



Infant Feeding and Development of Type 2 Diabetes: Evidence for Public Health Decision Making

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Key Take Home Messages

- At present there is insufficient research evidence of high quality to support a claim that breastfeeding protects against the development of type 2 diabetes in later life.
- Although syntheses including meta-analyses may be of good or moderate quality, the individual studies included are less rigorous cohort and case-control designs.
- Definitions of breastfeeding are inconsistent among studies making the dose/exposure difficult to calculate.
- Researchers often rely on subjects, or the mother, to recall the duration of breastfeeding many years after weaning, leading to potential recall bias.
- Further well-designed prospective research studies are needed to search for an effect of infant feeding on the development of type 2 diabetes in later life.
- Messaging to staff and the public will not include an association between not breastfeeding and the development of type 2 diabetes later in life.

Executive Summary

Peel Public Health Nurses within the Family Health Division promote informed decision making by clients about feeding their infants. Expectant parents are encouraged to visit our website to learn more about the risks of formula feeding and the benefits of breast-feeding. Key messages about breastfeeding reducing the risk of infections during infancy and of obesity later in life are posted on the website. A later search for differences in cognitive development, attributable to type of infant feeding, detected no significant differences for full term infants.

Since Peel has a high prevalence of diabetes, the current review was conducted to determine whether the type of infant feeding in the first six months of life affects the risk of developing type 2 diabetes later in life. At present, there is insufficient good quality evidence to support a claim that breastfeeding reduces the risk of developing diabetes, in later life, among those who were breastfed, in populations reflective of Peel Region.

Dr. Donna Ciliska, of the National Collaborating Centre for Methods and Tools, facilitated a meeting of key representatives of management and front-line staff to review the literature search and to discuss applicability and transferability of the findings.

1 Issue

Peel Public Health achieved WHO/UNICEF Baby Friendly Community Health Service designation in June, 2009. As a Baby Friendly service we are required to promote informed decision making among clients by providing information about the benefits of breastfeeding and the health consequences of mixed or formula feeding. Focus groups conducted in 2007 for Peel Public Health revealed that the benefits of breastfeeding were well understood both in prenatal and preconception audiences; however the consequences of using artificial breast milk substitutes were not. In response, Peel Health Nurses developed a social media campaign to encourage women to visit www.formulaNOthanks.ca to learn more about infant feeding and the impact on health outcomes (1).

A search for high quality research produced evidence which supports key messages about breastfeeding

- reducing the risk of obesity later in life
- reducing the risk of infections including acute otitis media, gastroenteritis, and lower respiratory tract infections

among breastfed infants in comparison to those who are or were formula fed. This evidence has been translated into lay language for the website. Visitors to the website can access the evidence for these claims, via a link to the full text article (2).

A second search was conducted for evidence of differences in cognitive development among infants less than six months of age who were exclusively breastfed (or fed breast milk) compared

to infants fed breast milk and infant formula. No significant differences were found, at that time, for full term infants (3).

To date evidence of an impact of type of infant feeding on the risk of developing diabetes, SIDS, allergies, and infant attachment has not been systematically sought or appraised by Peel Health staff. Due to a high prevalence of diabetes among Peel residents, this health issue has been selected as the focus of the current literature search.

2 Context

In preparation for the literature search, two meetings were held to develop a conceptual model regarding factors influencing parent decisions about infant feeding. Nurses identified as subject matter experts were instrumental in developing and verifying the model included as Appendix A. The model helps to clarify our current focus on health outcomes for those who were breastfed, while acknowledging many other factors influence client decision making about infant feeding.

2.1 Diabetes in Peel

The prevalence of diabetes in Peel and Ontario rose rapidly over the past decade with Peel prevalence rates exceeding those for Ontario. Type 2 diabetes, which accounts for more than 90% of diagnosed cases, can be prevented or delayed through healthy eating, regular physical activity and maintaining a healthy body weight (4).

2.2 Births in Peel

Each year nearly 16,000 babies are born to Peel residents. Over the past 20 years the fertility rate in Peel has decreased in women under 30 years of age, and increased in the over 30 population. The highest rate is now among 30-34 year olds (4). Breastfeeding rates are typically higher among older women.

2.3 Immigrant Population

The proportion of Peel mothers who were born in Canada declined to 35% in 2006, while mothers born in South Asia increased to 30%. East Asia was the region of birth for almost 10% of mothers; 5% were born in the Caribbean and 3% in Africa (4).

In 2009, UNICEF published statistics on the feeding of infants and young children from selected countries and regions for the period 2000-2007. Exclusive breastfeeding up to six months of age was reported for 44% of women surveyed from South and East Asia; and for 23-40% of women from Africa (excluding North Africa) (5). These rates are higher than the 10% exclusive breastfeeding rate (of the total rate of any breastfeeding of nearly 60%) reported by Peel mothers in 2004-2005 when their infants were 6 months of age.

