Rapid Review Update 2: What are best practices for risk communication and strategies to mitigate risk behaviours?

Prepared by: The National Collaborating Centre for Methods and Tools

Date: March 23, 2023

Suggested Citation:

National Collaborating Centre for Methods and Tools. (2023, March 23). *Rapid Review Update 2: What are best practices for risk communication and strategies to mitigate risk behaviours?* https://www.nccmt.ca/pdfs/res/risk-communication.

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The authors declare they have no conflicts of interest to report.

Executive Summary

Background

As the coronavirus disease 2019 (COVID-19) pandemic progresses into its fourth year, most regions have returned to pre-pandemic levels of activity and lifted almost all restrictions. The COVID-19 pandemic provides an opportunity to take stock of what worked, and didn't, communicating with the public during a global communicable disease crisis. Effective communication by government officials, physicians, local public health organizations and other community leaders is necessary to support the public in making decisions that will best protect themselves and those around them.

This rapid review was produced to support public health decision makers' ongoing response to the COVID-19 pandemic as well as to inform communication strategies in the event of future public health crises. This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making.

This rapid review is based on the most recent research evidence available at the time of release. The previous version was completed on February 12, 2021. This updated version includes evidence available up to November 16, 2022 to answer the question: **What are best practices for risk communication and strategies to mitigate risk behaviours?**

What Has Changed in This Version?

- New evidence specific to COVID-19 has emerged and is included in this update; specifically, ten new syntheses, thirty-eight new single studies, one review protocol and one in-progress single study were identified. As the body of COVID-19 evidence is now much more substantial, 11 non-COVID related reviews were removed from this version. An archived version of Update 1 is available, and a list of previously included but now excluded studies is available in Appendix 2.
- These new studies provide increased specificity on characteristics of effective spokespeople, including physicians for some populations.
- A very small number of studies discuss and provide guidance on combatting misinformation. To learn more about misinformation, please refer to our rapid review exploring the public's experiences accessing and interacting with public health information during the COVID-19 pandemic.
- Evidence continues to emerge on message framing.
- New evidence has emerged on considerations for the use of visual risk communication and provides guidance on the use of data visualization, colours, and positive visual aids to avoid misinterpretation of public health information.
- All other key points remain consistent with the previous version.

Key Points

- The COVID-19 risk communication literature emphasizes the importance of clear, repeated, action-oriented messaging by a trusted leader (e.g., physician, community leader, trusted public health professional). The certainty of evidence is moderate (GRADE); findings are unlikely to change as new data become available.

- Risk communication principles have remained the same, although some additional aspects of communications have become salient including the importance of communicating in a timely fashion, communicating uncertainty, addressing myths, prioritizing consistency of risk communication messages, and using plain language. The certainty of evidence is moderate (GRADE); findings are unlikely to change as new data becomes available.
- Mainstream media consumption (e.g., newspapers, news on television, radio) was shown to lead to better retention of messages and expressing more positive opinions of government crisis response. Peer health communication and intensive multimedia interventions show effectiveness for influencing uptake of virus-related disease prevention behaviours. The certainty of this evidence is moderate (GRADE); findings are unlikely to change as new data becomes available.
- More recent emerging evidence suggests that the following characteristics are effective in influencing public awareness, attitudes and behaviours: empathetic messages, positively framed messages emphasizing a collective or social responsibility message, versus an individual approach; and those that express hope rather than fear, COVID-19 successes and reassurance, use of multiple communication channels, culturally relevant messages, use of non-judgemental listening, and addressing rumours and conspiracies. The certainty of evidence is moderate (GRADE); findings are unlikely to change as new data becomes available.
- Community/local partnerships are essential to first build trust, and second, to understand the communication needs of a community, effective communication mediums (social media or face-to-face) along with the most effective framing and tailoring. The certainty of evidence is moderate (GRADE); findings are unlikely to change as new data becomes available.
- Communication should be tailored to audiences by both message and information channel; stakeholder engagement is important to identify the most appropriate message framing, theme and channel of the message. The certainty of evidence is low (GRADE); findings may change as new data emerges.
- Visual risk communication can be useful, but potentially problematic. Colour coding was found to be influential, but at times misleading. Risk visualizations displayed on a scale were not always perceived as trustworthy, depending on what type of scale was used. Guidance for visual risk communication included using positive visual aids and presenting data on a linear scale. The certainty of the evidence is low (GRADE); findings may change as new data emerges.
- When expressing risk using statistics, frequencies are better understood than percentages, and relative risk is more persuasive than absolute risk or number needed to treat. The certainty of the evidence is low (GRADE); findings may change as new data emerges.
- Trust in both the message and the person delivering the message can be built by addressing economic, social, and virus-related uncertainties, and acknowledging changing recommendations and information or previous errors. The certainty of the evidence is low (GRADE); findings may change as new data emerges.
- Overall, social media appeared to be underutilized as a vehicle to disseminate tailored messages (i.e., language, race concordance, social identity), effectively communicate risk by using all risk communication objectives, and dispel myths and misinformation. The certainty of evidence is low (GRADE); findings may change as new data emerges.

- Evidence is lacking for the experiences of many populations who live with social and structural inequities, such as Indigenous and racialized communities. Despite a large amount of additional evidence emerging since this review was last updated (Feb 2021), there was a gap in research investigating risk communication among equity-seeking populations. Mechanisms are needed to ensure research is conducted in such a way that the experiences of equity-seeking groups are reported on and adequately represented.
- The majority of studies in this review did not report their funding or received no funding for their research. Of those studies that did report funding, most were funded by national institutions or universities. Funding organizations are encouraged to allocate resources to further knowledge of risk communication among priority populations.

Overview of Evidence and Knowledge Gaps

- Physicians have been found to be effective spokespeople to convey COVID-19-related knowledge for some population groups, including Japanese, Black and Latinx audiences, and race/ethnicity-concordant physicians are particularly effective for improving knowledge among Black audiences. Other tailoring efforts (e.g., acknowledging injustice and economic hardship, addressing fear of stigma and racism when wearing a mask) did not have a significant effect on knowledge or preventive behaviours.
- Further research is still needed related to other characteristics of a trusted leader and community intermediators, as well as an understanding of who is the best person to deliver communications to specific target audiences.
- Community engagement and participation when developing risk communication strategies in low- and middle-income countries are most effective.
- Effective communication about vaccines depends on several factors, including perceived risk of the virus and vaccine side effects, level of knowledge (e.g., how vaccines work), and the few studies that focused on COVID-19 vaccine communication aligned with general COVID-19 risk communication approaches.
- It is unclear what mechanisms of social media are most effective (i.e., hashtags, video and picture captions, infographics), or what platforms drive the greatest behaviour change. However, it is important to understand the role of social media in delivering tailored messaging and combating misinformation to specific populations.
- A few studies investigated the changes in risk communication (i.e., message source, timing and framing) in the early phases of the COVID-19 pandemic, but there is a need for more retrospective studies to examine which risk communication objectives were emphasized during the various stages of the pandemic. While the COVID-19 risk communication evidence continues to grow, what we know is generally limited to the early phases of the pandemic. Only a small number of studies collected data in 2021 (n=4), and none of the studies included in this review collected data in 2022.

Methods

Research Question

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

Search

On November 16, 2022, the following databases were searched using key terms "risk communication", "behavioural science", "behavioral science", "social marketing", "social behaviour", "social behavior", "persuasive communication", "health communication". This search builds upon the previous search conducted in the first version of this rapid review.

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

A copy of the full search strategy is available in Appendix 1.

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 are presented first, as these take into account the available body of evidence and, therefore, can be applied broadly to populations and settings.

Additional exclusion criteria have been applied to this living review to refine its focus given the substantial body of evidence, and evolution of the COVID-19 pandemic. Beginning in this version (January 2023), studies not focused on COVID-19 risk communication were excluded.

A full list of studies that were previously included that are now excluded is available in [Appendix 2](#).

Single studies related to COVID-19 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 during COVID-19 from national and international public health 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.

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](#)
Mixed methods	Mixed Methods Appraisal Tool (MMAT) [MMAT Tool](#)
Qualitative	Joanna Briggs Institute (JBI) [Checklist for Qualitative Research](#)

| Quasi-experimental | Joanna Briggs Institute (JBI) [Checklist for Quasi-Experimental Studies](#) |
| Randomized controlled trial | Joanna Briggs Institute (JBI) [Checklist for Randomized Controlled Trials](#) |

Completed quality assessments for each included study are available on request.
The Grading of Recommendations, Assessment, Development and Evaluations ([GRADE](#)) (Schünemann *et al.*, 2013) 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

In this update, ten new syntheses, thirty-eight new single studies, one new review protocol and one new in-progress single study were identified, for a total of 63 publications included in this review.

