

# **Communicating Urgent Environmental Health Risks: a rapid review of the evidence**

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## Key Messages

1. Advance preparation of a risk communication strategy is essential.
2. Factors influencing the public's response to risk communications include personal risk perception, previous experience with risk, sources of information, and trust in those sources.
3. To increase the effectiveness of communication tools, whenever possible, integrate an interactive component, creating a two-way dialogue between an organization and its public.
4. Use positive wording for actions, develop a short message at a Grade six comprehension level, and avoid technical jargon when crafting messages.
5. Use text and diagrams, rather than only text for print materials.
6. Use multiple communication vehicles rather than only one medium alone.

# **Executive Summary**

## **Research Question**

What are the essential components for communicating urgent environmental health risks?

## **Context**

Over the past five years, the Environmental Health Division (EHD) of Peel Public Health has responded to 38 situations requiring risk communication. These experiences necessitated an examination of how we communicate environmental health risks. In 2012, the EHD began drafting an Urgent Response Plan. The intention of this rapid review is to integrate the findings into the communications component of the EHD Urgent Response Plan.

## **Methods**

- A systematic literature search identified 179 articles related to the research question.
- Of these articles, 168 were deemed outside the scope of the research question, based on a screening by title and abstract.
- Of the 11 remaining potentially relevant articles, nine were assessed as not relevant, and the remaining two were independently assessed for quality by four reviewers.
- This rapid review is based on one systematic review that was quality assessed as strong, and one manual that was quality assessed as moderate.

### **Findings from the systematic review**

- Presenting risk information verbally (for example, in a presentation) is more effective than simply providing written materials. Print material that uses a combination of information types (such as text and diagrams) is a more effective communication tool than a single type, such as all text.
- Since no single approach works for all populations or for all environmental risk situations, using multiple communication vehicles is more effective than any single media approach.
- Factors influencing the public's response to risk communications are impacted by personal risk perception, previous experience with risk, sources of information and trust in those sources.

### **Recommendations**

- When developing risk communication plans, consider the factors which influence people's uptake of risk communication messages.
- Acknowledge that risk communication is required at all stages. Prepare in advance for environmental health situations which would require an urgent response (an example of being prepared would be to create a list of community contacts and media sources).
- Use multiple communication vehicles rather than only one medium alone.
- To increase the effectiveness of communication, whenever possible, integrate an interactive component, creating a two-way dialogue between Peel Public Health and the public.
- Use positive wording for actions, develop a short message at a Grade six comprehension level, and avoid technical jargon when crafting messages.
- Use text and diagrams, rather than only text for print materials.

## **Issue**

Within the past decade, the Environmental Health Division (EHD) of Peel Public Health has responded to numerous situations requiring effective risk communication. Exposure to hepatitis A, multiple outbreaks of food-borne illnesses, an investigation of exposure to a rabid puppy sold at a flea market and lead contamination in soil are some examples of situations faced by Peel Public Health. All required communicating to the public about the risks to health and the actions to take to mitigate the risks.

Being prepared to respond proactively to environmental health risks requires careful planning and an effective risk communication strategy. The newly drafted EHD Urgent Response Plan will assist the division in the execution of activities to effectively respond to and manage situations. This rapid review investigates the most effective methods for communicating urgent environmental health risks. Results of the review will be incorporated into the communications component of the Urgent Response Plan.

## **1 Context**

Over the last five years, the Environmental Health Division (EHD) has been involved in coordinating 38 responses to urgent situations or significant events. Each presented different types of public health risk. Our responses varied according to the risk, as did the impact on staffing and the communications support required. In managing the potential public health risks, we relied largely on existing internal guidelines, policies and procedures, as well as best practice to direct us. We utilized predetermined communication media and interventions to provide key

messages to the public. However, in two situations we worked with a consultant who provided expertise and guided us in the risk communication.

Urgent response within Health Services is currently supported by a departmental emergency plan. The departmental plan is supported by the Regional Emergency Plan. Following the Public Health response to the threat of H1N1 in 2009, the Communicable Disease Division (CDD) drafted a Communicable Disease specific Urgent Response Plan. In 2012, the EHD staff were assigned the task of creating a similar plan. The EHD decided to adopt the CDD Urgent Response Plan, adapting contents to address the specific requirements related to programs and issues faced by our division.

The resulting EHD Urgent Response Plan defines three levels of response and outlines the corresponding roles and responsibilities. Each response level is based on the degree to which the event exceeds normal business operations, hours and resources. Level one has the lowest impact and level three the highest. The divisional business continuity plan (a plan for maintaining capacity within critical programming) is a factor in scaling an urgent response from a level one to a level three. An event requiring a response greater than the EHD's resources is a level four response (such as H1N1, which happened in 2009) and therefore is governed by the Health Department's Emergency Response.

A retrospective look at 38 events that occurred over the last five years within the EHD revealed that the majority of them would have been categorized as level one or level two. In 2008 and 2009, we identified two situations where the event would be considered a level three. One

involved supporting an investigation surrounding numerous exposures to a rabid puppy. The other involved blood borne exposure for clients frequenting a tattoo operation that improperly sterilized equipment. Each level of response required corresponding and varying degrees of communications support. Effectively communicating key messages during these urgent responses was vital.

Using effective communication interventions is essential in helping the public understand the risk and motivating them to taking any action required to mitigate or manage the risk.

## **2 Conceptual Model**

A conceptual model (see Appendix A) was developed in consultation with Research and Policy Analysts, the Infection Prevention and Control Supervisor, a Communication Specialist and members of the Urgent Response Plan committee. The question in this rapid review focuses on communicating risks and the different methods used for sharing information during times when an urgent response is required. The model shows the issues to consider when choosing a communication method.

## **4 Literature Review Question**

The literature search question for this rapid review was: “What are the essential components for communicating urgent environmental health risks?”