Continued breastfeeding for 12-15 months was practised by up to 88% of mothers from South Asia; 54% from East Asia; and 73-90% of women from Africa. (Data not provided for Latin America and the Caribbean) (5).

Breastfeeding is the cultural norm in many of the regions from which Peel's immigrant mothers originate. Might recent immigrants be receptive to messages encouraging exclusive breastfeeding for up to six months if this was common practice in their country of origin?

2.4 Maternity Care

Three hospitals in Peel region provide maternity care; residents also choose to give birth at a number of hospitals in the Greater Toronto Area (GTA). New mothers are discharged from hospital soon after delivery, before they have opportunity to develop skill in breastfeeding their newborn infant(s) and before their milk supply is well established. New mothers may be concerned that their baby "is not getting enough milk" and offer formula by bottle.

In 2008-2009, when 1,125 mothers who had given birth at Peel hospitals were asked by Peel Health nurses about formula supplementation, 54-72% reported that their infants had received a supplement while in hospital. In addition, 24-44% of mothers said they were given formula to take home. The practice of sending infant formula home with new mothers ‘just in case’ can undermine a mother’s confidence in her ability to exclusively breastfeed her baby (6).

2.5 Evidence-Informed Public Health Practice

Peel Public Health has as a 10 year strategic priority to become a leader in making evidence-informed decisions (EIDM) to improve our practice. In preparation for seeking BFI designation, research evidence from reliable sources, including the WHO, UNICEF, and RNAO Best Practice Guidelines, was used in developing breastfeeding protocols. Protocols and standards of practice encourage consistency in serving mothers who breastfeed.

Several sources promote the health benefits of breastfeeding based on unappraised research evidence. These key messages are remembered by Public Health Nurses and Family Visitors employed in the Family Health Division and have been shared with clients. Some staff employed in Family Health may be unfamiliar with the hierarchy of research evidence and the importance of critical appraisal. Mentoring is needed to encourage nurses to use current best evidence when developing and delivering key messages for clients. Some of Peel Health’s current messaging will be reinforced and other messages may need to change as the result of the EIDM process.

3 Literature Review

Peel Public Health has undertaken a search for evidence of the type of feeding that a baby received influencing their risk of developing diabetes.

The specific search question is:

Does the method of infant feeding in the first six months of life affect the risk of developing type 2 diabetes later in life?

The time interval was restricted to six months which is the recommended time for introduction of complementary feeding, and marks the end of exclusive breastfeeding.

3.1 Search Strategy

With the assistance of the Peel Health Librarian and Library Consultant two literature searches were conducted to identify relevant articles published between 1950 and 2010. MEDLINE and the Cochrane Database of Systematic Reviews were searched using OVID. Search terms included “type 2 diabetes”, “breastfeeding”, “risk factors”, “meta-analysis” and “systematic reviews”. The latter two terms restricted the search to higher order papers which combine the results of systematic reviews and single studies. Search terms were combined using Boolean operators. See Appendix B – Literature Search Strategies for further details.

The first search conducted June 3, 2010 yielded six articles. Titles and abstracts were screened for relevance; two were not relevant. The remaining four articles were retrieved in full text for

detailed review. One by Ip et al 2009 (7), an update of their earlier paper (2), contained no new information on the topic, and was therefore removed as a duplicate.

The search was rerun on June 29, 2010 by the Peel Health Librarian using terms to capture formula feeding and the risk of type 2 diabetes. The single result was a duplicate of one retrieved during the initial search (2).

All articles retrieved met the inclusion criteria as outlined in Appendix B. The reference lists of key articles were checked. All seven studies (8-15) included in the meta-analysis by Owen et al (16) were retrieved to answer questions about the calculations of odds ratios.

A hierarchy has been developed to inform searching for the best quality public health evidence (17). The current search identified one synopsis of syntheses, one synthesis and one synopsis of single studies. See Appendix C – Search Results.

3.2 Critical Appraisal

Three relevant articles were assessed for methodological quality using the Critical Appraisal Skills Programme (CASP) tool for reviews (18). Ratings were confirmed by a second independent reviewer. Of the papers reviewed, two (2, 16) were rated strong. The synopsis of single studies by Taylor et al (19) was rated weak by both reviewers and excluded.

3.3 Synthesis of Findings

Please refer to Appendix D - Data Extraction Table for further details of key articles.

In 2007, Ip et al. prepared an evidence report for the Agency for Healthcare Research and Quality entitled Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries. Of the twenty-three outcomes analysed, only studies of the relationship between breastfed term infants and the later development of type 2 diabetes were of interest to the current review (2). A summary and update was released in 2009. One meta-analysis by Owen et al., 2006 was the only synthesis included in either synopsis which examined the risk of developing type 2 diabetes (16).