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

Outcome	Studies included		Overall certainty in evidence (GRADE)
	Study design	n	
Messages should be clear, repeated, action-oriented and delivered by a trusted leader (e.g., physician, community leader, trusted public health professional).	Syntheses	6	⊕⊕⊕◯ Moderate[1]
	Experimental	2	
	Observational	3	
Deliver communication in a timely fashion, communicate uncertainties address myths, use plain language	Synthesis	1	⊕⊕⊕◯ Moderate[1]
	Observational	5	
Use of intensive multimedia interventions and peer health communication for influencing uptake of virus-related disease prevention behaviours.	Synthesis	1	⊕⊕⊕◯ Moderate[1]
	Experimental	2	
	Observational	1	
Positively framed messages emphasizing a collective or social responsibility message, versus an individual approach.	Syntheses	2	⊕⊕⊕◯ Moderate[1]
	Experimental	7	
	Observational	5	
Creating community/local partnerships build trust, and understand the communication needs of a community, effective communication mediums (social media or face-to-face) along with the most effective framing and tailoring.	Syntheses	6	⊕⊕⊕◯ Moderate[1]
	Observational	3	
Tailoring communication to audiences by both message and information channel	Experimental	1	⊕⊕◯◯ Low[2]
	Observational	5	
Careful consideration of data visualization, colours, and positive visual aids to avoid misinterpretation of public health information.	Experimental	1	⊕⊕◯◯ Low[2]
	Observational	5	
Risk summary statistics should be expressed as frequencies. Relative risk is more persuasive than absolute risk or number needed to treat.	Syntheses	1	⊕⊕◯◯ Low[2]
	Experimental	1	
	Observational	1	
Build trust by addressing pandemic and non-pandemic uncertainties	Observational	4	⊕⊕◯◯ Low[2]
Utilizing social media as a vehicle to: disseminate tailored messages (i.e., language, race concordance, social identity), effectively communicate risk by using all risk communication objectives, and as a tool to dispel myths and misinformation.	Observational	12	⊕⊕◯◯ Low[2]

[1] In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality evidence**, and this was updated to **moderate** taking into account the characteristics of the available evidence.

[2] In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality evidence**. No additional up or downgrades were made.

*Values exceed the total number of studies (n=63) as some studies involved multiple outcomes.

Table 1: Syntheses

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
New evidence reported specific to the COVID-19 pandemic on November 16, 2022					

Kalocsányiová, E., Essex, R., & Fortune, V. (2022). Inequalities in Covid-19 Messaging: A Systematic Scoping Review. *Health communication*, 1–10. Epub ahead of print.	Jul 19, 2022 (search completed Jan 12, 2022)	Studies included (n=40):
		• Qualitative (n=21)
		• Quantitative (n=14)
		  ○ Randomized controlled trial (n=1)
		  ○ Not reported (n=13)
		• Mixed methods (n=5)
			Insights on messaging included:
			• Translating messages into languages other than the official language(s) to ensure uptake and comprehension by various priority groups.
			• Using accessible formats for people who are visually impaired, hearing-impaired, and/or those without internet access.
			• Framing messages to include benefits to the individual.
			• Integrating community voices into messaging while staying true to facts.
			• Co-creating health messages through community partnerships.
			• Revising message content in response to specific community concerns surrounding the pandemic.
			• Using trusted messengers such as physicians and community leaders.
			
			Inequalities in health communication were identified as: language barriers and information that was accessible in other languages, lack of information about lived experiences in communities or consideration of unique circumstances and hard to access information or communication channels.
				Low	Not reported

Anakpo, G., & Mishi, S. (2022). Hesitancy of COVID-19 vaccines: Rapid systematic review of the measurement,	Jun 17, 2022 (search completed 2021)	Studies included (n=25):
		• Review articles:
		  ○ Systematic review (n=1)
		• Single studies:
		  ○ Qualitative (n=5)
			Evidence based findings and best practices identified measures such as:
			• Using clear and consistent communication to build public confidence and trust in the vaccine.
			• Use of empathetic messaging.
				Low	Not reported

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
predictors, and preventive strategies. *Human Vaccines & Immunotherapeutics*, 18(5), 2074716.		○ Quantitative (n=3) ○ Mixed methods (n=16) All included studies were specific to COVID-19 vaccines.	• Emphasizing the social benefits of vaccination. • Leveraging trusted sources of COVID-19 information to deliver messages. • Use of targeted campaigns for each context, using a multi-organizational approach. • Increasing vaccine literacy by delivering messages across various institutions and channels (e.g., school, workplace, traditional media). • Identifying key knowledge gaps (i.e., explaining how vaccines work, regulatory processes, safety, efficacy).		
Khan, S., Mishra, J., Ahmed, N., Onyige, C.D., Lin, K.E., Siew, R., & Lim, B.H. (2022). Risk communication and community engagement during COVID-19. *International journal of disaster risk reduction, 74*, 102903.	Mar 16, 2022 (search date not reported)	Studies, websites, and newspapers were included in this review, but no further details were provided.	Analysis of various countries and their risk communication response revealed that although the public was the main target of risk communication, they were not involved as a stakeholder in the formal risk communication process.	Low	Not reported
Batteux, E., Mills, F., Jones, L.F., Symons, C., & Weston, D. (2022). The Effectiveness of Interventions for Increasing COVID-19 Vaccine Uptake: A Systematic Review. *Vaccines, 10*(3), 386.	Mar 03, 2022 (search completed Jul 2021)	Studies included (n=39): • Randomized controlled trial (n=27) • Other experimental design (n=9) • Cross-sectional (n=3) All included studies investigated various interventions to increase COVID-19 vaccine uptake.	Personalizing communication and sending text message booking reminders were effective for increasing vaccine uptake. Findings on strategies to improve vaccination intention were mixed, but communicating vaccine uncertainty did not decrease intention. Weaker evidence was found for message presentation, and other specific characteristics, such as: using videos, using chatbots, positive message framing, communicating uncertainty, personalizing messages, integrating social norms into	High	Moderate-High

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
			messaging, and providing information about the vaccine development process may improve intentions to vaccinate.		
Januszek, S.M., Faryniak-Zuzak, A., Barnaś, E., Łoziński, T., Góra, T., Siwiec, N., … & Kluz, T. (2021). The approach of pregnant women to vaccination based on a COVID-19 systematic review. *Medicina*, 57(9), 977.	Sep 17, 2021 (search completed Jul 10, 2021)	Studies included (n=9) • All included studies were qualitative and specific to the evaluation of COVID-19 vaccine acceptance and/or hesitancy among pregnant women.	Factors to increasing vaccination during pregnancy were: • Establishing trust in the importance of the importance and effectiveness of the vaccine • Explicit communication about the safety of the vaccine during pregnancy • Acceptance of other vaccines during pregnancy • Establishing trust in public health agencies.	Low	Not reported
MacKay, M., Colangeli, T., Thaivalappil, A., Del Bianco, A., McWhirter, J., & Papadopoulos, A. (2021). A review and analysis of the literature on public health emergency communication practices. *Journal of Community Health*, 1-13.	Sep 13, 2021 (search completed Jun 2020)	Studies included (n=13): • Qualitative (n=12) • Mixed methods (n=1) Studies were specific to: • H1N1 pandemic (n=5) • COVID-19 (n=2) • SARS (n=1) • Ebola (n=1) • Fictious emerging infectious disease (n=1) • Unspecified (n=1)	Good characteristics for crisis communication to enhance public trust in institutions and reduce confusion during crises included: • Consistent messaging across channels and institutions. • Repetition of messages and reminders. • Timeliness of messages and health information. • Transparency, sharing facts, and communicating uncertainty. Highly rated sources of information included: public health, government, and community-based organizations.	Moderate	Moderate-high
El-Gilany, A.H., & Farrag, N. (2021). Risk communication in COVID-19 pandemic: A note for health-care workers. *International Journal of Health & Allied Sciences*, 10(3), 227-227.	Aug 04, 2021 (search date not reported)	Number of studies included, and study details not reported.	An overview of risk communication and a review of the best practices for COVID-19 included: • Addressing and tracking rumors, misinformation, and responding with best available evidence. • Evaluating communication strategies during and after the pandemic to identify areas for improvement.	Low	Not reported

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
			• Focusing on dialogue that enhances trust between the public and the messenger (e.g., experts, officials, organizations). • Being clear, open, transparent, and honest about what is known and not known. • Using plain language rather than epidemiological concepts and other technical terms. • Tailoring messaging to priority groups to ensure it is culturally sensitive, socially acceptable, and train local people to disseminate health information. • Including marginalized and vulnerable communities and focus on community engagement.		
Pian, W., Chi, J., & Ma, F. (2021). The causes, impacts and countermeasures of COVID-19 "Infodemic": A systematic review using narrative synthesis. *Information Processing & Management*, 58(6), 102713.	Aug 04, 2021 (search completed Jan 09, 2021)	Number of studies included (n=251): • Article, unspecified (n=127) • Commentary (n=29) • Editorial (n=24) • Letter (n=21) • Perspective (n=11) • Viewpoint (n=7) • Report (n=4) • Review (n=4) • Correspondence (n=3) • Unspecified (n=21) All included papers focused on the COVID-19 infodemic.	Risk communication strategies during an infodemic included: • Integrating risk communication into all aspects of a pandemic response. • Recognizing and communicating uncertainty to reduce fear mongering and risk underestimation. • Using non-judgmental listening (i.e., listen without judgement and separating feelings to truly understand what the person is saying) to listen to the community with patience about their fears and perceptions. • Delivering messages in a calm manner and using empathetic communicating. • Addressing rumours and conspiracies as soon as they appear. Misinformation-specific strategies were identified as: • Finding influential accounts and names to fight against misinformation. • Applying inoculation theory to contain misinformation (i.e., proactively communicate	Low	Low-moderate

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
			to individuals ahead of time to protect against changing health attitudes and beliefs for the worse).		

Berg, S.H., O'Hara, J. K., Shortt, M.T., Thune, H., Brønnick, K.K., Lungu, D.A., ... & Wiig, S. (2021). Health authorities' health risk communication with the public during pandemics: A rapid scoping review. *BMC Public Health*, 21(1), 1-23.	Jul 15, 2021 (search completed Oct 28, 2020)	Studies included (n=48):
		• Quantitative (n=37)
		  o Cross-sectional survey (n=14)
		  o Content analysis (n=8)
		  o Quasi-experimental (n=3)
		  o Randomized controlled trial (n=1)
		  o Other, general quantitative analysis (n=11)
		• Qualitative (n=10)
		• Mixed methods (n=1)
		
		Studies were specific to:
		• COVID-19 (n=33)
		• H1N1 pandemic (n=12)
		• Pandemic influenza, general (n=3)
			An analysis of health authorities' risk communication practices found the following:
			• People receive pandemic health risk information through multiple communication channels and information sources.
			• They are influenced by newspapers, television, printed information, government websites, scientific articles, radio, interpersonal and informal sources such as friends, family, healthcare professionals and social media.
			• Message framing is important in mass media.
			