The PICO question is:

Population – general public

Intervention – communicating urgent environmental health risks

Control – N/A

Outcome – enhanced knowledge, take actions and/or adjust or change behaviour

## **5 Literature Search**

The search strategy was developed based on the PICO question and in consultation with a Peel Public Health librarian and knowledge broker.

The databases searched (between 2002 to 2013) included Environment Complete, the Cochrane Library, Global Health, Medline and Health Evidence. A grey literature search was completed on the following websites: Evidence for Policy and Practice Information and Co-ordinating Centre, Guideline Advisory Committee, Health Canada, National Collaborating Centre for Environmental Health (NCCEH), National Guideline Clearinghouse, the World Health Organization, and the U.S. Centers for Disease Control and Prevention.

## **6 Relevance Assessment**

The inclusion criteria were:

- Language: English
- Country/location: Developed countries in North America, Europe & Australia
- Publication date: 2002 to 2013 (July 3)
- Age group: Adults
- Publication type: Synthesized evidence (systematic reviews, guidelines and textbooks)
- Subject matter: Environmental health risks that require an urgent response

## 7 Results of the Search

The search identified 179 articles (see Appendix C: Search Results Flowchart). Of the 179 articles, 168 were deemed non-relevant based on a screening by title and abstract. Of the 11 remaining potentially relevant articles, nine were not relevant:

- four due to document type (they were not systematic reviews)
- three due to population (one article concerned adults in both the U.S. and Asia; another concerned health care providers; and the third concerned communities in Bangladesh, India and Kenya)
- one due to outcomes (knowledge of stroke symptoms)
- one due to its publication date (California's Crisis and Emergency Risk Communications Toolkit was based on an earlier version of the CDC manual).

Two papers met the inclusion criteria and were critically appraised for quality: one systematic review and one manual.

## 8 Critical Appraisal

The four team members critically appraised the two papers. Disagreements were resolved by discussion.

The systematic review was appraised using the Quality Assessment Tool from Health Evidence. It was rated as strong, with a score of 10 out of 10.

Five chapters of the manual were appraised using the Agree II Tool. Team members rated the manual as moderate. Although it came from a credible source (the U.S. Centers for Disease Control and Prevention) which merited consideration to be included in this rapid review, the methodology was unavailable. Three attempts were made to contact the author for clarification. The author responded to some but not all the questions and therefore did not provide complete clarification about the methodology.

## **9 Description of Included Systematic Review and CDC Manual**

*Systematic Review:* Fitzpatrick-Lewis, Yost, Ciliska and Krishnaratne, 2010. Communication about environmental health risks: a systematic review.

This systematic review had two objectives:

1. To identify the effectiveness of communication strategies for environmental health risk.
2. To identify factors that impact communication uptake by the recipients.

The Fitzpatrick-Lewis et al (2010) systematic review included 24 studies, three of which were qualitative. The study designs for the 21 quantitative studies varied: 11 surveys, four controlled clinical trials, two randomized controlled trials, two interrupted time series, and two post-test designs (see Appendix D for the Data Extraction Chart).

Although this systematic review was rated as strong, the authors ranked all of the studies included in their systematic review as methodologically weak.

Fitzpatrick-Lewis et al grouped 16 studies into three broad intervention categories: mass media (seven studies), print materials (eight studies), and contact with experts (one study). They identified factors that influence the public's response to risk communications and outlined recommendations for risk communication plans.

**Manual:** Reynolds, Barbara and Seeger, Matthew, 2012. Crisis and Emergency Risk Communication (CERC). The U.S. Centers for Disease Control and Prevention.

The CDC manual presents the principles and practical tools of crisis and emergency risk communication based on their agency's experience. The 2012 edition updated and, in some cases, expanded the CDC manual originally published in 2002 (see Appendix E for the Data Extraction Chart). The target audience is health, emergency management and government professionals.

The CDC manual covers a wide range of topics (such as the spokesperson, working with the media, social media, etc) in 13 chapters. Five chapters are relevant to this rapid review.

- **Chapter 3: Messages and Audiences** covers message length, comprehension level, wording, etc.
- **Chapter 4: Crisis Communication Plans** lists the minimum elements that should be part of any communication plan (see Appendix F). Five checklists are also included, with one listing actions to take during the first 48 hours after verification of a public health emergency (Appendix G).

- **Chapter 7: Stakeholder and Partner Communication** covers identifying and building positive relationships with your stakeholders and community partners pre-event, as well as having a contact list prepared before an event occurs.
- **Chapter 8: Other Communication Channels** describes the benefits and limitations for various communication tools.
- **Chapter 9: CERC, Social Media, and Mobile Media Devices** provides an overview of social media.

## **10 Findings of the systematic review**

The systematic review reported primary research while the CDC manual is a how-to guide for communicating health risks. The two papers differ in their objectives and in methodology. Therefore, a narrative synthesis of findings is presented in the Summary of Findings Table below.

