



Making immunization decisions for school-aged children: A Rapid Review

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Key Messages

The evidence from three systematic reviews and one guideline identified that:

- Parents need information about: vaccine safety and side effects, vaccine effectiveness, and severity of vaccine-preventable diseases to make decisions about immunization.
- Vaccine uptake increased when strategies were tailored to population subgroups and targeted to those at-risk for low immunization uptake.
- Vaccine uptake increased when printed materials were combined with an opportunity to have questions answered.
- Attitudes toward immunization (MMR) improved when parents used a web-based decision tool.
- When parents reported feeling prohibited from having free discussions, rushed, condescended to, or depersonalized, they were dissatisfied with their primary care provider consultation.
- Vaccine uptake decreased when parent's immunization discussions with primary care providers were inadequate in depth and length; difficult and dismissive; and with the perception that health professionals do not agree with one's decision.
- The evidence is conflicting regarding the use of gain-framed or loss-framed messaging.
- The results were inconsistent about using the following communication strategies: brochures, face-to-face interventions, poster messaging, and a radio show.

Executive Summary

Research Question

What information do parents need and how do they prefer to receive it to feel comfortable and confident when making decisions about immunizations for their school-aged children?

Issue and Purpose

We want to be sure we are providing parents with the right information to help them make a decision about immunizing their child. The purpose of this review is to identify what information parents need and how they prefer to receive it to make decisions about immunizations for their school-aged children.

Literature Search and Critical Appraisal

A systematic search, from 1946 to July 2013, identified 21 articles. Four were relevant and are included in this review; one strong quality guideline and three strong quality systematic reviews.

Key Findings

Two systematic reviews and one guideline examined the information parents need in order to make immunization decisions. Receiving information about vaccine safety/side effects, vaccine effectiveness, and severity of vaccine-preventable diseases was associated with an increase in vaccine uptake. Evidence for using gain-framed versus loss-framed messaging was mixed regarding intention to vaccinate.

Three systematic reviews and one guideline provided information about effective methods to deliver immunization information to parents. Delivering

messages using a multi-component approach was associated with vaccine uptake. Using a web-based decision tool was associated with a positive outcome on attitudes. A decrease in vaccine uptake was associated with immunization discussions with primary care providers that were inadequate in depth and length; difficult and dismissive; and with the perception that health professionals do not agree with one's decision. Parents were dissatisfied with their primary care provider consultation when they reported feeling prohibited from having free discussions, rushed, condescended to, or depersonalized. Effectiveness of brochures, face-to-face interventions, poster messaging, and a radio show were unclear.

Recommendations:

1. Continue to include messaging about vaccine safety, side effects, effectiveness, and severity of disease in all communications with parents.
2. Gain a better understanding of Peel's sub-populations including those with low immunization uptake.
3. Support health care professionals in their conversations/communications with parents about immunization.
4. Explore the feasibility of using web-based decision tools and evaluate their effectiveness.
5. When informing parents about immunizations, where possible, provide in-person meetings along with printed information to discuss, address questions, and support parents to ask questions.

6. Advocate for PHO/MOHLTC to develop communication tactics for the general public.
7. Monitor the literature around immunization messaging and re-run the search every one to two years.

1 Issue

We want to provide parents with the right information to help them decide about immunizing their child. While resources and professional forums frequently offer suggestions about how to decrease parental concerns about immunization, it is unclear whether there is research evidence about what information parents need. We do not know whether the immunization information we provide has an impact on coverage rates. We do, however, want to be sure that we are not inadvertently discouraging some parents from consenting by providing information that does not meet their needs.

Every year, thousands of parents sign our immunization consent form and trust us to immunize their children. Each year, the Vaccine Preventable Diseases (VPD) teams consider whether or not we need to change the information we send. Should we revise the wording on the consent to try and make it resonate with more parents? Because what we have been using seemed to work, how can we determine if a new version of the consent is needed?

Parents who call us tell us what they want. Some of them have a long list of ideas about what should be included in the materials we provide. What about the parents who do not call, and those who do not sign our consents, are we meeting their information needs?

This Rapid Review asks the question: *what information do parents need and how do they prefer to receive it to feel comfortable and confident when making decisions about immunizations for their school-aged children?*

2 Context

Communication Initiatives

Peel Public Health has used various strategies to communicate with more than 50,000 parents annually about immunization. These include: media campaigns, websites, pamphlets, fact sheets, letters, consent forms and in-person meetings. To date, we have had only anecdotal information about parental preferences to inform these strategies.

Evaluation Initiatives

In 2010, PPH carried out user-acceptance testing to evaluate our on-line immunization record reporting form and mailed notifications. The results helped us understand how users navigate our website and evaluate the readability of our printed materials. We did not address the information needs of parents.

In 2012, 77 parents attending our school-based immunization-catch-up clinics participated in focus groups and completed surveys. The purpose was to determine if our consent form provided the information they needed to make an informed decision about immunization. Feedback on the format and content was positive. The results could not be generalized to all parents because only those who consented and attended a catch-up clinic were surveyed.

In May 2013, a brief analysis of a multi-media campaign did not show any impact of the campaign on response rates to notices requesting immunization information from parents.

Provincial Initiatives

In 2012, Public Health Ontario (PHO) funded a locally-driven collaborative project involving Peel and other local public health units. This project addressed program delivery strategies to increase human papillomavirus (HPV) vaccine coverage rates in Ontario. The project identified potential strategies from the literature and those currently in use by Ontario's health units. Identifying communication and information needs of parents was one of the strategies identified for potential intervention. The project could not be sustained and was placed on hold in November 2012.

In 2014, the Ministry of Health and Long Term Care (MOHLTC) launched an education campaign about immunizations for parents with young children about how vaccines work, common myths, and vaccine safety.

Immunization Coverage Rates in Peel

Peel Public Health reports annually on vaccine coverage for antigens administered in schools (Table 1) and for those required for school attendance under the Immunization of School Pupils Act (Table 2). While Peel's coverage rate is comparable to the provincial rate, PHO indicates that most jurisdictions, including Peel, do not meet the national targets.

Table 1: School-based vaccine coverage, 2011-2012 *

	Hepatitis B	Meningococcal	HPV
Peel	87.7%	80.8%	70.2%
Ontario	86.6%	84.4%	70.2%
National Target	95.0%	90.0%	90.0%

* Immunization coverage for Ontario's school-based programs 2011-2012, Public Health Ontario, 2013.

Table 2: School-based vaccine coverage of children 17 years old, 2011-2012*

	Diphtheria	Tetanus	Polio	Measles 2 doses	Mumps 2 doses	Rubella > 1 dose
Peel	89.3%	89.3%	95.4%	95.9%	93.6%	97.7%
Ontario	82.6%	82.6%	93.5%	94.8%	92.9%	96.7%
National Target	99.0%	99.0%	99.0%	99.0%	99.0%	97.0%

* Immunization coverage report for school pupils 2011-2012, Public Health Ontario, 2013.

3 Conceptual Framework

Parental decisions about immunization are impacted by internal and external factors and it requires them to understand a lot of complex information.

The conceptual model illustrates the multiple competing factors present for parents when making immunization decisions. See Appendix A for the conceptual model.

4 Literature Review Question

Our research question is:

What information do parents need and how do they prefer to receive it to feel comfortable and confident when making decisions about immunizations for their school-aged children?

In PSIO format, this question is:

Population (P)	Parents of school-aged children
Situation (S)	What information do parents need
Intervention (I)	How parents prefer to receive it
Outcome (O)	To feel comfortable and confident about immunization decisions

5 Literature Search

In May to July 2013, we used OVID to search the following databases (since database inception): Medline, Cochrane Database of Systematic Reviews, Global Health and PsychInfo. EBSCO was used to search the following databases (since database inception): CINAHL, Psychology & Behavioural Sciences, and SocIndex. The search strategy included medical subject headings and keywords. The main search concepts were “immunization or vaccination”, “parents”, and “decisions”. See Appendix B for our search strategy.

In August 2013, a search for grey literature using the same key words was completed through the Center for Disease Control and Prevention, World Health Organization, National Guideline Clearinghouse, Public Health Agency of Canada, National Institute for Health and Care Excellence, Registered Nurses Association of Ontario, Center for Reviews and Dissemination, Evidence for Policy and Practice Information and Co-ordinating Centre, The Campbell

Collaboration, The Guideline Advisory Committee, Google Scholar, and the TRIP database.

All searches were limited to English language. Due to the volume of literature, we limited the inclusion of synthesized literature to those published within 2009 to 2013.

6 Relevance Assessment

Two independent reviewers assessed relevance of the search results based on (1) title and abstract, and (2) full-text. Discrepancies were resolved through discussion and, when needed, with a third reviewer.