			Recommendations for health authorities' risk communication practices included:
			• Utilizing multiple communication channels, providing accessible webpages that are updated frequently, and tailoring content to varying reading levels.
			• Collaborating with trusted and credible community spokespersons and tailor communication strategies to immigrant and ethnic populations.
			• Recognizing that there is likely no "one size fits all" approach, and message attributes and level of scientific information must be modified depending on the group receiving the health risk information.
				Low	Not reported

Tambo, E., Djuikoue, I. C., Tazemda, G. K., Fotsing, M. F., & Zhou, X. N. (2021). Early stage risk communication and community engagement (RCCE)	Feb 14, 2021 (search date not reported)	Studies included (n=49): • Articles, unspecified (n=42) • Books (n=4) • Reports (n=3)	Several broader considerations for pandemic risk communication were identified: • Development of risk communication systems against COVID-19 involving whole or high levels of government.	Low	Not reported

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies

strategies and measures against the coronavirus disease 2019 (COVID-19) pandemic crisis. *Global Health Journal*, 5(1), 44-50.		All studies were specific to risk communication and community engagement in the context of COVID-19.	• Enhancing local partnerships, leadership, and coordination of risk communication and community engagement against COVID-19.
			• Strengthening public trust and participatory risk communication.
			• Improving community engagement and resilience by leveraging community groups, international organizations and pharmaceutical industries.
			• Addressing global COVID-19 uncertainty, risk perception, and misinformation.
			• Reinforcing pandemic capacity building and community health worker competencies at all levels.
			• Addressing future priorities and needs for risk communication in developing countries through 3 approaches:
			    ○ Integration of data and models from various governmental, regional, and geographical levels to inform evidence-based risk communication strategies.
			    ○ Building and enhancing surveillance systems.
			    ○ Bolstering clinical and public health information sharing and resilience across international borders.		

Previously reported evidence specific to the COVID-19 pandemic					

Ghio, D., Lawes-Wickwar, S., Tang, M.Y., Epton, T., Howlett, N., Jenkinson, E., ... & Keyworth, C. (2021). What influences people's responses to public health messages for managing risks and preventing infectious	Jul 13, 2020 (Search completed May 20, 2020)	Studies included (n=68):
		• Review articles:
		    ○ Systematic reviews (n=3)
		    ○ Rapid review (n=1)
		• Single studies
		    ○ Qualitative (n=28)
		    ○ Quantitative (n=19)
			Risk communication strategies during a crisis included:
			• Engaging with different communities to ensure relevance and relatability and build community resilience through the following:
			    ○ Target and tailor messages to specific populations
			    ○ Translate to other languages, considering accuracy and cultural relevance
				Low	Moderate-High

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
diseases? A rapid systematic review of the evidence and recommendations. *BMJ Open*, 11(11), e048750.		• Randomized controlled trial (n=1) • Commentary (n=6) • Preprints (n=11) Studies were specific to: • H1N1 (n=20) • COVID-19 (n=15) • Ebola (n=11) • Influenza (n=8) • SARS (n=7) • Zika (n=4) • Avian influenza (n=6) • Pandemic, unspecified (n=1) • Hypothetical influenza (n=1) • Meningococcal septicemia (n=1) • MERS (n=1) Values exceed the total number of studies (n=68) because some studies investigated multiple crises.	○ Use diverse media forms and consider barriers to access. • Addressing uncertainties 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. • Unifying messaging to ensure accurate understanding and heightened risk perception: ○ Keep core messaging consistent. ○ Increase awareness. ○ Clear instructions are more memorable. • Message framing to increase understanding and knowledge of threat: ○ Positively frame messages in the context of social responsibilities and norms. ○ Language to explain severity. ○ Emphasize sense of personal control.		
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.	Low	Not reported

Reference	Date Released	Description of Included Studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
			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. Communicating risk honestly (neither exaggerating or downplaying) builds trust and sets 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.		

Table 2: Review Protocols

Reference	Anticipated date of completion	Description
New evidence reported November 16, 2022		
Grimani, A., Bonell, C., Michie, S., Antonopoulou, V., Kelly, M.P., & Vlaev, I. (2021). Effect of prosocial public health messages for population behaviour change in relation to respiratory infections: A systematic review protocol. *BMJ Open*, 11(1), e044763.	Not reported	The review aims to synthesize the literature on infectious diseases communication strategies for population behaviour change and specifically focus on "protecting each other." The review will answer the following questions: (a) are "other" focused messages effective? (b) what behaviour(s) do messages about protecting others have a positive effect on? and (c) what populations do these "protecting other" messages have a positive effect on?

Table 3: Single Studies

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
New evidence reported November 16, 2022						
Lowe, M., Harmon, S.H.E., Kholina, K., Parker, R., & Graham, J.E. (2022). Public health communication in Canada during the COVID-19 pandemic. *Canadian journal of public health, 113*(Suppl 1), 34–45.	Nov 3, 2022	Mixed methods	n=34 key informant interviews (global, federal, provincial and territorial public health actors) Other sources of data include: • 287 news releases • 60 provincial public health updates	Alberta Nova Scotia Ontario	From Jan 31, 2020 – Oct 5, 2021, provincial epidemiological data, public health communication (including official provincial updates and news reports) and key informant interviews were triangulated to measure how well each province communicated to the public about the COVID-19 pandemic. Overall, messaging from each province did not meet the conditions of "good communication" (transparency, promptness, clarity, engagement of diverse communities), which was found to undermine public trust in public health communication.	Moderate
Kompani, K., Deml, M.J., Mahdavian, F., Koval, O., Arora, S., & Broqvist, H. (2022). Who Said What: A Multi-Country Content Analysis of European Health Organisations' COVID-19 Social Media Communication. *International journal of public health, 67*, 1604973.	Sep 22, 2022	Mixed methods	n=1,633 social media posts from 15 official government health authorities	Germany Norway Sweden Switzerland United Kingdom	From Jan to Dec 2020, Facebook, Instagram and Twitter COVID-19 posts from government health authorities were compared to the CDC's Crisis and Emergency Risk Communication (CERC) model (early, correct, credible information with empathy, communicate concrete actions people can take, and show respect by promoting collaboration and rapport). Overall, health authorities' social media communication included the majority of the CERC domains. However, there was not sufficient on-going communication with the public during the pre-pandemic phase and after the initial easing of restrictions between waves. Messaging differed depending on which platform was being used. Instagram tended to be the most underutilized platform yet may have the greatest impact based on audience size and the potential for two-way communication.	Low

