion Journal of Australia. 2000; 10(2).	2000	Mass media evaluation
5.	Canada Public Health Agency (57).	Protecting, promoting and supporting breastfeeding- a practical workbook for community-based programs. (2nd edition).	2014	Breastfeeding support
6.	Centers for Disease Control and Prevention (U.S.) (58)	CDCynergy lite; social marketing made simple: a guide for creating effective social marketing plans. 2010.	2010	Social marketing
7.	Centers for Disease Control and Prevention (U.S.) (59)	Public Health Workbook to Define, Locate and Reach Special, Vulnerable, and At-risk Populations in an Emergency: CDC: Atlanta, GA, USA; 2010.40.	2010	Vulnerable populations, emergencies
8.	Dorfman L, et al (60)	Voices for change: taxonomy of public communications campaigns and their evaluation challenges.	2002	Media advocacy
9.	Fishbein M, et al (61)	The role of theory in developing effective health communications. Journal of Communication. 2006; 56.s1 (2006): S1-S17.	2006	Use of behaviour theory
10.	Goldstein S et al (62)	Soul City Theory and Impact Series 4 Evaluation	2001	Edutainment
11.	Kickbusch I, et al (7).	"Health literacy. The solid facts." Copenhagen, Denmark. WHO Regional Office for Europe. 2013.	2013	Health literacy
12.	Marmot M, et al. (63)	"WHO European review of social determinants of health and the health divide." The Lancet 2012;380.9846 (2012): 1011-1029	2012	Social determinants of health
13.	NCCMT. National collaborating centre for methods and tools	Rapid reviews: Methods and implications. http://www.nccmtca/pubs/Methods_Synthesis1pdf		Rapid reviews

	(9)			
14.	NICE (27)	Behaviour Change at population, community and individual levels, in NICE Public Health	2007	Behaviour change campaigns
15.	Obregon R, Waisbord S. (11)	The handbook of global health communication: John Wiley & Sons; 2012.	2012	Global health communications
16.	Parvanta C., et al (64)	Public health communication: A planning framework. Communicating public health information effectively A guide for practitioners. 2002:11-3.	2002	Ecological framework
17.	Rootman, I et al (65) WHO EURO	Evaluation in health promotion Principles and perspectives	2001	Health Promotion
18.	Schiavo R. (10)	Health communication from theory to practice: Jossey-Bass; 2013.	2013	Health Communication
19.	Thomas V et al (66)	Communication skills and cultural awareness courses for healthcare professionals who care for patients with sickle cell disease.	2006	Cultural competence
20.	UNICEF (67)	Improving Exclusive Breastfeeding Practices by using Communication for Development in Infant and Young Child Feeding Programmes Web-based Orientation Series for Programme and Communication Specialists	2010	Training guide breastfeeding
21.	USAID (68)	Technical Reference Materials: Social and behaviour Change https://dec.usaid.gov/dec/GetDoc.axd?ctID=ODVhZjk4NWQtM2YyMiO0YjRmLTkxNjktZTcxMjM2NDBmY2Uy&pid=NTYw&attchmnt=VHJ1ZQ==&rID=MzUwMTY5.	2014	Behaviour change
22.	Vaughan et al (69)	Effective Health Risk Communication About Pandemic Influenza for Vulnerable Populations.	2009	Vulnerable population and communications during pandemic
23.	Whitehead M et al (70)	"Concepts and principles for tackling social inequities in health: Leveling up Part 1." World Health Organization: Studies on social and economic determinants of population health 2. (2006).	2006	Health inequities

2. Findings

What are the characteristics of, and approaches taken by health communication interventions that lead to healthier behaviours and choices undertaken by vulnerable populations?

The great promise of communication projects lies in their ability to disseminate well-defined behavioural messages to audiences large [general society or carefully targeted vulnerable population] repeatedly, over time, in an incidental manner, and at a low cost per head (Wakefield, Loken & Hornik, 2010).

2.1. Design is key

There is strong consensus in the reviews and textbook chapters included in this study (see Table 2) that following effective communication project design principles would lead to greater influence on knowledge, attitudes and behaviours (Noar, 2006; Wakefield, Loken & Hornik, 2010; Hornik, 2002). Moreover, there is strong consensus about how effective communication projects should be designed. Key steps identified include the following (Sixsmith, Doyle & Barry, 2014; NICE, 2007; Noar, 2006; Noar, 2012):

- **Setting goals and objectives — using formative research (Fishbein & Cappella, 2006)**
- **Using theory to guide choice of behaviour change strategy and overcome barriers (Glanz, Rimer & Viswanath, 2008);**
- **Segmenting audiences into meaningful sub-groups (French & Apfel, 2014);**
- **Testing and framing messages for action and to spark interpersonal discussions (Noar, 2006);**
- **Adapting campaigns and materials for contextual/cultural applicability (Liu et al, 2012);**
- **Selecting multi-channel approaches — addressing “ecological” individual, community and societal factors (Parvanta et al, 2002; Winch, 2012, Stokols, 1996);**
- **Evaluating and learning from project processes and outcomes (Sixsmith, Fox, Doyle & Barry, 2014; Wakefield, Loken & Hornik, 2010; Hornik, 2002)**

These essential components of an effective health communication project have been codified in a variety of guides, toolkits and templates (see Table 4) by a number of organisations.

Guidance and templates for project design: some examples

- 1. European Centre for Disease Prevention and Control. A practical guide to conducting health communication activities on MMR vaccination. Stockholm: ECDC; 2010.**
http://ecdc.europa.eu/en/publications/Publications/1008 TED_conducting_health_communication_activities_on_MMR_vaccination.pdf
- 2. The Centre for Health Promotion at the University of Toronto provides a hands-on 12-step process for developing health communication campaigns [projects]**
<https://www.prevention.org/Resources/SAPP/documents/CommunicationCampaign.pdf>
http://www.thcu.ca/resource_db/pubs/713413616.pdf
- 3. U.S. Centers for Disease Prevention and Control provides guidelines on health literacy with specific guidance on a variety of topics; including cultural competence, plain language, the use of social media**
http://www.cdc.gov/socialmedia/tools/guidelines/pdf/socialmediatoolkit_bm.pdf
<http://www.cdc.gov/healthliteracy/developmaterials/guidancestandards.html>

Developers and implementers should be aware from the outset that although “fidelity to principles of campaign design is consistently identified as a most important factor to success of a mass media campaign” (Noar, 2006), other factors not considered by project evaluators may affect project results.

“Campaign messages can fall short and even backfire; exposure of audiences to the message might not meet expectations, hindered by inadequate funding, the increasingly fractured and cluttered media environment, use of inappropriate or poorly researched formats (e.g., boring factual messages or age-inappropriate content), or a combination of these features; homogeneous messages might not be persuasive to heterogeneous audiences; and projects might address behaviours that audiences lack the resources to change.” (Wakefield, Loken & Hornik, 2010, p.1261). Understanding how communication projects can go wrong can help organisers and implementers take “smarter” action in the design phase.

Smith (2002, p. 332) lists four types of failure common to communication interventions:

- **Strategy Failure: Communication is really not the problem. People need better services, and messages are inadequate in themselves to affect change.**
- **Execution Failure: Messages are badly needed, but they are poorly constructed, lack adequate exposure, and/or are addressed at the wrong audience.**
- **Measurement Failure: Communication was the right answer; it was well delivered, but poorly evaluated. Either the instruments measured the wrong change or time was inadequate to permit the change to become detectable.**
- **Expectation Failure: The problem is that real change occurred, but did not meet the expectations of planners or funders. A success was declared to be a failure.**

2.2. Set goals and objectives

All reviews listed in Table 2 (see for example Schiavo, 2013 and Hornik, 2012)) identify social behaviour change as the key goal of communication projects. This reflects the evolution of communication science and practice. As Hornik (2002) and Smith (2002) note, this acknowledges the fact that health outcomes are dependent on people taking action and adopting/changing to/maintaining healthier behaviours as individuals, providers (e.g. enhancing their cultural competence), advocates (e.g. challenging community standards and practices) or policy makers (e.g. setting new health standards and/or regulations).

A second key finding regarding setting goals and objectives is consensus about the need to use formative research with target audiences to gain insights and understanding into people's behaviours and their enablers and obstacles. French and Apfel (2014, p.4), for example, remind us that "many programmes are constructed by experts and policy planners who attempt to drive the behaviour changes they desire down through populations. As a consequence the targeted people may misunderstand these interventions or view them as irrelevant and end up rejecting the proposed solutions."

Smith (2002, p. 334) recommends that we set goals and objectives "based on multifaceted and multidisciplinary research that triangulates direct observation of the target behaviour, qualitative exploration of the determinants of the behaviour and representative sampling of the target population through surveys".

The key emphasis in this formative research step of project design is to gain a better understanding of insights into the target audience in terms of the problem behaviour at hand. Whether it is condom use or multiple sexual partners in HIV (Bertrand et al, 2006; LaCroix et al, 2014), use of folic acid in pregnancy (Quinn et al, 2006) or exclusive breastfeeding in disadvantaged communities (Fairbank et al, 2009; Green, 1999; Higginbottom et al, 2014), the emphasis across all the studies reviewed is behaviour change. Goals tend to be expressed and measured in terms of impact upon reduction of risky behaviours, adoption and or maintenance of healthier behaviours. A wide variety of formative research techniques and approaches are described in the articles and guidance reviewed for this study; including literature reviews, analysis of archival data, surveys, focus groups and qualitative interviews (Noar, 2006; Smith, 2002).

NICE (2007) provides the following key guidance tips for implementing multi-level behaviour change interventions:

- Base interventions on a proper assessment of the target group, where they are located and the behaviour that is to be changed: careful planning is the cornerstone of success.
- Work with other organisations and the community itself to decide on and develop initiatives.
- Build on the skills and knowledge that already exists in the community, for example, by encouraging networks of people who can support each other.
- Take account of – and resolve – problems that prevent people changing their behaviour (for example, the costs involved in taking part in exercise programmes or

buying fresh fruit and vegetables, or lack of knowledge about how to make changes)

Only two of the reviews (Michie et al, 2009; Smith, 2002) give specific information and details on the techniques and approaches used in the formative processes of studies. Such information is generally not reported. Without this detail, it is difficult to evaluate the quality of the formative research, moderators, and interviewers; compare the impact of interventions based on insights gathered from the research to others; or ascertain whether this is an effective way to gather information.

2.3. Using “theories of change” to guide choice of behaviour change strategy and overcome barriers

A theory is a set of interrelated concepts, definitions, and propositions that present a systematic view of events and situations by specifying relations among variables, in order to explain and predict the events or situations (Glanz K, Rimer BK & Viswanath, 2008, p.26).

Theories and models of behaviour change explain the logic of behaviours and suggest ways that projects can help persuade people to change (strengthen or maintain) their attitudes and actions. Such theories help identify strategies to address determinants of change and overcome barriers. For communication projects such determinants and barriers can be competing influences that offset messages. For example, for nutrition programmes these might include food marketing and pricing and/or lack of access to fresh food and vegetable; for birth-rate reduction, social norms for family size and lack of access to services; for breastfeeding, cultural preferences and hospital practices (Wakefield, Loken & Hornik, 2010).

Michie, et al (2009, p. 611) explains that campaigns to change behaviour should draw on theories of behaviour and behaviour change in their development for three main reasons:

- **Interventions are likely to be more effective if they target causal determinants of behaviour and behaviour change. Through a broad behavioural analysis we get a fuller picture of the current behavioural patterns and trends to make sure that the incentives and barriers associated with both the ‘problematic behaviour’ and the ‘desired behaviour’ are fully understood.**
- **Theory-based interventions facilitate an understanding of why particular interventions work and thus provide a basis for developing better interventions across different contexts, populations and behaviours.**
- **Theory can be advanced only if interventions and evaluations are theoretically informed. However, many studies do not make the link between theoretical models, expected outcomes and the process of change explicit.**

Key questions to ask include “How is the policy or intervention supposed to work?” and ‘what inputs, activities, mechanisms, people and resources have to be in place for the policy to be effective?’ (Pawson, 2002; Patton, 2008; White, 2009). Building on different

theories of behaviour change, a causal sequence by which the different elements of the intervention will work to bring about successful delivery and outcomes is described. This causal chain may not be linear, and may operate at different levels of intervention (individual, social, community, environmental).

Glanz, Rimer and Viswaneth's 2008 handbook 'Health Behaviour and Health Education: Theory, Research, and Practice' provides an excellent summary of behaviour theories and models that focus on individual, community and societal levels of intervention. Examples of health behaviour change and social theories and models include: the Health Belief Model, the Theory of Reasoned Action, the Theory of Planned Behaviour, the Integrated Behavioural, Model, the Stages of Change (Trans-theoretical) Model, the Precaution Adoption Process Model, the Social Cognitive, Learning Theory, Theories of Organisational Change, the Socio-Ecological Model and the Precede-Proceed Planning Model.

Several theories are highlighted below:

- **Diffusion of innovations (Rogers, 2010)** This theory introduces the ideas of relative advantage and “trialability” of recommended behaviours, and the individual adoption decision process, as well as opinion leadership that shapes diffusion through interpersonal channels.
- **Health Belief Model (HBM)(Becker, 1974)** This model aims to explain why people will take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits and barriers to a behaviour, cues to action and self efficacy and response efficacy of performing the recommended behaviour (those who are confident carrying out recommended actions are more likely to attempt and sustain behavioural enactment efforts) (Glanz, Rimer & Viswanath, 2008, p.46).
- **Social Cognitive Theory SCT** emphasises the processes by which source role models, explicitly demonstrated behaviours, and depiction of vicarious reinforcement enhance the impact of mediated messages(Bandura, 2001).
- **The Trans-theoretical Model (Prochaska & Velicer, 1997)**, for example, is a stage-of-progression model which identifies sub audiences on the basis of their stage in the process of behaviour change with respect to a specific health behaviour — pre-contemplation, contemplation, preparation, action, or maintenance. Each shapes and hypothesises, the readiness to attempt, adopt, or sustain the recommended behaviour. Using such a theoretical approach, for example, can help project developers better select audience segments and shape messages appropriately.
- **The ‘socio-ecological’ approach or model** proposes ways to address a range of individual, social, and policy factors that affect health behaviours, and offers a more integrated perspective for analysing a range of social and behavioural determinants, including: social networks, social capital, power, participation and empowerment issues. (Obregon & Waisbord, 2012); Glanz, Rimer & Viswanath, 2008).

The ECDC health communication research consortium review of theory based interventions (Angus et al, 2013) notes that theories intended to modify individual-level behaviour remain the most commonly applied and there is a need for more community/system level theories.

2.4. Segmenting audiences into meaningful sub-groups

Target Audience Segmentation is the division of the audience we intend to address into groups that share similar beliefs, attitudes and behavioural patterns. This approach goes beyond demographic, epidemiological and service uptake data, and aims to include data about people's beliefs, attitudes, understanding and observed behaviours. Target audiences are segmented using these data sets. Campaigns are directly tailored to a specific audience segment rather than being addressed to a broader general audience with the hope that those that need the intervention will be reached (the so-called 'spray and pray approaches')(French & Apfel, 2014).

Four reviews (Liu et al, 2012; Michie et al, 2009; Netto et al, 2010; Noar, 2006) and one guideline review (CDC Communication for Development, 2010) specifically highlight the importance of segmentation strategies, especially when working with vulnerable populations. These reviews point to the lack of effective segmentation and message targeting as key factors in failed projects, and recommend gathering specific information on the needs and assets of well-segmented target groups. From there, forthcoming campaigns can be selected shaped and adapt all interventions to reflect this intelligence. This is discussed in more detail in section 2.6.

