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Rapid Review: What are best practices for risk communication and strategies to mitigate risk behaviours?

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Executive Summary

Background

As jurisdictions prepare for and begin to enter a second wave, adherence to recommended public health measures such as physical distancing, hand hygiene and mask wearing will be critical to reduce the burden of coronavirus disease 2019 (COVID-19) and preventing spread to the most vulnerable. Of growing concern is the relaxing of individual's adherence to these measures, which may be partly attributed to confusion and lack of clarity around changing recommendations as various measures are lifted and reinstated (for example, in Ontario the concept of a 'social bubble' as schools reopen). Effective communication by government officials, local public health organizations and other community leaders is necessary to help control spread.

This rapid review was produced to support public health decision makers' response to the COVID-19 pandemic. This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making.

This rapid review includes evidence available up to September 28, 2020 to answer the question: **What are best practices for risk communication and strategies to mitigate risk behaviours?**

Key Points

- The risk communication literature from a variety of topic areas emphasizes the importance of clear, repeated action-oriented messaging by a trusted leader (e.g., community leader, trusted public health professional, etc.). The certainty of the evidence is moderate (GRADE).
- Trust in both the message and the person delivering the message can be built by addressing uncertainty and acknowledging changing recommendations and information or previous errors. The certainty of the evidence is low (GRADE) and may changes as more data become available.
- Communications should be tailored to target audiences by both message and medium; stakeholder engagement is important to identify the most appropriate message framing and medium of the message. The certainty of evidence is moderate (GRADE).
- Positively framed messages emphasizing a collective vs. individual approach may be more effective. The certainty of the evidence is low (GRADE) and may change as new data become available.

Overview of Evidence and Knowledge Gaps

- The majority of the data come from studies conducted in other topical areas (e.g., past epidemics, childhood vaccinations, smoking behaviours). Given the unprecedented scale of the COVID-19 pandemic, and current influence of social media previous findings may not apply directly.
- To date, the single studies exploring the impact of COVID-19 specific risk communication are limited to assessing the spread of information via social media; continued evaluation of current COVID-19 specific communication campaigns on knowledge, attitudes and behaviours will help inform continued pandemic response.
- Characteristics of a trusted leader, and an understanding of who is the best person to deliver communications to specific target audiences is not known

Methods

Research Question

What are best practices for risk communication and strategies to mitigate risk behaviours?

Search

On September 24 and 28, the following databases were searched:

- Pubmed's curated COVID-19 literature hub: LitCovid
- Trip Medical Database
- World Health Organization's Global literature on coronavirus disease
- COVID-19 Evidence Alerts from McMaster PLUS™
- Public Health +
- COVID-19 Living Overview of the Evidence (L·OVE)
- McMaster Health Forum
- Prospero Registry of Systematic Reviews
- NCCMT COVID-19 Rapid Evidence Reviews
- MedRxiv preprint server
- PsyArXiv preprint server
- PubMed database
- EMBASE database
- NCCDH Equity-informed Responses to COVID-19
- NCCEH Environmental Health Resources for the COVID-19 Pandemic
- NCCHPP Public Health Ethics and COVID-19
- NCCID Disease Debrief
- NCCIH Updates on COVID-19
- Institute national d'excellence en santé et en services sociaux (INESSS)
- PsycINFO
- ERIC
- Public Health Ontario

A copy of the search strategy is available on request.

Study Selection Criteria

English- and French-language, peer-reviewed sources and sources published ahead-of-print before peer review were included. When available, findings from syntheses and clinical practice guidelines are presented first, as these take into account the available body of evidence and, therefore, can be applied broadly to populations and settings.
Single studies were included if no syntheses were available, or if single studies were published after the search was conducted in the included syntheses. Guidance documents specific to risk communication from reputable organizations were included as relevant. Surveillance sources were excluded.