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
O'Dowd, I., Joyal-Desmarais, K., Scharmer, A., Walters, A., & Snyder, M. (2022). Should Health Communication During the SARS-CoV-2 Pandemic Emphasize Self- or Other-Focused Impacts of Mitigation Behaviors? Insights from Two Message Matching Studies. *Preprint.*	Sep 19, 2022	Quasi-experimental	n=862 adults Experiment 1: n=515 at T1, and n=447 at T2 Experiment 2: n=415	United States	From Oct 2020 - Mar 2021, the effectiveness of message tailoring to improve adherence to mask use, physical distancing and COVID-19 vaccination was measured. • Messages were more effective at promoting intentions to wear masks and socially distance when they emphasized benefits to others, close or distant, compared to self (p<0.05). • All messages performed similarly when promoting vaccination (p>0.05).	Moderate *PREPRINT*
Vaala, S.E., Ritter, M.B., & Palakshappa, D. (2022). Framing Effects on US Adults' Reactions to COVID-19 Public Health Messages: Moderating Role of Source Trust. *American Behavioral Scientist, 0*(0).	Sep 16, 2022	Quasi-experimental	n=721 adults • Experiment 1: n=442 adults, 50% female • Experiment 2: n=279 unvaccinated adults, 46% female	United States	From Apr - Jun 2020, an investigation was conducted to: • Determine the effects of tweet frame and emotional appeal on individuals' perceived threat of COVID-19 and efficacy towards social distancing, and • Examine the effects of tweet frame and content frame on unvaccinated individuals' perceived threat of COVID-19, efficacy of vaccination, and vaccine intentions. Effects of tweet frame and emotional appeal on individual's perceived threat: • Being exposed to a neutral tweet feature with an individualistic frame was associated with hopeful emotion (p<0.01), fear emotion (p<0.01), annoyed emotion (p<0.01), and perceived argument strength (p<0.01) among people with low and high trust in the Centers for Disease Control and Prevention (CDC) (p<0.01).	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• Hopeful emotion was associated with self-efficacy (p<0.01) and response efficacy (p<0.001). • Fear emotion was associated with perceived susceptibility (p<0.01), and perceived severity (p<0.001). • Annoyed emotion was associated with perceived severity (p<0.05). Effects of tweet frame and content on an unvaccinated individual's perceived threat: • A public health frame that was individualistic was associated with fear emotion (p<0.01), hopeful emotion, annoyed emotion and perceived argument strength (p<0.001). • Fear emotion was associated with perceived susceptibility and perceived severity (p<0.001). • Argument strength was associated with response efficacy (p<0.01), and response efficacy in turn, was associated with intentions to get the COVID-19 vaccine (p<0.05).	
Hendriks, F., Janssen, I., & Jucks, R. (2022). Balance as Credibility? How Presenting One- vs. Two-Sided Messages Affects Ratings of Scientists' and Politicians' Trustworthiness. *Health communication,* 1–8. Epub ahead of print.	Aug 18, 2022	Randomized controlled trial	n=603 adults aged 18-77 Mean age=42.08 (SD=14.07) 346/603 (57.4%) female 254/603 (42.1%) male 3/603 (0.5%) NR	Germany	From May 19 - 25, 2020, the effect of two-sided messaging (including arguments pro and contra the effectiveness of mask-wearing) or one-sided (only pro arguments) was measured on participant's ratings of scientists' and politicians' message trustworthiness (i.e., expertise, integrity, and benevolence). • Scientists were judged as being more competent and having more integrity than politicians (p<0.01). • Both politicians and scientists were perceived as having more expertise when they gave two-sided information (p<0.05) compared to one-sided information.	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• Participant's ratings were affected by prior topic attitudes (p<0.001) and epistemic certainty beliefs (p<0.05). • Message-sidedness was not significant. • None of the experimental variations significantly affected ratings of benevolence.	
Cristea, F., Weishaar, H., Geurts, B., Delamou, A., Tan, M.M.J., Legido-Quigley, H., … Bcheraoui, C.E. (2022). A comparative analysis of experienced uncertainties in relation to risk communication during COVID19: a four-country study. *Globalization and health, 18*(1), 66.	Jun 27, 2022	Mixed methods	n=301 Public health stakeholder key informant interviews (n=155) General population focus groups (n=112) People with barriers to information (n=34)	Germany Guinea Nigeria Singapore	From Aug – Dec 2020, national and regional public health risk communication concerning the COVID-19 pandemic was compared to the general population's experience of risk communication and community engagement strategies. The main failure in risk communication during the first year of the pandemic was identified as a divergence between what decision-makers and individuals, especially those from affected communities considered to be relevant in terms of pandemic uncertainty: • Epidemiological uncertainty (related to the nature and severity of the virus), • Information uncertainties (related to access to reliable information), • Social uncertainties (related to social behaviour in times of increased risk) and • Economic uncertainties (related to financial insecurities). Unaddressed uncertainty was negatively associated with people's reported ability to assess their risk and trust in government containment measures.	High
Xu, D., Li, Y.J., & Lee, Y. (2022). Predicting Publics' Compliance with Containment Measures at the Early Stages of COVID-19: The Role of	Jun 19, 2022	Cross-sectional	n=502 adults	United States	In Apr 2020, an online survey was conducted to evaluate how transparent government communication impacted public cynicism, self-efficacy beliefs, and cooperation during the pandemic. Perception of Centers for Disease Control and	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
Governmental Transparent Communication and Public Cynicism. *International Journal of Strategic Communication, 16*(3), 364-385.					Prevention (CDC) communication transparency was negatively associated with public cynicism towards CDC (β=-0.191, p<0.001). Transparent communication by the CDC was associated with self-efficacy beliefs (β=0.432, p<0.001), and these self-efficacy beliefs were associated with practicing protective behaviours (β=0.845, p<0.001).	
Zahry, N.R., McCluskey, M., & Ling, J. (2022). Risk governance during the COVID-19 pandemic: A quantitative content analysis of governors' narratives on twitter. *Journal of Contingencies and Crisis Management,* 1-15.	Jun 11, 2022	Content analysis, quantitative	n=7,000 Twitter messages from 50 United States governors	United States Twitter	From Mar 13 - Aug 17, 2020, US governor tweets were coded and analyzed based on the five communication objectives listed within the Crisis Emergency Risk Communication (CERC) model. Frequently used communication objectives include address rumours and misunderstanding (61%) and describe preparedness/response efforts (42%). Gaps in communication objectives include promote protective actions (17%), acknowledge crisis with empathy (14%) and segment audience (9%). Three new subcategories under the CERC's communication objectives were coded as being salient: attention to mental health issues, call for social influencers, and promote hope and optimism. Tweets in the initial phase of the pandemic (Mar – Apr 2020) were associated with acknowledging the crisis with empathy (β=0.03, p<0.001) and negatively associated with promoting protective actions (β=-0.04, p<0.001) compared to the maintenance phase (May – Aug 2020).	Moderate
Seale, H., Harris-Roxas, B., Heywood, A., Abdi, I., Abela, M., Chauhan, A., … Woodland, L. (2022). The role of	May 17, 2022	Qualitative	n=46 key informant and stakeholder interviews	Australia	From Jan to Apr 2021, key informants and community stakeholders provided feedback on the federal government's COVID-19 Vaccination Programme Culturally and Linguistically Diverse Communities (CaLD) Implementation Plan.	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
[community leaders and other information intermediaries during the COVID-19 pandemic: insights from the multicultural sector in Australia](#). *Humanities & Social Sciences Communications, 9*(1).					Fundamental principles of the plan included: • Wide distribution of easy-to-read information in a variety of languages. • Providing a variety of communication channels for people from CaLD backgrounds to ask questions. • Ensuring vaccination workforce has the capabilities to work with CaLD people, including access to professional interpreters. • Provision of free vaccines. Overall, participants felt that the Federal government agencies failed to recognize the role of community information intermediaries early in the pandemic and failed to provide sufficient resources and support. • Community intermediaries were identified as essential in bridging divides within the community and ensuring that information reaches all community members. • The role(s) of community intermediaries extended beyond passing on COVID-19 information. They also set up support networks, homework groups and virtual sessions focused on a range of community-identified topics. • There were concerns that community leaders may not have the necessary understanding to deliver information; there may be issues with translation, interpretation or information may be withheld from communities based on community leader beliefs. • Community intermediaries were overworked and overstressed, having to disseminate information with pressure coming from outside the community and within.	
Bokemper, S.E., Huber, G.A., James, E.K., Gerber, A.S., & Omer, S.B. (2022).	Mar 23, 2022	Randomized controlled trial	n = 8,647 adults	United States	From May - Aug 2020, the effectiveness of various public health messages on individuals' willingness to agree on the importance of social distancing, willingness to persuade others to	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
[Testing persuasive messaging to encourage COVID-19 risk reduction](). *PloS one, 17*(3), e0264782.			experiment 1: n=2,568 experiment 2: n=6,079		practice social distancing, intentions to practice social distancing, and intentions to wear masks was evaluated. • Compared to an unrelated messaging, "protect others" messaging (linear cooperation) was associated with intentions to socially distance (p<0.05). All other messages were not associated with this outcome. • Compared to an unrelated message, reframing bravery messaging was associated with willingness to convince others to socially distance (p<0.05). All other messages were not associated with this outcome. • Compared to an unrelated message, a baseline informational message, reframing bravery message, and other-regarding linear cooperation message were associated with agreeing that social distancing was important (p<0.05), intentions to wear masks (p<0.05), and intentions to socially distance (p<0.05).	
Gillman, A.S., Iles, I.A., Klein, W.M.P., & Ferrer, R.A. (2022). [Increasing Receptivity to COVID-19 Public Health Messages with Self-Affirmation and Self vs. Other Framing](). *Health communication*, 1–12. Epub ahead of print.	Mar 9, 2022	Randomized controlled trial	n= 600 adults 100/600 (17%) had a health condition thought to increase the risk for severe COVID-19 Mean age=33 51% female	United States	In Aug 2020, participants were exposed to different messaging types to reduce reactance (e.g., negative emotions, feeling manipulated, negative attitudes), increase positive attitudes towards public health guidance, and increase intentions and willingness to engage in protective behaviours. • Those who received the other-focused message dismissed the message less than those who received the self-focused message (p<0.05). • Participants in the self-focused condition who received the health affirmation dismissed the message more than participants who received the value affirmation (p<0.05). No other significant differences were seen within or between groups.	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• No observable effects were reported for attitudes towards public health guidance or personal mitigation behavioural response. • When moderated by objective risk, other-focused messaging and self-affirming messaging were more likely to elicit a positive response among those individuals at higher risk for COVID-19 complications (p<0.05). No other significant differences were seen within or between groups.	
Ebrahim S. (2022). The corona chronicles: Framing analysis of online news headlines of the COVID-19 pandemic in Italy, USA and South Africa. *Journal of Interdisciplinary Health Sciences, 27,* 1683.	Feb 21, 2022	Qualitative	n=814 news headlines from Italy (n=279), United States (n=210), and South Africa (n=325)	Italy United States South Africa	In Mar 2020, news headlines from 3 countries with the highest reported COVID-19 case infection rates were analyzed for epidemic framing typology. The most common frame was consequence, followed by uncertainty, action, reassurance and new evidence, respectively. Comparing countries, headlines differed depending on what pandemic phase each country was in. Consequence frames were most common in Italy, where infection rates were high compared to the United States and South Africa where infection rates were lower. Message framing was consistent across countries with the exception of reassurance, which was found in Italian and South African messaging, but not in messaging from the United States.	Low
Petersen, M.B., Christiansen, L.E., Bor, A., Lindholt, M.F., Jørgensen, F., Adler-Nissen, R., ... Lehmann, S. (2022). Communicate hope to motivate the public during the COVID-19	Feb 15, 2022	Randomized controlled trial	n=3022 adults	United States	In Feb 2021, during the spread of the COVID-19 Alpha variant, the effectiveness of a visual communication aid conveying competing messages were measured against epidemiological modelling. The messages were either fear-based due to the spread of a more infectious variant, or hope-oriented due to vaccines and were measured against epidemiological modelling.	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
pandemic. *Scientific reports, 12*(1), 2502.					Hope-oriented visual communication aids, depicting the competing effects on the epidemic curve of a more infectious variant and vaccinations, motivate public action more effectively than fear-oriented visual communication, focusing exclusively on the threat of the new variant (p<0.05). A hope-oriented visual communication aid also increased the motivation to adhere to the guidelines of the health authorities (p<0.05), the understanding of how to get safely through the pandemic (p<0.001) and why stronger measures are needed (p<0.001).	
Padilla, L., Hosseinpour, H., Fygenson, R., Howell, J.L., Chunara, R., & Bertini, E. (2021, July 6). Impact of COVID-19 Forecast Visualizations on Pandemic Risk Perceptions. *Preprint.*	Feb 7, 2022	Randomized controlled trial	n=2,549 adults split into 34 groups (n=75 each) and presented with various visualization techniques of the same COVID-19 mortality data n=1,199 in Experiment 1 n=1,350 in Experiment 2	United States (New York, California)	From Oct - Dec 2020, a study among a large sample to examine how COVID-19 data visualizations influence perceived risk. Overall, the findings from the data visualization exercises revealed the following: • Visualizing data using a cumulative scale led to the largest increases in perceived risk compared to those who viewed an incident scale and compared to before viewing the visualization. • The use of confidence intervals in data visualizations produced mixed results. The findings for data depicting an upward trend for weekly incident cases were mixed; only one sample exhibited a higher perceived risk.	High *PREPRINT*
Reed-Thryselius, S., Fuss, L., & Rausch, D. (2022). The relationships between socioeconomic status, COVID-19 risk perceptions, and the adoption of protective	Feb 7, 2022	Cross-sectional	n=326 adults	Greenfield, Wisconsin, United States	An online survey was distributed to apply the Health Belief Model (HBM) to examine how social identities influence behavior uptake through risk communication pathways and identify practical recommendations for improved messaging. The data collection period was not reported. Overall, all Health Belief Model (HBM) dimensions were associated with protective behaviours	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
measures in a Mid-Western city in the United States. *Journal of Community Health*, 1-11.					(p<0.0001), education was associated with risk perceptions (p<0.05), and those with higher risk scores were associated with adopting COVID-19 protective behaviours (p<0.01). Findings from study compared to the local community context suggest that television, healthcare workers and government were the most appropriate pathways of communication as these sources were identified as the most trusted and reliable by residents to receive information during the COVID-19 pandemic.	
Wieland, M.L., Asiedu, G.B., Njeru, J.W., Weis, J.A., Lantz, K., Abbenyi, A., … Sia, I.G. (2022). [Community-Engaged Bidirectional Crisis and Emergency Risk Communication With Immigrant and Refugee Populations During the COVID-19 Pandemic](#). *Public health reports*, *137*(2), 352–361.	Jan 13, 2022	Mixed methods	n=24 community leaders representing 39,875 immigrants and refugees speaking 7 different languages Sources of data include: >400 emails 32 recorded work group meetings 20 reflection interviews 3 post-implementation focus groups	Minnesota, United States	From Mar - Aug 2020, a community-academic partnership adopted a bidirectional CERC framework (acceptability, reach, perceived efficacy and sustainability) between policy makers, community communication leaders and their social networks to communicate information related to COVID-19. • Community leaders indicated that direct conversation, face-to-face communication, and telephone calls were the preferred communication channels for the public. • Messages delivered in official and non-official languages reached a greater number of community members who otherwise would not have received the message. • Social media reach was greater than engagement, although community members frequently acknowledged seeing or acting on a resource when communicating with leaders. • Community leaders created networks amongst themselves leading to greater engagement knowing they had access to peer and health experts. • Continuous engagement with community leaders led to real-time adaptation of the intervention process based on feedback from leaders and their social networks.	Poor