**Summary of Findings Table:** effective communication from the CDC manual and the systematic review:

<b>Intervention</b>	<b>CDC Manual</b>	<b>Systematic review</b>
Briefings	<ul style="list-style-type: none"> <li>• Allow for the exchange of information and concerns.</li> <li>• Allow stakeholders (officials, the media and community leaders) to ask questions before the public release of information.</li> </ul>	
Print materials flyers newsletters	<ul style="list-style-type: none"> <li>• Summarize key facts.</li> <li>• Ensure that technical information is easy to understand.</li> <li>• Always include contact information.</li> </ul>	<ul style="list-style-type: none"> <li>• Print material using a combination of information types (for example, text and diagrams) is a more effective communication tool than just a single type, such as all text.</li> </ul>
Community mailings	<ul style="list-style-type: none"> <li>• Allow for coverage of a specific area, such as every household in a certain postal code.</li> </ul>	
Mass media campaign		<ul style="list-style-type: none"> <li>• Using multiple communication vehicles is more effective than any one medium alone.</li> </ul>
Exhibits	<ul style="list-style-type: none"> <li>• Place in a highly visible location.</li> <li>• Staff the exhibit.</li> </ul>	
Contact with experts during workshops		<ul style="list-style-type: none"> <li>• Participants had a decrease in perceived societal support and increase in perceptions of personal control.</li> </ul>
Open houses	<ul style="list-style-type: none"> <li>• Extra staff time is required.</li> <li>• Creates an image of accessibility and transparency.</li> </ul>	
Presentations	<ul style="list-style-type: none"> <li>• Ensure that staff have presentation skills.</li> <li>• Presentation tips: dress for success; be prepared; keep the target audience in mind; start the presentation well (for example, choose the right opening), use supporting visual aids, convey appropriate emotions.</li> </ul>	<ul style="list-style-type: none"> <li>• Presenting risk information verbally (for example, a presentation) is more effective than simply providing written materials.</li> </ul>
Public meetings	<ul style="list-style-type: none"> <li>• Staff must skillfully manage discussions.</li> </ul>	
Small group meetings	<ul style="list-style-type: none"> <li>• Invite a cross section of community representatives to each meeting.</li> <li>• Keep a written, audio or video record.</li> </ul>	
Social media	<ul style="list-style-type: none"> <li>• Update your information to keep it current and dispel rumours.</li> <li>• Before a crisis, ensure that social media is part of your organization's risk and crisis management policy.</li> <li>• Ensure that public health communicators understand social media (for example, by staying informed about new platforms and being aware of who is using what types of social media regarding the crisis).</li> </ul>	

<p>Messaging (general)</p>	<ul style="list-style-type: none"> <li>• A good reputation, a track record of effective response and a history of responsible conduct will build goodwill for your organization, making your organization more credible and help ensure that your messages are positively received.</li> <li>• Understand the needs, cultural background, community history, location and values of your audience.</li> <li>• Develop a short message at a grade six comprehension level.</li> <li>• Use positive wording for actions rather than negative wording.</li> <li>• Repeat the message.</li> <li>• Create action steps in threes or fours, or create an acronym.</li> <li>• Use personal pronouns for your organization.</li> <li>• Avoid technical jargon.</li> <li>• Promise or guarantee only what can actually be delivered.</li> <li>• Avoid speculation (for example, a worst case scenario).</li> <li>• Do not use humour, nor discuss money or liability.</li> <li>• Be aware of the cultural diversity of your population.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure communication comes from a trusted source.</li> <li>• Tailor communication for the audience.</li> <li>• Build the content of messages with the strongest scientific evidence available.</li> <li>• Deliver audible warning signals on an assigned schedule for rare events.</li> </ul>
<p>Medium (general)</p>	<ul style="list-style-type: none"> <li>• Have stakeholders and partners come together as an advisory group or task force.</li> <li>• Select the appropriate medium in order to reach your target audiences.</li> <li>• The medium should be chosen based on its strength (for example, newspapers are good for reporting details whereas TV delivers information quickly and can include visuals), availability, your audience's preference and how your organization wishes to provide information.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop communication strategies with the awareness that people make choices based on personal past experience with disasters.</li> <li>• Incorporate an opportunity for the public to have their questions and concerns addressed.</li> <li>• Try not using automated phone call-in systems as a proxy for human interaction; but if they are used, ensure they are easily accessible.</li> </ul>

### **10.1 Findings for effective interventions (systematic review only)**

The primary research was not structured to give effect size in every case.

#### *Mass media*

No single approach works for all populations or for all environmental risk situations; using multiple communication vehicles is more effective than any one medium alone.

The seven studies about mass media included public service announcements, a press kit, television, print and billboard ads, newspapers, radio, a website, and an automated phone message. The range of samples in these studies included: labourers over the age of 50, a representative sample of the Dutch population (as determined by age and gender), individuals in urban and rural households with listed phone numbers, random groupings, and residents. In one study, those who had seen TV commercials, billboards and read ads resulted in separate disposal of small chemical waste ( $p < 0.001$ ) and increased knowledge ( $p < 0.03$ ).

#### *Print materials*

Presenting risk information verbally (for example, in a presentation) is more effective than simply providing written materials. Having a person on hand provides an opportunity for people to ask questions and deepen their understanding of the issue(s). Also, print material that uses a combination of information types (such as text and diagrams) is a more effective communication tool than a single type, such as all text.

The seven studies on print materials included brochures, fact sheets, and a letter and card. The study samples included women of various ages, pregnant women and other women of childbearing age, licensed fishermen, adults (mostly male), homeowners and residents living near controversial industries (one study did not give details of its sample). One sample who read



brochures reported changes in knowledge about a new hazardous technology ( $p < 0.001$ ). For the pregnant women and women of child-bearing age who attended a classroom presentation (about the risks of eating contaminated fish), they provided the correct answers more often ( $p < 0.001$ ) than those who read a brochure. Licensed fishermen received four different types of fact sheets about eating contaminated Great Lakes sportsfish. The households of concern (women of childbearing age and anglers living with children under the age of 15) were more likely to choose a text-diagram combination ( $p < 0.01$ ) and a quantitative comparative risk ladder ( $p < 0.05$ ).

#### *Contact with experts*

Participants (candidates who had unsuccessfully run to be the general administrator of the local water board) who attended workshops with experts on flood risk showed statistically significant changes ( $p \leq 0.05$ ) from pre- to post-test for two perceptions (perceived societal support and personal control).

## **10.2 Factors influencing the public's response to risk communications**

Factors influencing the public's response to risk communications include personal risk perception, previous experience with risk, sources of information, and trust in those sources.