Inclusion Criteria:

- Parents of children from newborn to 21 years of age
- Methods used to support parental decision making
- Qualitative or quantitative research design
- Publication type: synthesized research
- English language
- United States, United Kingdom, Australia, New Zealand, Canada, developed European countries

Exclusion Criteria:

- Interventions assessing immunization of individuals ages >21
- Immunization effectiveness and efficacy
- Effectiveness of booster immunizations
- Effectiveness of Influenza immunizations

- Vaccine antigen effectiveness
- Papers describing adverse events related to general immunization
- Studies in countries that do not have school based immunization programs
- Immunization schedules

7 Results of the Search

The search yielded 148 studies. Based on title review, 125 did not meet the relevance criteria and two were duplicates. Twenty-one studies were retrieved in full-text and assessed for adherence to the inclusion criteria, resulting in 16 studies being excluded. The remaining five studies were reviewed for quality.

See Appendix C for search results flowchart.

8 Critical Appraisal

Two reviewers independently critically appraised four systematic reviews using the Health Evidence Quality Assessment Tool and one guideline using the Agree II tool. Following independent appraisals, discrepancies were resolved through discussion and, when needed, with another reviewer. Three systematic reviews and one guideline rated strong. One systematic review rated moderate and was excluded.

9 Description of included studies

Brown et al., 2012. Factors underlying parental decisions about combination childhood vaccinations including MMR.

This systematic review examined the factors underlying parental vaccination decisions. Thirty-one studies using either quantitative or qualitative study designs were included. The authors examined how various factors affect parental decisions on the outcome of combination vaccine uptake. The factors were categorized by: vaccine factors, information needs, healthcare systems/government, disease factors, parenting/social context, practicalities, and demographics. No comparators were used.

Data were synthesized and summarized narratively. Due to the variation in study designs, it was not possible to calculate summary effect sizes. The quality of most included studies was low; the authors reported that persistent methodological shortcomings and inadequate reporting meant that most studies were awarded less than half of the points available for quality.

Sadaf et al., 2013. Interventions for reducing parental vaccine refusal and vaccine hesitancy.

This review assessed the effects of state and school-level laws and parent-centred information in reducing parental vaccine refusal and hesitancy. Thirty studies were included: four examining passage of state laws, five examining state and school-level implementation of laws, and 25 examining parent-centred information/education. Study designs included randomized controlled trials (RCTs), non-RCTs (mailed surveys and self-administered questionnaires), before-and-after design, and evaluation studies (survey or

datasets from raw data, Center for Disease Control, and Arkansas Division of Health).

The outcomes examined included: a) parent's knowledge and attitudes towards immunization and b) parent's intention to vaccinate their children. Data were combined narratively due to significant heterogeneity among included studies. The authors report that most of the included studies scored low using the GRADE (Grading of Recommendations, Assessment, Development and Evaluations) criteria on the quality assessment.

Kaufman et al., 2012. Face-to-face interventions for informing or educating parents about early childhood vaccination.

This review assessed the effectiveness of face-to-face interventions to inform or educate parents about early childhood immunizations. Effectiveness was measured by examining parental knowledge and vaccine uptake. Study designs included RCTs and cluster RCTs. Seven studies were included in this systematic review. Six studies examined the effectiveness of single versus multi-session face-to-face interventions directed to individual parents compared to a control group. One study examined group face-to-face interventions compared to a control group. Three studies were completed in low- or middle-income countries and four in high-income countries.

Primary outcomes examined were: immunization status of child and parent's knowledge or understanding of vaccination. Secondary outcomes examined were: parent's intention to vaccinate their child, parent's experience with the intervention, and the cost of implementing the face-to-face intervention.

Meta-analysis was completed using a random-effects model due to the heterogeneity of the populations and interventions within the primary studies. The meta-analysis did not include the cluster RCT because it did not report useable data. The results of the cluster RCT were synthesized based on the intervention type and results were presented in table form and described narratively.

The authors reported that the studies scored low in quality using the GRADE tool, which led to limited confidence in the summary estimate.

National Institute for Clinical Excellence (NICE), 2009. Reducing differences in the uptake of immunizations.

This guideline focused on increasing immunization uptake among groups and settings where coverage was low. Studies using either quantitative or qualitative study designs were included. One hundred and forty-two studies were included: multi-component interventions, interventions to increase uptake of MMR, providing health information/education for families/communities, reminder/recall interventions, home visiting, client or family incentive or disincentive, interventions in school or daycare settings, provider-based interventions, providing child vaccination information to service providers, opportunistic vaccinations, National Immunization Programme, and interventions for increasing neonatal hepatitis B.

Information from 46 studies was used for our review. These studies examined uptake of vaccination using multi-component interventions compared to no intervention; interventions specific to measles, mumps and rubella; and provision of health information/education for families/communities.

The quality of studies in the guideline ranged from very good to poor. Included evidence was summarized and evidence statements reflect the strength of the evidence (quantity, type and quality) and its applicability to populations and settings.

10 Synthesis of Findings

Information parents need to make decisions about immunizations (Table 3)

- ❖ Receiving information on vaccine safety, side effects, vaccine effectiveness, and severity of vaccine preventable diseases were associated with an increase in vaccine uptake (35 out of 68 studies)
- ❖ Two studies reported mixed results regarding the use of gain-framed versus loss-framed messaging

How to best deliver immunization information to parents (Table 4)

- ❖ Delivering messages using a multi-component approach (working with parents through discussions, addressing questions about vaccines, and supporting parents to ask questions about immunizations through in-person meetings) was associated with vaccine uptake (14 out of 15 studies)
- ❖ Using a web-based decision tool was associated with a positive outcome on attitudes (1 study)
- ❖ A decrease in vaccine uptake was associated with negative immunization discussions with healthcare providers. These were described as: inadequate in depth and length; difficult and dismissive; and with the

perception that health professionals do not agree with one's decision (10 of 22 studies)

- ❖ Parents were dissatisfied with their primary care provider consultation when they reported feeling prohibited from having free discussions, rushed, condescended to, or depersonalized.
- ❖ Effectiveness of brochures, face-to-face interventions, poster messaging, and a radio show is unclear

Tables 3 and 4 summarize the findings from the literature on the information parents need to make decisions about immunizations and the methods to deliver the information. Information needed (Table 3) and methods (Table 4) can be seen in the left columns. The effect of information-type on outcomes and Intervention effectiveness for specific outcomes (i.e. intention, uptake, or qualitative data) can be seen in the right column. The strength of the evidence (i.e. number of studies, significance) is indicated. The quality of literature is noted (e.g. poor (-), good (+), and very good (++)). P-values are provided for studies that report it.

Table 3. Information parents need to make an immunization decision

What information do parents need	Results and Effect Sizes
<p>Vaccine Safety and Side Effects Quantitative studies Brown 11 studies (-)</p>	<p><u>Uptake of immunization</u> Lower uptake was significantly linked to concerns about:</p> <ul style="list-style-type: none"> • General side effects and safety (p<.05 in 7 studies) • Risk for asthma, allergies, and autism • Safety of single vaccines, danger in immune overload (p<.05 in 2 studies) • Too many shots (p<.05 in 1 study) • Own and other’s experiences of vaccines and vaccine adverse events (p<.05 in 2 studies)
<p>NICE 11 studies (7-, 2+, 2++)</p>	<p><u>Uptake of immunization</u></p> <ul style="list-style-type: none"> • A range of perceived risks of immunization may influence some parents to delay or avoid immunizations <p>Lower uptake was significantly linked to:</p> <ul style="list-style-type: none"> • Fear of vaccines being contraindicated for existing medical conditions • Concerns about combined antigens on immune system
<p>Qualitative studies Brown 11 studies (-)</p>	<p>Parents had concerns with:</p> <ul style="list-style-type: none"> • Risk for asthma, allergies and autism • General safety fears about side effects or reactions • Overloading immature immune systems • MMR-autism link (belief that this link is small but significant and weighing autism against disease) • MMR more than other vaccines • Amount and scope of research (particularly around “developing immune system”) • Anomalous cases for which research cannot account or prepare
<p>Severity of Vaccine Preventable Diseases (VPDs) Quantitative studies Brown 6 studies (-)</p>	<p><u>Uptake of immunization</u> Lower uptake was significantly linked to:</p> <ul style="list-style-type: none"> • Lower perceived disease severity (p<.05 in 2 studies) • Lower perceived likelihood of catching VPDs (p<.05 in 2 studies).
<p>NICE 2 studies (-)</p>	<ul style="list-style-type: none"> • Parents of children with incomplete immunizations were less likely to see childhood diseases as being severe (1 study) • Immunization uptake was not significantly linked to parental beliefs about the incidence and severity of VPDs (1 study)