Owen et al. conducted a literature search to identify published studies, letters, abstracts and review articles on infant feeding and measures of adiposity. They examined 23 published studies of the relationship between type of infant feeding and development of type 2 diabetes or risk factors for diabetes in later life. Sixteen studies did not provide the odds of type 2 diabetes and were excluded from further analysis (16).

The risk of developing type 2 diabetes can be expressed as an odds ratio (OR). When the frequency of exposure (e.g. to breastfeeding) is lower among cases the $OR < 1$ indicating breastfeeding is protective. When the frequency of exposure is higher among cases the $OR > 1$, indicating increased risk of developing diabetes among those who were breastfed.

Odds ratios were reported in three studies included in the Owen meta-analysis; authors of the remaining four studies provided Owen with additional data upon request. Six of the seven studies related breastfeeding to a lower risk of type 2 diabetes. A pooled odds ratio was calculated (0.61;

95% CI: 0.44, 0.85; P = 0.003) indicating subjects who were breastfed had a 40% lower risk of developing type 2 diabetes (16).

While the methodological quality of the Owen et al meta-analysis was originally rated strong by two independent reviewers using the CASP tool, the primary studies included had not been appraised. Upon closer examination, several areas of concern have been identified and the quality rating has been reduced to moderate. In April, 2012 the quality appraisal of this article posted at www.health-evidence.ca was found to be 6, or moderate.

Firstly, definitions of exclusive feeding are based on classifications by authors of the single studies. Only one study reported exclusive breastfeeding; others compared any or ever breastfed with exclusively formula fed; one compared exclusively breastfed at 10 days vs. partly formula fed; and the final study failed to define feeding exclusivity. It is impossible to be confident of a dose-response relationship with such imprecise definitions of exposure.

Secondly, sources of information on infant feeding included:

- mothers (or hospital records) shortly after birth of an infant;
- mothers, when their children were age 0-28 years old; and
- adults aged 45-71 years asked to recall themselves, or verify with a female relative, their feeding history.

The potential for recall bias, especially for adults questioned in later years about how they were fed as infants, is a concern.

Thirdly, only three smaller studies of the seven included in the Owen meta-analysis adjusted for confounders (birth weight, parental diabetes, SES and individual or maternal body size). The odds ratios were reported to be similar before and after adjustment (16). The largest study adjusted for age only. Although the pooled odds ratio favours ever breastfeeding (or longer breastfeeding) over not breastfeeding, failure to adjust for important confounders could exaggerate the magnitude of the association (2).

Fourthly, upon careful review of the forest plot (Figure 2 in Owen) one author (EW) detected an error in the OR calculated using the prevalence of diabetes in feeding groups reported by Rich Edwards et al (14). Dr. Owen has recalculated the OR for this single study and for the seven studies combined. The corrected pooled OR is 0.78 (95% CI 0.73 to 0.84). An erratum can be found at <http://www.ajcn.org/content/95/3/779.full> .

Two high quality single studies provide some evidence that Native North American breastfed infants may be at lower risk for the development of type 2 diabetes. Pettitt et al (9) studied Pima Indians, a population with a high prevalence of this disorder. The adjusted OR 0.51 (0.28-0.93), which was reported in an abstract (9) was preferentially used in the Owen meta-analysis (16). In Winnipeg, Manitoba Young et al (15) found an increased risk of type 2 diabetes among Native Canadians younger than 18 years. However, the OR calculated by Owen et al (16) was 0.56 with a 95% confidence interval of 0.23-1.38, indicating the difference between feeding groups was not statistically significant. These findings are not readily transferable to Peel Region where less than 1% of the population is Native Canadian.

3.4 Applicability and Transferability

Dr. Donna Ciliska, of the National Collaborating Centre for Methods and Tools, facilitated a meeting of key representatives of management and front-line staff to review the literature search and to discuss applicability and transferability of the findings. The group concluded that the results of the current literature review do not support a claim that breastfeeding protects against the development of type 2 diabetes later in life. Concerns with study designs, and the potential for recall bias, as outlined above, prompted this conclusion.

Discussion using questions contained in the Applicability & Transferability Worksheet (see Appendix E) highlighted the following:

- Making Evidence-Informed Decisions is a strategic priority for Peel Public Health
- Promotion of exclusive breastfeeding, through the website www.formulaNOthanks.ca, incorporates evidence informed messages.
- Nurses writing for the web may need some support in crafting evidence-informed messages in lay terms. These same messages will be useful for all staff who speak directly with clients about breastfeeding.
- Results of this review will be shared with all Family Health Division staff and external agency partners. Two teams of nurses and their supervisors who are dedicated to promoting and supporting breastfeeding will take the lead in knowledge dissemination.

