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Social Media's Role in Public Health Crisis Communication Across Global Cities: A Comparative Study of New York, Seoul, and Sydney

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ABSTRACT

This study explores how social media influences public health crisis communication (pandemic response, infectious disease outbreaks, environmental health risks) in New York (USA), Seoul (South Korea), and Sydney (Australia). It uses a mixed-methods approach—content analysis of official posts, public perception surveys, interviews with communicators—to analyze 4,200 social media artifacts (2021–2024) and 3,600 public responses, focusing on cross-cultural strategy differences and impact on compliance. Results: Seoul emphasizes „collective responsibility“ (e.g., K-pop partnerships for vaccination), achieving 82% compliance; New York focuses on „individual choice/accessibility“ (e.g., free testing threads), with 68% compliance; Sydney prioritizes „science transparency“ (e.g., epidemiologist Q&As), with 75% compliance. Misinformation is most prevalent in New York (28%) and least in Seoul (12%). The study develops a „Crisis Communication Adaptability Framework“ to guide future city responses.

Keywords: Social media; Public health crisis communication; Global cities; Cultural context; Public compliance; Misinformation; New York; Seoul; Sydney; Pandemic response

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ARTICLE INFO

Received: 6 August 2025 | Revised: 16 August 2025 | Accepted: 23 August 2025 | Published Online: 30 August 2025

DOI: <https://doi.org/10.55121/gcms.v1i1.824>

CITATION

Emma W. 2025. Social Media's Role in Public Health Crisis Communication Across Global Cities: A Comparative Study of New York, Seoul, and Sydney. *Global Communication and Media Studies*. 1(1):18-34. DOI: <https://doi.org/10.55121/gcms.v1i1.824>

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1. Introduction

1.1 Background of Public Health Crises and Social Media

Public health crises—from pandemics (e.g., COVID-19 variants) to infectious disease outbreaks (e.g., monkeypox, influenza) and environmental health risks (e.g., wildfire smoke, air pollution)—pose significant threats to urban populations, which account for over 56% of the global population (United Nations, 2023). Effective crisis communication is critical to mitigating these threats: it informs the public about risks, guides protective behaviors (e.g., mask-wearing, social distancing, vaccination), and reduces anxiety and misinformation (World Health Organization [WHO], 2022). In the digital age, social media has emerged as the most influential channel for public health communication: 78% of urban residents globally use social media to access health information, compared to 45% for traditional media (Pew Research Center, 2023).

Social media's unique affordances—real-time updates, two-way communication, and targeted messaging—make it ideal for crisis response. For example, during the 2022 monkeypox outbreak, New York City's health department used Twitter to share daily case counts and testing site locations, reaching over 2 million users per day (New York City Department of Health and Mental Hygiene [NYC DOHMH], 2022). Seoul's health ministry partnered with K-pop groups like BTS to post vaccination reminders on Instagram, generating over 50 million likes and increasing youth vaccination rates by 35% (Seoul Metropolitan Government [SMG], 2022). Sydney's health officials used Facebook Live to host Q&As with epidemiologists during the 2023 wildfire season, addressing public concerns about air quality and respiratory health (New South Wales [NSW] Health, 2023).

However, social media also presents challenges. The speed and accessibility of information sharing enable the rapid spread of misinformation (e.g.,

“COVID-19 vaccines cause blood clots,” “wildfire smoke is not harmful”)—which can erode public trust in health guidelines and reduce compliance (Lazer et al., 2021). Additionally, cultural differences in how audiences perceive and respond to health messages can limit the effectiveness of “one-size-fits-all” communication strategies. For example, a message emphasizing “individual responsibility” may resonate in individualist cultures like New York but fail in collectivist cultures like Seoul, where community-focused messaging is more impactful (Hofstede Insights, 2023).

1.2 Research Gaps and Objectives

Existing research on social media and public health crisis communication has three key limitations. First, most studies focus on national-level communication (e.g., U.S. CDC, WHO) rather than city-level strategies, despite the fact that cities are often the frontline of crisis response (e.g., implementing local mask mandates, distributing vaccines) (Graham et al., 2022). Second, cross-cultural comparative studies are rare: most research focuses on single cities or Western contexts, overlooking how cultural values shape communication effectiveness in non-Western cities like Seoul (Park et al., 2022). Third, few studies link social media content (what cities communicate) to public outcomes (e.g., compliance with health guidelines), relying instead on engagement metrics (likes, shares) that do not directly measure impact (Wilson et al., 2023).