(-) poor quality
(+) good quality
(++) very good quality

What information do parents need	Results and Effect Sizes
<p>Severity of VPDs (cont...) Qualitative studies Brown 10 studies (-)</p>	<p>Parents had an inadequate understanding of contraindications, need, and purpose of MMR.</p>
<p>Gain-framed vs. loss-framed messaging Sadaf 2 studies (-)</p> <p>Gain-framed messaging is defined as health information stressing the potential benefit of performing behaviour (Fahy & Desmond, 2010)</p> <p>Loss-framed messaging emphasizes the possible costs of not performing a healthy behaviour (Fahy & Desmond, 2010)</p>	<p><u>Attitudes towards immunization</u> Not significantly linked to written positive-framed or loss-framed messages about HPV vaccination</p> <p><u>Intention to immunize</u></p> <ul style="list-style-type: none"> • Significantly linked to loss framing with Hispanics and African-Americans (p<.001) • No difference when gain-framed or loss-framed HPV messaging used with non-Hispanic White (p<.001)
<p>Vaccine Effectiveness Quantitative studies Brown 6 studies (-)</p>	<p><u>Uptake of immunization</u> Lower vaccine uptake was significantly linked to:</p> <ul style="list-style-type: none"> • Lower perceived vaccine effectiveness and importance (p<.05 in 3 studies) • Perceptions that vaccine research is vital but inadequate (p<.05 in 2 studies).
<p>Qualitative studies Brown 11 studies (-)</p>	<p>Parent's perceptions of vaccine efficacy/importance were underpinned by:</p> <ul style="list-style-type: none"> • Previous experience of vaccine failure • The limited duration of protection afforded by vaccines

(-) poor quality
(+) good quality
(++) very good quality

Table 4. Methods to deliver immunization information to parents

Interventions	Outcomes and Effect Sizes
<p style="text-align: center;">Brochures addressed: HPV, influenza, vaccine safety, general vaccine info, childhood vaccines</p> <p style="text-align: center;">Sadaf 13 studies (-)</p>	<p><u>Attitudes towards immunization</u> Significantly linked to (5 studies):</p> <ul style="list-style-type: none"> • Effectiveness of HPV vaccine against HPV infection and cervical cancer, (p<.001) • Vaccine information (p<.0001) • New vaccine pamphlet (p=.02) • CDC vaccine information sheet (p=.001) • Information on influenza immunization using school-based intervention, (p=.04) • Information on influenza immunizations using provider-based interventions, (p<.001) • Vaccine safety concerns <p>No difference with (4 studies):</p> <ul style="list-style-type: none"> • HPV information sheet • Education pamphlet on childhood vaccines • Mailed pamphlets with vaccine information statement and HPV information. <p>Negative immunization attitudes with (1 study):</p> <ul style="list-style-type: none"> • Mailed vaccine information pamphlet (p<.05) <p><u>Intention to immunize</u> Significantly linked to (3 studies):</p> <ul style="list-style-type: none"> • Factsheets about HPV and vaccine (p<.001) • Factsheet from CDC about HPV and vaccine (p=.0005) • Graphical HPV statistics (p<.01) <p>No difference with (1 study):</p> <ul style="list-style-type: none"> • HPV vaccine information with expanded messaging targeted to males
<p style="text-align: center;">Face-to-face types: single session or multisession with individual or groups of parents</p> <p style="text-align: center;">Kaufmann 7 studies (-) Sadaf 1 study (-)</p>	<p><u>Knowledge about immunizations</u> Significantly linked to (1 study):</p> <ul style="list-style-type: none"> • A PowerPoint presentation with group discussion (p<.0001) <p>No difference with (3 studies):</p> <ul style="list-style-type: none"> • Multi-sessions with individual parents, (MD 0.85, 95% CI: -0.06 to 1.76) and (MD 0.10, 95% CI:-0.11 to 0.31) • An 8-minute lecture delivered by a nurse compared with a 14-minute immunization video featuring the same nurse <p><u>Intention to immunize</u> Significantly linked to (1 study):</p> <ul style="list-style-type: none"> • A PowerPoint presentation with group discussion (p=.002)

(-) poor quality
(+) good quality
(++) very good quality

Interventions	Outcomes and Effect Sizes
<p>Face-to-face (cont...) types: single session or multisession with individual or groups of parents</p> <p>Kaufman 7 studies (-) Sadaf 1 study (-)</p>	<p><u>Uptake of immunization</u> Significantly linked to (2 studies):</p> <ul style="list-style-type: none"> • A single session with individual parents, (RR 1.18, 95%CI: 1.05 to 1.33) and (RR 1.54, 95% CI: 1.33 to 1.79) <p>Not significantly linked to (3 studies):</p> <ul style="list-style-type: none"> • Single sessions with individual parents, (RR 0.99, 95% CI: 0.92 to 1.07); (RR 1.02, 95% CI: 0.95 to 1.11); (RR 1.01, 95% CI: 0.94 to 1.08) • A 20 minute multi-session at birth and at 3 months with individual parents, (RR 1.01, 95% CI: 0.94 to 1.08) • Home visits by midwife to individual parent, (RR 0.67, 95%CI: 0.33 to 1.35)* <p>*Study reported it as a negative effect.</p>
<p>Multi-component addressed: working with parents through discussions, addressing questions about vaccines, and supporting parents to ask questions about immunizations through in-person meetings</p> <p>NICE 14 studies (6-, 3+, 5++) Sadaf 1 study (-)</p>	<p><u>Attitudes towards immunization</u> No difference with (1 study):</p> <ul style="list-style-type: none"> • Provision of balanced information • A group discussion • A coaching exercise supporting parents to ask questions <p><u>Intention to immunize</u> No difference with (1 study):</p> <ul style="list-style-type: none"> • Provision of balanced information • A group discussion • A coaching exercise supporting parents to ask questions <p><u>Uptake of immunization</u> Significantly linked to (14 studies):</p> <ul style="list-style-type: none"> • Tailoring info to population subgroups • Targeting children at risk for low immunization • Printed materials and in-person intervention
<p>Poster addressed: HPV vaccine for pre-teen boys</p> <p>Sadaf 1 study (-)</p>	<p><u>Attitudes towards immunization</u> Significantly linked with the use of poster messaging</p> <p><u>Intention to immunize</u> No difference with the use of poster messaging</p>
<p>Radionovela (Spanish Radio Show) addressed: HPV</p> <p>Sadaf 1 study (-)</p>	<p><u>Attitudes towards immunization</u> Significantly linked to the use of a Radio Show</p> <p><u>Intention to immunize</u> No difference with the use of a Radio Show</p>

(-) poor quality
(+) good quality
(++) very good quality

Interventions	Outcomes and Effect Sizes
<p>Web-based Decision Tool addressed: MMR</p> <p>Sadaf 1 study (-)</p>	<p><u>Attitudes towards immunization</u> Significantly linked to the use of a web-based decision tool (p<.0001)</p>
<p>Vaccine specific discussions with Healthcare professionals Quantitative studies Brown 10 studies (-)</p>	<p><u>Uptake of immunization</u> Lower uptake was significantly linked to:</p> <ul style="list-style-type: none"> • Perceptions that discussion with health professionals in primary care about immunization concerns was inadequate in length and depth, dismissive and difficult (p<.05 in 3 studies) • Health professionals not agreeing with one's decision (p<.05 in 1 study) <p>No difference in the uptake of immunization as:</p> <ul style="list-style-type: none"> • Both vaccine-acceptors and vaccine-decliners felt dissatisfied with their health professionals
<p>Qualitative studies Brown 12 studies (-)</p>	<ul style="list-style-type: none"> • Time pressure in primary care, feeling condescended to, being depersonalized by "the system" and unequal power relations prohibiting free discussion underpinned dissatisfaction with health professional consultations, regardless of uptake decision. • Some parents feared that vaccine refusal could negatively affect their relationship with their health professional, and viewed vaccine refusal as rebellion.

(-) poor quality
(+) good quality
(++) very good quality

11 Applicability and Transferability

PPH management and nursing staff working in VPD participated in a facilitated discussion about the feasibility and generalizability of the findings to Peel's population.

Applicability

Political Acceptability

Our political environment is supportive of changes to immunization interventions. Immunization is a topic well-understood by Regional Council. Awareness of the importance of vaccines has increased with recent outbreaks of childhood diseases (measles, pertussis, etc.).

Social Acceptability

In general, immunization initiatives are accepted by Peel's parents and stakeholders (i.e. schools, school boards, health care professionals, etc.). Messaging is likely to be of interest to parents who are vaccine-accepting and vaccine-hesitant, but not to those who oppose vaccines (i.e. anti-vaccine).

In order to target messages appropriately we need a better understanding of the population subgroups in Peel with low vaccine uptake (i.e. those with ISPA exemptions and those who do not consent to voluntary vaccinations). To avoid targeting population subgroups in a biased manner, we need to do this with sensitivity.

The popularity of learning sessions related to vaccine hesitancy (i.e. Public Health hospital rounds and educational events for health professionals) speaks to the support needed by health care providers to answer parent's questions about

immunizations. Peel physicians will welcome tools to help with conversations with parents around immunizations.