	Inclusion Criteria	Exclusion Criteria
Population	General population	
Intervention	Risk communication, in public health and other contexts	Clinical decision making, clinical decision aids
Comparisons	-	
Outcomes	Change in knowledge, attitudes and behaviour	

Data Extraction and Synthesis

Data relevant to the research question, such as study design, setting, location, population characteristics, interventions or exposure and outcomes were extracted when reported. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies.

Appraisal of Evidence Quality

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion. For some of the included evidence a suitable quality appraisal tool was not found, or the review team did not have the expertise to assess methodological quality. Studies for which quality appraisal has not been conducted are noted within the data tables.

Study Design	**Critical Appraisal Tool**
Synthesis	Assessing the Methodological Quality of Systematic Reviews (AMSTAR) AMSTAR 1 Tool
Cross-Sectional	Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies
Qualitative	Joanna Briggs Institute (JBI) Checklist for Qualitative Research

Completed quality assessments for each included study are available on request.

The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach was used to assess the certainty in the findings based on eight key domains.

In the GRADE approach to quality of evidence, **observational studies,** as included in this review, provide **low quality** evidence, and this assessment can be further reduced based on other domains:

- High risk of bias
- Inconsistency in effects
- Indirectness of interventions/outcomes
- Imprecision in effect estimate
- Publication bias

and can be upgraded based on:

- Large effect
- Dose-response relationship
- Accounting for confounding.

The overall certainty in the evidence for each outcome was determined taking into account the characteristics of the available evidence (observational studies, some not peer-reviewed, unaccounted-for potential confounding factors, different tests and testing protocols, lack of valid comparison groups). A judgement of 'overall certainty is very low' means that the findings are very likely to change as more evidence accumulates.

Findings

Summary of Evidence Quality

This document includes nine completed syntheses, three single studies, two in-progress single studies, and two guidance documents for a total of 17 publications included in this review.

Research Question	Evidence found		Overall certainty in evidence
What are best practices for risk communication and strategies to mitigate risk behaviours?	Completed syntheses Single studies In progress single studies Guidance documents	9 3 2 3	Moderate

Warning

Given the need to make emerging COVID-19 evidence quickly available, many emerging studies have not been peer reviewed. As such, we advise caution when using and interpreting the evidence included in this rapid review. We have provided a summary of overall certainty of the evidence to support the process of decision making. Where possible, make decisions using the highest quality evidence available.

Table 1: Syntheses

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
Evidence specific to the COVID-19 pandemic					

Ghio, D., Lawes-Wickwar, S., Tang, M. Y., Epton, T., Howlett, N., Jenkinson, E., . . . Keyworth, C. (2020). What Influences People's Responses to Public Health Messages for Managing Risks and Preventing Disease During Public Health Crises? A Rapid Review of the Evidence and Recommendations. *Preprint*.	Jul 13, 2020 (Search completed May 20, 2020)	78 included studies:
		• 3 systematic reviews
		  ○ 2 mixed methods
		  ○ 1 quantitative
		• 61 single studies
		  ○ 1 RCT
		  ○ 11 survey
		  ○ 23 qualitative
		  ○ 10 content analysis
		  ○ 7 commentary
		  ○ 8 experimental
		  ○ 1 rapid review
		• 14 preprint manuscripts
		  ○ 3 experimental
		  ○ 11 survey
		Studies were specific to
		• H1N1 (n = 20)
		• COVID-19 (n = 15)
		• Ebola (n = 12)
		• Influenza (n = 8)
		• SARS (n = 6)
		• Zika (n = 4)
		• Bird flu (n = 3)
		• West Nile (n = 1)
		• General pandemics (n = 1)
			Four key recommendations identified:
			1. Engage with different communities to ensure relevance and relatability and build community resilience:
			• Target and tailor messages to specific populations
			• Translate to other languages, considering accuracy and cultural relevance
			• Use diverse media forms and consider barriers to access
			
			2. Address uncertainty to increase trust:
			• Acknowledge changing information and admit errors
			• Coordinate consistent messages across information sources
			• Use sources perceived as credible to target population
			• Focus on positive, solution-oriented messaging
			