To fill these gaps, this study aims to:

Identify the social media communication strategies used by New York, Seoul, and Sydney during public health crises (2021–2024);

Analyze how cultural context (individualism-collectivism, high-low context) influences the design and reception of these strategies;

Measure the impact of social media communication on public compliance with health guidelines and trust in government;

Develop a “Crisis Communication Adaptability Framework” to guide city-level social media strategies

in future health crises.

1.3 Significance of the Study

This research contributes to both global communication and public health studies. For communication scholars, it expands our understanding of how cultural context mediates the relationship between social media content and public behavior—moving beyond Western-centric frameworks to include diverse global cities. For public health practitioners, it provides actionable insights for designing culturally adaptive social media strategies: for example, how to use celebrity partnerships in collectivist cultures (Seoul) or personalized data in individualist cultures (New York).

Practically, the findings can help cities prepare for future health crises. By understanding which strategies work in different cultural contexts, cities can allocate resources more effectively (e.g., investing in fact-checking in high-misinformation environments like New York) and reduce the gap between communication and compliance. Additionally, the Crisis Communication Adaptability Framework offers a tool for cities to tailor their strategies to local cultural values, improving the overall effectiveness of public health crisis response.

2. Literature Review

2.1 Public Health Crisis Communication Theory

Public health crisis communication theory focuses on how to disseminate timely, accurate information to the public during emergencies, with the goal of promoting protective behaviors and reducing harm (Sellnow & Seeger, 2020). Two key models dominate this field: the **Situational Crisis Communication Theory (SCCT)** and the **Health Belief Model (HBM)**.

SCCT (Coombs, 2019) argues that effective crisis communication depends on matching the response strategy to the crisis type (e.g., preventable, accidental) and the public's perceived responsibility. For example, during a preventable crisis like an influenza outbreak,

cities should use “instructive” strategies (e.g., “Get vaccinated to protect yourself and others”) to guide behavior. During an unavoidable crisis like wildfire smoke, “adjustment” strategies (e.g., “Stay indoors and use air purifiers”) are more appropriate.

The HBM (Rosenstock et al., 1994) focuses on individual perceptions of health risks: individuals are more likely to comply with health guidelines if they perceive the risk as severe, the benefits of compliance as high, and the barriers to compliance as low. Social media can influence these perceptions by framing risks (e.g., highlighting severe outcomes of non-compliance) and reducing barriers (e.g., sharing links to free testing sites) (Jones et al., 2022).

In recent years, scholars have expanded these models to account for digital media. The **Social Media Crisis Communication Model (SMCCM)** (Austin et al., 2021) emphasizes the importance of two-way communication: social media allows cities to not only disseminate information but also listen to public concerns, address questions, and build trust. For example, during the COVID-19 pandemic, cities that responded to user comments on social media reported higher public trust than those that used one-way messaging (Graham et al., 2022).

2.2 Social Media and Public Health Crisis Communication

Social media's role in public health crisis communication has been studied extensively, with research highlighting both opportunities and challenges. On the positive side, social media enables real-time updates: during the 2022 monkeypox outbreak, cities that posted hourly updates on social media had 30% higher public awareness than those that posted daily (NYC DOHMH, 2022). Social media also allows for targeted messaging: platforms like Facebook and Instagram let cities segment audiences by age, location, and interests, ensuring that messages reach those most at risk (e.g., seniors for influenza vaccination campaigns) (Pew Research Center, 2023).

Influencer and celebrity partnerships are another key advantage of social media. Research shows that

messages from trusted influencers—particularly those with expertise in health or large, engaged followings—are more effective at promoting compliance than messages from government accounts alone (WHO, 2022). For example, during the COVID-19 vaccine rollout, Seoul’s partnership with K-pop celebrities increased vaccine uptake among 18–24-year-olds by 40% (SMG, 2022).

However, social media also facilitates the spread of misinformation. Misinformation about public health crises is often more engaging than accurate information—due to its emotional tone and simplicity—and can spread faster than fact-checks (Lazer et al., 2021). For example, during the 2023 wildfire season in Sydney, misinformation claiming “wildfire smoke is good for respiratory health” was shared 10,000 times on Facebook before fact-checks were able to counter it (NSW Health, 2023). Misinformation can have serious consequences: studies link anti-vaccine misinformation on social media to lower vaccination rates and higher infection rates during outbreaks (Jones et al., 2022).

2.3 Cultural Context and Public Health Communication

Cultural context plays a critical role in how public health messages are received and acted upon. Hofstede’s (2001) cultural dimensions—particularly individualism-collectivism and high-low context—are widely used to explain cross-cultural differences in health communication.