#### *Personal risk perception*

In one study, a large proportion (19-33%) of survey respondents in Texas, Mississippi and Alabama would not evacuate for a hurricane or a flood if told to do so by a government official because they thought they would be safe at home (73-79%), the hurricane and its aftermath would not be too bad (42-51%) and they would need to protect property (20-31%). In a second

study, Californian homeowners who read the high probability information on earthquake preparedness showed greater preparedness behaviour ( $p=0.04$ ). In another study concerning risk information about influenza and the need for vaccination, participants given information in a relative format (with vaccination, the risk of being affected is reduced by 50%) versus an absolute format (the risk of being affected is 5% lower) were more likely ( $p<0.01$ ) to indicate they would get vaccinated, but only if they were not informed of the baseline information.

### *Personal experience with risk*

Personal experience with risk affects people's response. One study explored public response to risk information about an on-going emergency (earthquake aftershocks). Those who experienced more damage were more likely to take protective action.

### *Sources of information, and trust in those sources*

People pay more attention to information when it comes from credible sources. Two studies concerned sources of information, one of which was a qualitative study that determined the main source of information about an anthrax threat was television, newspapers and the CDC. The second study reported that people were more likely ( $p<0.01$ ) to evacuate because of a hurricane threat if they viewed public officials' advice as an important source of information and had seen more visual images of hurricane damage in the past.

Three qualitative studies considered how trust in sources of information can affect risk communication. In one study which focused on an evacuation order for Hurricane Katrina and issues of trust related to those orders, participants (who had received evacuation orders due to

Katrina) believed that authorities did not have their best interests in mind, which affected their trust in the authorities and their reaction to the risk communication messages. In a second study which sought to determine the role of the media in a community's coping strategy living in areas of Puerto Rico that had been recently affected by Hurricane Georges, participants stated that the Internet, television or radio were their preferred medium. Also, many participants were more motivated to use the media for emotional support, companionship and community ties than for updates on the hurricane. The last study which examined risk communication strategies related to the anthrax threat in Washington D.C., many postal workers did not trust the higher authorities, from which risk communication was disseminated, believing that authorities were too slow to evacuate the post office and to initiate nasal swab testing.

### **10.3 Recommendations for risk communication plans**

The systematic review offered the following recommendations for risk communication plans:

- Ensure communication comes from a trusted source.
- Tailor communication for the audience.
- Build the content of messages with the strongest scientific evidence available.
- Include visuals (such as pictures and diagrams) in print materials.
- Disseminate information through multiple sources.
- Deliver audible warning signals on an assigned schedule for rare events.
- Develop communication strategies with the awareness that people make choices based on personal past experience with disasters.

- Incorporate an opportunity for the public to have their questions and concerns addressed.
- Try not using automated phone call-in systems as a proxy for human interaction; but if they are used, ensure they are easily accessible.

## **11 Applicability and Transferability**

Staff from the Environmental Health Division and Corporate Communications involved in developing either the urgent response plan and/or risk communication materials met on November 6, 2013 to discuss the applicability and transferability of the results presented in this rapid review.

### **Applicability**

#### *Political acceptability or leverage*

- Both the public and Council expect that Peel Public Health put effort into risk communication planning. Regional councillors are connected to their neighbourhood and would appreciate the work that we would do concerning risk communication. The public would benefit by us enhancing our approach too.

#### *Social acceptability*

- Any attempt to address the needs of the public is a positive step.
- A needs assessment is needed to gain a better understanding of the multicultural community of Peel and to investigate what multicultural communication vehicles currently exist in Peel.
- Another way to analyze a community is through people's life stage (such as parents of newborns vs. single people) and age.

### *Available essential services*

- A risk communications strategy and tools needs to be developed. A very important part of this work is the pre-planning phase. The EHD will need to assign staff to this project and determine time lines, and work with Corporate Communications as well.
- Need to integrate risk communications into the EHD Urgent Response Plan.
- Must determine which social media tools are available for EHD's use and then decide if staff need training.

### *Organizational expertise and capacity*

- This rapid review relates to three infrastructure priorities from Peel Public Health's strategic plan: 1) making evidence-informed decisions; 2) enhancing external/internal communications; and 3) serving an ethno-culturally diverse community.
- Risk communication is a requirement under the Ontario Public Health Standards and should be part of preparedness, response and recovery.
- Investigate the capacity of Peel's design staff to integrate diagrams into existing and future print materials.

## **Transferability**

### *Magnitude of health issue in local setting*

- Environmental health situations requiring an urgent response will continually occur (the question is when, what issue and who will be affected).

### *Magnitude of reach and cost effectiveness of interventions*

- We need to know this before we can invest in communications, and to understand our communication channels and their reach.

### *Target population characteristics*

- Need to factor in detailed planning to deliver urgent/emergent risk communication messages to diverse communities, even though there was little guidance about diverse communities in this rapid review.
- Need to identify major ethnic communities in Peel (including contact information) as part of the larger communication strategy.

## **12 Recommendations**

It is recommended that Peel Public Health:

- When developing risk communication plans, consider the factors which influence people's uptake of risk communication messages, such as people making choices based on their personal past experience with a particular environmental health issue.
- Acknowledge that risk communication is required at all stages: preparation before an environmental health event requiring an urgent response, during and after an event (an example of being prepared would be to create a list of community contacts and media sources).
- Incorporate an evaluation component into the risk communication planning process.
- Establish a framework for risk communications and integrate a risk communication strategy into the EHD Urgent Response Plan.
- Use multiple communication vehicles rather than only one medium alone.
- To increase the effectiveness of communication, whenever possible, integrate an

interactive component, creating a two-way dialogue between Peel Public Health and the public.

- Explore the use of social media channels as an option for risk communication.
- Use positive wording for actions, develop a short message at a Grade six comprehension level, and avoid technical jargon when crafting messages.
- Use text and diagrams, rather than only text for print materials. Review existing materials to determine if/how diagrams can be integrated into the documents. Consult with the Region's design team to work with the EHD.

## References

Burger et al. 2003. Evaluating risk communication about fish consumption advisories: efficacy of a brochure versus a classroom lesson in Spanish and English. *Risk Analysis*, 23:791-803, as noted in Fitzpatrick-Lewis et al.