Parents are drawn to the internet because of easy access to available vaccine information and their desire to make good decisions on behalf of their children. Peel's parents are receptive to well-thought-out information based on evidence and sound rationale.

Available Essential Resources

The VPD staff of Peel Public Health have a good grasp of the technical information about immunization and the diseases they prevent. They have the skills and experience in producing written documents that include the information identified through this review as being needed by parents. Staff skill of adapting technical information to parents' learning needs in face-to-face conversations is developed through experience. A formal process may be needed to ensure all staff has the necessary support and skills to have confident conversations with parents about VPDs.

Peel physicians provide the majority of the childhood vaccines. As a result, many parents are having conversations with physicians that have an impact on immunization decision-making. Physicians have identified that having immunization-related conversations with parents can be difficult. A web-based decision tool may be helpful in assisting physicians with immunization conversations with parents, it would provide messaging to many parents, as well

as maximize the use of Public Health resources. The use or adaptation of an existing tool, if there is one, may be a good alternative.

Organizational Expertise and Capacity

If resources are developed for physicians, there is an opportunity to work with the Physician Outreach Specialist. Our continued work with 'Strength in Numbers' allows us to use our data to examine the impact of vaccine preventable diseases in Peel.

Transferability

The majority of the school population in Peel is immunized. There is no immediate risk for VPDs currently; however, more information is needed on the impact of Peel's exemption rates and non-vaccinators on health outcomes.

There were some differences in study populations particularly when they focused on specific sub-populations. Overall the differences do not limit the application of the findings in Peel; however, the findings do support the need to understand Peel's subpopulations.

In summary, the recommendations are transferable to staff and key stakeholders who provide immunization information to parents. We should explore populations with low immunization uptake, how to support physician's communications with parents, and staff capacity when communicating with parents.

Recommendations

1. The VPD program should continue to include messaging about vaccine safety, side effects, effectiveness, and severity of disease in communications for parents.
2. Gain a better understanding of populations with low immunization uptake.
3. Support health care professionals in their conversations/communications with parents about immunization.
4. Explore the feasibility of using web-based decision tools and evaluate their effectiveness.
5. When informing parents about immunizations, where possible, provide in-person meetings along with printed information to discuss, address questions, and support parents to ask questions.
6. Advocate for PHO/MOHLTC to develop communication tactics for the general public.
7. Monitor the literature around immunization messaging and re-run search every 1-2 years.

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3. Kaufman, J., Synnot, A., Ryan, R., Hill, S., Horey, D., Willis, N., Lin, V., & Robinson, P. (2013). Face to face interventions for informing or educating parents about early childhood vaccination. *Cochrane Database of Systematic Reviews*, 5. Art. No.: CD010038. DOI: 10.1002/14651858.CD010038.pub2.
4. National Institute for Health and Care Excellence (2009). Reducing differences in the uptake of immunisations, public health guidance 21. Downloaded from: <http://www.nice.org.uk/nicemedia/live/12247/45497/45497.pdf>.
5. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage report for school pupils 2011-12 school year. Toronto, ON: Queen's Printer for Ontario; 2013.
6. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage for Ontario's school-based programs: 2011-12 school year and exploring the impact of expanded eligibility programs on immunization coverage (2007-08 to 2010-11 school years). Toronto, ON: Queen's Printer for Ontario; 2013.
7. Sadaf, A., Richards, J. L., Glanz, J., Salmon, D. A., & Omer, S. B. (2013). A systematic review of interventions for reducing parental vaccine refusal and vaccine hesitancy. *Vaccine*, 31(40): 4293-4304.

Appendices

Appendix A: Conceptual Model

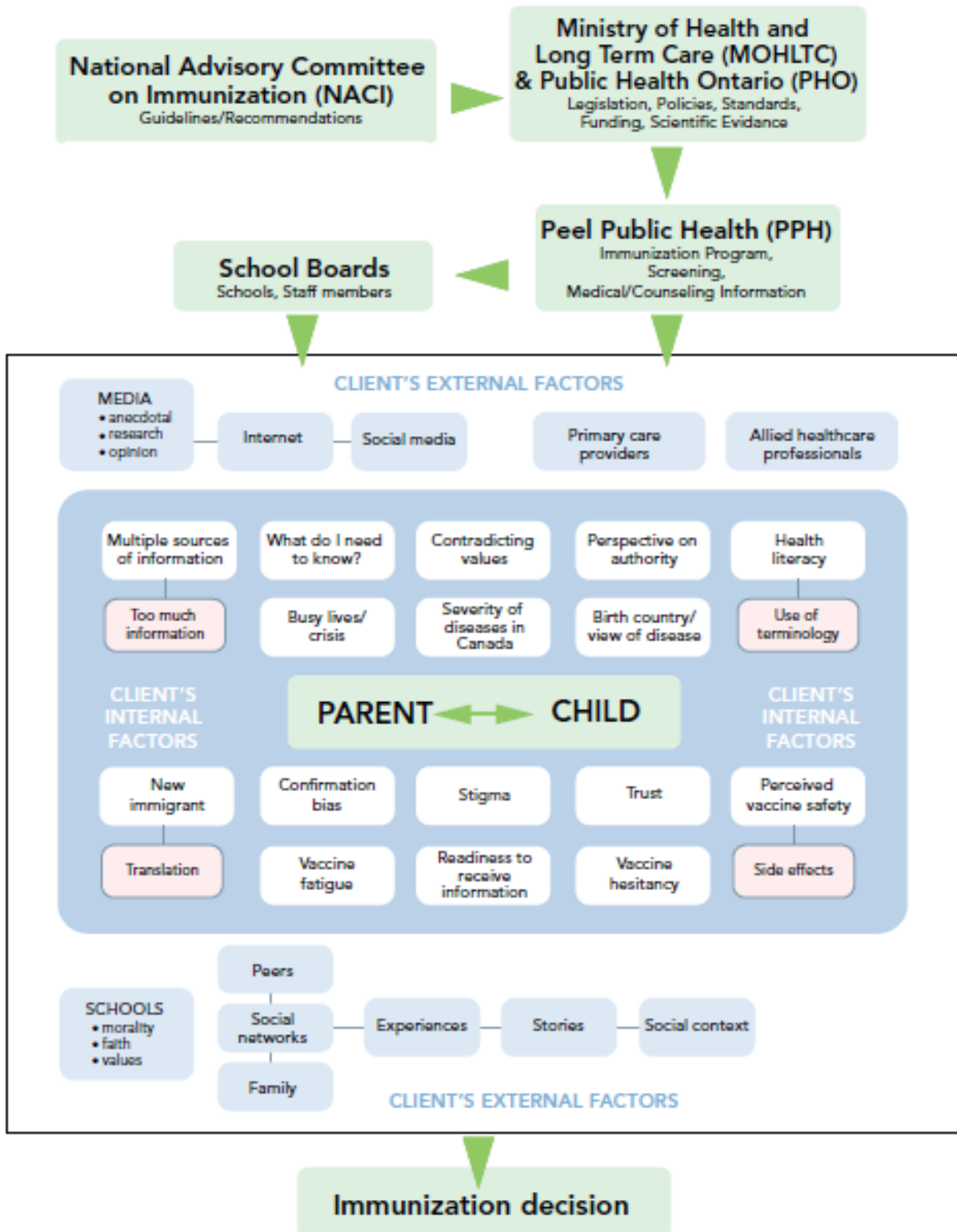
Appendix B: Search Strategy

Appendix C: Literature Search Flowchart

Appendix D: Data Extraction Tables

Appendix E: Applicability and Transferability Worksheet

Appendix A Conceptual Model



Appendix B Literature Search

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to May 2013>,

Global Health <1973 to 2013 Week 26>, Ovid MEDLINE(R) <1946 to July Week 1 2013>, Ovid

MEDLINE(R) In-Process & Other Non-Indexed Citations <July 10, 2013>, PsycINFO <2002 to

July Week 2 2013>

Search Strategy:

-
- 1 exp vaccination/ (96808)
 - 2 exp Vaccination/ (96808)
 - 3 exp Parents/ (122646)
 - 4 (parent* or guardian* or caregiver*).ti,ab. (470382)
 - 5 exp Immunization/ or exp Immunization Programs/ (193804)
 - 6 (immuniz* or immunis* or vaccinat*).ti,ab. (257759)
 - 7 school*.ti,ab. (363344)
 - 8 exp Adolescent/ or exp Child/ (2422347)
 - 9 1 or 2 or 5 or 6 (330853)
 - 10 3 or 4 (528211)
 - 11 7 or 8 (2670781)
 - 12 9 and 10 and 11 (4175)