2.3.1 Individualism-collectivism

In individualist cultures (e.g., New York, Sydney), individuals prioritize personal autonomy and self-interest. Health messages that emphasize “individual choice” (e.g., “Get tested to protect your family”) or “personal benefits” (e.g., “Vaccination reduces your risk of severe illness”) are more effective (Hofstede Insights, 2023). In collectivist cultures (e.g., Seoul), individuals prioritize community and group harmony. Messages that emphasize “collective responsibility” (e.g., “Get vaccinated to protect our community”) or “social norms” (e.g., “80% of Seoul residents are vaccinated”) perform better (Park et al., 2022).

2.3.2 High-low context

High-context cultures (e.g., Seoul) rely on implicit communication, nonverbal cues, and shared cultural knowledge. Health messages in these cultures can be more subtle (e.g., a photo of a family wearing masks) and still be understood. Low-context cultures (e.g., New York, Sydney) require explicit, direct messages (e.g., “Wear a mask in indoor public spaces”) with clear instructions (Hall, 1976).

Recent research has applied these frameworks to social media communication. For example, a study of COVID-19 messaging found that Seoul’s Instagram posts—which often featured community scenes (e.g., neighbors helping each other) and implicit calls to action—had higher engagement than New York’s explicit, data-heavy Twitter threads (Miller et al., 2022). However, New York’s threads were more effective at driving specific behaviors (e.g., visiting testing sites) due to their clear instructions.

2.4 Gaps in Existing Literature

Despite the growing body of research, three gaps remain. First, most studies focus on national-level social media communication (e.g., U.S. CDC) rather than city-level strategies, even though cities have unique crisis response responsibilities (e.g., local mask mandates, neighborhood testing sites) and face distinct cultural and demographic challenges (Graham et al., 2022). Second, cross-cultural comparative studies of city-level communication are rare: existing research often compares national strategies or focuses on single cities, limiting our understanding of how cultural context shapes city-level communication effectiveness. Third, few studies measure the impact of social media communication on actual public compliance (e.g., whether individuals wear masks or get vaccinated)—relying instead on self-reported engagement (e.g., “I liked a health post”) or awareness (e.g., “I know about testing sites”) (Wilson et al., 2023).

This study addresses these gaps by: (1) focusing on city-level social media communication; (2) comparing three cities with distinct cultural contexts (New York: individualist, low-context; Seoul:

collectivist, high-context; Sydney: mixed individualist-collectivist, low-context); (3) linking social media content to public compliance using survey data.

3. Methodology

3.1 Research Design

This study uses a sequential mixed-methods design, combining quantitative content analysis (Phase 1), cross-sectional surveys (Phase 2), and qualitative in-depth interviews (Phase 3). The sequential design allows each phase to inform the next: content analysis identifies social media strategies (Phase 1); surveys measure the impact of these strategies on public compliance (Phase 2); interviews with public health communicators explain the rationale behind the strategies (Phase 3). This triangulation of data ensures that findings are both descriptive (what strategies are used) and explanatory (why strategies work or fail) (Creswell & Plano Clark, 2021).

3.2 Case Selection: New York, Seoul, Sydney

We selected three global cities with distinct cultural contexts, public health crisis experiences, and social media usage patterns:

New York (USA): An individualist, low-context city with a diverse population (8.8 million residents) and a history of public health crises (e.g., COVID-19, monkeypox, 2023 influenza outbreak). Its primary social media platforms for health communication are Twitter (X) (for real-time updates) and Instagram (for visual content), with over 1.2 million followers on each platform (NYC DOHMH, 2023).

Seoul (South Korea): A collectivist, high-context city with a dense population (9.7 million residents) and a strong track record of crisis response (e.g., COVID-19, 2022 mpox outbreak). It uses Instagram (for celebrity partnerships) and KakaoTalk (a local messaging app) for health communication, reaching over 2 million users daily (SMG, 2023).

Sydney (Australia): A mixed individualist-collectivist, low-context city with a population of 5.3 million and experience with environmental health

crises (e.g., 2023 wildfire smoke, 2022 influenza) and infectious diseases. Its key platforms are Facebook (for live Q&As) and Twitter (for updates), with 800,000+ followers (NSW Health, 2023).

These cities were chosen for three reasons: (1) they have active, publicly accessible social media accounts for public health communication; (2) they represent diverse cultural contexts, allowing for cross-cultural comparison; (3) they have experienced multiple public health crises in the past three years (2021–2024), providing a rich dataset of communication strategies.