3.5 Recommendations

It is recommend that

1. Key findings of the current review be disseminated across the Family Health Division so that all staff continue to promote clients' informed decision making about infant feeding.
2. Written materials for the public and for staff be reviewed and revised to reflect findings of the current review.
3. Key messages for lay audiences be posted on the website www.formulaNOthanks.ca .
4. A Public Health Nurse from a breastfeeding team, in conjunction with library services and a Research and Policy Analyst, keep abreast of systematic reviews on health outcomes by type of infant feeding.
5. A rapid review of the literature be repeated in three to five years.
6. Given the limitations of research designs, suspend further literature reviews on type of infant feeding and selected health outcomes (including allergies, SIDS, and infant attachment) until concerns over study methodologies are addressed.
7. Staff use the newly developed conceptual model (Appendix A) to inform planning for future public health initiatives related to infant feeding.

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Appendices

Appendix A: Concept Model

Appendix B: Search Strategy

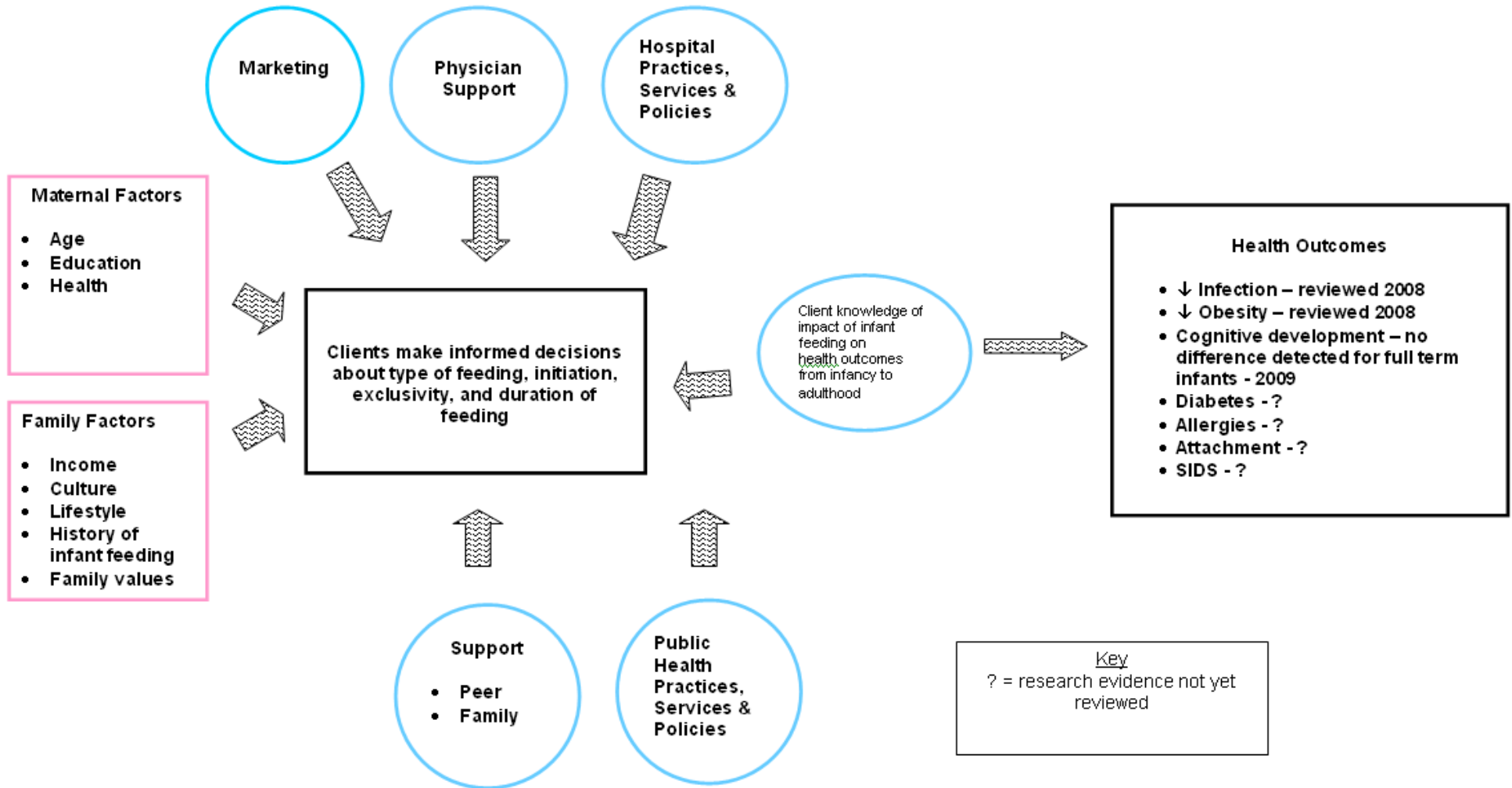
Appendix C: Literature Search Flowchart

Appendix D: Data Extraction Tables

Appendix E: Applicability & Transferability Worksheet

Appendix A: Concept Model

FACTORS INFLUENCING PARENT DECISIONS ABOUT INFANT FEEDING July 2010



Appendix B: Search Strategy

PICOT Search Terms

Population – children, youth, adolescents, adults

Intervention – breast milk, breastfeeding, “only breast milk” (for first 6 months of life)