- 13 ("research synthesis" or "realist synthesis").ti,ab. (618)
- 14 ("systematic review" or "integrative review" or "quantitative review" or "qualitative review").ti,ab. (60969)
- 15 meta-analysis.af. (264600)
- 16 meta analysis.af. (264600)
- 17 "meta analysis".af. (264600)
- 18 meta analysis.ti,ab. (67674)
- 19 meta-analysis.ti,ab. (67674)
- 20 13 or 14 or 18 (112174)
- 21 ("research synthesis" or "realist synthesis").af. (8152)
- 22 ("systematic review" or "integrative review" or "quantitative review" or "qualitative review").af. (171322)
- 23 15 or 17 or 21 or 22 (368906)
- 24 meta-analysis.mp,pt. (97908)
- 25 systematic review.tw. (63201)
- 26 cochrane database of systematic reviews.jn. (17902)
- 27 24 or 25 or 26 (142020)
- 28 exp guideline/ (41508)
- 29 (practice guideline or guideline).pt. (24667)

30 28 or 29 (41508)

31 27 or 30 (182621)

32 (comment or letter or editorial or note or erratum or short survey or news or newspaper
article or patient education handout or case report or historical article).pt. (1729421)

33 31 not 32 (176286)

34 23 or 33 (412953)

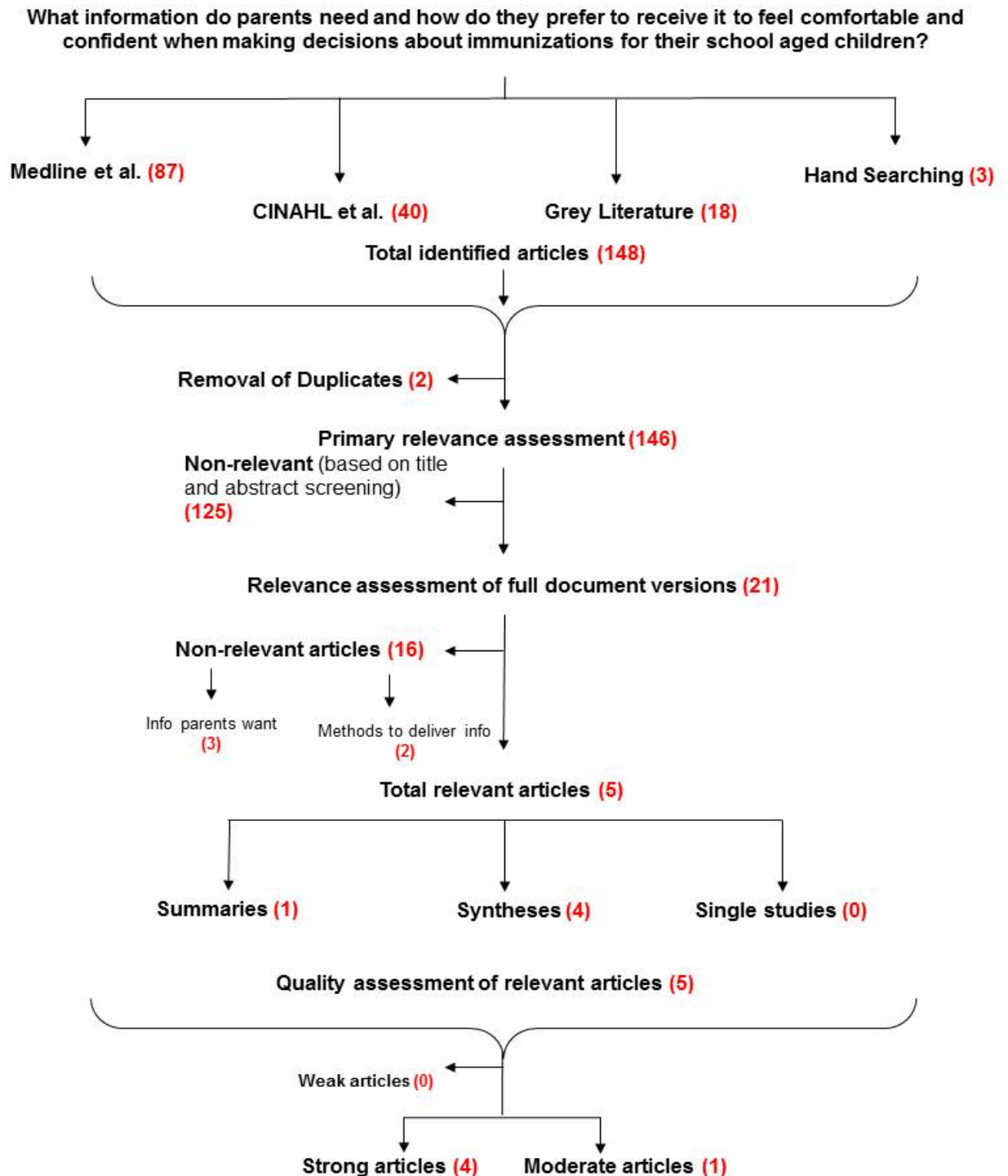
35 12 and 34 (115)

36 remove duplicates from 35 (100)

37 influenza.ti. (66600)

38 36 not 37 (86)

Appendix C Search Results FlowChart



Adapted from: healthevidence.org *Keeping Track of Search Results: A Flowchart.* [Retrieved January 13, 2010]
Version 2013 October

Appendix D Data Extraction Table

Items Reviewed	Factors underlying parental decisions about combination childhood vaccines including MMR: a systematic review
General Information & Quality Rating for Review	
Author(s) & Date	Brown, K. F., Kroll, J. S., Hudson, M. J., Ramsay, M., Green, J., Long, S. J., Vincent, C. A., Fraser, G., and Sevdalis, N. (2010)
Country	United Kingdom
Quality Rating	9/10 (Strong) using Health Evidence Tool
Objectives of Review	Examine the factors underlying parental vaccination decisions
Details of Review	
# of studies included	31 studies
Types of studies	Quantitative: questionnaires, face to face structured interviews, telephone interviews Qualitative: focus groups, individual interviews: semi-structured to structured individual interviews
Search Period	1987-2008
# of Databases Searched	3 databases: MedLine, PsychInfo, EMBASE
Inclusion & Exclusion Criteria	<p><i>Include::</i></p> <ul style="list-style-type: none"> • Routine childhood vaccinations • Vaccine uptake data and link to factors underlying uptake • Parent-reported barriers to uptake or parents' cognitive/emotional appraisal of vaccination • Data collected in a developed country (countries ranked 'high' or 'medium' in UN Human Development Index) • Combination vaccinations <p><i>No exclusion criteria noted.</i></p>
Details of Interventions	
Target Groups	Parents, policymakers, practitioners, and researchers
Primary outcomes	<ol style="list-style-type: none"> 1) Vaccine factors* 2) Information needs 3) Healthcare systems/Government* 4) Disease Factors*

	5) Parenting/Social Context 6) Practicalities 7) Demographics
Results of Review	
Main results of Review	<p>*Only the categories on vaccine factors, healthcare systems/government and disease factors were extracted as these addressed our question. Only <i>p values</i> provided in the review; <i>p values</i> noted where available.</p> <p><i>Vaccine factors</i></p> <ul style="list-style-type: none"> • Lower vaccine uptake (seen in comparison studies) was linked with: <ul style="list-style-type: none"> ○ General side effects/safety concerns (9 studies, $p < .05$ in 7 studies) ○ Lower perceived vaccine effectiveness and importance (6 studies, $p < .05$ in 3 studies) ○ Belief that vaccine causes autism (4 studies, $p < .05$ in 2 studies) ○ Own and other's experiences of vaccines and vaccine adverse events (3 studies, $p < .05$ in 2 studies) ○ Belief in safety of single vaccines (3 studies, $p < .05$ in 2 studies) ○ Belief in a danger of immune overload (3 studies, $p < .05$ in 2 studies) ○ Thinking about vaccine in advance of it being due (2 studies, $p < .05$ in both studies) ○ Belief that children receive too many shots (1 study, $p < .05$ in 1 study) • Qualitative studies reported: <ul style="list-style-type: none"> ○ Vaccine safety concerns including risk for asthma, allergies and autism ○ General safety fears were linked to experience of side effects or reactions (typically second or third hand negative experience) ○ Immune overload particularly for immature immune systems (single vaccines were considered safer than combined vaccines though parents were dissatisfied with information about and access to them) ○ MMR-autism link (belief that this link is small but significant and weighing autism against disease) ○ Perceptions of vaccine efficacy/importance were underpinned by previous experience of vaccine failure and the limited duration of protection afforded by vaccines ○ Parents demonstrated poor understanding of contraindications to, need for, and purpose of