Our overall search results point to a general lack of "segmented" research on disadvantaged/vulnerable populations in the communication literature. Only 12% of communication-related search results matched with disadvantaged populations (72,258 out of 556,566). This is consistent with the results of the NICE systematic review on breastfeeding interventions, which also noted a lack of research focus on disadvantaged populations. Of the 80 eligible studies (including three reviews) reviewed, only 17 studies (21%) examined the needs of women from disadvantaged groups. One of the main findings of this NICE review was the documentation of this great evidence gap relating to disadvantaged groups (NICE, 2005).

2.5. Testing and framing messages for action and to spark interpersonal discussions

Frames are mental structures we use to integrate new information into our brains in a coherent way. New information - whether a word, image or action - triggers concepts already familiar to us. These concepts, once activated, make this new information meaningful by evoking associations, emotions and responses to everyday information. Since people can hold multiple, even contradictory, frames in their heads at the same time, the one that gets triggered and repeated more often has a better chance of influencing people's interpretation of the text (Dorfman & Gehlert, 2010). Framing and reframing strategies for messaging are at the heart of any communication intervention. The language - verbal and visual - in which an issue is couched, and the terms in which it is presented, can determine the way in which it is perceived and responded to by both members of the public and policy makers. This 'framing' creates the context within which all messages will be received and debated (Apfel, 2013).

All reviews in this study point to the importance of using formative research to inform message development. As Wakefield, et al (2010) point out, project messages should be based on sound science and research of target group(s) and should be tested during project development and adapted according to feedback received. Recently, the widespread use of interactive technologies (e.g., social media and mHealth) has made it more feasible to tailor specific messages to target audiences based on feedback they give about themselves (Snyder, 2007).

Wakefield et al (2010) further emphasise how media messages can set an agenda for, and increase the frequency, and/or depth of interpersonal discussion on a particular health issue within an individual's social network, which, in combination with individual exposure to messages, might reinforce (or undermine) specific changes in behaviour (Abraham-Dowsing, Godfrey & Khor, 2014).

Dorfman and Wallack (2005) emphasise the importance of understanding the existing values and beliefs motivating behaviour(s) related to the public health change being sought. They point to the benefits of articulating core messages that correspond to shared values and how such messaging can help public health practitioners compete more effectively with adversaries in public debate. Such insights can identify critical themes and help dispel myths, which act as barriers to behaviour change.

For example, Quinn et al (2006) provide an example of such formative feedback in regards to folic acid use. They write:

"Folic acid was misperceived and misunderstood across both samples of Mexican women. For example, the use of the term "acid" led many women to believe it was an illegal substance similar to LSD. To address this issue, we retested a concept from a previous project and substituted "B vitamin" for folic acid and found that although folic acid did have a negative connotation, "B vitamin" was not distinguishable from other vitamins and that it was best to use the term folic acid and explain what it is. Many women felt that if folic acid was so important, their health professionals would talk to them about it on a regular basis, but that it would also be available in injectable form at the pharmacy. Participants volunteered that in Mexico, people often receive vitamin injections from the pharmacist for fatigue or other ailments. The majority of women also did not believe in a link between folic acid and birth defects."

2.6. Adapt campaigns and materials for contextual/cultural applicability

An intervention is defined here as any organised, deliberate set of activities designed to influence the specific determinants of behaviour. Examples of interventions can be discrete, one-off events like projects, or continuous activities like the provision of telephone information lines, m-health text messaging services (Evans, Wallace & Snider, 2012).

A wide variety of guides and training materials are available describing different

interventions (see Table 4). While all the reviews in this study describe communication interventions, only one (Michie et al, 2009) provided a typology which “deconstructed” the interventions and identified the various techniques applied, so that comparison could be made about effectiveness.. This study developed a “taxonomy of techniques” to quantify which techniques (e.g., goal setting, planning social support/change and providing rewards) worked best with different target groups, e.g. low-income groups. The general lack of such process and procedural detail in most studies makes comparisons difficult and undermines the reliability of results in general.

Adaptation for vulnerable groups: ethnic minorities

Four reviews (Liu et al, 2012; Michie et al, 2009; Netto et al, 2010; Noar, 2006) and one guideline review (CDC Communication for Development, 2010) provided specific recommendations on approaches community-based developers and implementers can take to adapt tools, materials and interventions for work with vulnerable groups, especially ethnic minorities. In an extensive review (>175 studies) of factors associated with the planning, engagement, implementation and retention in health promotion interventions with ethnic minorities, Liu et al (2012) generated a list of insights and recommendations:

- **Communication strategies used to deliver health messages worked best when focused on oral delivery and group format. Experiential learning was preferred.**
- **The best foci of interventions were at the level of the family, defined to include extended and adopted family members as opposed to nuclear families, or at the level of communities (instead of individuals who are usually the target of health promotion interventions for the general population).**
- **Women were seen as central figures both as targets of behaviour change and as agents of change because of their role in the family (e.g. role-modelling, care-taking).**
- **The goals for behaviour change for ethnic minority groups were best framed around psychological, community and family gains as benefits of behaviour change compared with more individual and aesthetic-focused goals to motivate behaviour change in the general population – this was particularly apparent for weight loss.**
- **Many health goals are seen to represent mainstream or dominant discourses and behaviour change may be perceived as assimilation.**
- **Day-to-day real-life experiences, particularly stressors, and competing priorities are perceived as barriers to change for ethnic minority populations. Although these factors are acknowledged in health promotion interventions for the general population, they appear to be more substantive barriers for ethnic minority populations**
- **Culture constitutes a protective asset rather than a pathology, and is framed as an important factor in both risk and resilience.**
- **Degrees of acculturation, ethnic identity and religious affiliation should be measured to better adapt interventions for ethnic minority populations.**

In a review of papers on how health promotion interventions can be adapted for ethnic minority populations, Netto, et al (2010) noted that there is considerable scope for adapting interventions to increase their appropriateness for the target communities by considering the multiple dimensions of individuals' real-life experiences. These include their minority status, socially disadvantaged position, cultural and religious beliefs, and affiliations.

These findings support the need for a targeted approach to addressing vulnerable populations. To target or not to target public health communication projects and other campaigns on specific vulnerable populations and their inequities has been an on-going point of debate in health policy for many years. Particular concerns are raised about whether population-wide health communication projects worsen the equity gap (Potvin, 2007).

Reviewing studies related to the uptake of folic acid by women of childbearing age across populations, Sumar, et al (2010) noted that agentic⁷ population-based communication projects (requiring self motivated action) were more likely to worsen equity gaps (due to higher uptake by higher social levels) than structural regulatory interventions (e.g., required folic acid fortification programmes). Backholder et al (2014), reinforces this finding. In a study that proposes a framework for addressing obesity in disadvantaged populations, they conclude that limiting further increases in socioeconomic inequalities in obesity requires the implementation of structural interventions.

Engaging with disadvantaged communities

Everson-Hock et al (2013) identify a variety of facilitators and barriers to engaging with disadvantaged communities around community-based diet and physical activity campaigns (see Table 5 below).

Table 5-.Facilitators and barriers to community-based campaigns on healthy food choices in disadvantaged populations in England (Everson-Hock et al, 2013)

	Facilitators	Barriers
Resources	Sufficient available resources —	Lack of funding, time and labour for

⁷ To be an agent is to intentionally make things happen by one's actions. Agency embodies the endowments, belief systems, self-regulatory capabilities and distributed structures and functions through which personal influence is exercised, rather than residing as a discrete entity in a particular place. The core features of agency enable people to play a part in their self-development, adaptation, and self-renewal with changing times.⁸⁴ Bandura A. "Social cognitive theory: An agentic perspective." Annual review of psychology 521 (2001): 1-26. 2001.

	financial, infrastructural and human A focused and elaborated action plan	running interventions. Lack of available facilities for preparing, storing and transporting food.
Staff	Health worker: knowledge of the community (with a deeper knowledge of target groups' circumstances); capacity to facilitate empowerment and engage participants in the subject matter, communicate information in a meaningful way, empathise; be perceived as trustworthy.	Lack of facilitative characteristics in health workers. People feeling bombarded by information, often confusing and contradictory, Distrust.
Messages	Television was seen as a facilitator, when used positively to improve knowledge of food and nutrition.	Lack of clear information, misunderstanding of food messages and the perception of healthy eating messages as complex (e.g., sugar content and the classification of fats, a balanced diet (misinterpreted as a balance of 'good' and 'bad' foods) and the '5-a-day' message (misinterpreted as five portions of fruit).
Perceptions	Acceptability of health workers, the delivery style and content of interventions; social inclusion and the associated image formed by health behaviours; interventions: women only classes, activities at the weekend, free sessions, child-care and food, tailored recipes and enjoyable activities, could enhance acceptability.	Negative connotations with exercise clothing and the term 'healthy eating'. Existing attitudes to and sense of control related to health. Perception of 'bad' foods as a treat and 'good' foods as boring and unsatisfying Prioritisation of traditional food and family preferences over healthy choices. Lack of family support in childhood, parental influence, habit in unhealthy shopping and eating and living alone.

<p>Affordability</p>	<p>Introducing budgeting in nutritional education programmes.</p> <p>Limiting costs of physical activity, transport and facilities, by referral schemes.</p>	<p>The cost of buying healthy food, perceived lack of affordable food locally, public transport costs, the cost of cooking different meals to suit different preferences, marketing strategies promoting unhealthy foods and concerns about wasting money buying food that the family would not eat.</p>
<p>Environmental</p>	<p>Practical demonstrations, progressive small steps towards change, male-only classes and orientation to weight management;</p> <p>Delivering content according to participants' needs, incentives such as free food</p> <p>Using familiar and affordable food and using community members to deliver the intervention.</p>	<p>Perceived lack of local shopping amenities.</p> <p>Difficulty accessing shops with children.</p> <p>Fear of crime, intimidation and attack, dark evenings and poor weather were barriers to outdoors physical activity.</p> <p>Social norms, preferences, habitual behaviours and lifestyle were also found to be influential.</p>
<p>Lifestyle</p>	<p>Enhancing skills in a non-threatening way and using peer and family support to strengthen sporting capability, cooking skills and confidence in cooking meals from scratch and being able to eat '5-a-day'.</p>	<p>Commitments and responsibilities, stress, comfort eating, being stuck in a rut, embarrassment, the belief that activity around the home is sufficient and lack of time.</p> <p>Conversely, boredom was cited as a reason for unhealthy eating, with some people aware of the apparent contradiction. Health professionals suggested that mental health problems such as depression could have an impact.</p>

2.7. Selecting multi-channel approaches: addressing “ecological” individual, community and societal factors

Channels refer to the platforms and technologies available for the dissemination of communication messages. The communication projects reviewed in this study used a wide variety of channels, such as traditional mass media (e.g., TV, radio, newspapers); the Internet and social media (e.g. websites, Facebook, Twitter); small media (e.g. brochures, posters, fliers); group interactions (e.g. workshops, community forums); and one-on-one interactions (e.g. hotline counselling) and m-Health platforms (with SMS messaging and interactive smart phone applications (Everson-Hock et al, 2013; Noar, 2006).

Projects described in the reviews have used a great diversity of channels and methods to engage with communities and “get their message out.” None of the reviews identify communication projects that used only one channel. The likelihood of health communication project success is substantially increased by the application of multiple interventions (Wakefield, Loken & Hornik, 2010). Effective campaigns must be *experienced* by the target audience in order to be effective. Despite the seeming simplicity of this notion, one of the greatest flaws to date in interventions has been their inability to achieve sufficient exposure, or scope, to have the intended impact. Scope and exposure are strongly tied to the availability of resources and the complexity of the behaviour and the number of channel used to reach target audiences(Smith, 2002).

For example, a comprehensive worldwide breastfeeding campaign used a multi-channel approach to address contextual barriers to breastfeeding by lobbying to change hospital, national, and international policies and consistently using new language (e.g. using the term “breast milk substitute” instead of “baby formula”). It addressed the target population of pregnant and lactating women directly by conducting media campaigns and organising support groups for that population. What’s more, it engaged influential third parties by creating campaigns for fathers and influential older women. To gain the support of medical, political, and key organization leaders, the campaign organized conferences. To support and inform health professionals, the campaign also organized national chapters of an international breastfeeding organisation, created reference materials, and conducted training. For future health professionals, the campaign lobbied to change the curriculum in medical and nursing schools, conducted in-service training and created and distributed reference materials (Snyder, 2007, p.S36).

From an evaluation point of view, if a project using numerous channels is effective, it can be difficult or impossible to know which one(s) are most crucial to the project’s outcome. On the other hand, synergy among channels can likely increase exposure and may increase the impact of a project (Noar, 2006).

Addressing motivational issues and barriers to change

Some studies and guides point to the importance of combining information projects with related channels both as a motivation and as a way of addressing potential barriers to action. One CDC social marketing guide (Robinson et al, 2014), for example, notes that the distribution of free or reduced-price products with a projects “enables the target to manifest its motivation and ability” to see the benefits of engaging in that behaviour.

Several other reviews emphasise the importance of the availability of and access to key services promoted by projects; e.g. breastfeeding advice and support, smoking cessation programmes, etc.) as important factors that can help persuade individuals motivated by media messages to act on them. The creation of policies that support opportunities to change or discourage unhealthy behaviours (e.g. company policies designating space and time for breast feeding, regulations controlling the distribution of infant formula, etc.) helps make “healthier choices easier choices”, and provides additional motivation for change (Smith, 2002; Wakefield et al, 2010).

Socio-ecological approach

Some groups, such as Soul City, acknowledge that behavioural change interventions aimed solely at individuals have limited impact, and set project goals based on generating impact at multiple mutually reinforcing levels; individual, community and socio-political environment (Usdin S, et al, 2005). Soul City builds its interventions on behaviour and health promotion principles.

While many of the review authors acknowledge the desirability of taking a more socio-ecological approach, most of the reviews note that such approaches are not common, and that most interventions remain focused on only one or two of the multilevel aspects of such an approach. This finding reinforces the view of many — that such high level modelling may be very useful for describing and even better for understanding the relationship among contextual factors and health, but its usefulness for intervention strategies remains a subject for more evidentiary exploration [23]. Nonetheless, such multilevel modelling may help identify the potential explanatory factors that explain the most variance in any causal model (McQueen & Yuri, 2014).

Web 2.0 (Infoveillance/Infodemiology), social media and m-health

Social media is increasingly being used by public health organisations, both as a broadcasting platform to amplify messages from traditional media sources (e.g., radio, television, print media), and as a new way of collaborating and co-creating content with target audiences (see Box 8). “In the latter approach, organisations have had to adapt their communications strategies to incorporate user generated content and feedback. The process of engaging users to co-create content, to rate, rank and comment on communications, more so than the resulting message, is increasingly perceived to give a heightened authenticity to messages, improving trust in, and building users’ relationships with, organisations. Social media - unlike traditional media - provides novel opportunities

to embed and interject public health messaging into the daily online conversations of [people]. Schein, Wilson & Keelan (2010, p.3) have developed the following guidelines and recommendations for developing a health-related social media strategy.