Comparison – infant formula (feeding); artificial breast milk substitutes

Outcome – development of diabetes, type 2 diabetes

Type of study – control group

Inclusion Criteria

- English language, developed countries, all cultural groups, studies with a control group e.g. RCT, case control, peer reviewed journals with abstracts; guidelines, grey literature, conference proceedings; “Expert” Authors – include Kramer, Bergman, N.

Exclusion Criteria

- single studies, synopses of single studies, expert opinion

First Search Strategy:

Database: Ovid MEDLINE (R) <1950 TO June Week 3 2010>

1	exp Diabetes Mellitus, Type 2/	59967
2	(type 2 diabetes or niddm).tw.	41822
3	non-insulin-dependent diabetes mellitus.tw.	6656
4	1 or 2 or 3	70782
5	Breast Feeding/	21481
6	(breastfeed* or breast feed*).tw.	18238
7	5 or 6	27177
8	exp risk/ or risk factors/	617237
9	risk.tw.	821296
10	8 or 9	1097194
11	7 and 10	6215
12	4 and 11	49
13	meta-analysis.mp,pt.	40113
14	(search or systematic review or medline).tw.	131589
15	cochrane database of systematic reviews.jn.	6701
16	or/13-15	156797
17	12 and 16	6

Second Search Strategy:

Database: Ovid MEDLINE (R) <1950 TO June Week 3 2010>

-
- 1 exp Diabetes Mellitus, Type 2/ (60323)
 - 2 (type 2 diabetes or niddm).tw. (42118)
 - 3 non-insulin-dependent diabetes mellitus.tw. (6657)
 - 4 1 or 2 or 3 (71213)
 - 5 Breast Feeding/ (21526)
 - 6 (breastfeed* or breast feed*).tw. (18276)
 - 7 infant formula/ (1457)
 - 8 infant formula.tw. (1777)
 - 9 (artificial adj baby milk).tw. (13)
 - 10 (cow's milk adj formula).tw. (193)
 - 11 (breastmilk adj substitute*).tw. (54)
 - 12 (breast milk adj substitute*).tw. (195)
 - 13 formula feed*.tw. (863)
 - 14 5 or 6 (27233)
 - 15 or/7-13 (3862)
 - 16 exp risk/ or risk factors/ (620121)
 - 17 risk.tw. (825257)
 - 18 16 or 17 (1102371)
 - 19 15 and 18 (736)
 - 20 4 and 19 (5)
 - 21 meta-analysis.mp,pt. (40454)
 - 22 (search or systematic review or medline).tw. (132367)
 - 23 cochrane database of systematic reviews.jn. (6753)
 - 24 or/21-23 (157746)
 - 25 20 and 24 (1)
 - 26 from 25 keep 1 (1)