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• Additional working groups were created to focus on evolving needs; messages were tailored to meet the needs of specific groups (e.g., social media users, adolescents, young adults, and those who had tested positive); and priority groups were matched with community-based organizations for ongoing supportive services.	
Spoel, P., Lacelle, N., & Millar, A. (2021). Constituting good health citizenship through British Columbia's COVID-19 public updates. Health,136345932110 64115. Epub ahead of print.	Dec 7, 2021	Qualitative	n=131 live-streamed updates where British Columbia's Provincial Health Officer was the primary speaker	British Columbia	From Mar 16 - Dec 31, 2020, public health updates from British Columbia's Provincial Health Officer (BCPHO) were analyzed for alignment to communication practices that pertained to civic imperative and being a "good covid citizen" (defined as including characteristics of being part of a unified community, being a proud and committed British Columbian, being kind and caring, taking action for the sake of others, and being informed and taking reflexive actions). Messaging by the BCPHO was consistent with the 5 dimensions of being a good covid citizen. Risk citizens (those *at* risk and those who pose *a* risk), especially those *at* risk, figured most prominently in COVID-19 messaging encouraging good covid citizens to protect those at risk.	High
Ciorraga, E. H. (2021). Analysis of citizen information materials from the Ministry of Health's Campaign We stop this virus together published from March to May 2020. *Revista Espanola De Comunicacion En Salud*, 121-134.	Nov 30, 2021	Content analysis, quantitative	n=18 videos on government websites n=122 non-video messages on government websites	Spain	From Mar 1 – May 18, 2020, COVID-19 messages from the Ministry of Health's website were analyzed to determine the presentation characteristics and content. Overall, most messages were clear, detailed, easily accessible, and favourable. Of the videos, 9/18 (50%) focused on COVID-19 prevention. Of the non-video messages, 39/122 (32%) focused on COVID-19 prevention. Messages with the following characteristics were observed less frequently: • Health promotion recommendations	Low