	<p>MMR</p> <ul style="list-style-type: none"> ○ Parents discussed the peculiarity of MMR concerns in comparison with other vaccines <p><i>Healthcare system/government</i></p> <ul style="list-style-type: none"> ● Lower vaccine uptake (seen in comparison studies) was linked with: <ul style="list-style-type: none"> ○ Lower trust in healthcare system and/or government (5 studies, $p < .05$ in 3 studies) ○ Perception that discussion with health professionals about immunisations concerns was inadequate in length and depth, dismissive and difficult (4 studies, $p < .05$ in 3 studies) ○ Perception that vaccine research is vital but currently inadequate (2 studies, both $p < .05$) ○ Perception that health professionals do not agree with one's decision (3 studies, $p < .05$ in 1 study) ● 2 cohort studies found that the same amount of vaccine-acceptors and vaccine-decliners felt dissatisfied with their health professionals. ● Qualitative studies found: <ul style="list-style-type: none"> ○ Vaccine-acceptors and decliners raised concerns around the amount and scope of research (particularly around "developing immune system") and anomalous cases for which research cannot account or prepare. ○ Time pressure in primary care, feeling condescended to, being depersonalized by "the system" and unequal power relations prohibiting free discussion underpinned dissatisfaction with health professional consultations, regardless of uptake decision. ○ Some parents feared that vaccine refusal could negatively affect their relationship with their health professional, and viewed vaccine refusal as rebellion. <p><i>Disease Factors</i></p> <ul style="list-style-type: none"> ● Lower vaccine uptake (seen in comparison studies) was linked with: <ul style="list-style-type: none"> ○ Lower perceived disease severity (4 studies, $p < .05$ in 2 studies) ○ Lower perceived likelihood of catching vaccine-preventable disease (4 studies, $p < .05$ in 2 studies)
Comments/Limitations	<p>Low quality single studies No specific information given on type of information parents were dissatisfied with.</p>

Items Reviewed	A <i>systematic review</i> of interventions for reducing parental vaccine refusal and vaccine hesitancy
General Information & Quality Rating for Review	
Author(s) & Date	Sadaf, A., Richards, J. L., Glanz, J., Salmon, D. A., Omer, S. B. (2013)
Country	USA
Quality Rating	9/10 (Strong) using Health Evidence Tool
Objectives of Review	Assessing interventions to reduce parental vaccine refusal and hesitancy
Details of Review	
# of studies included	30 studies
Types of studies	Before and After (13), Randomized Control Trials (RCT)(3), Non-RCT (7) and evaluation studies (6).
Search Period	1990-2012
# of Databases Searched	4 databases: PubMed, Central, EMBASE, and PsychInfo
Inclusion & Exclusion Criteria	<p><i>Include:</i></p> <ul style="list-style-type: none"> • Interventional studies (natural or scientific) with outcomes that measured parental vaccine behavior, attitudes toward immunization, and/or intent to vaccinate were included. • Vaccine refusal behavior' was defined as either an act of refusing to vaccinate that was communicated by study participants or measured by nonmedical exemption rates. <p><i>Exclude:</i></p> <ul style="list-style-type: none"> • Non-intervention studies, reviews, historical articles, case reports, commentaries, clinical guidelines and recommendations were excluded.
Details of Interventions	
Description of Interventions	<ul style="list-style-type: none"> • State and school-level implementation of laws (5 studies) • Passage of state laws (4 studies) • Parent-centred immunization information or education (25 studies)* <ul style="list-style-type: none"> ○ Written educational information (brochures, pamphlets, posters). ○ "Radionovela" (Spanish radio show), PowerPoint presentation, and a web-based decision aid.
Target Group	The population in the studies were parents, school, and government
Outcome measures	
Primary outcomes	<p>A) Parents' attitudes toward immunization (15 studies)</p> <p>B) Parents' intention to vaccinate their children (10 studies)</p>

Results of Review

Main results of Review

*Only the parent centred immunization information or education intervention (25 studies) was extracted as this addressed our question.

Only *p values* provided in the review; *p values* noted where available.

A) Parents' attitudes toward immunization (15 studies)

8/15 studies found educational information had an effect on parents attitudes towards vaccination

- 5/8 were educational pamphlets:

- Effectiveness of HPV vaccine against HPV infection and cervical cancer (40 % undecided and 16% disagreed in pre-test became supportive of vaccine post test, $p < .001$)
- Vaccine information (post-test found that parents were twice as likely to want to immunize children, $p < .0001$).
- New vaccine pamphlet* versus standard CDC vaccine information statement (VIS) versus both pamphlets and VIS (mothers viewing the pamphlet alone ($p = .02$) or with VIS ($p = .001$. had increased confidence in vaccines).
- Information on influenza immunization using school-based intervention ($p = .04$) vs provider based ($p < .001$) vs. control (both increased from baseline. No difference in control compared to baseline).
- Pamphlet vaccine safety concerns (mothers responded more positively to questions supporting the safety and importance of vaccines compared to baseline).

- 1 was poster messages promoting HPV vaccine for pre-teen boys using motivational messaging.

- 1 was a culturally tailored intervention (radionovela - Spanish radio show) on HPV in a Hispanic rural population (significant increase in parental acceptance of the HPV vaccine).

- 1 was a web-based decision aid for parents in Australia and New Zealand (significant improvement in parents' attitudes towards MMR immunization, $p < .0001$).

1/15 studies had a negative effect (mailed vaccine information pamphlet)

- parents in intervention group were significantly less like to be comfortable with vaccines, $p < .05$

6/15 studies evaluating the impact of educational information had no effect on parents attitudes towards vaccination

- 4/6 were educational pamphlets:
 - HPV information sheet vs. baseline survey
 - Childhood immunizations
 - Two mailed pamphlets (vaccine information statement and HPV information)
- 1 was a multicomponent parent meeting vs MMR educational leaflet alone (increase in decisional conflict in both groups).
- 1 used written gain-framed vs. loss-framed message about HPV vaccination (no effect on attitudes about HPV vaccines, personal behavioural controls and normative beliefs).

B) Parents' intention to vaccinate their children (10 studies)

5/10 studies evaluating the impact of educational information were effective on parents intention to vaccinate their children.

- 2/5 were brochures:
 - Fact sheet HPV infection and vaccine (37% of opposed and 65% undecided parents supported vaccination after the intervention, $p < .001$).
 - Fact sheet from CDC about HPV and HPV vaccine (undecided parent's intentions increased at a significant level, $p = .0005$)
- 1 used graphical vs. non-graphical HPV statistics vs. no statistics (mothers' intention to vaccinate daughters for HPV were highest in the graphical group vs. other groups, $p < .01$).
- 1 was a PowerPoint presentation on HPV with group discussion (parents' vaccination intention increased significantly post-test, $p = .002$).
- 1 used gain-framed vs. loss-framed messages on HPV vaccine (both types of framing were equally effective in increasing vaccination intentions in non-Hispanic White ($p < .001$); intentions after loss framing were higher in Hispanic and African-American, $p < .001$).

5/10 studies evaluating the impact of educational information had no effect on parents intention to vaccinate their children.

- 1 tested written messaging about HPV vaccine vs. expanded message including information for males

	<ul style="list-style-type: none"> ○ 1 was a multicomponent parent meeting vs MMR educational leaflet alone (increase in decisional conflict in both groups). ○ 1 was a Spanish Radionovela on HPV ○ 1 was poster messages promoting HPV vaccines for pre-teen boys using motivational messaging (pre-test (61%) and post-test (23%) on intention to vaccinate sons). ○ 1 used written positive-framed vs. loss-framed messages about HPV vaccination
Comments/Limitations	<ul style="list-style-type: none"> ● Low quality single studies ● No content information provided about the new vaccine pamphlet* ● PowerPoint presentation also examined impact of educational information on knowledge with significant increase in HPV knowledge post-test, $p < .0001$ (not an outcome in main result of study)

Items Reviewed	Face to Face interventions for informing or educating parents about early childhood vaccination (Review)
General Information & Quality Rating for Review	
Author(s) & Date	Kaufman, J., Synnot, A., Ryan, R., Hill, S., Horey, D., Willis, N., Lin, V., & Robinson, P. (2013)
Country	Australia
Quality Rating	10/10 (strong) using Health Evidence Tool
Objectives of Review (of interest)	Effectiveness of face-to-face interventions for informing or educating parents about early childhood immunizations
Details of Review	
# of studies included	7 trials described in 8 papers (two papers reported different outcomes of the same trial)
Types of studies	6 Randomized control trials (RCT) and 1 cluster RCT
Search Period	Up to September 2012
# of Databases Searched	7 databases searched: CENTRAL, MEDLINE, EMBASE, CINAHL, PsychInfo, Global Health, Global Health Library Grey Literature: The Grey Literature Report, and OpenGrey Other Resources: Google Scholar, ISI Web of Science, The International Clinical Trials Registry Platform
Inclusion & Exclusion Criteria	Include: <ul style="list-style-type: none"> • Informing or educating about immunization Exclude: <ul style="list-style-type: none"> • If intervention omitted immunization but had an immunization-related outcome, author contacted for more information. If no response, studies excluded.
Details of Interventions	
Description of Interventions	<i>Face to face communication</i> directed to parents to inform or educate them about routine childhood immunization. Interventions included describe or communicate information about a feature of routine childhood vaccination with the purpose of changing knowledge, beliefs, attitudes, behaviour or self-efficacy. Type of content that may be covered includes information about: <ul style="list-style-type: none"> • Vaccine preventable diseases (eg symptoms, prevalence, transmission, severity) or