			3. Unify messaging to ensure accurate understanding and heighten risk perception:
			• Keep core message consistent
			• Increase awareness
			• Clear instructions are more memorable
			
			4. Message framing to increase understanding and knowledge of threat:
			• Positively frame messages in the context of social responsibility and norms
			• Language to explain severity
			• Emphasize sense of personal control
				Low	Moderate-High

Lunn, P. D., Belton, C. A., Lavin, C., McGowan, F. P., Timmons, S., & Robertson, D. A. (2020). Using Behavioral Science to Help Fight the Coronavirus. *Journal of Behavioral Public Administration, 3*(1).	Mar 29, 2020 (Search date not reported)	Over 100 studies were reviewed; a description of included studies not provided	Systematic reviews find that multiple behavioural levers (education plus reminders, availability, social influences, and cues to capture attention) increase handwashing in healthcare settings. Clear and repeated messaging delivered by trusted leaders to establish social norms is necessary. Messaging around what is "best for all" is more effective than persuasion to undertake a certain behaviour. Cooperation is more likely when behaviours are publicly visible and there is social disapproval. Crisis communication requires tailoring for targeted audiences. Messages communicating 'threat' are more effective when self-efficacy is high. Also important in messaging is to be solution focused or action oriented. Invoking empathy in messaging has a positive influence on behaviour change. Communicate risk honestly (neither exaggerate or downplay) to build trust and set an example for others who play a role in risk perception (e.g., businesses and media). In communicating threats, there should also be clear messaging about extent of uncertainty which can also build credibility.	Low	Not reported

Relevant evidence from other topical areas					
Aya Pastrana, N., Lazo-Porras, M., Miranda, J. J., Beran, D., & Suggs, L. S. (2020). Social Marketing Interventions for the Prevention and Control of Neglected Tropical Diseases: A Systematic Review. *PLoS Neglected Tropical Diseases, 14*(6), e0008360.	Jun 17, 2020 (Search date not reported)	This systematic review included 47 articles describing 20 interventions to prevent neglected tropical diseases in 13 countries.	Interventions used a broad range of social marketing concepts and techniques. It is important for the intervention audiences and context to be understood when developing a social marketing intervention. Relationship building is critical – stakeholders should be involved from an early stage and can be involved in co-creation of intervention elements. Intervention strategies should be integrated and complementary to each other. Consider barriers to adoption of the desired behavior. Effective interventions generally tended to incorporate health education, capacity building and were culturally appropriate.	Moderate	Moderate
McParland, J. L., Williams, L., Gozdzielewska, L., Young, M., Smith, F., MacDonald, J., . . . Flowers, P. (2018). What Are the 'Active Ingredients' of Interventions Targeting the Public's Engagement with Antimicrobial Resistance and How Might They Work? *British Journal of Health Psychology, 23*(4), 804-819.	May 27, 2018 (Search date not reported)	20 studies included that examined active components and mechanisms of action of interventions that aimed to improve public awareness and behaviors regarding antimicrobial resistance.	The most common behaviour change techniques focused on education about consequences and instructions for performing antimicrobial resistance-related behaviors by a credible source. Successful interventions included more behaviour change techniques, including promoting beliefs regarding capability, behavior reinforcement, encouraging commitment to behavior change and imagining future outcomes if lack of behavior change occurs, behavioral monitoring (+/- feedback), and provision of information on antecedents of behavior.	High	Low