- **Establish clear objectives: Distinguish between increasing reach and awareness (message amplification), and expanding the scope of messages (collaborative, iterative message development).**
- **Know your target audience: Where they are “present” online and what key behaviours they engage in (understand the cultural norms of each platform): (e.g., youth are currently more likely to Twitter; women between the ages of 25-35 are likely to be posting to Facebook daily).**
- **Design projects for longevity and/or have exit strategies and clear archiving processes: Material from social media projects can “live forever” online, and can reappear in circulation years after the project ends. It is important to consider date-stamping or providing explicit local and temporal context to information in order to prevent users in the future from using dated information that may no longer be appropriate.**
- **Determine resource needs: For many platforms that require daily monitoring and responses (e.g., Facebook, Twitter), it is important to allocate sufficient time and resources for on-going interactions.**
- **Determine an agency content-clearance and / or prepare-pre-approved process**
- **Messaging Scripts: Some social media platforms require rapid clearance processes to enable real-time interactions with users (SecondLife, Twitter, Facebook), while immediate responses are not critical on other platforms (e.g. YouTube).**
- **Listen to online health discourse. Monitor the reception of project materials, and react to gaps, contradictory information or satirical responses to project materials. Both manual and automated infoveillance tools are available. Most platforms have freely available analytic tools, news aggregators and fee-for-service infoveillance monitoring is available.**
- **Encourage or sponsor research investigating social media applications and specific health objectives.**
- **Encourage coordination of materials and messages with municipal, provincial and federal agencies (share resources and leverage national projects). Consider incorporating high quality content from existing projects. Integrating popular and high quality materials from other public health agencies will not only leverage existing public health resources. Cross-linking and redirecting of traffic can improve the visibility of high-quality information online, and reverse traffic flow can improve your agency’s visibility.**

m-Health

Mobile devices such as mobile telephones, as well as wireless and satellite communications, are giving remote communities the opportunity to be connected and to access information. Three in every four people on the planet now have access to mobile telephones, and according to a UN estimate, sixty-four per cent of all mobile telephone users live in the developing world. The potential for m-Health communications is enormous. m-Health is a rapidly evolving communication area and early results support development of it as a powerful, interactive channel for health-related communications. These developments offer exciting opportunities for expanding the availability of health information to underserved populations, and countering misinformation rapidly and effectively (Apfel, 2013).

Current uses of m-Health communication include citizen science (a variety of activities whereby the public participate in scientific research), education and awareness, disease and epidemic outbreak tracking (providing decision-makers with timely, location-related information), patient diagnostic and treatment support, and health care provider training and communications (Apfel, 2013).

Text messaging

Text messaging programmes have succeeded in the promotion of health-related behaviours, such as use of oral contraceptives, physical activity and smoking cessation. Gazmararian et al (2014) report that 8 out of 12 randomised controlled trials and quasi-experimental studies of behavioural change campaigns delivered via text messaging supported the role of text messaging in behaviour change in disease prevention and/or management. The review also described several limitations of text message use in behaviour change, including the interruption of mobile phone services and the exclusion of underserved populations that may not have access to cell phones, or are not comfortable with SMS — especially individuals who have low literacy and low SES. Research shows that cultural differences should also be addressed when developing messages for underserved populations and that text messages should be examined more carefully, taking various cultural and social-economic factors into consideration.

2.8. Evaluating and learning from project process and outcomes

Health communication evaluation in this context is understood as ‘the systematic application of research procedures to understand the conceptualisation, design, implementation, and utility of interventions’ (Valente, 2012). The ECDC research consortium identifies three phases:

- **Formative evaluation, which helps to guide project development by gaining a deeper understanding of the values, attitudes, and beliefs of the target population (Valente, 2012; Noar, Palmgreen & Zimmerman, 2009)**
- **Process evaluation, where project exposure and target audience feedback is monitored to inform any necessary mid-point project improvements (Noar, 2012; Noar, Palmgreen & Zimmerman, 2009) and**
- **Summative or outcome evaluation, which aims to assess project impact and identify explanations for any achievements observed. (Dorfman, Ervice & Woodruff, 2012; Valente, 2012; Noar, Palmgreen & Zimmerman, 2009; Green, 2006)**

While all of the reviews in the study which specifically look at impacts of mass media health projects report some evidence of a positive knowledge, attitude and/or behavioural effect of health communication projects, most identified significant limitations to current evaluation approaches and capacities, and identified various suggestions for improvement (see Table 6).

Table 6. Benefits, limitations and recommendations of reviews

Study	Benefit	Limitations	Recommendations
Abraham-Dosing et al, BBC Media Action (14)	What is clear is the belief that media matters in development.	What is equally clear is the noted level of frustration at the fact that this evidence conversation has been around for the last half-century and yet as practitioners we still do not seem to be able to take it forward collectively or cohesively.	Clearer standards for evaluation reporting. Greater investment in rigorous formative and summative evaluations and implementation research. Greater efforts to collate, comprehensively review and share the evidence that does exist. Appropriate to critique and understand research and evaluation findings.

<p>Barnard (16)</p>	<p>On two of the seven outcomes, at least half of the studies did show a positive impact of the mass media: knowledge of HIV transmission and reduction in high-risk sexual behaviour.</p>	<p>Mixed results on the effectiveness of the mass media to change HIV-related behaviours in developing countries. On most of the outcomes examined across studies, we found no statistically significant impact.</p>	<p>Further rigorous evaluation on comprehensive programmes is required.</p>
<p>Everson-Hock, E.S (18)</p>	<p>A strength of this review was the inclusion of many types of evidence, which allowed us to explore effectiveness findings in contextual detail and create explicit links between quantitative and qualitative evidence, using methods appropriate for the data. Overall, evidence on the effectiveness of community-based dietary and physical activity campaigns are inconclusive.</p>	<p>Behavioural outcomes of interventions were mainly self-reported; therefore some caution is required in interpreting our quantitative review findings. A range of barriers and facilitators exist, some of which were addressed by campaigns.</p>	<p>Address identified barriers in planning and implementing community programmes.</p>
<p>Grilli (21)</p>	<p>Mass media can have impact on use by health services, both as the result of planned projects and unplanned coverage.</p>	<p>Studies are descriptive and lack statistical analysis,</p>	<p>Better study design.</p>

LaCroix(22)	Mass media interventions may be useful in reducing global HIV/AIDS disparities because of their reach and effectiveness. Media projects are a means of “going to scale”—taking an intervention to large numbers of people.	Given the inability to reliably control access to mass media, it may be both difficult and costly to use true or quasi-experimental designs.	The intervention literature in general would benefit tremendously from the public availability of more quantitative evaluations (i.e., using pre projects comparison groups or quasi-experimental designs), described in greater detail (e.g., specifying media channels used).
Noagle (25)	Mass media projects can positively impact a wide range of child survival health behaviours	Publication bias - Unsuccessful campaigns do not report their results.	Everyone should report findings.
Noar (28)	Targeted, well-executed health mass media projects can have small-to-moderate effects not only on health knowledge, beliefs, and attitudes, but on behaviours as well, which can translate into major public health impact given the wide reach of mass media.	There may be cases, in which a strong research design is simply not possible. While some of the weaker designs may offer evidence of exposure and clues regarding project effectiveness, they cannot provide solid evidence of project effectiveness and likely will contribute little to the scientific literature on effectiveness.	Those involved in projects should strive for the most rigorous research designs possible, as these will generate the best evidence of project effectiveness.
Synder (33)	5% benefit of targeted populations over controls (e.g., fruit and vegetable consumption, fat intake and breastfeeding.	Habits—which would include most dietary matters—can be harder to change than adopting new behaviours that only need to be performed once or twice.	More research needed, e.g., details on nutrition specific behaviours to target, ways to make impacts more sustainable, and cost benefit studies.

<p>Wakefield (34)</p>	<p>Mass media projects can change population health</p> <p>The likelihood of success is substantially increased by the application of multiple interventions¹⁰² and when the target behaviour is one-off or episodic (e.g., screening, vaccination, children’s aspirin use) rather than habitual or on-going (e.g., food choices, sun exposure, physical activity).</p>	<p>Study designs are less than classically excellent.</p> <p>Pervasive marketing for competing products or with opposing messages, the power of social norms, and the drive of addiction frequently mean that positive project outcomes are not sustained. The increasingly fractured and cluttered media environment poses challenges to achieving adequate exposure</p>	<p>Investment in longer, better-funded projects to achieve adequate population exposure to media messages.</p> <p>Concurrent availability of and access to key services and products are crucial to persuade individuals motivated by media messages to act on them.</p>
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Reflections on developing evaluation and evidence

The ECDC consortium indicates that researchers should be clear about what is being evaluated, and be realistic and explicit about the expected direct and indirect effects, consider potential unintended effects, and use appropriate theory to inform project development and evaluation. The consortium recommends that evaluation, including cost effectiveness analysis, should be integrated with formative, process and summative evaluation through project planning, development and implementation. They identify preferred evaluation research designs as including those with: pre-post test, cohort designs, time-series designs and natural experiments. They note that the use of post-test only designs is severely compromised but may be the only option in situations of scarce resources. They call for the acknowledgement and documentation of the context in which projects are implemented as a way of facilitating the transfer of knowledge (Sixsmith, Fox, Doyle & Barry, 2014).

In the BBC Action Group discussion paper on evidence for media for development initiatives (Abraham-Dowsing, Godfrey & Khor, 2014). Phillip Davies makes the following points about evidence in this area:

- Evidence is not definitive. It is tentative, representative of different perspectives and contested.
- Evidence does not tell people what to do or how to act. It gives direction, guidance and insight into whether outcomes are being achieved.
- The meaning and significance of evidence for decision-making depends on how it is interpreted in light of the experience, expertise and judgment of people who use it.
- Mixed-methods research and evaluation based on a clear theory of change are most likely to offer the most robust evidence.

- **Measuring impact does not necessarily require a randomized controlled trial.**
- **Many impact questions, particularly those that seek to understand how and why change happens, cannot be answered in purely quantitative ways. Some impact questions can only be measured qualitatively.**

3. Discussion - Application of findings

We will now turn to exploring ways that community programme developers and implementers can apply the evidence-based framework presented in support of their own planning related to promoting healthier diet and nutrition to disadvantaged pregnant and breastfeeding women. To this end, we will draw on articles listed in Table 3, which focus on nutrition and breastfeeding interventions with these target groups.

3.1. Setting goals and objectives

A variety of useful reviews are available to inform community-based formative research studies on the nutritional assets and needs of disadvantaged pregnant and breastfeeding women in the various pilot city and regional settings. These reviews describe and analyse, for example, information seeking behaviours, facilitative and obstructive factors to exclusive breastfeeding, differential uptake of folic acid and dietary (weight control) advice.

Szwajcer et al (2005), provide some useful insights into the kind of pregnancy-related nutrition information Dutch women seek and the channels they use to access it. “Pregnant women perceive pregnancy-specific nutrition information as important because it is one of the few things that they can apply in their daily lives to protect the health of the foetus”. The report continues:

“Women hoping to have a child generally sought little nutrition information because they were not pregnant yet. Information sources were the Internet (anonymous) and the social environment (models). In relation to the manifestation of nutrition-related information-seeking behaviours during first-time pregnancies, three groups of women could be distinguished: (1) women who feel like a mother from the moment they know that they are pregnant, (2) women who feel like a mother later in pregnancy, and (3) women who do not feel like a mother yet. Each group had its own specific information-seeking behaviour.

Important information sources used by the first group were the Internet (anonymous and up-to-date), books (extended) and midwives (expert) during the first trimester; the 9-month calendar (fun and tips), friends (experience) in the second trimester; and friends (information on breastfeeding) in the third trimester. Information sources used by second group of women were mainly brochures provided by the midwife, and the midwife herself. The third group of women mainly relied on their own common sense. Second-time pregnant women mainly relied on their experience, the midwife, and books for specific questions.”

3.2. Using theory to guide choice of behaviour change strategy and overcome barriers

ALIVE & THRIVE (A&L) (2014) is an initiative to improve infant and young child feeding practices by increasing rates of exclusive breastfeeding and improving complementary feeding practices in Bangladesh, Ethiopia, and Vietnam. With support from the Gates Foundation and others, A&L has invested resources in a professional commercial-style project. It worked with media savvy professionals to create materials with high production values and appeal, and purchased sufficient airtime for their project to have an impact.

A&L created a model for behaviour change that was built on a clear measurable behavioural goal - the practice of exclusive breastfeeding for the first 6 months. Its research showed that giving water to babies was a big threat to exclusive breastfeeding rates in Vietnam. Eliminating that practice was hypothesised as a way of increasing numbers of exclusively breastfed babies. So this small, doable action became the focus of the mass media project with a single overriding message - “Do not give your baby water for the first 6 months.” As simply increasing mothers’ awareness or knowledge may help some mothers adopt a new behaviour—but was unlikely to result in widespread change, the project addressed specific behavioural determinants—the factors that research showed drove the behaviour. The following four behavioural determinants were identified:

- **Knowledge of what the recommended behaviour/action is.**
- **Beliefs about outcomes of practicing the behaviour - the mother thinks that adopting the behaviour will result in an outcome she cares about.**
- **Perceptions of social norms - what the mother thinks other mothers like her are doing; and what she thinks other people (whose opinions matter to her) think she should do.**
- **Sense of self-efficacy - the mother feels she is capable of practicing the behaviour and that it is convenient for her.**

A&L used many channels to deliver this message and ensure high exposure. Their results were significant: at 18 months exclusive breastfeeding for 6 months increased from 26 to 48%.

3.3. Segmenting audiences into meaningful sub-groups

Several of the nutrition related studies (including breastfeeding studies) provide evidence on risk factors associated with positive and or negative behaviours by pregnant and breastfeeding women. Community project organisers can use insights from these studies to shape their own research and/or to carefully select sub-groups that might most usefully be targeted.

Ahluwalia, et al (2005), for example, notes that factors known to be associated with not breastfeeding, and with early breastfeeding cessation include smoking, exposure to environmental tobacco smoke (ETS), maternal medication use, physical and mental problems such as obesity and depression, and circumstances that make breastfeeding difficult, such as going back to work or school.

McInnes et al (2001) identify five factors in two disadvantaged populations living on housing estates in Scotland, which they found were independently predictive of breastfeeding intention. These were previous breastfeeding experience, living with a partner, smoking, parity and maternal age. Importantly, they note that after adjusting for these factors that deprivation did not provide useful additional predictive information.

Secondary targets — stakeholders

A NICE study (2005) calls for the “wholehearted involvement and support of a large list of key stakeholders”, all of whom would require targeted tailored messages. Their list includes:

- **Clinical professionals in community and hospital settings**
- **Community based workers including Sure Start staff**
- **Managers with responsibility for health and social services and staff**
- **Those with responsibility for collecting health and health service—related data**
- **Educators in the fields of health and social services; schoolteachers and those responsible for the school curriculum in primary and secondary schools**
- **Employers in large and small organisations**
- **Politicians and policy makers at local, regional and national levels**
- **Those with influence over public opinion**
- **Families and the public at large**

3.4. Framing messages for action

Formative studies can give important insights that can shape messages, framing and imagery.

Looking at the experience of pregnant migrant women as reported in 16 qualitative studies in Europe, Balaam et al (2013) identified key concerns/themes which could inform messaging strategies. These included “Preserving one's integrity in the new country” revealed two key aspects; 'Struggling to find meaning' and 'Caring relationships'. 'Struggling to find meaning' comprised four sub-themes; 'Communication and connection', 'Striving to cope and manage', 'Struggling to achieve a safe pregnancy and childbirth', and 'Maintaining bodily integrity'. 'Caring relationships' was based on the following three sub-themes: 'Sources of strength', 'Organisational barriers to maternity care', and 'The nature and quality of caring relationships'.

Schmeid et al (2001) note that care interventions judged positively were described as 'authentic' and 'facilitative', whilst unhelpful or detrimental interventions were considered as 'disconnected' and 'reductionist'. Such insights can help shape communication framing, messages and imagery. The findings emphasise the importance of people-centric communication approaches, and of relationship building in supporting a woman to breastfeed. Mothers commented that the development of a trusting continued relationship, which was encouraging and affirmative of their ability was most conducive to breastfeeding prolongation. Interactions, which were fragmented, lacking in rapport or where staff were either over-zealous about breast-feeding or offered conflicting advice, negatively influenced a woman's personal confidence.