Fitzpatrick-Lewis, Yost, Ciliska and Krishnaratne. 2010. Communication about environmental health risks: a systematic review. *Environmental Health*, 9:67.

Glik, Deborah. 2007. Risk Communication for Public Health Emergencies. *Annual Review of Public Health*, 28:33-54.

Mulilis, J.P and Lippa, R. 1990. Behavioral change in earthquake preparedness due to negative threat appeals; a test of protection motivation theory. *Journal of Applied Social Psychology*. 20/8: 619-638, as noted in Fitzpatrick-Lewis et al.

Reynolds, Barbara and Seeger, Matthew. 2012. Crisis and Emergency Risk Communication (CERC). The U.S. Centers for Disease Control and Prevention.

Reynolds, Barbara & Seeger, Matthew. 2005. Crisis and Emergency Risk Communication as an Integrative Model. *Journal of Health Communication*, 10:43-55.



## **Appendices**

**Appendix A: Conceptual Model**

**Appendix B: Search Strategy**

**Appendix C: Search Results Flowchart**

**Appendix D: Data Extraction Chart for the Systematic Review**

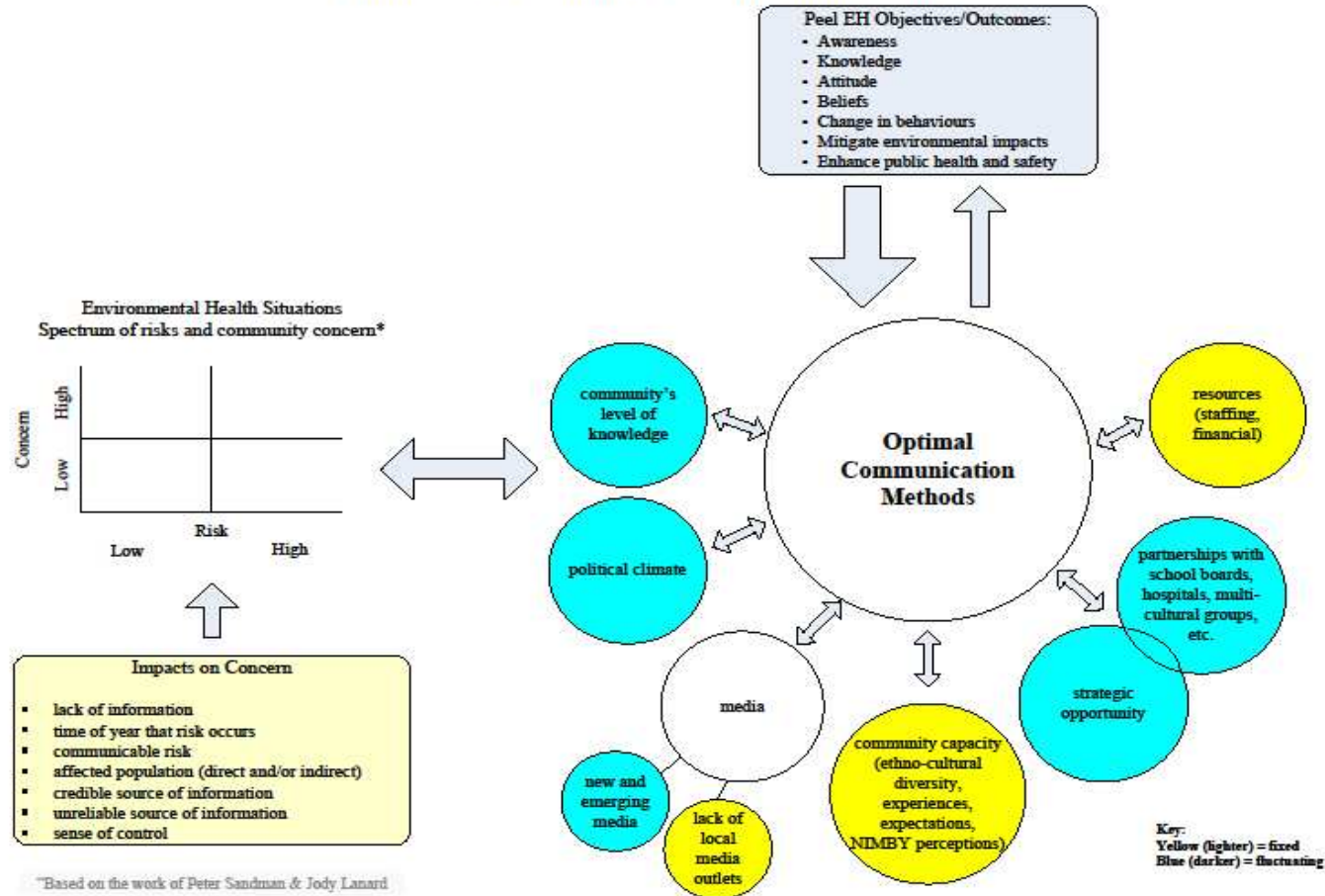
**Appendix E: Data Extraction Chart for the CDC Manual**

**Appendix F: Nine Steps for Success**

**Appendix G: Checklist for the First 48 Hours**

# Appendix A: Conceptual Model

**Conceptual Model:  
Influences Upon Communicating Environmental Health Risks**



## Appendix B: Search Strategy

### Search Terms

Effectiveness/lessons learned	Methods	Risk	Communication	Public
effective* best practice* lesson*	method* strateg* tool* model* guideline* message* framework* plan*	risk* threat* hazard* outbreak* emergen* urgen*	communication mass media info dissemination communicat*/ti,ab	public* population* communit* consumer* stakeholder *

### Search Strategy

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to May 2013>, Global Health <1973 to 2013 Week 25>, Ovid MEDLINE(R) <1946 to June Week 3 2013>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <July 02, 2013>