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• Information for specific populations and • General information.	
Gretton, J. D., Meyers, E. A., Walker, A. C., Fugelsang, J. A., & Koehler, D. J. (2021). A brief forewarning intervention overcomes negative effects of salient changes in COVID-19 guidance. *Judgment and Decision Making*, 16(6), 1549-1574.	Aug 5, 2021	Randomized controlled trial	n=1,699 Experiment 1: contingency of guidance (n=300) Experiment 2: brief forewarning intervention (n=1399)	Canada United States	From Oct 14 - Dec 7, 2020, the effect of different messaging types was measured to: • Test consistency of messaging on public perceptions towards public health authorities and behavioural intentions, and • Investigate whether a brief forewarning strategy indicating changes to guidance can mitigate the detrimental effects of public perceptions. Findings from Experiment 1: • The type of consistency in messaging was not associated with COVID-19 vaccination intentions (β=-0.12, p=0.372). • Individuals receiving inconsistent messages perceived more change in scientific findings regarding COVID-19 compared to participants in the consistent group (β=0.35, p<0.05). • Being exposed to inconsistent messages was associated with individuals perceiving public health authorities as having less expertise (β=-0.47, p<0.01). Findings from Experiment 2: • Change in guidance was seen as more acceptable following forewarning compared with no forewarning (β=0.15, p<0.05). • Without forewarning, inconsistency of messages reduced individuals' trustworthiness ratings for public health authorities compared with consistency (β=–0.38, p=0.001). • With forewarning, trustworthiness ratings were similar among inconsistency and consistency groups (β=0.11, p=0.343). • Guidance and forewarning had an interaction effect on individuals' ratings of perceived expertise of public health authorities	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					(p=0.001), trustworthiness of public health authorities (p=0.003), and intention to get the COVID-19 vaccine (p<0.05).	
Bangdiwala, S. I., Gómez, A., Monsalves, M. J., & Palmeiro, Y. (2021). Statistical considerations when communicating health risks: Experiences from Canada, Chile, Ecuador and England facing COVID-19. *African Safety Promotion: A Journal of Injury and Violence Prevention*, 19(1), 52-79.	Jul 30, 2021	Content analysis, quantitative	Number of government websites and webpages analyzed not reported	Canada Chile Ecuador England	From Feb – Aug 2020, risk communication strategies from four countries were analyzed to assess and propose statistical and general considerations for risk communication. Earlier in the pandemic, all countries communicated information by sharing cumulative case counts and deaths. Over time, information conveyed improved in terms of clarity, transparency, and accuracy. Aside from the risk of infection, other actual risks were never quantified and instead categorized as low, medium, high, or higher in certain populations leading the public to make their own interpretation of what these messages meant for them.	Low
MacKay, M., Colangeli, T., Gillis, D., McWhirter, J., & Papadopoulos, A. (2021). Examining Social Media Crisis Communication during Early COVID-19 from Public Health and News Media for Quality, Content, and Corresponding Public Sentiment. *International journal of environmental research and public health*, 18(15), 7986.	Jul 28, 2021	Content analysis, quantitative	n=27,212 Facebook posts (n=438) Facebook post comments (n=26,774) (Demographics not available or collected)	Canada Canadian public health and national news media: Healthy Canadians (366,200 followers) CTV news (2,746,966 followers) CBC news (966,977 followers)	From Dec 31, 2019 – Jun 14, 2020, Facebook posts and their respective post comments were collected, analyzed, and compared to the CDC's Crisis and Emergency Risk Communication (CERC) model for crisis communication using social media. Overall, the most common guiding principles for social media used were: • Call to action (92-99%) and • Conversational tone (25-90%). Gaps were observed in: • Correcting of misinformation (1-4%), • Compassion (2-4%), • Transparency (2-4%), • Timeliness (6-24%) and • Clarity (16-21%).	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					There was variability in the key features of crisis communication in the use of topics, including: • Situation (26-92%), • Resource (14-89%) and • Action (1-54%). Overall, the sentiment of Facebook posts was negative (25-41%), followed by neutral (31-33%), and positive (27-32%). Recommendations included: • Consistent application of the guiding communication principles by Public Health. • Expansion of news messaging to focus on actions and resources to increase message acceptance. • Building trust among actors through effective crisis communication and use of the guiding principles. • Monitoring social media sub-arenas to assess message acceptance.	
Durand, H., Mc Sharry, J., Meade, O., Byrne, M., Kenny, E., Lavoie, K.L., & Molloy, G.J. (2021). Content analysis of behaviour change techniques in government physical distancing communications for the reopening of schools during the COVID-19 pandemic in Ireland. *HRB Open Research*, 4(78).	Jul 22, 2021	Content analysis, quantitative	n=8 posters from the Government of Ireland	Ireland Government website	Following school re-opening in Sept 2020, government produced posters to promote physical distancing in schools were analyzed to identify behaviour change techniques (BCTs). Posters used a combination of text, icons and illustrations aimed at students, school staff and school visitors. Overall, the most used BCTs across all posters were: • Credible source, • Prompts/cues, and • Instruction on how to perform a behaviour. Less commonly used were: • Goal setting • Action planning • Reduced negative emotions • Restructuring the physical environment	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					• Restructuring the physical and/or social environment	
Zey, E., & Windmann, S. (2021). Effects of Message Framing, Sender Authority, and Recipients' Self-Reported Trait Autonomy on Endorsement of Health and Safety Measures during the Early COVID-19 Pandemic. *International journal of environmental research and public health, 18*(15), 7740.	Jul 21, 2021	Randomized controlled trial	n=707 Most participants were female (64%) and the remaining were male (36%) Mean age=38 years	Germany Twitter	From Apr 16 - 20, 2020, an assessment of Twitter message framing, sender authority and recipient's autonomy on the public's approval of the government's COVID-19 health and safety regulations were assessed. Overall, Twitter messages significantly increased endorsement of the rules (p<0.001). • Individuals exposed to messages from a social worker rated them higher on trustworthiness compared to individuals exposed to messages from the state secretary (p<0.05). • Individuals exposed to messages from a social worker rated them higher on morality compared to individuals exposed to messages from the state secretary (p<0.05). • Participants rated the moral/prosocial message as more effective than the authoritarian/controlling message (p<0.01). • Participants perceiving themselves to have high autonomy were less likely to shift responses across interventions and were consistent in endorsing rules compared to those with low autonomy (p<0.01). • Participants endorsed mask wearing in public spaces (which were not yet mandated) much more after the intervention than before (p=0.03).	Moderate
Frias-Navarro, D., Pascual-Soler, M., Berrios-Riquelme, J., Gomez-Frias, R., & Caamaño-Rocha, L. (2021). COVID-19. Effect of Moral Messages to	Jul 19, 2021	Randomized controlled trial	n=3,662 Spain (n=1,122) Chile (n=1,107) Colombia (n=1,433)	Spain Chile Columbia	From Mar 25 – Apr 21, 2020, participants were exposed to 4 Facebook messages, 3 different moral messages and a non-moral control. The effect of messaging type was measured against 4 COVID-19 mitigation behaviours: handwashing, participating in public gatherings, staying at home and avoiding social contacts and sharing COVID-19 messages.	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
[Persuade the Population to Stay at Home in Spain, Chile, and Colombia](). *The Spanish journal of psychology, 24,* e42.			Mean age: 33.17 (SD=13.67) 1158/3662 (31.62%) male 2491/3662 (68.02%) female		Moral messages were identified as: Deontological (emphasizing duty and responsibility, especially to one another), Utilitarianism (consequences associated with conduct) and Ethical virtue (positive traits of a good person). Those who received ethical virtue messages were less likely to wash hands, stay at home, avoid social contacts and share the message on Facebook and were more likely to participate in public gatherings than those receiving other moral and non-moral messaging (statistical measures NR). There was no interaction between message type and country (p=0.474).	
Psychological Science Accelerator Self-Determination Theory Collaboration (2022). [A global experiment on motivating social distancing during the COVID-19 pandemic](). *Proceedings of the National Academy of Sciences of the United States of America, 119*(22), e2111091119.	Jun 15, 2021	Randomized controlled trial	n=25,718 university students from 89 countries Mean age=37 (SD=15.6) 16,273/25,718 (63.3%) female 8636/25,718 (33.6%), male	Global	From Apr–Sep 2020, participants were exposed to different forms of motivational quality messaging; autonomy-supportive messaging (i.e., those that promoted personal choice), controlling messages (i.e., restrictive and shaming) or no message to establish whether different messaging approaches can reduce feelings of defiance and increase motivation and adherence towards COVID-19 social distancing recommendations. Controlling messages increased controlled motivation (p<0.001) compared to receiving no message. No other differences were seen with controlled motivation. Autonomy-supportive messages lowered feelings of defiance (p<0.001) compared to controlling messages. No other differences were seen with defiance. Messaging type did not influence short or long-term intentions to social distance: autonomy-supportive messages were not highly correlated to intention to social distance (p=0.128) compared	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					to controlling messages (p=0.086) or no messages (p=0.917).	
Toker H. (2021). How Loud and Clear Rung the Alarm Bell: The Communication Efforts of WHO on the Beginning of COVID-19 Outbreak. *Internation al journal of health services*, *51*(4), 423–435.	Jun 14, 2021	Mixed methods	n=42 World Health Organization (WHO) issued statements	Global	Analysis of WHO news reports and statements from Dec 31, 2019 - Mar 30, 2020 indicate that 23/42 (55%) of all communications were related to COVID-19. Of these, 12/23 (52%) were not issued until March. The most frequently mentioned experts in news releases were United Nations directors (24%), researchers/universities (18%), and WHO's director (17%). The least mentioned experts in news releases were companies (3%), others (e.g., health workers, 5%), and the WHO in general (9%). This lack of expert coverage and mentions suggests low-level warnings in WHO-issued statements. Predominant themes were identified as: • Allocation • Solidarity • Institutional collaboration • Fundraising campaigns Risk communication and transparency were identified once as a secondary theme and twice as a tertiary theme. Warnings about COVID-19 were the primary topic in only 2 items, and a secondary theme in 5 items and mostly placed after the headline or opening line(s) of the releases.	Moderate to poor
Reyes Bernard, N., Basit, A., Sofija, E., Phung, H., Lee, J., Rutherford, S., … Wiseman, N. (2021). Analysis of crisis communication by the Prime Minister of Australia during the	Jun 8, 2021	Qualitative	n=91 media releases, media statements and press conferences sourced from the Australian Prime Minister	Australia	From Jan 25 - Jul 1, 2020, analysis of a federal leader's COVID-19 communication identified messaging frames and alignment with the Crisis and Emergency Risk Communication (CERC) framework. Messages were triangulated with case counts, policy measures and general phase of the COVID-19 pandemic. The most common messaging frames used were:	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
COVID-19 pandemic. *International journal of disaster risk reduction, 62,* 102375.			concerning COVID-19		• Political and economic context • Basic information • Social context • Preventive information • Treatment information • Medical research • Personal stories New "other" frames that emerged were commonly used, including: • Referral to public health and medical expertise • Assuring and commending the public and/or institutes • Referral to states and territories • Comments and referral to other countries Overall, messaging was aligned to all domains of the CERC framework. • Key gaps in the Prime Minister's communication included expressions of empathy, where to look for information, what is not known, personal stories. • Communication frequency varied over time depending on the stage of the pandemic but no observable trends were noted besides the sharp increase in message content related to 'containment'.	
Yang, J., Wu, X., Sasaki, K., & Yamada, Y. (2021). No significant association of repeated messages with changes in health compliance in the COVID-19 pandemic: a registered report on the extended parallel	Jun 3, 2021	Randomized controlled trial	n=326 180/326 (55%) male 141/326 (43%) female 2% NR Mean age = 46	Fukuoka, Kyushu, Japan	From Oct 22 - Nov 6, 2020, a study was conducted to examine whether participants exposed to the same health message after 1-3 days would impact attitudes such as response efficacy and perceived susceptibility. • Message repetition was not associated with response efficacy (p=0.110). • Message repetition was not associated with perceived susceptibility (p=0.680).	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
process model. *PeerJ, 9*, e11559.					No implications for risk communication were noted. However, authors propose that repeated health messages may be more effective at changing attitudes and behaviours if they are more complex and provide stimulus.	
Malik, A., Khan, M. L., & Quan-Haase, A. (2021). Public health agencies outreach through Instagram during the COVID-19 pandemic: Crisis and Emergency Risk Communication perspective. *International Journal of Disaster Risk Reduction*, 61, 102346.	May 27, 2021	Content analysis, quantitative	n=269 posts from 4 health organizations CDC (n=103) The International Federation of Red Cross and Red Crescent Societies (n=84) World Health Organization (n=53) National Health Services England (n=29)	Global Instagram	From Jan 1 – Apr 30, 2020, Instagram posts were evaluated based on the Crisis and Emergency Risk Communication framework (CERC). Posts generally included most of the CERC domains, however, all accounts lacked content in the following areas: • Theme of "clarification" in the form of addressing misconceptions, myths, and fake news. • Establishing the organization's credibility, and addressing rumors, misunderstandings, and unclear facts.	Moderate
Kostopoulou, O., & Schwartz, A. (2021). To unpack or not? Testing public health messaging about COVID-19. *Journal of Experimental Psychology. Applied, 27*(4), 751–761.	May 13, 2021	Quasi-experimental	n=2087 Mean age=45.08(SD=16.34) 1051 (51%) female 1028 (49%) male	United States United Kingdom	From Apr 24, 2020 - May 12, 2020, participants rated COVID-19-related symptoms in terms of induced worry and perceived severity. Intention to practice social distancing was measured in response to 3 public health messages: • "Most people will experience only mild symptoms" (standard messaging) • "Most people with Covid-19 will experience only mild symptoms. Symptoms may include fever, fatigue, a tight chest, wheeze, cough, breathlessness and/or others" (standard messaging unpacked) • "Most people will not require hospitalization."	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					Unpacked messaging was associated with the highest intention to comply with social distancing (Odds Ratio (OR) =1.22 (95% CI=1.01, 1.48)) compared to standard messaging. No other significant comparisons were seen. Summative worry about symptoms (OR=1.03 (95% CI=1.02, 1.04)) and summative severity (OR=1.04 (95% CI=1.01, 1.070)), were identified as independent predictors of intention to comply. Country of residence was not associated with intention to comply (OR=1.04 (95% CI=0.91, 1.24)).	
Sleigh, J., Amann, J., Schneider, M., & Vayena, E. (2021). Qualitative analysis of visual risk communication on twitter during the Covid-19 pandemic. *BMC public health, 21*(1), 810.	Apr 28, 2021	Content analysis, quantitative	n=616 most retweeted messages from 351 Twitter accounts	Global Twitter	From Jan - Oct 2020, analysis of visual risk communication to promote recommended preventative COVID-19 behaviours on Twitter was examined. • Most tweets used a combination of 2-5 graphic types (55%). Among these combination tweets, animated visuals (42%) and photographs (45%) were commonly used. • Of tweets using only one graphic type, photographs (n=181) were the most frequently used component. • Across all tweets, most used colour (97%) and included text within an image (68%). Only a small portion included a link in the image/text (26%). • Regarding message tone, most messages did not have a tone (51%). Of the messages that did, most were critique (32%), followed by entertaining (10%), gratitude (5%), and a combination of these (2%). • Regarding message framing, messages were mostly health loss framed (37%), compared to health gain (27%), neither (31%), and both (5%). • Combined, individual voices made up most of the tweets (51%). Health institutions,	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					government institutions, and media had a large COVID-19 Twitter presence at the beginning of the pandemic but it shifted to individual voices (e.g., influencers).	
Dennis, A.S., Moravec, P.L., Kim, A., & Dennis, A.R. (2021). Assessment of the Effectiveness of Identity-Based Public Health Announcements in Increasing the Likelihood of Complying With COVID-19 Guidelines: Randomized Controlled Cross-sectional Web-Based Study. *JMIR public health and surveillance, 7*(4), e25762.	Apr 13, 2021	Randomized controlled trial	n=292 social media users Median age=30	United States	In July 2020, the effectiveness of customized COVID-19 public service announcements (PSAs) on individuals' compliance was compared to standard information only messages. Tailored messages advocated for mask wearing in public settings and staying at home; PSA appealed to the identities held by participants (Christian or economically motivated). Overall, tailored messaging matched to individual identity increased the likelihood of compliance: • PSA tailored for Christians, when matched with a Christian identity, increased the likelihood of compliance overall by 12% (effect size (ES)=0.3 (95% CI=2.9, 22.6)). • PSA that focused on economic values, when shown to individuals who identified as economically motivated, increased the likelihood of compliance overall by 6% (ES=0.24 (95% CI=1.5, 12.1)). Non-aligned PSAs trended towards significance with a negative association towards compliance, suggesting that nonaligned PSA may be more damaging to compliance than information only PSA (p=0.10).	Moderate
Slavik, C. E., Darlington, J. C., Buttle, C., Sturrock, S. L., & Yiannakoulias, N. (2021). Has public health messaging during the COVID-19 pandemic reflected local risks to health?: A content analysis of	Apr 13, 2021	Content analysis, quantitative	n=501 tweets from 118 Canadian public health leaders and organizations Tweets from agencies (n=377)	Canada Twitter	From Jan 1 – Jun 30, 2020, a content analysis of tweets from public health leaders and organizations was conducted to identify differences in tweeting practices and propose recommendations to improve risk communication. Overall, 262/485 (54%) tweets contained at least one risk communication strategy.	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
tweeting practices across Canadian geographies. *Health & Place*, 69, 102568.			Tweets from leaders (n=124)