In the A&L programme, focus groups (Alive & Thrive, 2014) showed that mothers were most attracted to seeing real babies talk about issues.

Dorfman et al (2010) devised a framing strategy to help California agencies take increase exclusive breastfeeding rates and subsequently reduce health disparities. This framing strategy was to support media advocacy to medical professionals, hospital administrators and other community decision makers. It is outlined below:

- **You can't have a media strategy without an overall strategy.**
 - **The desired policy change drives the message, not the other way around. Once advocates have identified these policies, they can determine the media and message strategies to follow. With those in place, advocates are ready to attract the attention of journalists to raise the issue on the agenda, framed in a way that highlights the solution they seek. Messages about the health benefits of breastfeeding will reinforce an individualized *Good Mother* frame, unless the messages also call out the policy context that can support breastfeeding.**
- **The primary target is never the general public**
 - **The object of media advocacy is to put pressure on decision makers to make**

the right decision for the public's health. Media advocates focus on getting news coverage to put pressure on those decision makers. Secondary audiences are those who can put direct pressure on the primary target. Educating the general public happens in the context of reaching the primary target, usually a policy maker or governing body.

- **Be proactive and reactive**
 - **Media advocacy can be planned. And breastfeeding advocates can prepare themselves and their organisations to be responsive when news breaks. To do that well, advocates and their organisations need to practice good media relations: Get to know key reporters and bloggers, be sure they know you, keep an up-to-date media list, and understand what's newsworthy and how to pitch a story. And, of course, think in terms of the larger frame, so that your social change goals are present in all communication with journalists.**
- **Frame the landscape, not just the portrait**

Health messages about breastfeeding can educate the general public, but education alone cannot create an environment that supports breastfeeding. If the goal is structural or environmental changes that support breastfeeding, then advocates' messages must illustrate the landscape that surrounds breastfeeding mothers to make visible why those structural changes are needed. And the messages must link the policy changes to that landscape.

3.5 Adapting interventions for contextual/cultural utility

Interventions may include, or take the form of informative and /or educational, practical, or motivational initiatives. Most articles and reviews focus on hospital and community-based interventions delivered by: midwives, doctors, midwifery support workers, nurse/neonatal nurse, breastfeeding support worker and lactation consultants. Fewer focus on interventions delivered by peer/lay counsellors. While communication projects are mentioned in systemic reviews, evidence is generally considered weak and this is identified as an area requiring greater research.

While such evidence does not provide specific technical guidance for communication project interventions, it does yield import insights regarding content, messaging, framing and imagery etc. All these insights can inform communication strategies, especially advocacy projects calling for healthier organisational and/or community-based policies.

Determining which interventions work for breastfeeding and other nutritional interventions is approached by several studies. The NICE review of breastfeeding interventions (2005) provides evidence on both what works and doesn't work in a UK context. They include the following as successful interventions:

Postnatal hospital stay

- **Skilled breastfeeding support, peer or professional, proactively offered to women**

who want to breastfeed

- **Preventing the provision of discharge packs containing formula-feeding information and samples**
- **Unrestricted feeding from birth onwards**
- **Unrestricted mother-baby contact from birth onwards**
- **Unrestricted kangaroo care/skin-to-skin care from birth onwards**
- **Avoiding supplementary fluids for babies unless medically indicated**
- **Regular breast drainage/continued breastfeeding for mastitis**
- **Antibiotics for infective mastitis**

Postnatal care in the community

- **Skilled breastfeeding support, peer or professional, proactively offered to women who want to breastfeed**

On-going care in the community

- **Skilled peer or professional breastfeeding support**

A Cochrane Review (Dyson et al, 2005) concludes that health education and peer support interventions can result in some improvements in the number of women beginning to breastfeed. Findings from these studies suggest that larger increases are likely to result from needs-based, informal repeat education sessions, than more generic, formal antenatal sessions. These findings are based on studies among women on low incomes (in the USA), and with varied ethnicity and feeding intention.

Social marketing projects in Brazil (moving average breastfeeding duration from 2 months to 10 months) and one by the USDA (the US Department of Agriculture) entitled the “Loving Support makes Breastfeeding Work” project have led to significant increases in exclusive breastfeeding duration (Pérez-Escamilla, 2012). These projects emphasised the need for comprehensive approaches which “shift the social norm.” Significant “industry-related” obstacles to the mass communication elements were identified:

“Although the project received \$30 million in free advertising during 2 years, the formula industry spent \$80 million during the same period of time promoting its products. And, some key media outlets such as baby magazines that ran paid advertisements from the formula industry refused to run the project’s public service announcements at no cost. The free public service announcements were delivered through other types of magazines, radio, newspapers, and billboards. The key lesson learned from this project is that health communication projects by themselves are not enough to improve breastfeeding duration. Also, health communication projects without adequate budgets for paid public service announcements are likely to be less effective, given the priority placed by key media channels toward paid advertisement by the formula industry.”

3.6. Selecting multi-channel approaches addressing “ecological” individual, community and societal” factors

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Articles and reviews identify a wide variety of channels used, as follows:

BROADCAST

- **TV spots on national and regional TV stations**
- **Radio**
- **Audio messages delivered over outdoor loudspeakers**

OUT-OF-HOME

- **Print ads on the outside of buses**
- **Billboards**
- **Posters in health centres**

ONLINE and m-HEALTH

- **A website, dedicated to infant and young child feeding, with information and TV spots**
- **Interactive online counselling**
- **Interactive mothers’ forum**
- **TV spots placed on websites that are most popular with women**
- **Facebook fan page**
- **Mobile app to connect young mothers and allow them to track baby’s milestones, share photos, access and feeding recommendations**
- **TV spots displayed on LCD screens in hospitals, health centres, and supermarkets**
- **SMS messaging**

mHealth and SMS messaging

In reviewing 34 studies on mHealth (mainly in developing countries), Tamrat et al (2012) conclude that mobile technology is an effective tool that empowers pregnant women and healthcare providers. Generally, programs focused on specific points such as emergency responses during birth, with fewer projects that intervened at multiple points along the continuum of care. Tamrat found that overall, mHealth can be a useful part of a comprehensive approach in expediting emergency obstetric referrals and enabling health workers to collaborate and improve delivery of care. Likewise, the use of mHealth can bolster preventive services through the enhanced dissemination of prenatal and neonatal education and promotion of antenatal care. However, the literature review revealed a paucity of project evaluations and a general lack of management and policy frameworks for guiding and coordinating the adoption of mHealth services into the broader health system.

Text 4 Baby

The nationwide text4baby programme was launched in February 2010 (in the USA) to help address inequities in birth outcomes. It provides a free mobile information service to pregnant and postpartum women promoting healthy birth outcomes and infant growth. Pregnant women and new mothers receive targeted, developmentally appropriate, weekly Short Message Service (SMS) text messages (vetted by CDC) about key prenatal and postpartum health services and behaviours. For example, a message may say: “worried about keeping baby warm at night? Infant pajamas & infant sleep sacks are safe for baby to wear to sleep but no loose blankets in the crib”. Evans et al (2012) conducted a randomized controlled trial study to evaluate the national text4baby programme, and found that women who received text4baby messages were nearly three times more likely to have beliefs that they were prepared for motherhood when compared to the mothers who did not receive text messaging exposure. Gazmararian et al. evaluated the programme in 2014 and concluded that it is widely accepted by this target population of low-income underserved pregnant women and new mothers, and has the potential to prompt change in health behaviour.(Gazmararian et al, 2014).

3.7. Evaluating and learning from project impact: processes and outcomes

The studies reviewed show that various program interventions can change key nutrition and breastfeeding behaviours. Some campaigns are more effective in reaching specific audiences or bringing about specific behaviour changes. Combinations of interventions are often needed to have the desired effect on knowledge and behaviour(Green, 1999). The need for the strengthening of evaluation approaches is a frequent recommendation(NICE, 2005; Ahluwalia et al, 2005; Services, 2011).

4. Conclusions

This review has focused on summarising evidence from systematic and other reviews as they have the advantage over single evaluations in that they provide an overall balance of evidence and provided a convenient way of narrowing our search volumes to match the resources available for this study. It should be noted, however, that what constitutes robust evidence in the health communication area is the topic of much debate and dialogue⁸. The multidisciplinary nature of health communication has led to the evolution of many alternative and appropriate views of evaluation(Armstrong et al, 2007; Bauman, 2000; Rootman, 2001; Noar, 2012; CDC, 1999; Glasgow et al, 2006; NICE, 2007; Cooper et al, 2009). As a result, there is no single methodology that is appropriate; rather, there are several well-developed approaches or lenses that are useful.

Some researchers have suggested that there is a “hierarchy of evidence” (Leigh, 2009; Sackett et al, 1996), which gives greater status to quantitative and experimental evaluation over and above qualitative and naturalistic methods of inquiry. This view fails to appreciate that the most appropriate type of evaluation depends on the policy or practice question that is being asked. For questions that concern people’s experiences or understanding of policy interventions, for example, in-depth interview studies, focus group analysis and ethnographic inquiry are clearly superior to experimental/quasi-experimental methods (Abraham-Dowsing et al, 2014). Many community-based interventions do not meet the rigorous methodological criteria established by systematic review groups, and as a result yield insufficient evidence. This ‘insufficient evidence’ finding is to a great extent, an artefact of the study criteria that does not efficiently deal with complex interventions. The question for evaluation becomes one of whether the evidence is poor or the evidence-seeking behaviour and model are inappropriate(McQueen & Carter, 2014). Importantly the significant and increasingly influential and important social media platforms like YouTube are poorly studied and documented.

For the evidence included, it should also be noted that several biases have been introduced through utilising a rapid approach, including:

- **selection bias;**
- **publication bias;**
- **language of publication bias.**

Additionally, rapid data extraction may have missed some information.

Nevertheless, the study has identified a wide range of insights for community-based managers and practitioners and other stakeholders to use in planning interventions to promote healthier nutrition to disadvantaged pregnant and breastfeeding women. It will be

⁸ Examples include: *World Bank and Oxfam blogs (see <http://blogs.worldbank.org/publicsphere/have-evidence-will-um-erm-2-2> and <http://oxfamblogs.org/fp2p/the-evidence-debate-continues-chris-whitty-and-stefan-dercon-respond/> and the 2013 Politics of Evidence: Big Push Forward conference in the UK: <https://www.ids.ac.uk/events/politics-of-evidence-conference>.*

important for these pilot projects to document their processes and outcome so that reports of these interventions can strengthen what is currently a weak evidence base in this area. Of particular importance will be the evaluation of “new” and increasingly important communication channels, like You tube and mHealth that to date, do not figure prominently in the peer-reviewed literature.

Annex

Search strategy developed on NICE NHS search engine:

1. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; ((communicat* OR "media " OR "health promotion" OR "social marketing" OR "behave* communication" OR "health literacy")).ti,ab; 749402 results.
2. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 1 AND ("vulnerable groups" OR "vulnerable populations" OR "disadvantaged groups" OR "low social economic status" OR "low SES" OR "ethnic minorities" OR "migrants") [Limit to: Publication Year 2005-2015]; 3386 results.
3. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 2 AND (Europe OR EU OR Spain OR UK OR Bulgaria OR "Czech Republic" OR Denmark OR "United Kingdom") [Limit to: Publication Year 2005-2015]; 835 results.
4. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 3 AND (reviews OR "systematic reviews" OR "exploratory reviews") [Limit to: Publication Year 2005-2015]; 123 results.
5. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 3 AND (pregnant OR "breastfeeding women" OR "lactating women") [Limit to: Publication Year 2005-2015]; 82 results.
6. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 2 AND (pregnant OR "breastfeeding women" OR "lactating women") [Limit to: Publication Year 2005-2015]; 172 results.
7. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 5 AND (nutrition OR diet OR obesity OR lifestyle OR
 1. "physical activity") [Limit to: Publication Year 2005-2015]; 44 results.
8. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 6 AND (nutrition OR diet OR obesity OR lifestyle OR "physical activity") [Limit to: Publication Year 2005-2015]; 70 results.
9. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 4 AND 7 [Limit to: Publication Year 2005-2015]; 0 results.
10. AMED, EMBASE, MEDLINE, PsycINFO, BNI, CINAHL; 4 AND 8 [Limit to: Publication Year 2005-2015]; 0 results.

Chapter 2 References

1. McQueen D. ME, Carter Y. . The added value of health promotion and health education methods and concepts in the prevention of communicable diseases. International Union for Health Promotion and Education (IUHPE)/ ECDC Study-unpublished 2014.
2. Apfel F. Chapter 10. Health communication (p. 141 -158) in Cragg, Liza Davies, Maggie Macdowall, Wendy, Health Promotion Theory, 2E: McGraw-Hill International; 2013.
3. Puska P. Successful prevention of non-communicable diseases: 25 year experiences with North Karelia Project in Finland Public Health Medicine 2002;4(1):5-7.
4. Vartiainen E PM, McAlister A, and Puska P. Fifteen-year follow-up of smoking prevention effects in the North Karelia youth project. American journal of public health. 1998;88, 1, 81-85 81-5
5. Puska P VE, TuomilehtoJ, et al. Changes in premature deaths in Finland: successful long-term prevention of cardiovascular diseases: 1998. Bulletin of the World Health Organization. 1998;76(4): 419-425.
6. Sixsmith J, Doyle P, Barry MM. Health communication and its role in the prevention and control of communicable diseases in Europe-Current evidence, practice and future developments. 2014.
7. Kickbusch I PJ, Apfel F, Tsouros A. "Health literacy. The solid facts." Copenhagen, Denmark: . WHO Regional Office for Europe 2013.
8. Whitehead M, and Göran Dahlgren. . "Concepts and principles for tackling social inequities in health: Levelling up Part 1." World Health Organization: Studies on social and economic determinants of population health 2 (2006).
9. NCCMT. National collaborating centre for methods and tools, Rapid reviews: Methods and implications. http://wwwnccmtca/pubs/Methods_Synthesis1pdf.
10. Schiavo R. Health communication from theory to practice: Jossey-Bass; 2013.
11. Obregon R, Waisbord S. The handbook of global health communication: John Wiley & Sons; 2012.
12. Bulmer M. The ethnic group question in the 1991 Census of Population. Ethnicity in the. 1991:33-62.
13. Mizrahi T MR, Starks SH, Fong L, Deer AE, Jaipaul IK, et al National Association of Social Workers. NASW standards for cultural competence in social work practice: National Association of Social Workers; 2001.
14. Abraham-Dowsing K, Godfrey A, Khor Z. Reframing the evidence debates: a view from the media for development sector. BBC Media Action working paper http://downloads.bbc.co.uk/rmhttp/mediaaction/pdf/research/working_paper_reframing_the_evidence_debates.pdf, 2014.
15. Angus K, Cairns G, Purves R, Bryce S, MacDonald L, Gordon R. Systematic literature