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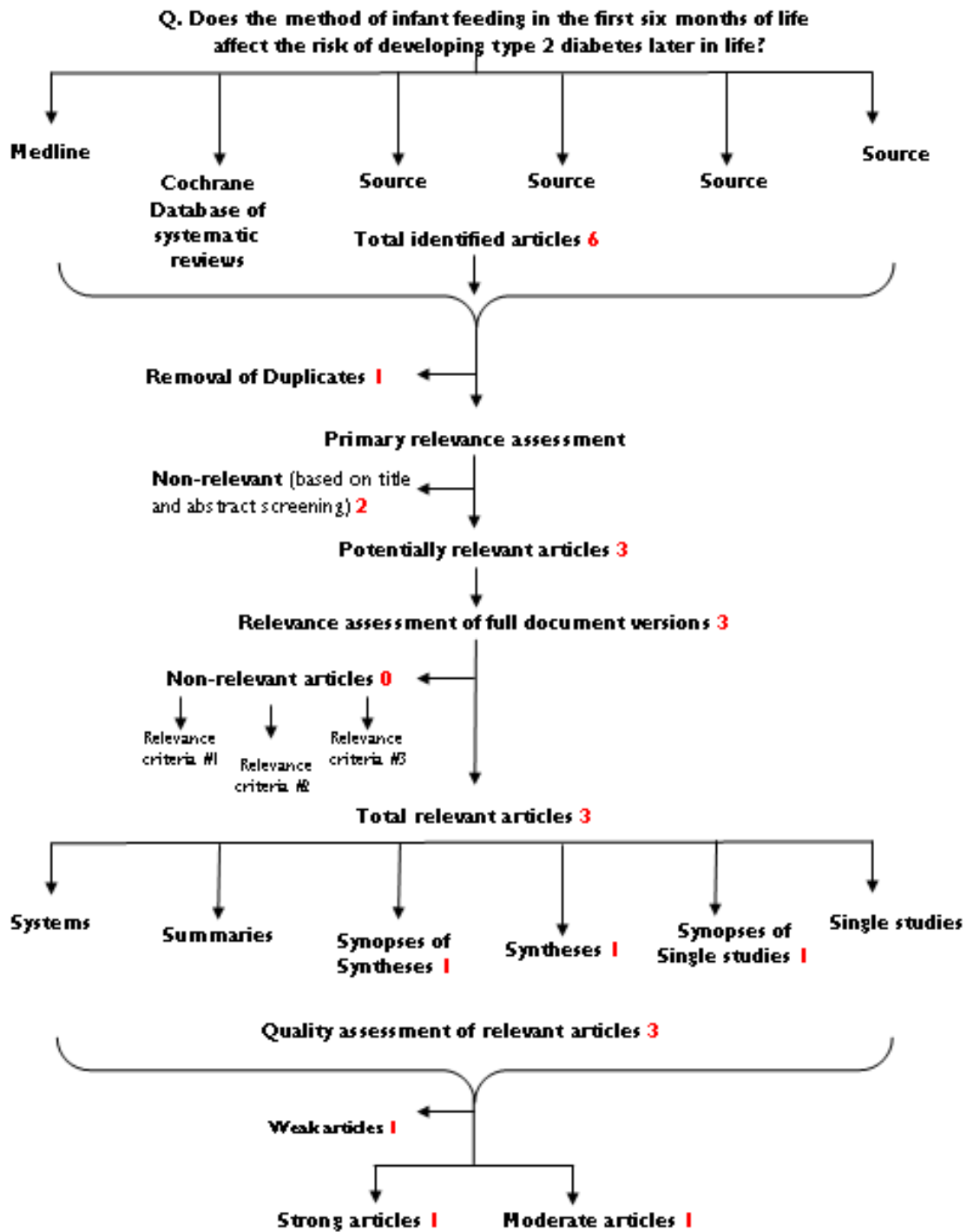
Authors Full Name

Ip, Stanley. Chung, Mei. Raman, Gowri. Chew, Priscilla. Magula, Nombulelo. DeVine, Deirdre. Trikalinos, Thomas. Lau, Joseph.

Title

Breastfeeding and maternal and infant health outcomes in developed countries. [Review] [218 refs] Source

Appendix C: Literature Search Flowchart



¹ Tool created by Health-evidence.ca (2009, November 25). Adapted 2011, March 4.

Appendix D: Data Extraction Tables for Systematic Review of Infant Feeding and Development of Type 2 Diabetes

General information and Quality Rating for each Review	Details of Each Review	Details of interventions included in Review	Outcome Measurements in Review	Results of Review
<p>Ip S, Chung M, Raman G, Trikalinos TA, Lau J. 2009</p> <p>USA</p> <p>Rating: Good/Strong -using CASP critical appraisal tool for reviews.</p> <p>Generalisability to local population: Studies of healthy term infants and mothers in developed countries. Breastfeeding mothers tend to be white, older, more educated and of higher SES.</p>	<p>Summary and update of 2007 report by Ip et al. Searched Medline, CINAHL and Cochrane, bibliographies of reviews, studies identified by experts from 11/2005 – 08/2006. English language. Included systematic reviews; meta-analyses; primary studies where no systematic reviews available. No primary studies on topic of interest published subsequent to Owen et al, 2006, were identified. Abstracts screened by two reviewers; full articles screened by one reviewer for inclusion/exclusion and by second review if results equivocal. Used MOOSE guidelines.</p>	<p>Majority of studies did not distinguish between exclusive and partial breastfeeding or between breastfeeding and bottle feeding expressed breast milk. All definitions of exclusive breastfeeding as provided by study authors were accepted. Conclusions were qualified based on the specific definitions.</p> <p>Primary studies included where there was a comparator arm of formula feeding or differences in duration of breastfeeding.</p> <p>See Owen et al, 2006.</p>	<p>Used experts to determine outcomes, including harms.</p> <p>See Owen et al, 2006.</p>	<p>Main Results of Review: Comments/Limitations: “Only 3 studies (of the 7 analysed by Owen) appropriately adjusted for all important confounders, including birth weight, parental diabetes, SES, individual or maternal body size. Even though these three studies found that adjustment did not alter the crude estimate, we cannot be completely confident that the potential confounding by birth weight and maternal factors has been ruled out for the overall pooled estimate. This potentially could exaggerate the magnitude of the association.” P. 161.</p>