	<ul style="list-style-type: none"> • Vaccines (e.g. delivery method, dose, ingredients, schedule, risk or side effects, benefits) <p>Interventions included:</p> <ol style="list-style-type: none"> 1. Face to face interventions directed to individual parents versus control (6 studies) <ol style="list-style-type: none"> a. Single session given at child’s birth and immunization status measured at 3 months (2 studies) b. Multi-session (session given at child’s birth and immunization status measured at 3 months along with another session. Immunization status measured again at 6 months (4 studies) 2. Face to face intervention directed to groups of parents versus control (1 study)
Target Groups	<p><i>Children:</i></p> <ul style="list-style-type: none"> • Infants (less than 1 year) or preschool-aged children (1 -6 years). RCTs including school-aged children were only included if the main focus of the intervention was vaccines whose series begins in infancy or for preschool-aged children <p><i>Parents:</i></p> <ul style="list-style-type: none"> • Parents, guardians or others filling the parental role, alone or in groups, targeted to receive face to face information or education, and who have at least one child due or overdue for childhood vaccinations. • Participants may also be expectant parents, who are individuals or couples currently pregnant, considering adoption or otherwise expecting to become guardians of a child. <p><i>Vaccine Program Organizers:</i></p> <ul style="list-style-type: none"> • Anyone involved in the planning or implementation of immunization programs or interventions
Primary outcomes/Secondary outcomes	<p>Primary outcomes:</p> <ul style="list-style-type: none"> • Immunization status of child* • Parents knowledge or understanding of vaccination* <p>Secondary outcomes:</p> <ul style="list-style-type: none"> • Parents intention to vaccinate child • Parent’s experience of intervention (eg satisfaction, assessment of communication) • Cost of implementing intervention by vaccine program managers. <p>*For the purpose of this review, only information on face to face interventions and its effects on the</p>

	immunization status of a child and parent's knowledge or understanding of vaccination were extracted as these addressed our question.
Results of Review	
Main results of Review	<p>There are a limited number and low quality reviews to inform decisions about changing current practice related to face to face interventions to inform or educate parents about early childhood vaccinations.</p> <p><i>Single session face-to-face with individual parents on immunization status</i></p> <ul style="list-style-type: none"> • 2/3 studies found that this session increased uptake (RR 1.18, 95% CI: 1.05 to 1.33)(RR 1.54, 95% CI: 1.33 to 1.79) • 1 study found no effect. <p><i>Multi-session face-to-face with individual parents on immunization status</i></p> <ul style="list-style-type: none"> • 1 study found no effect on uptake of immunization (RR 0.67, 95% CI: 0.33 to 1.35) with 8 home visits by a midwife* (*Note: study reported it as a negative effect). • 1 study found no effect with 20 minute multi-topic sessions at birth and 3 months after birth (RR 1.01, 95% CI: 0.94 to 1.08). <p><i>Multi-session face-to-face with individual parents on knowledge or understanding of vaccination</i></p> <ul style="list-style-type: none"> • 2 studies saw no effect [(MD 0.85, 95% CI: -0.06 to 1.76); (MD 0.10, 95% CI: -0.11 to 0.31)] <p><i>Face-to-face interventions with groups of parents on understanding of vaccination</i></p> <ul style="list-style-type: none"> • 1 study found an uncertain effect (no mean score reported) with a 8 minute lecture delivered by a nurse compared with a 14-minute immunisation video featuring the same nurse, <p>No evidence available on the secondary outcomes of interest: parent intention to vaccinate, parent experience of the intervention, or adverse events</p>
Comments/Limitations	Low quality single studies

Items Reviewed	Reducing differences in the uptake of immunisations	
General Information & Quality Rating for Review		
Author(s) & Date	National Institute for Health and Clinical Excellence (NICE), 2009	
Country	United Kingdom	
Quality Rating (using Agree II tool)	Reviewer #1 (ATS) Overall assessment: 6/7 Scope & Purpose – 21/21 Stakeholder involvement –18/21 Rigour of development –50/56 Clarity of presentation –20/21 Applicability – 25/28 Editorial independence – 4/14 Recommended for use – Yes	Reviewer#2 (PW) Overall assessment: 6/7 Scope & Purpose – 19/21 Stakeholder involvement –18/21 Rigour of development –49/56 Clarity of presentation –18/21 Applicability –24/28 Editorial independence –5/14 Recommended for use – Yes
Objectives of Review	Focusing on increasing immunization uptake among groups and settings where coverage is low	
Details of Review		
# of studies included	142 (with 27 studies applicable to our question)	
Types of studies	Quantitative: RCTs, Non-RCTs, Controlled before and after studies, Cohort Studies, Interrupted Time Series, systematic reviews, meta-analyses, case-control studies, cross-sectional studies, and longitudinal studies/surveys. Qualitative: face to face and semi-structured interviews, focus groups, surveys, questionnaires, and secondary data [other studies, computer records].	
Search Period	1988 to March 31, 2008	
# of Databases Searched	14 databases: Medline, EMBASE, CINAHL, PsychInfo, Sociological Abstracts, Applied Social Science Index and Abstracts, ERIC, Cochrane Library (Cochrane Database of Systematic Reviews and the DARE), EPPI-Centre databases, Campbell Collaboration, Ecolit, Health Economics Evaluation Database, Health Technology Assessment, NHS Economic Evaluation Database Grey Literature: American Academy of Pediatrics, Canadian Coalition for Immunization Awareness and Promotion, Canadian Pediatric Society, Centers for Disease Control and Prevention, Department of Health, DIPEX-personal experiences of health and illness, European Centre for Disease	

	<p>Prevention and Control, Eurosurveillance, Evidence for social policy and practice co-ordinating centre, health evidence bulletin Wales, Health Protection Agency, Health Protection Scotland, Immunisation Advisory Centre, Immunise Australia, Intute (previously OMNI), National Centre for Immunisation Research and Surveillance, NHS Quality Improvement Scotland, NHS Wales, Public Health Organization of Canada, Scottish Intercollegiate Guidelines Network, Vaccine Education Center (Philadelphia Children’s Hospital), World Health Organization</p>
<p>Inclusion & Exclusion Criteria</p>	<p><i>Include:</i></p> <p><u>Population</u></p> <ul style="list-style-type: none"> • Individuals \leq 19 years • Parents/carers of Individuals \leq 19 years • Health professionals and practitioners who care for Individuals \leq 19 years <p><u>Interventions</u></p> <ul style="list-style-type: none"> • 1:1 or small group interventions, local systems, service delivery mechanisms, commissioning routes, partnerships and management strategies aiming to reduce differences in the uptake of immunizations and/or to improve access to immunisation services, particularly for children and young people with low immunisation rates <p><u>Comparators</u></p> <ul style="list-style-type: none"> • Interventions of interest with a no-intervention control or another intervention. <p><u>Outcomes</u></p> <p>Articles were eligible for inclusion if they reported any of the following primary outcomes:</p> <ul style="list-style-type: none"> • Increased or decreased rates of immunisation and differential impact across population subgroups • Increased or decreased rates of initiation and/or completion of the recommended immunisation schedule within the recommended timeframe • Impact of barriers on uptake of immunisations. <p>Other outcomes of interest included:</p> <ul style="list-style-type: none"> • Views and experiences of children, young people, parents/carers, health professionals and/or practitioners in relation to immunisation and interventions to reduce differences in the uptake of

	<p>immunisations</p> <p><i>Exclude:</i></p> <ul style="list-style-type: none"> • Not English, those published as abstracts only, and those which were not held by the British Library. <p>The following interventions were excluded:</p> <ul style="list-style-type: none"> • Individuals ≥ 19 yrs • National immunisation strategies, policies, priorities and targets • vaccination of young people <ul style="list-style-type: none"> • At occupational risk of infection • Travelling to countries with increased prevalence of infectious agents • Clinically at risk of infection with vaccine-preventable diseases as a result of underlying medical conditions • Increase uptake of single-antigen vaccines for measles, mumps and rubella.
Details of Interventions	
Description of Interventions	<ul style="list-style-type: none"> • Multicomponent Interventions [working with parents to ensure they understood the immunization schedule, reduced their misconceptions about vaccinations or encouraging them to be proactive and request immunizations from their providers] (20 studies) • Interventions specific for increasing uptake of MMR (6 studies) • Provision of Health Information/Education for families/communities (20 studies)
Target Groups	Children from birth to 19 years
Primary outcomes	Uptake of vaccinations
Results of Review	
Main results of Review	<p>Note: No p values or effect sizes provided.</p> <p><i>Quality Ratings</i> (strength of the evidence)</p> <p>++ All or most of the methodology checklist criteria have been fulfilled. Where they have not been fulfilled, the conclusions are thought very unlikely to alter.</p> <p>+ Some of the methodology checklist criteria have been fulfilled. Those criteria that have not been</p>

fulfilled or not adequately described are thought unlikely to alter the conclusions.
- Few or no methodology checklist criteria have been fulfilled. The conclusions of the study are thought likely or very likely to alter.