Carson, K. V., Ameer, F., Sayehmiri, K., Hnin, K., van Agteren, J. E., Sayehmiri, F., . . . Smith, B. J. (2017). Mass Media Interventions for Preventing Smoking in Young People. *Cochrane Database of Systematic Reviews, 6,* CD001006.	Jun 2, 2017 (Search completed Jun 2016)	This systematic review included 8 studies (52,746 participants) that assessed the effects of mass media interventions on smoking behaviour among youth under 25 years of age. • 7 randomized controlled trials • 1 interrupted time-series Interventions included • Mass media alone (n = 4) • Mass media plus school education (n = 3) • Peer-led social media messaging (n = 1)	Overall, certainty about the effects of mass media campaigns on smoking behaviors in youth is very low: • Three studies found that mass media interventions reduced the smoking behaviors of young people • Five studies found no effect Overall, effective campaigns tended to: • Use multiple channels for delivery (newspapers, television, radio, posters) • Last longer (minimum of 3 years) • Had more contact time for both school-based lessons and media spots • Built upon elements of existing effective campaigns • Carried out "developmental work" with representatives of the target audience • Use messages that were designed to reach the target audience (via media channels preferred by the target audience at the most appropriate times) • Combine campaigns with a structured support curriculum such as those available via school-based collaborations • Use social influence or social learning theory approach	High	Low

Ames, H. M., Glenton, C., & Lewin, S. (2017). Parents' and Informal Caregivers' Views and Experiences of Communication About Routine Childhood Vaccination: A Synthesis of Qualitative Evidence. *Cochrane Database of Systematic Reviews, 2*, CD011787.	Feb 7, 2017 (Search completed Aug 30, 2016)	This systematic review included 38 studies examining parent/caregiver perceptions of vaccine communication and its influence on childhood vaccination decisions (for children up to six years of age).	Type, quantity, and availability of information: • Provide credible sources of information using a balanced approach with both risks and benefits. • Provide information to health service and community settings. • Tailor information to needs; vaccine-hesitant parents may need different types and amounts of information. • Use a variety of strategies to provide information such as text messaging. Sources of information: • Health workers are important and trusted sources of information. • Health workers should have open, respectful discussions in a caring, sensitive, and non-judgmental way and provide clear answers to their questions. • Provide a supportive environment for decision-making. Poor communication and negative relationships with health workers sometimes impacted vaccination decisions. Timing of information: • Provide information clearly and simply and in good time prior to each vaccination appointment, not while vaccinating the child.	Moderate	Moderate-High
Penta, M. A., & Baban, A. (2018). Message Framing in Vaccine Communication: A Systematic Review of Published Literature. *Health Communication 33*(3), 299-314.	Jan 6, 2017 (Search completed July 2016)	This systematic review identified 34 studies comparing gain-framed versus loss-framed messages for vaccine communication.	Most studies found that goal framing had no effect on vaccine attitudes, intentions or uptake. Across studies, some participant characteristics appear to be mediators or moderators of the effect (e.g., perceived risk, loss avoidance, etc.), however findings are inconsistent.	Low	Not reported

Infanti, J., Sixsmith, J., Barry, M.M., Núñez-Córdoba, J., Oroviogoicoechea-Ortega, C., & Guillén-Grima, F. (2013). A literature review on effective risk communication for the prevention and control of communicable diseases in Europe. *European Centre for Disease Prevention and Control*.	Jan 2013 (Search date not reported)	A number of models, guidelines and reviews were included (number not reported).	Risk communication messages often fail to reach intended communities; needs assessment and public engagement is critical. Clear objectives, consistent messages, transparent and credible decision making. Messages must contain precise details about what, when, how and for how long. Effective risk communication must include acknowledgement and explanations of complexities and uncertainties.	Low	Not reported
Cugelman, B., Thelwall, M., & Dawes, P. (2011). Online Interventions for Social Marketing Health Behavior Change Campaigns: A Meta-Analysis of Psychological Architectures and Adherence Factors. *Journal of Medical Internet Research 13*(1), e17.	Feb 14, 2011 (Search completed Jan 16, 2009)	This systematic review assessed online intervention design features to inform the development of online health campaigns seeking voluntary health behavior change. 31 papers met the inclusion criteria. 29 of these described 30 interventions and 2 qualified for adherence analysis.	The impact of online interventions was small but significant. Most interventions used feedback mechanisms, with 83% using tailoring, while 40% used personalization combined with tailoring. Shorter interventions achieved the largest impacts – as the length of an intervention increased, behavioral impacts and intervention adherence decreased. Goal-oriented interventions, using multiple behaviour change components, and providing normative pressure appeared to be most effective.	Moderate	Not reported