- review to examine the evidence for the effectiveness of interventions that use theories and models of behaviour change: towards the prevention and control of communicable diseases. European Centre for Disease Prevention and Control, 2013.**
- 16. Bertrand JT, O'Reilly K, Denison J, Anhang R, Sweat M. Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviours in developing countries. Health education research. 2006;21(4):567-97.**
 - 17. D'Eath M, Barry MM, Sixsmith J. A rapid evidence review of health advocacy for communicable diseases. 2014.**
 - 18. Everson-Hock E, Johnson M, Jones R, Woods H, Goyder E, Payne N, et al. Community-based dietary and physical activity interventions in low socioeconomic groups in the UK: A mixed methods systematic review. Preventive medicine. 2013;56(5):265-72.**
 - 19. Glanz K, Rimer BK, Viswanath K. Health behaviour and health education: theory, research, and practice: John Wiley & Sons; 2008.**
 - 20. Glazier RH, Bajcar J, Kennie NR, Willson K. A systematic review of interventions to improve diabetes care in socially disadvantaged populations. Diabetes care. 2006;29(7):1675-88.**
 - 21. Grilli R, Ramsay C, Minozzi S. Mass media interventions: effects on health services utilisation. The Cochrane Library. 2002.**
 - 22. LaCroix JM, Snyder LB, Huedo-Medina TB, Johnson BT. Effectiveness of mass media interventions for HIV prevention, 1986–2013: a meta-analysis. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2014;66:S329-S40.**
 - 23. Liu JJ, Davidson E, Bhopal RS, White M, Johnson MRD, Netto G, et al. Adapting health promotion interventions to meet the needs of ethnic minority groups: mixed-methods evidence synthesis. 2012.**
 - 24. Michie S, Jochelson K, Markham WA, Bridle C. Low income groups and behaviour change interventions: a review of intervention content, effectiveness and theoretical frameworks. Journal of epidemiology and community health. 2009;jech.2008.078725.**
 - 25. Naugle DA, and Robert C. Hornik. "Systematic review of the effectiveness of mass media interventions for child survival in low-and middle-income countries. Journal of health communication 19sup1 (2014): 190-215. 2014.**
 - 26. Netto G, Bhopal R, Lederle N, Khatoon J, Jackson A. How can health promotion interventions be adapted for minority ethnic communities? Five principles for guiding the development of behavioural interventions. Health promotion international. 2010;25(2):248-57.**
 - 27. NICE. Behaviour Change at population, community and individual levels, in NICE Public Health Guidance 6. NHS. <http://www.nice.org.uk/PH6>; London. 2007.**
 - 28. Noar SM. A 10-year retrospective of research in health mass media campaigns: Where do we go from here? Journal of health communication. 2006;11(1):21-42.**
 - 29. Robinson MN, Tansil KA, Elder RW, Soler RE, Labre MP, Mercer SL, et al. Mass media**

- health communication campaigns combined with health-related product distribution: a Community Guide systematic review. American journal of preventive medicine. 2014;47(3):360-71.**
- 30. Schein R, Wilson K, Keelan JE. Literature review on effectiveness of the use of social media: a report for peel public health: Region of Peel], Peel Public Health; 2010.**
 - 31. Sixsmith J, Fox K, Doyle P, Barry M. A Literature Review on Health Communication Campaign Evaluation with Regard to the Prevention and Control of Communicable Diseases in Europe. 2014.**
 - 32. Smith W. From Prevention Vaccines to Community Care: New Ways to Look at Program Success Chap 18 in Hornik R Public health communication: Evidence forbehaviour change. 2002:314- 26.**
 - 33. Snyder LB. Health communication campaigns and their impact onbehaviour. Journal of Nutrition Education andbehaviour. 2007;39(2):S32-S40.**
 - 34. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. The Lancet. 2010;376(9748):1261-71.**
 - 35. Zeh P, Sandhu HK, Cannaby AM, Sturt JA. The impact of culturally competent diabetes care interventions for improving diabetes-related outcomes in ethnic minority groups: a systematic review. Diabetic medicine : a journal of the British Diabetic Association. 2012;29(10):1237-52.**
 - 36. Alive&Thrive. Strategic design of mass media: promoting breastfeeding in Viet Nam. Washington, D.C., USA: Alive & Thrive. 2014.**
 - 37. Balaam MC, Akerjordet K, Lyberg A, Kaiser B, Schoening E, Fredriksen AM, et al. A qualitative review of migrant women's perceptions of their needs and experiences related to pregnancy and childbirth. Journal of advanced nursing. 2013;69(9):1919-30.**
 - 38. Dorfman L, Gehlert H. Talking about breastfeeding: Why the health argument isn't enough. Berkeley Media Studies Group. 2010;18.**
 - 39. Dyson L, McCormick F, Renfrew MJ. Interventions for promoting the initiation of breastfeeding. Cochrane Database Syst Rev. 2005;2(2).**
 - 40. Entwistle F KS, Mead M. The promotion of breastfeeding among low- income women: midwives' knowledge and attitudes following a WHO/UNICEF breastfeeding ma. The Royal College of Midwives. 2009.**
 - 41. Fairbank L, O'Meara S, Renfrew M, Woolridge M, Snowden A, Lister-Sharp D. A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding: Core Research; 2000.**
 - 42. Gardner B, Cane J, Rumsey N, Michie S. Behaviour change among overweight and socially disadvantaged adults: a longitudinal study of the NHS Health Trainer Service. Psychology & health. 2012;27(10):1178-93.**
 - 43. Gazmararian JA, Elon L, Yang B, Graham M, Parker R. Text4baby program: an opportunity to reach underserved pregnant and postpartum women? Maternal and child health journal. 2014;18(1):223-32.**
 - 44. Green CP. Improving Breastfeedingbehaviours: Evidence from Two Decades of**

Intervention Research. 1999.

45. MacGregor E, Hughes M. Breastfeeding experiences of mothers from disadvantaged groups: a review. *Community Practitioner*. 2010;83(7):30-3.
46. McInnes RJ, Love JG, Stone DH. Independent predictors of breastfeeding intention in a disadvantaged population of pregnant women. *BMC public health*. 2001;1(1):10.
47. NICE. Breastfeeding for longer: what works? Systematic review summary. 2005.
48. Quinn GP, Hauser K, Bell-Ellison BA, Rodriguez NY, Frías JL. Promoting pre-conceptional use of folic acid to Hispanic women: a social marketing approach. *Maternal and child health journal*. 2006;10(5):403-12.
49. Renfrew M, Spiby H, D'Souza L, Wallace L, Dyson L, McCormick F. Rethinking research in breast-feeding: a critique of the evidence base identified in a systematic review of interventions to promote and support breast-feeding. *Public health nutrition*. 2007;10(07):726-32.
50. Schmied V, Beake S, Sheehan A, McCourt C, Dykes F. Women's perceptions and experiences of breastfeeding support: a metasynthesis. *Birth*. 2011;38(1):49-60.
51. Sumar N, McLaren L. Impact on social inequalities of population strategies of prevention for folate intake in women of childbearing age. *American journal of public health*. 2011;101(7):1218.
52. Szwajcer E, Hiddink G, Koelen M, Van Woerkum C. Nutrition-related information-seeking behaviours before and throughout the course of pregnancy: consequences for nutrition communication. *European Journal of Clinical Nutrition*. 2005;59:S57-S65.
53. Tamrat T, Kachnowski S. Special delivery: an analysis of mHealth in maternal and newborn health programs and their outcomes around the world. *Maternal and child health journal*. 2012;16(5):1092-101.
54. Apfel F. Promoting health advocacy guide for health professionals. International Council of Nurses 2008.
55. Armstrong R, Waters E, Jackson N, Oliver S, Popay J, Shepherd J, et al. Guidelines for systematic reviews of health promotion and public health interventions. Version 2. Australia: Melbourne University. 2007.
56. Bauman A. Precepts and principles of mass media campaign evaluation in Australia. *Health Promotion Journal of Australia*. 2000;10(2).
57. Canada Public Health Authority. Protecting, promoting, and supporting breastfeeding - A practical workbook for community-based programmes. (2nd edition).
58. Centers for Disease Control and Prevention (U.S.) Division of Communication Services., Strategic and Proactive Communication Branch. CDCynergy lite; social marketing made simple : a guide for creating effective social marketing plans. 2010.
59. CDC Communication for Development . Public Health Workbook to Define, Locate and Reach Special, Vulnerable, and At-risk Populations in an Emergency: CDC: Atlanta, GA, USA; 2010.
60. Dorfman L, Ervice J, Woodruff K. Voices for change: A taxonomy of public communications campaigns and their evaluation challenges. *Communications*

- Consortium Media Center, Media Evaluation Project, Washington, DC. 2002.**
- 61. Fishbein M, and Joseph N. Cappella. . The role of theory in developing effective health communications. *Journal of Communication*. 2006;56.s1 (2006): S1-S17.**
 - 62. Goldstein S, Usdin S, Scheepers E, Japhet G. Communicating HIV and AIDS, what works? A report on the impact evaluation of Soul City's fourth series. *Journal of health communication*. 2005;10(5):465-83.**
 - 63. Marmot M, et al. . "WHO European review of social determinants of health and the health divide." *The Lancet* 2012;380.9846 (2012): 1011-1029.**
 - 64. Parvanta C, Maibach E, Arkin E, Nelson D, Woodward J. Public health communication: A planning framework. *Communicating public health information effectively A guide for practitioners*. 2002:11-3.**
 - 65. Rootman I, Goodstadt M, Hyndman B, McQueen DV, Potvin L, Springett J, et al. Evaluation in health promotion: Principles and perspectives: World Health Organization Regional Office for Europe; 2001.**
 - 66. Thomas VJ, Cohn T. Communication skills and cultural awareness courses for healthcare professionals who care for patients with sickle cell disease. *Journal of advanced nursing*. 2006;53(4):480-8.**
 - 67. UNICEF. Improving Exclusive Breastfeeding Practices by using Communication for Development in Infant and Young Child Feeding Programmes. June 2010.**
 - 68. USAID. The Maternal and Child Health Integrated Program (MCHIP) - Social and behaviour change Technical Guide 2014.**
 - 69. Vaughan E, Tinker T. Effective health risk communication about pandemic influenza for vulnerable populations. *American journal of public health*. 2009;99(S2):S324-S32.**
 - 70. Whitehead M, Dahlgren G. Concepts and principles for tackling social inequities in health: Levelling up Part 1. World Health Organization: Studies on social and economic determinants of population health. 2006;2.**
 - 71. Hornik R. Public health communication: Evidence for behaviour change: Routledge; 2002.**
 - 72. Noar SM. An Audience-Channel-Message-Evaluation (ACME) framework for health communication campaigns. *Health promotion practice*. 2012;13(4):481-8.**
 - 73. Jeff French, Apfel F. Social marketing guide for public health programme managers and practitioners. ECDC technical document. 2014.**
 - 74. Winch P. Ecological models and multilevel interventions health behaviour Change at the Individual, Household and Community Levels 224.689. In: University TJH, editor. 2012.**
 - 75. Stokols D. Translating social ecological theory into guidelines for community health promotion. *American journal of health promotion*. 1996;10(4):282-98.**
 - 76. French J, Apfel F. Social marketing guide for public health programme managers and practitioners. ECDC technical document. 2014.**
 - 77. Gina MA Higginbottom HV, Joan Forgeron, Donna Gibbons, Fabiana Mamede, Barolia aR. Food choices and practices during pregnancy of immigrant women with high-risk**

pregnancies in

Canada: a pilot study. BMC Pregnancy and Childbirth. 2014;14:1-13.

- 78. Pawson R. Evidence-based policy: in search of a method. Evaluation. 2002;8(2):157-81.**
- 79. Patton MQ. Utilization-focused evaluation: Sage Publications; 2008.**
- 80. White H. Theory-based impact evaluation: principles and practice. Journal of development effectiveness. 2009;1(3):271-84.**
- 81. Green LW, and M. W. Kreuter. . "Health program planning." An Educational and Ecological Approach 2005.**
- 82. Rogers EM. Diffusion of innovations: Simon and Schuster; 2010.**
- 83. Becker MH. The health belief model and personal healthbehaviour. Vol 2 No 4 Slack, 1974.**
- 84. Bandura A. "Social cognitive theory: An agentic perspective." Annual review of psychology 521 (2001): 1-26. 2001.**
- 85. Prochaska JO, and Wayne F. Velicer. . "The transtheoretical model of healthbehaviour change.". American journal of health promotion 1997;12.1 (1997): 38-48.**
- 86. Dorfman L, Lawrence Wallack, and Katie Woodruff. " "More than a message: Framing public health advocacy to change corporate practices. Health Education &behaviour 2005;32.3 (2005): 320-336.**
- 87. Evans WD, Wallace JL, Snider J. Pilot evaluation of the text4baby mobile health program. BMC public health. 2012;12(1):1031.**
- 88. Potvin. L. Managing uncertainty through participation. In: McQueen DM, Kickbusch I, Potvin L, Pelikan JM, Balbo L, Abel T, eds. . Health & Modernity: The Role of Theory in Health Promotion New York, NY: Springer; 2007:103-128.**
- 89. Sumar N. ML. Impact on Social Inequalities of Population Strategies of Prevention for Folate Intake in Women of Childbearing Age. American journal of public health. 2011;101(7):1218-24.**
- 90. Backholer K, Beauchamp A, Ball K, Turrell G, Martin J, Woods J, et al. A framework for evaluating the impact of obesity prevention strategies on socioeconomic inequalities in weight. American journal of public health. 2014;104(10):e43-50.**
- 91. Usdin S, et al. . Achieving social change on gender-based violence: a report on the impact evaluation of Soul City's fourth series. Social Science & Medicine 2005;61.11 (2005): 2434-2445.**
- 92. McQueen David ME, and Cartier Yuri on behalf of the International Union for Health Promotion and Education (IUHPE) ECDC Report (unpublished) The added value of health promotion and health education methods and concepts in the prevention of communicable diseases. Health Promotion approaches for communicable disease interventions: transforming established practice into innovations. 2014.**
- 93. Schein R, Kumanan Wilson, and Jennifer E. Keelan. . Literature review on effectiveness of the use of social media: a report for peel public health. . Region of Peel], Peel Public Health. 2010.**

94. Valente T. 10. Evaluating communications campaigns in Rice, Ronald E Atkin, Charles K Public communication campaigns: Sage; 2012.
95. Noar SM, Palmgreen P, Zimmerman RS. Reflections on evaluating health communication campaigns. *Communication Methods and Measures*. 2009;3(1-2):105-14.
96. Green JS, J. Evaluation: Key Concepts for Public Health Practice (1st edition). Berkshire, England: Open University Press. 2006.
97. Ahluwalia IB, Morrow B, Hsia J. Why do women stop breastfeeding? Findings from the Pregnancy Risk Assessment and Monitoring System. *Pediatrics*. 2005;116(6):1408-12.
98. MacVicar S, Wilcock S. The effectiveness and maternal satisfaction of interventions supporting the establishment of breast-feeding for women from disadvantaged groups: a comprehensive systematic review protocol. *The JBI Database of Systematic Reviews and Implementation Reports*. 2013;11(8):48-63.
99. MacArthur C, Hemming K, Ingram L, Jolly K, Kenyon S. Evaluation of Lay Support In Pregnant women with Social risk: a randomized controlled trial (The ELSIPS Trial). 2011.
100. McInnes RJ, Stone DH. The process of implementing a community-based peer breast-feeding support programme: the Glasgow experience. *Midwifery*. 2001;17(1):65-73.
101. Pérez-Escamilla R. "Breastfeeding social marketing: lessons learned from USDA's "Loving Support" campaign. *Breastfeeding Medicine* 75 (2012): 358-363. 2012.
102. Services.. UDoHaH. The Surgeon General's call to action to support breastfeeding. 2011.
103. CDC. Building Our Understanding: Key Concepts of Evaluation. What is it and how do you do it?. http://www.cdc.gov/nccdphp/dch/programs/healthycommunitiesprogram/tools/pdf/eval_planningpdf. 1999.
104. Glasgow RE, Klesges LM, Dzewaltowski DA, Estabrooks PA, Vogt TM. Evaluating the impact of health promotion programs: using the RE-AIM framework to form summary measures for decision making involving complex issues. *Health Education Research*. 2006;21(5):688-94.
105. NICE. Behaviour change: the principles for effective interventions. October 2007.
106. Cooper H, Hedges LV, Valentine JC. The handbook of research synthesis and meta-analysis: Russell Sage Foundation; 2009.
107. Leigh A. What evidence should social policymakers use? *Australian Treasury Economic Roundup*. 2009;1:27-43.
108. Sackett DL, Rosenberg W, Gray J, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *Bmj*. 1996;312(7023):71-2.