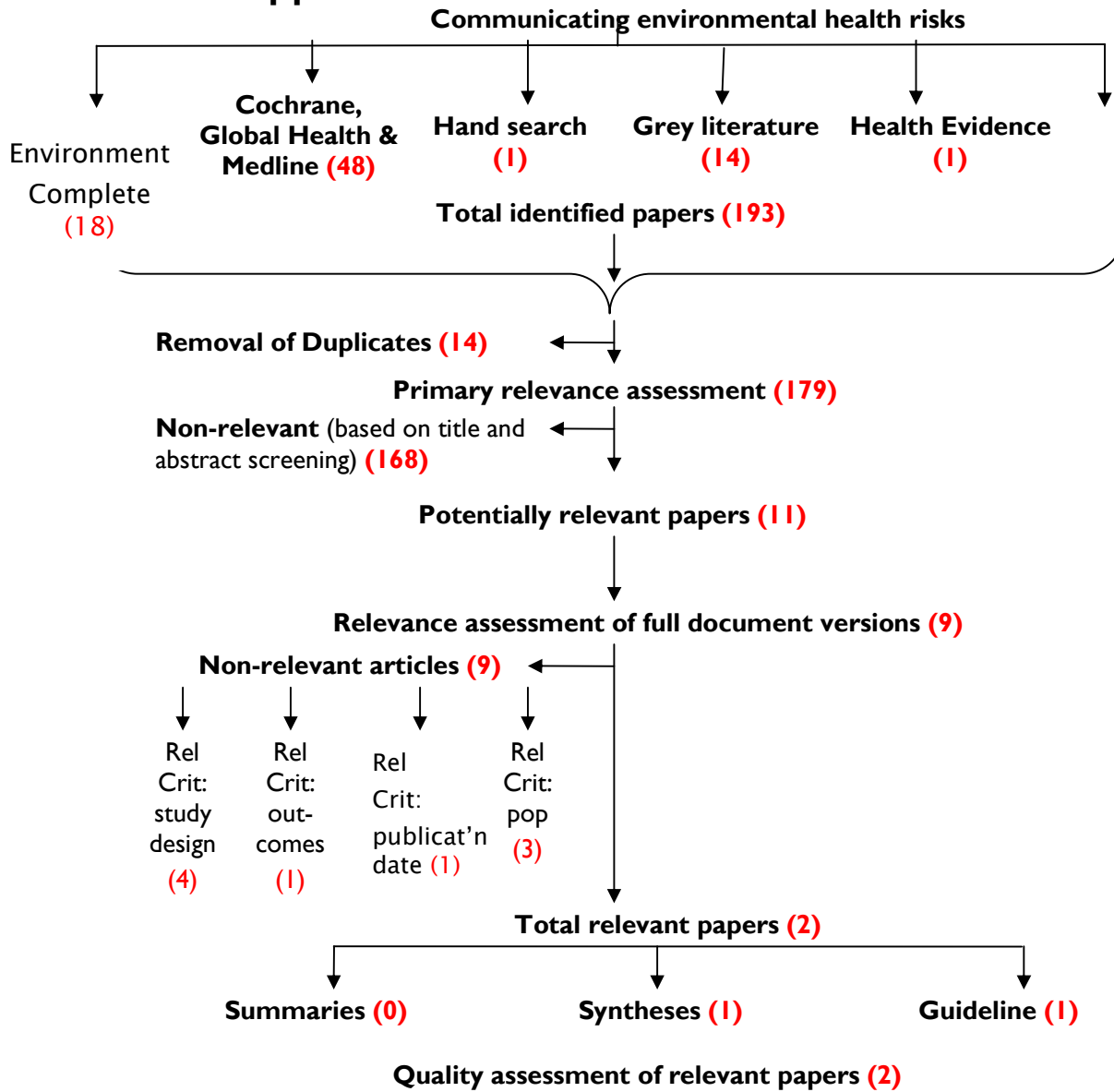
Search Strategy:

- 
- 1 exp Emergencies/ (35895)
  - 2 (emergen\* or urgen\*).ti,ab. (323946)
  - 3 communication/ (62133)
  - 4 mass media/ (10585)
  - 5 information dissemination/ (10722)
  - 6 exp Health Communication/ (438)
  - 7 communicat\*.ti,ab. (183533)
  - 8 3 or 4 or 5 or 6 or 7 (235581)
  - 9 health promotion/ (63076)
  - 10 (patient\* or chronic disease\*).ti,ab. (4881948)
  - 11 9 or 10 (4937901)
  - 12 meta-analysis.mp,pt. (85725)
  - 13 systematic review.tw. (54006)
  - 14 cochrane database of systematic reviews.jn. (17669)
  - 15 12 or 13 or 14 (122780)
  - 16 exp guideline/ (41101)
  - 17 (practice guideline or guideline).pt. (24295)

- 18 16 or 17 (41101)
- 19 15 or 18 (163001)
- 20 (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. (1708785)
- 21 19 not 20 (156803)
- 22 (effective\$ or evidence or best practice\* or lesson\*).ti,ab. (2484095)
- 23 (method\$ or strateg\$ or tool\$ or model\$ or guideline\$ or framework\$ or plan\$).ti,ab. (6712250)
- 24 (risk\$ or threat\$ or hazard\$ or outbreak\$).ti,ab. (1790288)
- 25 (public\$ or population\$ or communit\$ or consumer\$ or stakeholder\$).ti,ab. (1952223)
- 26 8 and 22 and 23 and 24 and 25 (2910)
- 27 21 and 26 (265)
- 28 27 not 11 (125)
- 29 limit 28 to yr="2010 -Current" (79)
- 30 1 or 2 or 24 (2056894)
- 31 8 and 22 and 23 and 25 and 30 (3424)
- 32 21 and 31 (303)
- 33 limit 32 to yr="2002 -Current" (281)
- 34 remove duplicates from 33 (244)
- 35 34 not 11 (116)

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## Appendix C: Search Results Flowchart