Select tweets (n=37) were not used for some analyses, leaving a final number of 464 | | National public health accounts had the highest percentage of Tweets containing any of the six risk communication strategies examined (65%), followed by regional/local level accounts (54%) and provincial accounts (51%).

The gaps in this study reveal public health account tweets do not always contain relevant messaging or risk communication strategies to help community members. | |
| Freeman, A.L.J., Kerr, J., Recchia, G., Schneider, C.R., Lawrence, A.C.E., Finikarides, L., ... Spiegelhalter, D. (2021). Communicating personalized risks from COVID-19: guidelines from an empirical study. *Royal Society open science*, *8*(4), 201721. | Apr 7, 2021 | Mixed methods | n=5,520

n=13 key informant interviews

general public; n=6

primary care physicians; n=7 | United Kingdom | From Jun 3 - Jul 23, 2020, information from iterative surveys was gathered in real time to inform the development of a personalized COVID-19 Risk Calculator for use by the general population.

The following risk-related information needs were identified:
• The majority of participants indicated a desire for detailed quantitative information about COVID-19 to base their own risk decisions.
• There was a weak correlation between participant's perceived risk and actual risk (p=0.4), suggesting the two are not closely related based on the individual subjective interpretation of individual risk.
• Risk communication was preferred in numerical form, rather than categorized (i.e., low, medium, high).
• The use of colours in risk visualizations was highly influential in how people interpreted numbers, but problematic (i.e., low risk visualized as green may lead people to incorrectly interpret their risk as acceptable).
• The use of logarithmic scales was thought of as misleading or untrustworthy; linear scales were preferred. | Moderate to high |

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:

					• Frequencies were thought to make the risk seem higher; users preferred to convert to a percentage.
					
					The following risk-related contextual factors were identified:
					• Participants understood the major risk factors for disease in-line with experts' estimation of risks.
					• Numbers expressed as a frequency were perceived as expressing higher level of risk than when expressed as a probability (p<0.05). The gap decreased as participants were given additional contextual information. (p<0.01)
					• Participants identified the following information priorities:
					   o Risk of death was of greater importance than risk of infection.
					   o Risk expressed by persona was more effective; descriptions of people who symbolized different levels of risk.
					• Participants indicated that trustworthiness was critical for communication.
					• Trustworthiness and relevance were enhanced when it was clear that the results presented were based on research (ideally from a trustworthy source) and on relevant data.
					
					Overall, participants indicated they would use a risk calculator tool for decision-making but recognized that it might be anxiety inducing.	

Slavik, C.E., Buttle, C., Sturrock, S.L., Darlington, J.C., & Yiannakoulias, N. (2021). Examining Tweet Content and Engagement of	Mar 11, 2021	Content analysis, quantitative	n=6,982 tweets from 128 unique Twitter accounts Public health agencies (n=4)	Canada Twitter	From Jan 1 - Jun 30, 2020, content and level of engagement of COVID-19 tweets made by Canadian public health agencies and decision-makers were characterized. Across all eligible tweets, 21% contained content about COVID-19.	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
[Canadian Public Health Agencies and Decision Makers During COVID-19: Mixed Methods Analysis](). *Journal of Medical Internet Research, 23*(3), e24883.			Local health departments (n=69) Provincial health authorities (n=15) Medical officers of health (n=22) Provincial health ministers (n=8)		• Compared to others, medical officers of health posted the most COVID-19 content relative to their total tweets (35%). In contrast, provincial health ministers' accounts authored the least tweets about COVID-19 (18%). • Hashtags (61-86%) and URLs (51-86%) were the most commonly recorded engagement strategies. The mean retweets per tweet containing various engagement strategies (i.e., media, hashtags, URLs, and user mentions) varied by account type. • Regarding message function, public health agencies, provincial health authorities, medical officers of health, and provincial health ministers used "Information" the most frequently (47-58%). Regional/local health departments used "Action" the most (47%). The mean retweets per tweet were the greatest for action-oriented messages (10-259/tweet), with the only exception of public health agencies where information-oriented messages received the most retweets (56/tweet). • Risk communication strategies varied, the following were used at low frequencies: risk (4-31%), efficacy (20-60%), concern (8-19%), experts (8-40%), corrective (0-4%), and uncertainty (0-7%). Recommendations to improve risk communication and maximize engagement included: • Tailoring messages to maximize engagement. • Using corrective and uncertain risk communication strategies by all public health Twitter accounts to ensure continuous delivery of relevant, accurate, and up-to-date information on potential health risks related to COVID-19.	