CHAPTER 3

Best practices compilation

A compilation of findings, key messages and recommendations to support the design of community projects to promote healthier nutrition choices among pregnant and breastfeeding women in Europe

Introduction

This compilation provides an analysis of selected health communication programmes and initiatives directed at pregnant and lactating women. The guidelines for best practices, lessons learnt and key evidence-based recommendations in the following pages are intended to serve as the basis for the elaboration of the intervention strategy and tools, to be undertaken in the next phase of the project.

It highlights best practices found in health-related literature and existing health communication initiatives targeted at pregnant and lactating women - especially those from disadvantaged backgrounds - on the importance of healthier diets and lifestyles. This compilation also provides orientation on how these practices could be adapted and applied to the five key cities and beyond.

It has been tailored to respect cultural and linguistic diversity and address communication challenges, by exploring a range of channels and approaches and assessing what works and what doesn't.

1. Communication interventions

1.1. Health communication in a nutshell

Successful health communication interventions are not one-way communicative acts – they are on-going social processes that unfold over time. They are designed to take multifaceted and multidisciplinary approaches to changing behaviours, introducing new practices to improve health and health care systems.

Health communication encompasses a wide variety of approaches including health journalism, blogs, entertainment-education, interpersonal communication, media advocacy, organisational communication, risk and crisis communication, social media, marketing and mobilisation. It can take many forms, such as mass multi-media, interactive communications (including mobile telephones and the internet) and traditional and culture-specific communication such as storytelling, puppet shows and songs.

The North Karelia Project – a case study in community-based health communication

Historically, health communication has focused on individual knowledge acquisition, with evaluation based on increased awareness and recall. Over time, greater attention has been given to attitude and behaviour change objectives, as multiple studies have shown that knowledge alone is not enough to improve health outcomes.

The concepts of health communication have further evolved to encompass an even broader view that focuses on community-level and/or social-cultural changes, and incorporates advocacy for policy change and settings approaches to enhance health literacy. Increasingly innovative approaches often yield highly successful results.

The North Karelia Project, for example, was an early community-based programme that incorporated a multi-level communication support approach. It was launched in Finland in 1972 in response to a local petition for urgent and effective help to reduce the great burden of exceptionally high coronary heart disease mortality rates in the area. In co-operation with local and national authorities and experts, and the WHO, the North Karelia Project was formulated and implemented to carry out a comprehensive campaign through community organisations and the actions of the people themselves.

Innovative communication projects were a key component of these activities from the very beginning, involving health and other services, schools, NGOs, local media, supermarkets, food industry, agriculture, etc. There was, for example, a co-production arrangement in which behavioural scientists devised and shaped the content of a television series as part of the project (with a particular focus on smoking cessation).

Over 40 years later, the published results of the North Karelia Project show how major changes in the levels of the target risk factors — such as a 70 % reduction in coronary artery disease deaths in males — have occurred in North Karelia, and subsequently in all of Finland.

This early example of a multi-faceted and community-based health initiative serves as an example of the potential of health communication when part of a comprehensive approach can help change behaviour by creating an environment conducive to better health.

Health communication has increasingly been acknowledged as an important determinant of health, and one integral to effective public health response in the European Union and beyond. Public health practitioners, managers and other stakeholders planning community-based interventions can benefit from enhancing their knowledge of the strengths, weaknesses and potential added value of health communication campaigns. Such knowledge can help them gain evidence-based insights into what may work in their own communities.

This is of particular importance in addressing vulnerable groups and inequities in health⁹. On one hand, health communication can enhance health literacy¹⁰ of vulnerable populations and improve capacities to access, understand and use information to improve

⁹ The term “inequities in health” is used to describe unfair systematic differences in health between social groups that are avoidable by reasonable means.

¹⁰ Health literacy is linked to literacy and entails people’s knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgments and take decisions in everyday life concerning health care, disease prevention and health promotion to maintain or improve quality of life during the life course (

health. On the other, poorly designed communication projects have been shown to widen health equity gaps by disproportionately enhancing the status of higher social classes.

The success of the Together intervention will rely heavily on our approach – that is, our ability to identify the contexts, channels, messages and reasons that will motivate individuals to receive and use the information conveyed. The findings presented in this compilation are intended to facilitate achieving this aim.

2. Overview of the findings

The research gathered has overwhelmingly concluded that women want to make changes to their diets in pregnancy, but report a lack of knowledge regarding healthy diet information. There is also a wide variety of environmental barriers to making healthier choices; for example, accessibility and cost of fresh fruits and vegetables, safe spaces for physical activity. In addition, women report conflicting information, making it difficult to become better informed (Ferrari, Siega-Riz, Evenson, Moos & Carrier; 2013).

The desire for clear information is so frequently repeated in the literature review that any approach to implementing the project should focus on the information highlighted in the studies, reports and webpages analysed. This includes a long list of topics and recommendations, such as advice about vitamin intake (e.g., vitamin D and folic acid), cravings and comfort eating, portion sizes and what to eat to be healthy.

Olander, Atkinson, Edmunds, & French (2012) found that women want to receive advice from health professionals early on in pregnancy in order to set up a routine for diet and exercise. They also found that women want to interact with other women during their pregnancies, but struggle to find the time.

Similarly, Chang (2014) found that pregnancy is a time when women tend to withdraw from their social lives, and desire the opportunity to spend time in groups with other pregnant women both for the social element and for support in achieving or maintaining health. Many women who are overweight during pregnancy find the support of a group especially helpful, as overeating is often an emotionally rooted behaviour, or one linked to other psychological factors or uncontrollable cravings.

A support network can be a powerful aid to changing behaviour for any group. Indeed, Cunningham (2013) found that children improved their physical activity with the support of their peers. The same principle has been shown effective when applied to pregnant women.

For health workers, pregnancy is an ideal time to work with women towards improved health because it is a time when they are more motivated to make change. This is also a key opportunity to dispel any conflicting messages and help the women to increase feelings of self-efficacy. The advice can then be repeated at different points and via different sources.

It has also been suggested that the information given in the project should be portrayed in terms of the perceived benefits for a healthy diet on mother and child, as the health of the child is the key motivator for the mother to make dietary changes.

Advice must be tailored in terms of demographics that impact on dietary needs or intake. Ethnicity is a key demographic factor that needs to be considered when tailoring dietary interventions to meet women's needs. For example, de Graaff (2012) found that health workers dealing with Moroccan and Turkish patients had improved communication when they recognised that the families of the women played important roles as decision makers,

not just the women themselves.

In addition to tailoring communication approaches for cultural differences, being aware of the differences in dietary intake is also critical. For example, vitamin D has been highlighted as being most important for those with darker-skin and those who do not have exposure to sunlight.

Addressing diverse targets requires that channels as well as messages be tailored to each target group's needs. Campbell, Johnson, Messina, Guillaume, & Goyder (2011) assert that many different interventions are needed to communicate health messages. These should include community-based interventions.

As observed in the North Karelia Project, non-traditional intervention techniques can be successfully utilised to increase the scope of an intervention, reaching targets from many different angles.

A number of similarly innovative community-based methods were surveyed in the literature review. For example, Boseley (2013) writes about an initiative offering food vouchers to women who breastfeed.

Several behaviour change techniques were used in the successful campaigns and cited by women as important in helping them make changes, these included: goal setting, self-monitoring and feedback (Streuling, Beyerlein, & von Kries; 2010).

3. Recommendations

3.1. Dispel misinformation/conflicting information

Pregnancy can be a confusing time for many women – often times, it will be the only time in their life when they are being told to gain weight. They are often receiving advice from friends, family members, online resources, health workers and more. The information they receive is frequently conflicting, and this causes many women to follow the wrong advice or just give up on changing their behaviour at all.

This is a key challenge for the Together initiative to overcome. It is essential that the communication materials are based on the most up-to-date scientific research and that the communication implementers are aware and in agreement that information provided must not be conflicting.

In addition to the campaign materials to be provided, there can be a list of additional resources that are approved for use in the campaign.

Several of the highlighted resources from the literature review include specific recommendations that are based on up-to-date scientific research. For example, the NICE online resource on maternal and child nutrition, the Eat Well Plate and the British Nutrition Foundation all offer such advice. The NHS initiative Start for Life goes a step further – in addition to the nutrition tips it offers healthy recipes that are suitable for women on a budget. It has been shown that many women believe that home-cooked meals are expensive – overcoming this mind-set may play a key role in helping some women to adopt healthier eating behaviours (Chang, 2014).

3.2. Offer interventions suitable for women with time shortages

Many women complain of never having enough time – especially mothers. It is important to take this into consideration when designing interventions. As much as possible, communication should be made available for women where and when they can easily receive it. This will include their routine visits with the doctor or midwife, but is not restricted to this.

One effect of having limited time tends to be a withdrawal from social life. During and after pregnancy many women desire interaction with and support from other women. Interventions that are able to offer a social element along with a health-related benefit are likely to have extra appeal. For example, a class that teaches women how to prepare delicious and healthy meals on a budget is an opportunity to improve health, save money and socialise.

3.3. Consider emotional/psychological factors in relation to healthy weight

Achieving and maintaining healthy weight is a complex issue for many women both during pregnancy and lactation and otherwise. Often times, weight management goes far beyond following recommendations on what and how much to eat and not eat.

Some women overeat for emotional reasons, while others have cravings that seem uncontrollable. Health workers should be prepared to discuss such issues with their patients and offer them adequate guidance.

Food diaries featured in many interventions, as a means by which to provide feedback and tailor campaigns. This can serve as a highly personalised means to working towards healthy weight, and self-monitoring is shown to be an important behaviour change technique.

Women who wish to manage their weight often appreciate having the support of a group. This could take form online or face-to-face.

3.4. Communicating with ethnic minorities

Communicating health to ethnic minorities requires its own special approach – or rather, many of them. For example, one study found that it was important when dealing with Turkish and Moroccan patients to consider that families play a significant role as decision-makers and thus should be considered or included in communications between women and health professionals (de Graaff, 2012).

Language barriers can also requires special tools. The use of pictures and visual aids has been proven an effective method of communicating medical risk information to immigrant populations (Garcia- Retamero & Dhimi, 2011). The possibility of building a maternity-specific mobile app has also been explored, to help midwives and women communicate in the presence of a persistent language barrier (Haith-Cooper, 2014).

The following additional insights gathered from the literature reviews should also be considered when designing tools and interventions for the different ethnic minorities to be targeted by the campaign:

- **Communication strategies used to deliver health messages worked best when focused on oral delivery and group format. Experiential learning was preferred.**
- **The best foci of interventions were at the level of the family, defined to include extended and adopted family members as opposed to nuclear families, or at the level of communities (instead of individuals who are usually the target of health promotion interventions for the general population).**
- **Women were seen as central figures both as targets of behaviour change and as agents of change because of their role in the family (e.g. role-modelling, care-taking).**
- **The goals for behaviour change for ethnic minority groups were best framed around**

psychological, community and family gains as benefits of behaviour change compared with more individual and aesthetic-focused goals to motivate behaviour change in the general population – this was particularly apparent for weight loss.

- **Many health goals are seen to represent mainstream or dominant discourses and behaviour change may be perceived as assimilation.**
- **Day-to-day real-life experiences, particularly stressors, and competing priorities are perceived as barriers to change for ethnic minority populations. Although these factors are acknowledged in health promotion interventions for the general population, they appear to be more substantive barriers for ethnic minority populations**
- **Culture constitutes a protective asset rather than a pathology, and is framed as an important factor in both risk and resilience.**
- **Degrees of acculturation, ethnic identity and religious affiliation should be measured to better adapt interventions for ethnic minority populations.**

4. Key messages

We have identified three priority areas for action on which key messages must be based.

- **Adopting healthy lifestyle and nutrition,**
- **Managing pregnancy related weight gain and loss,**
- **Benefitting from maintaining exclusive breastfeeding.**

It is essential to bear in mind that - while the messages may be the same for all sub-groups within our target of pregnant and breastfeeding women - they must be specially tailored and framed to communicate with the sub-group. This may imply presenting the information from a different perspective or using a different channel.

4.1. Healthy lifestyle and nutrition

Women are more motivated to make lifestyle changes during pregnancy, and want and seek dietary advice from health professionals to help them. They often, however, receive conflicting information. It is essential that the campaign communicates messages that are clear and easy to follow, and based on up-to-date scientific findings and lessons learnt in previous interventions. Obstacles to healthy lifestyles and nutrition need to be identified and addressed.

Outlined below are some specific lifestyle and nutrition recommendations to be included in the campaign.

For pregnant women

- **Food safety – preparation and storage**
- **Food to avoid e.g., raw and unpasteurised**

- **Steady weight gain or loss recommended**
- **Eat healthy:**
 - **Eat food from the five food groups**
 - **Balanced diet**
 - **Drink more water**
 - **Avoid alcohol**
 - **Portion sizes**
 - **Eat more fruit and vegetables**
- **Increase nutrient and vitamin intake, in particular:**
 - **Folic acid – 400-600 micrograms per day**
 - **Iodine – 150-250 micrograms per day throughout pregnancy**
 - **Vitamin D – 10 micrograms throughout pregnancy (UK). At-risk women outlined: those with darker skin and those not exposed to sunlight**
 - **Iron**
 - **Protein – increase by 6 grams per day**
- **Calcium**

For postnatal/breastfeeding women

- **Encourage and promote exclusive breastfeeding**
- **If breastfeeding, avoid alcohol and caffeine, and increase fluid and vitamin intake**
- **Healthy eating is important for the whole family**
- **Get support from health professionals to lose weight gradually**

4.2. Healthy weight gain and loss

We found that healthy gestational weight gain and postnatal weight loss is a topic of special importance to the objective of combating obesity and to mothers personally. Advice on weight gain amounts can be given if the country follows the Institute of Medicine's guidelines, but this must be applied selectively, as not all countries use these guidelines.

Several initiatives are already communicating successfully on this topic. For example, WomensHealth.gov offers clear advice and recommendations, such as the following:

- **Ask at 6 week postnatal check about eating to help return to a healthy weight.**
- **Gradual weight loss over several months is the safest way - increased risk of obesity in later life if weight not lost by 6 months post-natal.**
- **Breastfeeding women can lose a moderate amount of weight without affecting milk supply.**

However, weight gain and loss is a highly personal topic, and in many cases will require psychological factors to be taken into account (Skouteris et al; 2010). For example, some women are emotional over-eaters while others may have cravings that they are unable to control.

It is also worth taking into account that some women have difficulties controlling their diet and exercise behaviours because of limited available time, often due to childcare. Some women also report that they would like the support of a group, but have difficulty finding the time to take part in face-to-face group activities (Chang, 2014).

These variables may help explain why research has shown inconsistent results regarding dietary interventions and weight loss (Skouteris et al, 2010; Brekke et al, 2014).

4.3. Benefits of breastfeeding for mother and baby

There is plentiful evidence on the benefits of breastfeeding for mothers and their babies, yet many women choose to formula feed their babies. Thus, this should be a key messaging topic for the Together campaign.

A number of resources communicate on the topic, such as the NICE online resource on maternal and child nutrition (Nice.org; Maternal health and nutrition) and the Healthy Start initiative (Healthystart.nhs.uk). These resources feature recommendations for breastfeeding women, and also outline the benefits for both mothers and babies, and this information should be included in the campaign messaging.