## Appendix D: Data Extraction Chart for the Systematic Review

Items Reviewed	Review #1 (Fitzpatrick-Lewis et al, 2010) <b>Communication about Environmental Health Risks: a systematic review. <i>Environmental Health. 9:67</i></b>
1. Author(s) and Date	Donna Fitzpatrick-Lewis, Jennifer Yost, Donna Ciliska, Shari Krishnaratne, 2010
2. Country	Canada
3. Quality Rating	High (10/10)
4. Objectives of Review	1. To identify the effectiveness of communication strategies for environmental health risk. 2. To identify factors that impact communication uptake.
5. Number of primary studies	24
6. Types of Studies	21 quantitative studies (randomized controlled trials, cohort studies and interrupted time series) and 3 qualitative studies
7. Search Period	Date of journal inception to November 2009
8. Number of databases searched	11 (MEDLINE, Pre-MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, PsycINFO, Effective Public Health Practice Project Database, Sociological Abstracts, Applied Social Sciences Index, CSA Worldwide Political Science Abstracts, Web of Science, Science direct) -also conducted hand searching and grey literature search
9. Inclusion and Exclusion Criteria	<u>Inclusion:</u> Primary study design, public as participants, community-based interventions, reported measurable outcomes <u>Exclusion:</u> -disease transmission, chronic diseases, terrorism, substance use, crime, obesity, pharmacological, accidents, disease related diagnostic risk communication
10. Description of interventions	Print materials, media approaches, contact with experts (during workshops)
11. Intervention settings	Various: households in the States, four cities in the Netherlands, one Canadian city, county-wide
12. Theoretical frameworks	Used in only three studies (Protection Motivation Theory, Theory of Planned Behaviour, Social Cognitive Theory)

Items Reviewed	Review #1 (Fitzpatrick-Lewis et al, 2010)
13. Target groups	Adults
14. Primary Outcomes	Awareness, knowledge or attitudinal or behavioural change
15. Meta-analysis conducted?	No
16. Main Results of Review	<p data-bbox="683 347 853 379"><u>Key Findings</u></p> <ol data-bbox="683 384 1910 596" style="list-style-type: none"> <li>1. A multi-media approach (for example, using multiple communication vehicles for an issue) is more effective than any one medium alone</li> <li>2. Print material with a combination of information types (for example, text and diagrams) is more effective than a single type such as all text</li> <li>3. Presenting risk information verbally (for example, in a presentation) is more effective than simply providing written materials</li> </ol> <p data-bbox="683 635 1216 667"><u>Factors that impact communication uptake</u></p> <p data-bbox="683 671 1816 772">The factors influencing the response to risk communications are impacted by: personal risk perception, previous personal experience with risk, preferences for information, sources of information and trust in those sources</p> <p data-bbox="683 815 920 847"><u>Recommendations</u></p> <p data-bbox="683 887 1861 956">Recommendations for risk communication plans (based on previously published work and this systematic review) are:</p> <ul data-bbox="730 999 1787 1342" style="list-style-type: none"> <li>• Ensure communication comes from a trusted source</li> <li>• Tailor communication for the audience</li> <li>• Build the content of messages with the strongest scientific evidence available</li> <li>• Disseminate information through multiple sources</li> <li>• Incorporate text with visuals (such as pictures and diagrams) with qualitative and quantitative data for print materials</li> </ul>

	<ul style="list-style-type: none"> <li>• Disseminate information in the media through multiple sources</li> <li>• Deliver audible warning system notices on an assigned schedule for rare events (for example, sirens for chemical spills)</li> <li>• Develop communication strategies with the awareness that people make choices based on personal past experience with disasters</li> <li>• Incorporate an opportunity for the public to have their questions and concerns addressed</li> <li>• Try not using automated phone call-in systems as a proxy for human interaction; but if they are used, ensure they are easily accessible</li> </ul>
17. Comments/Limitations	- The 24 articles included in this review lacked methodological quality



## Appendix E: Data Extraction Chart for the CDC Manual

Items Reviewed	Manual #1 of 1 (Crisis and Emergency Risk Communication, 2012)
<b>General Information</b>	
1. Author, title, year	Reynolds, Barbara and Seeger, Matthew. Crisis and Emergency Risk Communication (2 <sup>nd</sup> Edition), Centers for Disease Control and Prevention (CDC), 2012
2. Overall Rating (from Agree II Tool appraisal)	Moderate
3. Intended Audience/Target Group	Public health professionals
<b>Details</b>	
4. Number of chapters dedicated to topic	Five: Chapter 3: Messages and Audiences Chapter 4: Crisis Communication Plans Chapter 7: Stakeholder and Partner Communication Chapter 8: Other Communication Channels Chapter 9: CERC, Social Media, and Mobile Media Devices
5. Objectives of the manual	<ul style="list-style-type: none"> <li>• Provides an overview of the principles and practical tools of crisis and emergency risk communication.</li> <li>• Presents the material in a practical, applications-oriented framework.</li> <li>• Describes the planning phases of a crisis communication plan (for example, pre-crisis, initial, maintenance, resolution, evaluation).</li> <li>• How to develop a crisis communication plan (for example, what elements to include, nine steps for success).</li> <li>• How to build good relationships with your stakeholders (for example, identify your stakeholders and build positive relationships with them before an event occurs).</li> <li>• How to work with community partnerships (for example, make an effort in pre-event planning to reach out to these groups, dealing with an angry public).</li> <li>• Describe different types of social media, their characteristics and five categories of users.</li> <li>• How to work with social media before and during a crisis.</li> <li>• Describes mobile media and its role during a crisis, as well as opportunities and challenges.</li> </ul>