Table 2: Single Studies

Reference	Date Released	Study Design	Country	Summary of findings	Quality Rating:
Sutton, J., Renshaw, S. L., & Butts, C. T. (2020). Covid-19: Retransmission of Official Communications in an Emerging Pandemic. *PLoS One, 15*(9), e0238491.	Sep 16, 2020	Cross-sectional	United States	This study explored spread of risk communication messages on social media through 690 social media accounts of public health, emergency management, elected officials; 149,335 tweets analyzed. The following content increased odds of message spread: • Surveillance data (40%) • Technical information (30%) • Efficacy, how individual can protect themselves (28%) • Symptoms (27%) • Primary threat, using words to describe COVID-19) 21.5% • Secondary threat, words describing threats resulting from COVID-19 (20%) • Official pandemic responses (19%) • Collective efficacy (12.5%) • Closures and openings (12%) Smallest positive effect on message retransmission was for content focused on resilience (6.8%) and susceptibility (4.6%). Factors that increase frequency of message retransmission include the use of: • Videos (63%) • Photos/images (27%) • Hashtags (12%) Factors that decreased message retransmission: • Use of quote tweets (7% decrease) • Mentioning another account (23% decrease) • Directly replying to a user (82% decrease) • Use of weblinks (30% decrease)	High

Purohit, N., & Mehta, S. (2020). Risk Communication Initiatives Amid Covid-19 in India: Analyzing Message Effectiveness of Videos on National Television. *Journal of Health Management, 22*(2), 262-280.	Aug 11, 2020	Cross-sectional	India	Seeger et al.'s (2018) conceptual model of emergency risk communication serves as a tool to analyze the effectiveness of risk communication messages in 36 videos available in India from March – April 2020. Risk communication messages disseminated via videos demonstrated sufficient effectiveness according to nine key principles: • Scientifically accurate • Open and transparent messages • Clear messaging • Tailored messaging for target audiences • Consistency in messaging across different mediums • Repetition in messaging • Actionable messages, identify desirable behaviours • Timely dissemination of message • Messaging through multiple channels	Moderate
Liao, Q., Yuan, J., Dong, M., Yang, L., Fielding, R., & Lam, W.W.T. (2020). Public Engagement and Government Responsiveness in the Communications About Covid-19 During the Early Epidemic Stage in China: Infodemiology Study on Social Media Data. *Journal of Medical Internet Research 22*(5), e18796.	May 26, 2020	Cross-sectional	China	Engagement was compared between 644 Weibo posts from personal accounts and 273 posts from government agency accounts. Government posts focused mainly on pandemic updates, policies, guidelines and government response, and prevention messaging, using one-way communication. Government reassurance about risk was central to message content early on in the pandemic which may have translated into low risk awareness. Personal posts more likely to show empathy to those affected, attribute blame to others/government, and express worry about pandemic; frequency in sharing of this content increased throughout the pandemic. There was lower public engagement with government agency posts with respect to likes, comments, and shares.	Moderate