Breast-feeding recommendations (Nice.org.uk, Maternal health and nutrition):

All breastfeeding women should supplement with 10 micrograms of vitamin D daily

Breastfeeding must be promoted exclusively for the first six months after birth, and for as long after as both mother and baby want it to.

Successfully communicating the messages

Having the correct message is only part of successfully communicating that message. The following sections, Framing the Message and Choosing the Right Channel, provide essential insight on how to communicate the messages effectively.

5. Framing the message

In all types of communication, including health communication, the frame surrounding a message serves as a lens through which the target audience will see – or not see – the desired information. Properly framing a message can be as important as the message itself, especially when communication with diverse target groups who will all need to view the same or similar messages through different lenses.

In order to create the proper message framing, a target audience analysis must be carried out to determine the appropriate message tone and channels. Audience definition and segmentation will play a crucial role in the Together communication objectives.

5.1. Target audience: Pregnant and breastfeeding women

The primary target for the health communication initiatives to be developed is: pregnant and breastfeeding women from disadvantaged communities from the five selected locations. Given as the locations were chosen for their socio-economic diversity, it will be necessary to create the appropriate sub-targets for each location separately. Messages will then need to be tailored and framed according to each sub-group's needs and cultural distinctions.

Disadvantaged ethnic groups by city, region, and/or country	
Czech Republic	Roma
Manchester, UK	South Asians and Black Africans
Murcia, Spain	Moroccans and South Americans
Varna, Bulgaria	Roma and Turks
Region of Southern Denmark	Turks, Iraqis and Bosnians

In addition to the disadvantaged ethnic minority subgroups, there may be socio-economically disadvantaged women who do not belong to an ethnic minority. These women will also need to be reached with a specific approach.

5.2. Secondary target audience: Stakeholders

The secondary targets for the initiative are stakeholders.

A study by the National Institute for Health and Care Excellence calls for the “wholehearted involvement and support of a large list of key stakeholders”. Indeed, there is a broad range of stakeholders that can be targeted, including:

- Clinical professionals in community and hospital settings
- Community-based workers including Sure Start staff

- **Managers and staff with responsibility for health and social services**
- **Those responsible for collecting health and health service-related data**
- **Educators in the fields of health and social services; schoolteachers and those responsible for the school curriculum in primary and secondary schools**
- **Employers in large and small organisations**
- **Politicians and policy makers at local, regional and national levels**
- **Influencers of public opinion**
- **Families and the public at large**

These diverse stakeholders are of critical importance to reach our primary target group, pregnant and lactating women. They must all be addressed with specially tailored messages and methods.

5.3. Other factors for target segmentation

Feelings of motherhood

Each woman feels differently during pregnancy and has unique feelings towards motherhood. A factor that is often overlooked when framing messages on health during pregnancy is the point during pregnancy when a woman feels like a mother. Depending on when this feeling of motherhood sets in, women have different tendencies in seeking nutrition information.

Women hoping to have a child generally sought little nutrition information because they were not pregnant yet. Information sources were the Internet (anonymous) and the social environment (models).

Amongst women who were pregnant for the first time, three groups can be distinguished:

- 1. Women who feel like a mother from the moment they know that they are pregnant.**
- 2. Women who feel like a mother later in pregnancy.**
- 3. Women who do not feel like a mother yet.**

Each group has been shown to have its own specific information-seeking behaviour.

Important information sources used by the first group were the Internet (anonymous and up-to-date), books (extended) and midwives (expert) during the first trimester; the 9-month calendar (fun and tips), friends (experience) in the second trimester; and friends (information on breastfeeding) in the third trimester.

Information sources used by second group of women were mainly brochures provided by the midwife, and the midwife herself.

The third group of women mainly relied on their own common sense. Second-time pregnant women mainly relied on their experience, the midwife, and books for specific questions.

A socio-ecological approach

It has been acknowledged in some research that behavioural change interventions aimed solely at individuals have limited impact, and set project goals based on generating impact at multiple mutually reinforcing levels: individual, community and socio-political environment. Soul City, for example, builds its interventions on behaviour and health promotion principles.

While many of the review authors acknowledge the desirability of taking a more socio-ecological approach, most of the reviews note that such approaches are not common, and that most interventions remain focused on only one or two of the multilevel aspects of such an approach.

This finding reinforces the view of many — that such high level modelling may be very useful for describing and even better for understanding the relationship among contextual factors and health, but its usefulness for intervention strategies remains a subject for more evidentiary exploration. Nonetheless, such multilevel modelling may help identify the potential explanatory factors that explain the most variance in any causal model.

6. Lessons learnt

Based on the research carried out in the literature reviews, we have identified several types of mistakes common to communication interventions:

- **Strategy: Mistakes in strategy mean that communication is not the problem. Rather, people need better services. Messages are inadequate in themselves to affect change.**
- **Messaging: Messages are poorly constructed, lack adequate exposure, and/or are addressed at the wrong audience.**
- **Measurement: Communication was well delivered, but poorly evaluated. Either the instruments measured the wrong change or time was inadequate to permit the change to become detectable.**
- **Expectation: Real change occurred, but did not meet the expectations of planners or funders. The success was thus declared to be a failure.**

We have developed the following guidelines, based on our research, to keep in mind when developing tools and initiatives in order to avoid making the common mistakes outlined above.

Set behavioural change goals

Women desire clearly defined goals during and after their pregnancies, when they are receiving such conflicting information. Effective goals tend to be expressed and measured in terms of impact upon reduction of risky behaviours (e.g. drinking alcohol during pregnancy), adoption and/or maintenance of healthier behaviours (e.g. exclusive breastfeeding, physical activity, taking folic acid).

Bear in mind that low-income and/or ethnic minority populations will imply target-group specific needs, barriers and facilitators to nutrition-related behaviour change. For example, food prices and/or lack of access to fresh food and vegetable; or social norms, community, workplace and hospital practices related to breastfeeding.

Use theories to overcome barriers and guide choice of behaviour change strategy

Most reviews, guidelines and texts emphasise the importance of using behavioural theories (e.g., the Health Belief or Trans-theoretical model) to help identify strategies to address causal determinants (and stages) of behaviour change. This will also help make sure that the incentives and barriers associated with both the 'problematic behaviour' and the 'desired behaviour' are fully understood.

This said, the reviews indicate that most studies do not make the link between theoretical models (especially those focused on community and societal influences), expected

outcomes and the process of change explicit. There is general agreement about the need for strengthening theoretically informed interventions to facilitate a better understanding of why particular interventions work or don't work in/with different contexts, populations and behaviours.

Segment audiences into meaningful sub-groups

Several systematic nutrition-related reviews provide useful insights that can inform segmentation strategies for community-based interventions. For example, factors known to be associated with not breastfeeding and with early breastfeeding cessation including smoking, exposure to environmental tobacco smoke (ETS), maternal medication use, physical and mental problems such as obesity and depression, and circumstances that make breastfeeding difficult such as going back to work or school.

Tailor and frame messages for action and to spark discussions

Several reviews, guidelines and texts point to the benefits of articulating and framing core messages in ways that reflect an understanding of existing values and beliefs motivating behaviour(s) related to public health [behaviour] change being sought (e.g importance of person-centred communication approaches and of relationship building in supporting a woman to breastfeed). Such messaging can help public health practitioners compete more effectively with adversaries in public debate (e.g., formula companies).

Most studies note that the widespread use of interactive technologies (e.g., social media, mobile Health or mHealth) has the potential to make it more feasible to tailor messages, that is, deliver particular messages to people based on feedback they give about themselves.

Advocacy messaging targeted those who can create (or those who can influence those who create) policies that support opportunities to change or discourage unhealthy ones (e.g. company policies designating space and time for breast feeding, regulations controlling the distribution of infant formula, etc.). This helps make “healthier choices easier choices” and provides additional motivation for change.

Adapt interventions and materials for contextual/cultural utility

While all the reviews in this study describe communication interventions, few provide process and procedural details which make comparisons and reliable analysis difficult. This said, several reviews provide specific recommendations on approaches that community-based developers and implementers can take to adapt health promotion [and communication] tools, materials and interventions for work with vulnerable groups, especially ethnic minorities. For example, personal “word-of-mouth” delivery (not written materials) and group format (not individual counselling) including extended and adopted family members; seeing women as central figures both as targets of behaviour change and

as agents of change because of their role in the family (e.g. role-modeling, care-taking); and/or considering the multiple dimensions of individuals' lived experiences- including their minority status, socially disadvantaged position, cultural and religious beliefs and affiliations.

Use multiple channels to address individual, community and societal factors shaping behaviours

A key message from many reviews is that interventions must be experienced (i.e., seen, heard and/or read about) by the target audience in order to be effective. Scope and exposure are strongly tied to the number of channels used to reach target audiences. Some studies and guides point to the importance of combining information projects with related products and services both as a motivation and as a way of addressing potential barriers to action (e.g., breast feeding advice and support, smoking cessation programmes, etc).

Social media and mHealth are identified as useful parts of a comprehensive approach to curative and preventive services (through the enhanced dissemination of information and promotion of healthy behaviours). However, the literature review revealed a scarcity of project evaluations and a general lack of management and policy frameworks for guiding and coordinating the adoption of social media and mHealth services into the broader health system.

Evaluate and learn from project processes and outcomes.

All studies confirm that communication projects can positively influence healthy behaviours, including nutrition-related choices of disadvantaged pregnant and breastfeeding women. Mixed-methods research and evaluation based on a clear theory of change were noted to offer the most robust evidence. Most reviews call for clearer standards for evaluation reporting; greater investment in rigorous formative and summative evaluations and implementation research; and greater efforts to collate, comprehensively review and share the evidence that does exist.

They note that many impact questions, particularly those which seek to understand how and why change happens, cannot be answered in purely quantitative ways. Some impact questions can only be measured qualitatively. Several reviews noted a publication bias and encouraged all interventions to report findings, not just those with good results.

7. Suggested channels

In all types of communication, the channel can be as important as the message. Indeed, no matter how true your message is, it is wasted if it doesn't arrive to its target.

Many diverse channels are available for health communication campaigns, and they are necessary to reach the diverse target groups in this campaign. Some of these suggested channels are highlighted below.

7.1. Community-based interventions

Community-based interventions will play a key role in the Together pilot project. Interventions should always be based on a proper assessment of the target group, where they are located and the behaviour that is to be changed: careful planning is the cornerstone of success. A variety of such successful community-level interventions were highlighted in the literature review as best practices and can potentially be replicated in the Together locations.

For example:

- **A guide on how to develop, maintain and communicate about breastfeeding support policies and procedures in the workplace (Acas.org; 2013);**
- **Women in low-income areas of the country where bottle-feeding is the norm are to be offered up to £200 in shopping vouchers if they breastfeed their baby, in an attempt to find out whether cultural barriers against breastfeeding can be overcome by a financial incentive (Boseley; 2013);**
- **Breastfeeding education given shortly after delivery to increase breastfeeding rates among disadvantaged mothers (Ma & Magnus; 2013);**
- **A community-based peer breast-feeding support programme located in a socio-economically disadvantaged area increased breastfeeding rates. Despite a low prevalence of breastfeeding, initiating and maintaining peer breastfeeding support was possible. Peer support appeared to be acceptable to mothers and health professionals, and resulted in increased confidence and self-esteem. (McInnes & Stone; 2001).**

These are just a few successful initiatives that have been carried out at community-level, but there are limitless possibilities for new ideas. Community-based interventions should be based on the skills and knowledge that already exists in the community, for example, by encouraging networks of people who can support each other.

Take account of – and resolve – problems that prevent people changing their behaviour. Such problems may include, for example, the costs involved in taking part in exercise programmes or buying fresh fruit and vegetables, or lack of knowledge about how to make changes.

7.2. Social media

Social media is an essential channel for any large-scale communication campaign. It is of special importance for the target of pregnant and lactating women, as a high percentage of them report a desire for group interaction but lack the time to participate. Becoming part of a social media group can serve a similar supportive purpose.

The following guidelines and recommendations are helpful in developing a health communication social media strategy:

- **Encourage or sponsor research investigating social media applications and specific health objectives.**
- **Encourage coordination of materials and messages with municipal, provincial and federal agencies (share resources and leverage national-level project). Consider incorporating high quality content from existing projects. Integrating popular and high quality materials from other public health agencies will not only leverage existing public health resources but through cross-linking and redirecting of traffic can improve the visibility of high-quality of information online and through reverse traffic flow, improve your own agency's visibility.**
- **Design projects for longevity and/or have exit strategies and clear archiving processes: Material from social media projects can “live forever” online and can reappear in circulation years after the project ends. It is important to consider date-stamping or providing explicit local and temporal context to information in order to prevent users in the future from using dated information that may no longer be appropriate.**
- **Establish clear objectives: Distinguish between increasing reach and awareness (message amplification) and expanding the scope of messages (collaborative, iterative message development).**
- **Know your target audiences, where they are “present” online and what key behaviours they engage in (understand the cultural norms of each platform): (e.g., youth are currently more likely to Twitter; women between the ages of 25-35 are likely to be posting to Facebook daily).**
- **Determine Resource Needs: For many platforms that require daily monitoring and responses (e.g., Facebook, Twitter) it is important to allocate sufficient time and resources for on-going interactions.**

7.3. Interactive web-based support

Interactive web-based systems can be a convenient way to reach pregnant and lactating women who don't have the time for frequent meetings, appointments or activities. Furthermore, they can be custom-made to suit the linguistic and cultural needs of any target group.

A report by Ahmed & Ouzzani (2013) highlights an interactive web-based breastfeeding

monitoring system (LACTOR). The system is designed to send notifications to mothers in case of breastfeeding problems using triggers such as inability to latch, sleepy infant, jaundice, and maternal sore nipple. It has two main components: the Mothers' Portal, where mothers can enter their breastfeeding data and receive notifications, and the Lactation Consultants' Portal, where mothers' data can be monitored.

The system proved to be user-friendly. The mothers said that the monitoring was beneficial and gave them an opportunity to track their children's feeding patterns and detect any problems early. Mothers also appreciated the notifications and interventions received through the system.

Web-based systems can be developed for a wide range purposes, such as a diet or exercise routine and monitoring system.

7.4. Mobile health

People everywhere are becoming increasingly dependent on their mobiles. In terms of convenience and accessibility, there may be no better option. Approximately 50% of the EU population regularly uses a smartphone, thus the potential for mobile health communications is enormous.

Like web-based support systems, mobile health offers limitless possibilities in regards to functionality and customisation. As the name implies, it has the added benefit of being completely mobile. While some people may only be able to access a website from their homes, a mobile application is available anytime and anywhere.

Consider this option for information that women want frequent access to, such as nutritional information.

7.5. Text messaging

Text messaging programmes have succeeded in the promotion of various health-related behaviours, such as use of oral contraceptives, physical activity and smoking cessation. Research shows that cultural differences should also be addressed when developing messages for underserved populations and that text messages should be examined more carefully, taking various cultural and social-economic factors into consideration. Nevertheless, this is a promising channel that could function as a useful tool in pregnancy and during lactation.

Selected literature and resources

1. Maternal and child nutrition (NICE Public Health Guidance 11)

The National Institute of Health and Clinical Excellence (NICE) (2010)

<http://www.nice.org.uk/guidance/ph11/resources/guidance-maternal-and-child-nutrition-pdf>

Recommendations during pregnancy:

All pregnant women should supplement with 10 micrograms of vitamin D daily

Vitamin D is especially important for women with darker skin and those who cannot go into the sunlight, as these women face a higher risk of vitamin D deficiency (referenced in the additional report 'Vitamin D: Increasing supplement use amongst at-risk groups – PH56')

Women must eat/take 400 micrograms per week of folic acid for the first 12 weeks of pregnancy.