Tailored information to population subgroups increased vaccine uptake

- 3 studies (two [+] and one [-]) indicated a need to tailor immunization information to particular groups. Study population included Somali, Pakistani and African-Caribbean mothers.
- 2 studies ([-] and [++]) done with the orthodox Jewish community and health care workers found that the research participants felt 'cut off' from the media as a source of information and instead relied on sources of information within their social networks.

Multicomponent community-based interventions should be targeted

- 8 studies (four [+] and four [-]) found that multicomponent community-based interventions that target children at risk of low immunization uptake increased the number of children who were up-to-date with the recommended vaccination series or who received vaccinations (within 6 months to 1 year) compared with children who did not receive community-based outreach.

Mixed results with parental perception of severity of vaccine-preventable diseases and vaccine uptake

- 1 study [-] found that parents of children with incomplete immunisations were less likely to see childhood diseases as being severe.
- 1 study [-] found that there were few differences between the beliefs of parents who had and had not had their children immunised regarding incidence and severity of vaccine-preventable diseases.

Conceptions on the safety of vaccines affects vaccine uptake

- 3 studies (two [-] and one [++]) found that a range of perceived risks of immunization may influence some parental decisions to delay or avoid immunizations for their children.
- 1 study [-] found concerns around fear of vaccines being contraindicated for existing medical conditions

	<ul style="list-style-type: none">• 3 studies ([-], [+], [++]) found concerns about combined antigens putting too much stress on a baby's immune system• 4 studies (three [-], one [+]) found that when parents are making the decision to immunize their children, risks and benefits of immunizations are weighed by how a parent perceives them. <p><i>Type of vaccine information received impacts vaccine uptake</i></p> <ul style="list-style-type: none">• 1 study [+] in the UK found that parents were more likely to vaccinate their child if they received printed materials and an in-person intervention versus only printed materials. <p>Recommendations in the guideline include:</p> <ol style="list-style-type: none">1) Provide parents and young people with tailored information, advice and support to ensure they know about the recommended routine childhood vaccinations and the benefits and risks. This should include details on the infections they prevent. Information should be provided in different formats, for example, for those whose first language is not English.2) Ensure parents and young people have an opportunity to discuss any concerns they might have about immunisation. This could either be in person or by telephone and could involve a GP, community paediatrician, health visitor, school nurse or practice nurse.
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Appendix E Applicability and 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? 	<p>Yes.</p> <ul style="list-style-type: none"> • Council very supportive of CD interventions; many opportunities to present immunization information to them • Local MPs/government officials advocating for constituents may support vaccine info-focused on safety, side effects
	Will this program enhance the stature of the organization?	<p>Yes.</p> <ul style="list-style-type: none"> • Recommendations have a potential to increase our visibility within the community as a leader in the promotion of immunizations
	Will the public and target groups accept and support the intervention in its current format?	<p>Yes.</p> <ul style="list-style-type: none"> • We are not doing anything new; recommendations are more connected to evidence • Providing content and methods of communication that are based in evidence is likely to be accepted • Physicians often seek support for immunization topics

Factors	Questions	Notes
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"> • Population is generally accepting with receiving immunizations, partially because it is publically-funded and free • Who are our population sub-groups? Are they spread throughout the Region or isolated? • Physicians have identified that having the immunization conversation with parents can be difficult • Physicians (during Rounds) have requested tools to help with the conversation with parents around immunizations. • A web-based tool may be very useful to family doctors to help parents decide on immunizations • Unsure of how vaccine safety and side effect information would be received by anti-vaccinators • Language/tone needs to be different depending on audience (simple for some, access to research used for others) • Information in re: vaccines is available; do not suspect it negatively impacts non-target groups

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? 	<ul style="list-style-type: none"> • We don't have the capacity for 1:1 face-to-face with all parents • Physicians see parents 1:1 and give most of the ISPA vaccines • With respect to content, staff time is used every year to review communication, having a framework for making content decisions would not take significantly more staff time. • Training: <ul style="list-style-type: none"> ○ Staff comfort with talking about vaccine in re: safety, effectiveness, risk of disease ○ Gain comfort in communicating this information/having challenging conversations with parents
	<ul style="list-style-type: none"> ○ What is needed to tailor the intervention locally? 	<ul style="list-style-type: none"> • Use available tool (web-based decision tool) versus developing a new tool <ul style="list-style-type: none"> ○ Need to find out what's available (environmental scan) ○ Needs to be more multi-cultural ○ Diversity/equity issues with tools ○ Capacity of Communications & Information, Systems and Technology Services (ISTS) for

Factors	Questions	Notes
		<p>expansion of methods</p> <ul style="list-style-type: none"> • Additional training would be required to implement a web-based program • A formal process may need to be developed to ensure all staff have the necessary support and skills in having conversations with parents • Additional staff may be required for program implementation and evaluation
	<ul style="list-style-type: none"> • 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> 	<ul style="list-style-type: none"> • Cost <ul style="list-style-type: none"> ○ Training ○ Meetings ○ Collecting/analyzing results ○ Documentation ○ Accessibility strategies
	<ul style="list-style-type: none"> • <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"> • We don't have the capacity for 1:1 face-to-face meetings with all parents in Public Health • Physicians see parents 1:1 and give most of the ISPA vaccines • Developing a tool for physicians in re: immunization communication may reach more parents

Factors	Questions	Notes
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')? 	<p>Yes.</p> <ul style="list-style-type: none"> In-line with two infrastructure priorities (Evidence-Informed Decision-Making and internal/external communication)
	<ul style="list-style-type: none"> Does the intervention conform to existing legislation or regulations (either local or provincial)? 	<p>Yes.</p> <ul style="list-style-type: none"> It fits well with Ontario Public Health Standards and Protocols in the Vaccine Preventable Diseases mandate.
	<ul style="list-style-type: none"> 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? 	<ul style="list-style-type: none"> Numeracy in Practice and their work around quantifying a public health issue (i.e. Measles) with local data Community of Practice: subject matter experts and building confidence in talking with smart people and at the same time, keeping it simplistic for parents. Physician education efforts/Parent Strategy/Corporate Service Innovation Strategies/Nurturing the Next Generation
	<ul style="list-style-type: none"> Any organizational barriers/structural issues or approval processes to be addressed? 	<ul style="list-style-type: none"> Capacity of Communications & ISTS for expansion of methods

Factors	Questions	Notes
	<ul style="list-style-type: none"> • Is the organization motivated (learning organization)? <ul style="list-style-type: none"> ○ <i>Consider organizational capacity/readiness and internal supports for staff learning.</i> 	<p>Yes.</p> <ul style="list-style-type: none"> ○ Numeracy in Practice and their work around quantifying a public health issue (i.e. Measles) with local data • Community of Practice: subject matter experts and building confidence in talking with smart people and at the same time, keeping it simplistic for parents.

Factors	Questions	Notes
Transferability (generalizability)		
<p>Magnitude of health issue in local setting</p>	<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"> • Peel coverage is high for mandatory vaccines and similar to provincial rates • The majority of people are and appropriately immunized. Investigation needed on the baseline prevalence of the health issue locally <ul style="list-style-type: none"> ○ Numeracy in Practice workgroup has been doing work around quantifying a public health issue using local data • A 1-2% exemption rate annually will add up cumulative rate = total number of kids susceptible

Factors	Questions	Notes
		<p>(exemption, vaccine failure)</p> <ul style="list-style-type: none"> ○ Look at sub-population (exemption group) and what type of exemption? And its impact ○ Completing some estimates and epidemiological modeling
<p>Magnitude of the “reach” and cost effectiveness of the intervention above</p>	<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"> • CD call centre reaches those who are proactive and are seeking information, but not the ones who are not actively seeking us • Consent forms reach parents of grade 7 and 8 students who take the time to read and understand information about Menactra, Hep B and HPV specifically • Physicians are key stakeholders in reaching parents regarding immunizations in general. Parents listen to and trust their physicians. • Need more information to understand our sub populations
<p>Target population characteristics</p>	<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"> • Brown – UK – comparable in socio economic terms, but UK had bigger issues with MMR/autism • Sadaf – USA – comparable. Insured service + program for

Factors	Questions	Notes
	<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> 	<p>uninsured in place.</p> <ul style="list-style-type: none"> ● Kaufman – Australia – looked at younger children with some inclusion of school-aged if series began in infancy. ● NICE – UK – looked at younger children with some inclusion of school-aged if series began in infancy ● Would need more information on population sub-groups