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
Li, Y., Guan, M., Hammond, P., & Berrey, L. E. (2021). Communicating COVID-19 information on TikTok: A content analysis of TikTok videos from official accounts featured in the COVID-19 information hub. *Health Education Research*, 36(3), 261-271.	Mar 1, 2021	Content analysis, quantitative	n=331 videos from 8 public health and United Nations agencies	Global TikTok	On May 5, 2020, TikTok videos featured in the COVID-19 information hub were downloaded and analyzed to determine video attributes and which videos received greater user engagement. Videos with the following characteristics received greater engagement: hashtags, subtitles, infographics, dancing. Videos with the following themes had greater engagement: expressing alarm/concern, mentioning susceptibility and severity of COVID-19, and response efficacy (i.e., beliefs surrounding the effectiveness of a preventive action to reduce a threat).	Moderate
Ranjit, Y. S., Shin, H., First, J. M., & Houston, J. B. (2021). COVID-19 protective model: the role of threat perceptions and informational cues in influencing behavior. *Journal of Risk Research*, 24(3-4), 449-465.	Feb 18, 2021	Cross-sectional	n=1,545 adults	United States	From Apr 7 – Apr 19, 2020, an online survey was conducted across a national sample to determine how risk perceptions and protective behaviours are impacted by various communication sources. Of the three information sources: • Traditional media use was associated with social distancing (β=0.03, $p<0.001$) and stay-at-home behaviours (β=0.04, $p<0.001$). • Interpersonal communication was associated with social distancing (β=0.04, $p<0.001$) and stay-at-home behaviours (β=0.05, $p<0.001$). • Social media use was negatively associated with social distancing (β=-0.17, $p<0.001$) and stay-at-home behaviours (β=-0.09, $p<0.001$).	Moderate
Nazione, S., Perrault, E., & Pace, K. (2021). Impact of information exposure on perceived risk, efficacy, and preventative behaviors at the beginning of the COVID-19 pandemic	Nov 12, 2020	Cross-sectional	n=698 adults	United States	On Mar 7, 2020, participants completed on online study to assess whether information exposure was associated with attitudes, beliefs, and protective behaviours. After controlling for age and chronic condition status, time spent consuming news, social media, and health website information was not related to risk perception of COVID-19.	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
in the United States. *Health Communication*, 36(1), 23-31.					Perceived general efficacy was strongly associated with preventive behaviours (β=0.437, p<0.001), and government health websites had underutilized resources in this area.	
Previously reported evidence						
Alsan, M., Stanford, F.C., Banerjee, A., Breza, E., Chandrasekhar, A.G., Eichmeyer, S., ... Duflo, E. (2021). Comparison of Knowledge and Information-Seeking Behavior After General COVID-19 Public Health Messages and Messages Tailored for Black and Latinx Communities: A Randomized Controlled Trial. *Annals of internal medicine, 174*(4), 484–492.	Apr 2021	Randomized controlled trial	n=11,694 Black or Latinx adults Mean age=40 57.4% female 7174 (61.3%) Black 4520 (38.7%) Latinx	United States	This study analyzed whether physician-delivered video messages improved COVID-19 knowledge and preventive behaviours. Seeing any video message significantly reduced knowledge gaps (IRR=0.737, 95% CI=0.64, 0.85, p<0.001); information-seeking behaviours did not change. Messages from race/ethnic-concordant physicians increased information-seeking behaviour among Black participants (IRR=1.08, 95% CI=1.02, 1.15). Other tailoring efforts (e.g., acknowledging injustice and economic hardship, addressing fear of stigma and racism when wearing a mask) did not have a significant effect. Intentions or behaviour change were not explored as outcomes. No further effects of the tailored messages were seen for either Black or Latinx participants.	High
Chen, T., Dai, M., Xia, S., & Zhou, Y. (2021). Do Messages Matter? Investigating the Combined Effects of Framing, Outcome Uncertainty, and Number Format on COVID-19 Vaccination Attitudes and Intention. *Health Communication*. Epub ahead of print.	Jan 27, 2021	Randomized controlled trial	n=413 adults aged 18 to 60	China	This online study assessed the interaction effects of message frames (gain vs. loss), outcome uncertainty (certain vs. uncertain), and number format (frequency vs. percentage) on vaccination attitudes and intention. No significant main or interaction effects of these communication techniques was demonstrated. More research on the impacts of situational factors on message framing is needed.	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
Heydari, S.T., Zarei, L., Sadati, A.K., Moradi, N., Akbari, M., Mehralian, G., & Lankarani, K.B. (2021). The Effect of Risk Communication on Preventive and Protective Behaviours During the COVID-19 Outbreak: Mediating Role of Risk Perception. *BMC Public Health 21*(54).	Jan 6, 2021	Cross-sectional	n=3,213 adults aged 15 and older	Iran	This study conducted a survey to assess how risk communication and perception affect protective and preventive behaviours during the COVID-19 pandemic. Results show that 73% of participants receive COVID-19 news via national mass media and social networks. Applying survey data to a risk communication model found that risk communication and risk perception had a significant, positive correlation. Communication related to accurate understanding of risk can influence risk mitigation behaviours.	Moderate
Brewer, L.C., Asiedu, G.B., Jones, C., Richard, M., Erickson, J., Weis, J., … Doubeni, C.A. (2020). Emergency Preparedness and Risk Communication Among African American Churches: Leveraging a Community-based Participatory Research Partnership COVID-19 Initiative. *Preventing Chronic Disease, 17*, E158.	Dec 10, 2020	Quasi-experimental	n=120 African American churches (number of congregation members not provided)	United States	In Mar 2020, the reach and engagement, feasibility, and acceptability of a COVID-19 emergency preparedness strategy using culturally relevant materials and community contacts within African American churches was described. The uptake of preventive measures was not studied. COVID-19 risks were communicated using message maps, containing 4 content areas: 1) inspirational messaging to promote spiritual, physical, and mental wellness; 2) COVID-19 health and preventive measures; 3) financial and community-based support resources; and 4) social support connections. Messages were disseminated via Zoom, Facebook Live, email, and social media channels. Results are described narratively: • Reach and engagement of Facebook posts increased over the course of the intervention. • The intervention was considered feasible. • Acceptability of the intervention overall was positive.	Moderate
Sutton, J., Renshaw, S.L., & Butts, C.T. (2020). COVID-19:	Sep 16, 2020	Cross-sectional	n=690 Twitter accounts	United States	From Feb 1 – Apr 30, 2020, the spread of risk communication messages on social media through the Twitter accounts of public health,	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
[Retransmission of Official Communications in an Emerging Pandemic](). *PLoS One, 15*(9), e0238491.			representing 149,335 tweets		emergency management, elected officials was 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%) The 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)	
Okuhara, T., Okada, H., & Kiuchi, T. (2020). [Examining Persuasive Message Type to Encourage Staying at Home During the COVID-19 Pandemic and Social Lockdown:]()	Aug 21, 2020	Randomized controlled trial	n=1980 adults aged 18-69	Japan	From May 9-11, 2022 (during a state pf emergency) the effect of persuasive messaging, from different narrators (e.g., local political leader, public health expert, physician, patient, resident or control) , intention to stay home during lockdown, perceived severity, vulnerability, response efficacy, self-efficacy was measured.	High

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
A Randomized Controlled Study in Japan. *Patient Education and Counseling*. Epub ahead of print.					Messages delivered by a physician significantly increased intention to stay home in areas with high numbers of infections (mean change=0.34; 95% CI=0.26, 0.41), vs. political leader, mean change=0.17; 95% CI=0.11, 0.22); vs. expert, mean change=0.19; 95% CI=0.13, 0.25); vs. resident, mean change=0.17; 95% CI=0.12, 0.23). Messages delivered by a physician also increased perceived severity of the pandemic (mean change=0.23; 95% CI=0.14–0.32), vs. political leader, mean change=0.06; 95% CI=0, 0.12, response efficacy (mean change=0.37; 95% CI=0.29, 0.46) (vs. resident, mean change=0.19; C.I. 0.12, 0.26), and self-efficacy (mean change=0.33; 95% CI= 0.25, 0.41) vs. political leader, mean change=0.17; 95% CI=0.11, 0.23); vs. patient, mean change=0.16, 95% CI=0.09, 0.23).	
Moreno, Á., Fuentes-Lara, C., & Navarro, C. (2020). COVID-19 Communication Management in Spain: Exploring the Effect of Information-Seeking Behavior and Message Reception in Public's Evaluation. *El profesional de la información*, *29*(4), e290402.	Jul 2, 2020	Cross-sectional	n=546	Spain	Mar 14-Apr 14, 2020 survey participant responses were assessed to identify how information forms and sources influence public information-seeking behaviours and perception of the government's crisis response strategies during the pandemic. Mainstream media use (television, newspapers and radio) was reported as high, with users of these platforms expressing more positive opinions of the government's crisis response. People were mainly informed through Twitter (50.7%) and Facebook (49.5%) strongly believed that the government's communication confused the population, compared to those who used print newspapers (45.4%), online newspapers (46.7%), television (45.9%) and radio (43.8%). Results showed that people rely on different information channels during crisis situations with high simultaneous and multiplatform	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
					consumption of information. Television (86.2%), WhatsApp (77.6%), online newspapers (75%), and radio (42.6%) were the most frequently used information channels. Use of multiple and simultaneous platforms may contribute to over-information and contra-information. The inability of some users to discern unreliable messaging must be considered in planning. Factors related to media choice, including use of social media platforms, need to be understood for risk and crisis communication strategies and for further research.	
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	n=36 videos	India	A conceptual model of emergency risk communication was used as a tool to analyze the risk communication messages in 36 videos available in India from Mar-Apr 2020. Risk communication messages disseminated via videos demonstrated 9 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	May 26, 2020	Cross-sectional	Weibo users	China	Public engagement between 644 Weibo posts from personal accounts and 273 posts from government agency accounts were compared. 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 in	Moderate

Reference	Date Released	Study Design	Population	Setting	Summary of findings	Quality Rating:
During the Early Epidemic Stage in China: Infodemiology Study on Social Media Data. *Journal of Medical Internet Research 22*(5), e18796.					the pandemic, which may have translated into low perception of risk. Personal posts were more likely to show empathy to those affected, attribute blame to others/government, and express worry about pandemic; frequency in sharing content of this sentiment increased throughout the pandemic. There was lower public engagement with government agency posts with respect to likes, comments, and shares.	

Table 4: In-Progress Single Studies

Title	Anticipated Date of Completion	Setting	Description of Document
New evidence reported November 16, 2022			
Kothari, A., Foisey, L., Donelle, L., , & Bauer, M. (2021). How do Canadian public health agencies respond to the COVID-19 emergency using social media: a protocol for a case study using content and sentiment analysis. *BMJ Open*, 11(4), e041818.	Not reported	Canada Twitter Facebook	This study will involve a content analysis and sentiment analysis of how Canadian provincial public health leaders, national public health leaders, and the Public Health Agency of Canada engage with the public using Facebook and Twitter during 2020. The outcomes of interest will be the following: level of engagement in posts, evaluation of content as it relates to risk communication, and public response to social media posts. A secondary objective of the study is to develop social media communication guidelines for public health organizations specifically for the Canadian context.
Previously reported evidence			
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 3 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 5: Guidance Documents

Reference	Date Released	Summary of findings	Quality Rating:
Previously reported evidence			
The British Psychological Society. (2020, Apr 4). [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 *NOT PEER REVIEWED*
World Health Organization. (2020, Mar 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 6 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 1 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 *NOT PEER REVIEWED*

References

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