<b>Practice Recommendations</b>	
6. What were the findings for effective messaging?	<p><u>Message content</u></p> <ul style="list-style-type: none"> <li>• Develop a short message at a grade 6 comprehension level.</li> <li>• Use positive wording for actions rather than negative wording.</li> <li>• Repeat the message.</li> <li>• Create action steps in threes or fours, or create an acronym.</li> <li>• Use personal pronouns for your organization.</li> <li>• Avoid technical jargon.</li> <li>• Promise or guarantee only what can actually be delivered.</li> <li>• Avoid speculation (for example, a worst case scenario).</li> <li>• Do not use humour, nor discuss money or liability.</li> <li>• Be aware of the cultural diversity of your population.</li> <li>• A good reputation, a track record of effective response and a history of responsible conduct will build goodwill for your organization, making your organization more credible and help ensure that your messages are positively received.</li> <li>• Understand the needs, cultural background, community history, location and values of your audience.</li> </ul>
7. What were the findings for effective media?	<ul style="list-style-type: none"> <li>• Have stakeholders and partners come together as an advisory group or task force.</li> <li>• Presentation tips: dress for success; be prepared; keep the target audience in mind; start the presentation well (for example, choose the right opening), use supporting visual aids, convey appropriate emotions.</li> <li>• Select the appropriate medium in order to reach your target audiences.</li> <li>• The medium should be chosen based on its strength (for example, newspapers are good for reporting details whereas TV delivers information quickly and can include visuals), availability, your audience's preference and how your organization wishes to provide information.</li> <li>• Ensure that public health communicators understand social media (for example, by staying informed about new platforms and being aware of who is using what types of social media regarding the crisis).</li> <li>• Before a crisis, ensure that social media is part of your organization's risk and crisis management policy.</li> </ul>

## Appendix F: Nine Steps for Success

Helpful steps for the planning phase (condensed from pages 98-104 of the CDC manual).

### **1. Obtain signed endorsements from senior leadership**

Make certain that senior leadership knows that the process has been thought through, the response planning is coordinated and that they have an important role in the plan's ownership. Have them sign and date the plan, as well as when it is updated.

### **2. Designate responsibilities for the media, public, social media, and partner information teams**

Decide who is in charge of the release of information to the public, including the media and partners.

### **3. Information verification and clearance procedures**

Your plan must specify who absolutely must review a new piece of information before it's released from the organization or before it's incorporated into an overall release from a higher authority.

### **4. Establish agreements on release authorities (who releases what, when, and how)**

When drafting agreements, consider:

- Use this aspect of preplanning to reduce damaging conflicts
- Place formal agreements on release authority in writing, but expect changes
- Know that information is usually not exclusively owned by any one organization or agency
- Once it's released, it's possible to incorporate the information into other messages for other public groups, partners and audiences

### **5. Have all media contact lists, including after-hour numbers, in place**

When you create media contact lists, include cell and landline phone numbers, email addresses and fax numbers; information about how to contact news directors and editors after hours as that is often when you will need them; keep contact information up-to-date (verify on an annual basis?).

### **6. Plan procedures to coordinate with public health response teams**

The communications function should be part of the formal decision system and should be integrated into the larger crisis response team.

### **7. Designate spokespersons for public health issues and third-party validators**

The crisis communication plan should specify public health spokespersons and designated backup personnel. Line up experts outside of the organization as the media and civic groups will appreciate the offer of alternative spokespersons.

### **8. Have agreements and procedures to join the EOC's, JIC\*, if activated**

Know when and how to join an Emergency Operations Centre.

## **9. Develop procedures to secure needed resources**

Space, equipment and personnel to operate 24/7 during a crisis will be needed.

\*EOC=Emergency Operations Centre

JIC= Joint Information Centre, a 24/7 emergency preparedness unit which has responded to the H1N1 pandemic flu, the Deep Horizon Gulf oil spill and the Haiti earthquake.

## **Appendix G: Checklist for the First 48 Hours**

### **Critical First Steps after Verification of a Public Health Emergency\***

#### **Notification:**

- Use your crisis plan's notification list. Make certain that your chain of command has been notified and they know you are involved.
- Ensure that your leadership is aware of the emergency, especially if awareness of the event comes from the media and not the Emergency Operations Centre. Let them know you are involved.
- Give leadership your first assessment of the emergency from a communication perspective and inform them of your next steps. Remember: Be first, be right, be credible.

#### **Coordination:**

- Contact your local, provincial and federal partners now.
- Contact the police if there is potential for criminal investigation.
- Secure a spokesperson as designated in the plan.
- Initiate alert notification and call in extra communication personnel, per the plan.
- Connect with the Emergency Operations Centre and make your presence known.

#### **Media:**

- Be first: Provide a statement that your agency is aware of the emergency and is involved in the response.
- Be right: Begin monitoring the media for misinformation that must be corrected.
- Be credible: Tell the media when and where to get updates from your agency.
- Give facts: Don't speculate. Ensure partners are saying the same thing.

**The public:**

- Trigger your public information toll-free number operation. Do this now if you anticipate that the public will seek reassurance or information directly from your organization. Adjust hours of operation and the number of on-call managers as needed.
- Use your initial media statement as your first message.
- Ensure that your statement expresses empathy and acknowledges public concern about the uncertainty.
- Give the precleared facts you have and refer the public to other information sources as appropriate.
- Remind people that your agency has a process in place to mitigate the crisis.
- Start call monitoring to catch trends or rumours now.

**Partners and Stakeholders:**

- Send a basic statement to partners and stakeholders to let them know you are thinking about them. Get them involved as needed.
- Use your prearranged notification systems, preferably email lists.
- Engage leadership to make important first phone calls, based on your plan. Have them reach partners and key stakeholders to let them know your agency is responding.
- Use the internal communication system, probably email, to notify employees that their agencies are involved in the response and update will follow. Ask for their support.

**Resources:**

- Disseminate contact lists as appropriate.
- Conduct the crisis risk assessment and implement assignments and hours of operation accordingly.
- Stake out your preplanned place in the Emergency Operations Centre or adjoining area.

\* from Checklist 4-1: First 48 Hours in the CDC manual (p. 129-130)