If women are diabetic, they or their partner have a neural tube defect (NTD), they have had a baby with NTD or have a NTD family history need to take an additional 5 milligrams of folic acid.

Recommendations after birth:

All breastfeeding women should supplement with 10 micrograms of vitamin D daily

Breastfeeding must be promoted exclusively for the first six months after birth, and for as long after as both mother and baby want it to

Additional information:

Focus on women from groups with complex socio-demographic needs – outlines Healthy Start Initiative (women aged 18 or under, on income-support or income-based job seekers allowance, or earning under £14,495 per year)

Baby Friendly initiative (www.babyfriendly.org.uk) is outlined.

Benefits of breastfeeding described.

2. The EatWell Plate

www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx

Promising practice: Source of information about healthy eating during and after pregnancy in terms of food groups

3. Healthy Start initiative

www.healthystart.nhs.uk

Recommendations during pregnancy:

- **Use the Eat Well plate for advice on food groups**
- **Reduce foods high in fat or sugar**
- **Caffeine intake should not exceed more than 200mg per day, and alcohol should not exceed 1 or 2 units per week**
- **Do not eat/take too much vitamin A**
- **Must eat/take 400 micrograms of folic acid until 12 weeks gestation**
- **Must eat/take 10 micrograms of vitamin D**

Recommendations after pregnancy:

- **Breastfeeding (outlines benefits for mums and babies)**

Additional information:

- **Foods to avoid**
- **Food safety, i.e. preparation and storage**
- **Links to healthy recipes**
- **Information on vitamins for pregnant women, breastfeeding women and children**

4. Healthy Eating When You're Pregnant or Breastfeeding

<http://www.eatforhealth.gov.au/eating-well/healthy-eating-throughout-all-life/healthy-eating-when-you%E2%80%99re-pregnant-or-breastfeeding>

Recommendations during pregnancy:

- **Enjoy foods from the five groups and reduce/avoid foods high in sugar/salt/fat/alcohol.**
- **Women should check what their nutritional needs are in case they need supplements.**
- **Increase nutrient not calorie intake.**
- **Do not lose weight in pregnancy.**

Recommendations after pregnancy:

- **Avoid alcohol when breastfeeding**
- **Encourage and support breastfeeding**

Additional information:

- **Institute of Medicine recommendations for weight gain.**
- **Risks from gaining too much pregnancy weight.**
- **Alternative weight gain table for Asian women.**

- **Food safety including mercury in fish is mentioned (links given for more information).**
- **Lots of links to other pages and resources.**

5. UK – British Nutrition Foundation (based on 2013 report)

www.nutrition4baby.co.uk

Specific recommendations during pregnancy:

- **Limit alcohol to one or two units once or twice a week.**
- **Eat/take 400 micrograms of folic acid per day up till 12 weeks gestation.**
- **Eat/take 10 micrograms of vitamin D per day throughout pregnancy.**
- **Do not drink more than 200mg of caffeine per day.**
- **Importance of omega 3 and omega 6 fatty acids outlined in weeks 13-16 and amount contained in fish presented.**
- **Importance of iron in weeks 17-20 outlined and foods high in iron presented.**

Additional information/topics:

- **Healthy recipe ideas.**
- **Advice on nausea and what to eat.**
- **What not to eat – e.g., raw and unpasteurised foods.**
- **Snack tips.**
- **Food safety – preparation, cooking and storing.**

6. Start for Life

<http://www.nhs.uk/start4life/>

Recommendations during pregnancy:

- **Eating healthily in pregnancy means baby eats healthy – focus on baby.**
- **Don't eat for two.**
- **Avoid alcohol and alternatives to help unwind, e.g. walk, read.**
- **Need to eat an extra 200 calories per day in the final three months of pregnancy.**

Recommendations after pregnancy:

- **If breastfeeding, limit alcohol consumption.**
- **Eat 5 fruits and vegetables a day**
- **Cut back on sugar, salt and fat.**

Additional topics:

- **Foods to avoid.**
- **Portion size advice.**
- **Links for recipes and healthy eating in pregnancy tips.**
- **Healthy recipes on a budget.**

- **Benefits of breastfeeding for mum and baby.**

Additional information:

Resources and branding

7. Women's health. Staying healthy and safe

<http://womenshealth.gov/pregnancy/you-are-pregnant/staying-healthy-safe.html>

Recommendations during pregnancy:

- **Need to eat/take 400-800 micrograms of folic acid per day through pregnancy.**
- **Need to eat/take 27 milligrams of iron per day.**
- **Need to eat/take 1,000 milligrams of calcium per day.**
- **Need to eat/take 770 micrograms of vitamin A per day.**
- **Need to eat/take 2.6 micrograms of vitamin B₁₂ per day.**
- **Need to increase nutrients and calories (300 more calories in last six months).**
- **Sensible, balanced meals combined with regular physical fitness is still the best recipe for good health during your pregnancy.**
- **Eat from five food groups based on prepregnancy Body Mass Index and activity level.**

Recommendations after pregnancy:

- **Ask at 6 week postnatal check about eating to help return to a healthy weight.**
- **Gradual weight loss over several months is the safest way - increased risk of obesity in later life if weight not lost by 6 months postnatally.**
- **Breastfeeding women can lose a moderate amount of weight without affecting milk supply.**

Additional topics:

- **Foods to avoid.**
- **Safe food storage and preparation.**
- **Recommendations re alcohol and caffeine intake.**
- **Institute of Medicine guidelines for pregnancy weight gain.**
- **Advice on avoiding alcohol if breastfeeding, avoiding high fat/sugar/salt content food.**

8. I am pregnant and want to do better but I can't: Focus groups with low-income overweight and obese pregnant women.

Chang, M.W., et al (2014). Journal of Maternal and Child Health. doi: 10.1007/s10995-014-1605-x

Implications:

- **Women wanted support from peers as they withdrew from social lives but found attending face-to-face groups hard due to time and childcare.**
- **Interventions addressing healthy eating must take into account: Women over eat as emotional eaters, uncontrollable cravings and were 'eating for two'**
- **Women did not like cooking, had no time to cook, liked eating out and thought home cooked meals were expensive**

9. A qualitative study of women's perceptions of provider advice about diet and physical activity during pregnancy.

Ferrari R.M., Siega-Riz A.M., Evenson K.R., Moos M.-K. & Carrier K.S.. (2013). Patient Education and Counseling 91 (3), 372-377.

Implications:

- **Women need clearer, more consistent dietary advice**
- **Dietary advice is needed at several points in pregnancy**
- **Difference by ethnic group in terms of views of advice.**

10. Promoting healthy eating in pregnancy: what kind of support services do women say they want?

Olander, E., Atkinson, L., Edmunds, J.K., & French, D.P. (2012). Primary Health Care Research & Development, 13, 237-243.

Implications:

- **Women want dietary advice early in pregnancy to set up a routine.**
- **Women want to interact with other women.**
- **Practical sessions are needed to help them cook inexpensive meals.**

11. Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data.

Campbell, F., Johnson, M., Messina, J., Guillaume, L., & Goyder, E., (2011). BMC Public Health, 11, 491.

Implications:

- **Dietary intervention had no significant effect on gestational weight gain.**

- **The conflicting messages reported by women must be addressed in interventions.**
- **Many types of interventions are needed including community based one.**

12. Preventing excessive gestational weight gain: A systematic review of interventions.

Skouteris, H., Hartley-Clark, L., McCabe, M., Milgrom, J., Kent, B., Herring, S.J., & Gale, J. (2010). *Obesity Reviews*, 11, 757-768.

Implications:

- **Inconsistent findings regarding the impact of dietary interventions on gestational weight gain were found.**
- **Psychological factors must be considered.**

13. Can gestational weight gain be modified by increasing physical activity and diet counselling? A meta-analysis of intervention trials.

Streuling, L., Beyerlein, A., & von Kries, R. (2010). *American Journal of Clinical Nutrition*, 92 (4), 678-687.

Implications:

- **Diet and physical activity interventions with self-monitoring components are successful at lowering gestational weight gain.**

14. Diet and exercise interventions among overweight and obese lactating women: Randomized trial of effects on cardiovascular risk factors.

Brekke H.K., Bertz F., Rasmussen K.M., Bosaeus I., Ellegard L. & Winkvist A., (2014). *PLoS ONE*, 9(2), n.p.

Implications:

- **Dietary intervention effective in reducing waist circumference.**

15. Improving diet and exercise in pregnancy with Video Doctor counseling: A randomized trial.

Jackson R.A., Stotland N.E., Caughey A.B. & Gerbert B., (2011). *Patient Education and Counseling*, 83 (2), 203-209.

Implications:

- **A video Doctor intervention can improve antenatal diet, specifically increasing consumption of certain foods.**

16. Evaluation of the 'healthy start to pregnancy' early antenatal health promotion workshop: a randomized controlled trial.

Wilkinson S.A. & McIntyre H.D., (2012). *BMC Pregnancy and Childbirth*, 12, n.p.

Implications:

- **Intervention effective in addressing fruit consumption only**

17. Accommodating breastfeeding employees in the workplace.

2014.

www.acas.org.uk

Promising practice: This guide provides details of how to develop, maintain and communicate about breastfeeding support policies and procedures in the workplace. While built on UK regulations its advice can serve as guidance throughout Europe.

18. Development and assessment of an interactive web based breastfeeding monitoring system (LACTOR).

Ahmed A, Ouzzani M. (2013). *Maternal and child health journal*.17(5): 809-15.

Promising practice: The system is designed to send notifications to mothers in case of breastfeeding problems using triggers such as inability to latch, sleepy infant, jaundice, and maternal sore nipple. It has two main components: the Mothers' Portal, where mothers can enter their breastfeeding data and receive notifications, and the Lactation Consultants' Portal, where mothers' data can be monitored.

The system proved to be user-friendly. The mothers said that the monitoring was beneficial and gave them an opportunity to track their children's feeding patterns and detect any problems early. Mothers also appreciated the notifications and interventions received through the system.

We concluded that the system is feasible and acceptable among breastfeeding mothers and a promising tool for maintaining communication between mothers and lactation consultant.

19. Researchers to offer shopping vouchers to mothers who breastfeed.

Boseley S. (2013). *The Guardian*. Life and style.

Promising practice: Women in low-income areas of the country where bottle-feeding is the norm are to be offered up to £200 in shopping vouchers if they breastfeed their baby, in an attempt to find out whether cultural barriers against breastfeeding can be overcome by a financial incentive. *Watch this space*

20. Influence of Friends on Children's Physical Activity: A Review.

Cunningham CCMaSA. *American Journal of Public Health*. 2013; 103(7): 23-38.

Promising practice: Children's PA was positively associated with encouragement from friends (43 of 55 studies indicating a positive relationship), friends' own PA (30/35), and engagement with friends in PA (9/10).

These findings are consistent with friends influencing PA, but most studies did not isolate influence from other factors that could explain similarity.

21. Understanding and improving communication and decision-making in palliative care for Turkish and Moroccan immigrants: a multiperspective study.

De Graaff FM, et al. *Ethnicity & health*. 2012; 17(4): 363-84.

Promising practice: Care providers need to understand that for Turkish and Moroccan patients, decision-making is seldom a matter of one-to-one communication. Next to acknowledging these patients' different cultural backgrounds, they must also recognise that the families of these patients often function as care management groups, with an 'equal' say in communication and decision-making. In addition, professionals should optimise communication within their own professional care management group.

22. Pictures speak louder than numbers: on communicating medical risks to immigrants with limited non-native language proficiency.

Garcia- Retamero R, Dhimi MK. *Health Expectations*. 2011; 14(s1):46-57.

Promising practice: When communicating risks to immigrants with limited non-native language proficiency, we should move beyond the simple, direct translation of health messages that are already being used with the indigenous population to messages that are more appropriate. The use of materials that include visual aids is an effective method of communicating medical risk information to immigrant populations.

23. Mobile translators for non-English-speaking women accessing maternity services.

Haith-Cooper M. *British Journal of Midwifery*. 2014; 22(11): 795-803

Promising practice: Google Translate was tested in a simulated clinical environment with multi-lingual service users. Google Translate was not adequately developed to be safely used in maternity services. However, a maternity-specific mobile app could be built to help midwives and women communicate in the presence of a persistent language barrier.

24. Can mass media interventions reduce child mortality?

Head R, et al. *The Lancet*. 2015.

Promising practice: An on-going trial in Burkina Faso is an attempt to bring together the very different worlds of mass media and epidemiology: to measure rigorously, using a cluster-randomised design, how many lives mass media can save in a low-income country, and at what cost.

Application of the Lives Saved Tool predicts that saturation-based media projects could reduce child mortality by 10–20%, at a cost per disability-adjusted life-year that is as low as any existing health intervention.

25. Exploring the concept of positive deviance related to breastfeeding initiation in black and white WIC enrolled first time mothers.

Ma P, Magnus JH. *Maternal and child health journal*. 2012; 16(8): 1583-93.

Promising practice: Positive deviance inquiry is effective in identifying advantageous health behaviours and improving health outcomes among disadvantaged resource-poor populations. The objective of this study was to apply the positive deviance concept to explore the characteristics of positive deviants for breastfeeding among WIC-enrolled first-time mothers in Louisiana.

Breastfeeding practices shortly after delivery including assistance and education from staff in the hospital are related to breastfeeding initiation among less educated WIC-enrolled mothers.

26. Evaluation of Lay Support in Pregnant women with Social risk: a randomised controlled trial (The ELSIPS Trial).

MacArthur C, et al. 2011.

Promising practice: The trial will provide high quality evidence as to whether or not lay support (POW) offered to women identified with social risk factors improves engagement with maternity services and reduces numbers of women with depression.

27. The effectiveness and maternal satisfaction of interventions supporting the establishment of breast-feeding for women from disadvantaged groups: a comprehensive systematic review protocol.

MacVicar S, Wilcock S. *The JBI Database of Systematic Reviews and Implementation Reports*. 2013;11(8):48-63.

Promising practice: This is protocol for study.

Specific quantitative and qualitative objectives are:

- Describe the interventions available to support the establishment of breast-feeding

for women from disadvantaged groups.

- **Assess the effectiveness of support interventions for women from disadvantaged groups as determined by the establishment of breast-feeding in the early postnatal period.**
- **Explore the maternal satisfaction of women from disadvantaged groups in relation to their views and perceptions of the usefulness and acceptability of interventions supporting the establishment of breast-feeding in the early postnatal period.**

28. The process of implementing a community-based peer breast-feeding support programme: the Glasgow experience.

McInnes RJ, Stone DH. *Midwifery*. 2001; 17(1): 65-73.

Promising practice: A community-based study located in a socio-economically disadvantaged housing estate on the outskirts of Glasgow. Despite a low prevalence of breastfeeding, initiating and maintaining peer breastfeeding support was possible. Peer support appeared to be acceptable to mothers and health professionals, and resulted in increased confidence and self-esteem.

29. MedlinePlus and the challenge of low health literacy: findings from the Colonias project.

Olney CA, et al. *Journal of the Medical Library Association*. 2007; 95(1): 31.

Promising practice: This study describes an innovative use of mediators who help do Medline searches and serve to facilitate access to evidence for those with low health literacy. With the help of paraprofessionals like promotoras, community-based health information outreach projects may improve the ability of community residents to understand their health conditions and to participate actively in their health care.

30. Roma Health Mediators: Successes and Challenges.

Schaaf M. *Open Society Public Health Program*. October 2011

Promising practice: This report provides details of how Roma Health Mediators have facilitated communications between their communities and health systems and have enhanced access, understanding and health outcomes.

In the case of Roma health mediation, evidence suggests that mediators both directly affect health and change the nature of the community in which programs occur, at a relatively small cost.