General information and Quality Rating for each Review	Details of Each Review	Details of interventions included in Review	Outcome Measurements in Review	Results of Review
<p>Owen CG, Martin RM, Whincup, PH Smith GD, Gook DG. 2006</p> <p>USA</p> <p>Rating: A – Good by Ip et al</p> <p>Initially rated Good/Strong using CASP critical appraisal tool for reviews. Upon closer review, the rating reduced to moderate – due to no rating of quality of studies included.</p> <p>Data for one study (Pettitt) from an abstract, which gave a more favourable OR. Footnote¹³ Table 1 explains “data from Pima Indians was published in multiple</p>	<p>Systematic review and meta-analysis of published literature.</p> <p>7 studies included (where OR were published or provided by authors).</p> <p>Observational studies including Historical cohort (3) Prospective cohort (1) Case Control (1) Cross Sectional (2)</p> <p>Electronic Lit search completed Nov, 2004 Embase ≥ 1980, Medline ≥ 1966, Web of Science ≥ 1980, including articles, letters, meeting abstracts, review articles and OVID alerts.</p>	<p>Purpose: To quantify the strength of the associations between breastfeeding and risk of type 2 diabetes later in life.</p> <p>Definitions of exclusive breastfeeding based on the classification given by authors in each article. An effect of breast-feeding on glucose and insulin metabolism is biologically plausible since the composition of breast milk differs from formula feeds and volumes received during breast-feeding are normally smaller than those associated with formula feeding and breastfeeding may protect against later obesity.</p>	<p>Primary outcome: Development of Type 2 diabetes.</p> <p>Secondary outcomes: Breastfeeding and subsequent fasting glucose and fasting insulin concentrations (markers of insulin resistance, an important precursor of type 2 diabetes).</p>	<p>Main results of review: Type 2 diabetes (7 studies – nearly 50,000 BF, nearly 27,000 formula fed subjects) OR 0.61 (95% CI 0.44, 0.85) P for difference between breastfed and formula fed 0.003. P for Chi-square test for heterogeneity 0.383 indicating no evidence of heterogeneity – therefore appropriate to combine study results.</p> <p>Comments/Limitations: Sources of information on infant feeding include maternal recall at the time of infant feeding, parental questionnaire at age 0-28 years, partici-pant questionnaire at age 45-59 years and 46-71 years.</p>

General information and Quality Rating for each Review	Details of Each Review	Details of interventions included in Review	Outcome Measurements in Review	Results of Review
<p>sources – data from an abstract with measures of both glucose and ORs of diabetes before and after adjustment for important confounders was preferentially used.”</p> <p>Population – 3 studies of people born in UK; one Dutch famine birth cohort, Holland; one Nurses’ Health Study, USA; one Pima Indians Arizona USA (Pettitt); one aboriginal Canadians, Winnipeg, Manitoba (Young)</p>	<p>Inclusion criteria- Infant feeding and measures of adiposity.</p> <p>Exclusion criteria – review articles; no comparison of diabetic outcomes among formula and breastfed; Type 1 diabetes; maternal diabetes; no data presented; no odds of Type 2 diabetes presented; mean differences in blood glucose not provided</p> <p>Owen contacted authors of 3 included studies for data from which to calculate ORs.</p>			<p>Feeding groups include exclusively fed either breast or formula; breast fed vs. exclusive formula fed; exclusively breast fed for 10 days vs. partly formula fed; ever breast fed vs. formula fed.</p> <p>“The extent of protection and the duration of breast-feeding required were not examined in this review....If breastfeeding protects against Type 2 diabetes, it will then be important to examine the extent to which duration of breastfeeding matters and whether this effect is explained by the protective effect of breastfeeding on the prevalence of obesity in adult life (p. 1052)</p>

Appendix E: Applicability & Transferability Worksheet

Factors	Questions	Notes
Applicability (feasibility)		
Political acceptability or leverage	<ul style="list-style-type: none"> • Will the intervention be allowed or supported in current political climate? • What will the public relations impact be for local government? • Will this program enhance the stature of the organization? <ul style="list-style-type: none"> ○ <i>For example, are there reasons to do the program that relate to increasing the profile and/or creative a positive image of public health?</i> • Will the public and target groups accept and support the intervention in its current format? 	<ul style="list-style-type: none"> • Yes. Strong evidence supports other reasons to promote exclusive breast-feeding. • Peel Health wishes to be seen by its customers as a credible source of high quality health information. • Some Public Health staff, members of the public, and stakeholders, may not be as critical in their review of the evidence and be disappointed with the decision taken. • The Canadian Lactation Consultant Association is offering a webinar on 2020.11.09 – <i>Breastfeeding and the prevention of Obesity and Diabetes. What does the research say?</i>
Social acceptability	<ul style="list-style-type: none"> • Will the target population find the intervention socially acceptable? Is it ethical? <ul style="list-style-type: none"> ○ <i>Consider how the program would be perceived by the population.</i> ○ <i>Consider the language and tone of the key messages.</i> ○ <i>Consider any assumptions you might have made about the population. Are they supported by the literature?</i> ○ <i>Consider the impact of your program and key messages on non-target groups.</i> 	<ul style="list-style-type: none"> • Yes. It is ethical practice to refrain from making unproven claims of health benefits. • Information for Peel’s website www.formulaNOthanks.ca will be written from the population health perspective, and in lay terms. • The target population is parents who are deciding how to feed their infants; women who are already breastfeeding and those supportive of breastfeeding