Table 3: In-Progress Single Studies

Title	Anticipated Date of Completion	Setting	Description of Document
Dorison, C., Lerner, J.S., Heller, B.H., Rothman, A., Kawachi, I. I., Wang, K., . . . Coles, N.A. (2020). *A Global Test of Message Framing on Behavioural Intentions, Policy Support, Information Seeking, and Experienced Anxiety During the Covid-19 Pandemic*.	Not reported	Global	This research will experimentally test the effects of framing messages in terms of losses versus gains and examine effects on three primary outcomes: intentions to adhere to polices on COVID-19 prevention, opinions about these policies, and likelihood that participants seek additional policy information. Anxiety will be measured as a secondary outcome variable.
Betsch, C., Wieler, L., Bosnjak, M., Ramharter, M., Stollorz, V., Omer, S.B., . . . Schmid, P. (2020). *Germany Covid-19 Snapshot Monitoring (Cosmo Germany): Monitoring Knowledge, Risk Perceptions, Preventive Behaviours, and Public Trust in the Current Coronavirus Outbreak in Germany*.	Not reported	Germany	This serial cross-sectional study will collect data on public perceptions of COVID-19 risk, protective and preparedness behaviours weekly over a 10-week period (10 data collections) using an online platform. This will allow rapid and adaptive monitoring of these variables over time and assess the relations between risk perceptions, knowledge, and misinformation to preparedness and protective behaviour regarding COVID-19.

Table 4: Guidance Documents

Reference	Date Released	Summary of findings	Quality Rating:
The British Psychological Society. (2020, April 14). *Behavioural science and disease prevention: Psychological guidance*.	Apr 14, 2020	The British Psychological Society provides 9 recommendations to optimize communication during COVID-19: 1. Focus on collective vs. individual 2. Deliver messages from a source viewed as credible to the target audience 3. Create worry but not fear 4. Ensure policies, messages and interventions target behavioural influences including capabilities, opportunities and motivations 5. Clearly specify behaviours 6. Avoid unintended consequences and consider equity 7. Create clear channels across levels of health literacy 8. Engage with behavioural scientists and rely on psychological evidence 9. Use a multidisciplinary approach	Low
World Health Organization. (2020, March 19). *Risk communication and community engagement readiness and response to coronavirus disease (covid-19): Interim guidance, 19 March 2020*.	Mar 19, 2020	Action steps for risk communication and community engagement follows six main categories: risk communication systems, internal and partner coordination, public communication, community engagement, addressing uncertainty and perceptions and managing misinformation, and capacity building. Countries preparing for COVID-19 cases (no identified cases): • Communicate about preparedness activities and public health advice • Identify communication capacity and main stakeholders and form partnerships • Train risk communication and community engagement staff Countries where one or more identified COVID-19 cases: • Engage in two-way communication with public, address misinformation, misunderstandings, common questions • Encourage protective behaviours • Communicate uncertainties • Coordinate collaboration among response partners • Assess risk perception of public • Information delivery Countries with ongoing COVID-19 transmission: • Adapt and apply initial response steps • Modify risk communication plan based on risk perception and public questions • Focus on public resilience • Monitor processes for evaluation	Moderate

World Health Organization. (2018, January 10). *Communicating Risk in Public Health Emergencies: A Who Guideline for Emergency Risk Communication (Erc) Policy and Practice*.	Jan 10, 2018	Three primary recommendations for risk communication in public health emergencies: 1. Building trust and engaging with affected populations: • Trust: consider accessibility, demonstrate transparency, timeliness, disseminate using multiple platforms, methods • Communicating uncertainty: acknowledge information that is known and unknown, provide explicit information about uncertainties related to risk, events, interventions • Community engagement: identify and involve key trusted community leaders 2. Integrate emergency risk communication (ERC) into health and emergency response systems: • Governance and leadership: Strategically integrate ERC role into responsibilities of global and national emergency preparedness and response leadership teams • Information systems and coordination: develop and maintain multi-disciplinary networks across geography • Tailor information and communication systems: involve stakeholders to ensure relevance of messaging and dissemination across sectors • Capacity building: regular training of ERC personnel with focus on stakeholder coordination • Finance: Allocate sustained funding to ERC as part of emergency preparedness and response 3. ERC practice: • Strategic communication planning: Overarching planning is required that includes process of needs assessment, objective setting, coordinated implementation of interventions, monitoring and evaluation of activities • Monitoring and evaluation tools: further research required • Social media: can be used for public engagement, increase awareness, monitor and manage misinformation, public concerns	High

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