Factors	Questions	Notes
Available essential resources (personnel and financial)	<ul style="list-style-type: none"> • Who/what is available/essential for the local implementation? • Are they adequately trained? If not, is training available and affordable? • What is needed to tailor the intervention locally? • What are the full costs? <ul style="list-style-type: none"> ○ <i>Consider: in-kind staffing, supplies, systems, space requirements for staff, training, and technology/administrative supports.</i> • Are the incremental health benefits worth the costs of the intervention? <ul style="list-style-type: none"> ○ <i>Consider any available cost-benefit analyses that could help gauge the health benefits of the intervention.</i> ○ <i>Consider the cost of the program relative to the number of people that benefit/receive the intervention.</i> 	<ul style="list-style-type: none"> • Two teams of public health nurses and two supervisors are dedicated to promoting and supporting breast-feeding. • Some staff may need additional education about EIDM, including searching for pre appraised literature and critical appraisal. Research and Policy Analysts can assist. • Nurses, writing for the web, may need some support in crafting evidence informed messages in lay terms.
Organizational expertise and capacity	<ul style="list-style-type: none"> • Is the intervention to be offered in line with Peel Public Health’s 10-Year Strategic Plan (i.e., 2009-2019, ‘Staying Ahead of the Curve’)? • Does the intervention conform to existing legislation or regulations (either local or provincial)? • Does the intervention overlap with existing programs or is it symbiotic (i.e., both internally and externally)? • Does the intervention lend itself to cross-departmental/divisional collaboration? • Any organizational barriers/structural issues or approval processes to be addressed? • Is the organization motivated (learning organization)? <ul style="list-style-type: none"> ○ <i>Consider organizational capacity/readiness and internal supports for staff learning.</i> 	<ul style="list-style-type: none"> • Refraining from making claims of risks or benefits based on inadequate studies will support our strategic priority of making evidence-informed decisions. • Staff across the Family Health Division, including Child Health, Reproductive Health and Healthy Babies, Healthy Children will need to hear the results of this review. • Peel Health is a learning organization and management will be supportive of the findings of this review.

Transferability (generalizability)		
Factors	Questions	Notes
Magnitude of health issue in local setting	<ul style="list-style-type: none"> • What is the baseline prevalence of the health issue locally? • What is the difference in prevalence of the health issue (risk status) between study and local settings? <ul style="list-style-type: none"> ○ <i>Consider the Comprehensive Health Status Report, and related epidemiological reports.</i> 	<ul style="list-style-type: none"> • In Peel, there is good initiation of breastfeeding but lower than desired continuation of exclusive breastfeeding to four and six months.
Magnitude of the “reach” and cost effectiveness of the intervention above	<ul style="list-style-type: none"> • Will the intervention appropriately reach the priority population(s)? <ul style="list-style-type: none"> ○ What will be the coverage of the priority population(s)? 	<ul style="list-style-type: none"> • Web trends indicate www.formulaNOthanks.ca was visited an average of 212 times/month April, 2009 to October, 2010. • Nurses will convey messages to clients during individual encounters and in group settings. • A plan to roll out the results of this literature review to staff and external agency partners will be developed.
Target population characteristics	<ul style="list-style-type: none"> • Are they comparable to the study population? • Will any difference in characteristics (e.g., ethnicity, socio-demographic variables, number of persons affected) impact intervention effectiveness locally? <ul style="list-style-type: none"> ○ <i>Consider if there are any important differences between the studies and the population in Peel (i.e., consider demographic, behavioural and other contextual factors).</i> 	<ul style="list-style-type: none"> • While all study participants in the meta-analysis lived in developed countries, the populations from which they were drawn are dissimilar to the population living in Peel Region. Limiting the literature search to developed countries excluded subjects from South Asian countries, a population in Peel with a high incidence of diabetes

Proposed Direction (after considering the factors outlined above): There is insufficient high quality evidence to promote exclusive breastfeeding as a way of reducing the risk of developing type 2 diabetes later in life for those who were breast fed.

Form Completed by: Elizabeth Walker, RPA and Deb Chang, Manager, Child Health

Worksheet adapted from: Buffet C., Ciliska D., and Thomas H. National Collaborating Centre for Methods and Tools. November 2007. *Can I Use this Evidence in my Program Decision? - Assessing Applicability and Transferability of Evidence.*