3.3 Phase 1: Content Analysis of Social Media Artifacts

3.3.1 Sampling Strategy

We sampled social media artifacts from January 2021 to December 2024 (the past three years) to capture communication during multiple crises (e.g., COVID-19 variants, monkeypox, wildfires). For each city, we collected artifacts from their official public health social media accounts:

New York: NYC Department of Health and Mental Hygiene (Twitter/X, Instagram)

Seoul: Seoul Metropolitan Government Health Bureau (Instagram, KakaoTalk)

Sydney: NSW Health (Facebook, Twitter/X)

Artifacts included posts, tweets, reels, live streams, and KakaoTalk messages. We used stratified random sampling to ensure coverage of different crisis types and time periods: we divided the 2021–2024 period into 12 quarters and sampled an equal number of artifacts from each quarter ($n=350$ per quarter across all platforms), resulting in a total sample of 4,200 artifacts (1,400 per city). This sampling strategy avoids temporal bias (e.g., overrepresenting content from a single crisis) and ensures coverage of both acute crises (e.g., monkeypox outbreaks) and chronic risks (e.g., ongoing air pollution).

For KakaoTalk messages (Seoul) and Facebook Live streams (Sydney), we accessed archived content via official city databases (e.g., Seoul Metropolitan Government's Digital Archive, NSW Health's Media Library) and transcribed key segments (e.g., Q&A

exchanges during live streams) for analysis. For Twitter/X and Instagram, we used platform APIs (Twitter API v2, Instagram Graph API) to collect posts and engagement metrics (likes, shares, comments), ensuring compliance with data privacy policies (e.g., anonymizing user comments).

3.3.2 Coding Framework

We developed a deductive-inductive coding framework to categorize social media artifacts, drawing from public health crisis communication theory (SCCT, HBM) and cultural theory (Hofstede, Hall). The deductive component included pre-defined codes:

Communication strategy: Aligned with SCCT, categorized as:

- Instructive (guides specific behaviors: e.g., “Get vaccinated at X site on Monday”);
- Adjustment (adapts to unavoidable risks: e.g., “Stay indoors if air quality index > 150”);
- Emotional support (reduces anxiety: e.g., “We’re here to help—call our hotline for support”);
- Misinformation countering (addresses false claims: e.g., “Vaccines do not cause blood clots—here’s the science”).

Cultural framing: Linked to Hofstede’s and Hall’s theories, categorized as:

- Individualist framing (emphasizes personal choice/benefits: e.g., “Vaccination protects *you* from severe illness”);
- Collectivist framing (emphasizes community/social norms: e.g., “Vaccination protects *our* community”);
- High-context communication (implicit, visual: e.g., a photo of masked commuters with no text);
- Low-context communication (explicit, detailed: e.g., “Wear a mask in all indoor public spaces—fine for non-compliance: \$500”).

Content type:

- Data/statistics (e.g., “100 new monkeypox cases in NYC today”);
- Expert commentary (e.g., “Dr. Smith explains why masks reduce transmission”);
- Celebrity/influencer endorsement (e.g., “BTS

shares their vaccination experience”);

- User-generated content (UGC) features (e.g., “Share your mask-wearing tips with #NYCMasks”);
- Actionable resources (e.g., links to testing sites, appointment booking tools).

Crisis type:

- Infectious disease (e.g., COVID-19, monkeypox, influenza);
- Environmental health risk (e.g., wildfire smoke, air pollution, heatwaves);
- Other (e.g., foodborne illness outbreaks).

Engagement metrics: Likes, shares, comments, click-through rates (collected from platform insights).

The inductive component allowed for emerging codes, such as “multilingual content” (e.g., New York’s posts in Spanish, Korean, and Mandarin to reach diverse communities) and “local cultural references” (e.g., Seoul’s use of traditional Korean holidays to promote vaccination: “Get vaccinated before Chuseok to protect your family”).

3.3.3 Reliability Testing

Four trained research assistants (fluent in English, Korean, and Spanish) independently coded a random subset of 420 artifacts (10% of the total sample). We used Cohen’s Kappa to measure inter-coder reliability: the overall Kappa coefficient was 0.84, indicating “substantial” agreement (Landis & Koch, 1977). Disagreements (e.g., conflicting categorization of “individualist” vs. “collectivist” framing) were resolved through group discussion with the lead researchers, and the coding framework was revised to clarify ambiguous terms (e.g., defining “actionable resources” as links that directly enable health behaviors, not just informational pages) before full-scale coding began.

3.4 Phase 2: Cross-Cultural Surveys on Public Compliance

3.4.1 Sample Design

To measure the impact of social media communication on public compliance, we conducted cross-sectional surveys in New York, Seoul, and Sydney between March and July 2024. The target

population was urban residents aged 18–75 who use social media at least once a week (to ensure exposure to social media health content) and had lived in the city for at least 6 months (to ensure familiarity with local health guidelines).

We used stratified random sampling to ensure demographic representativeness (age, gender, ethnicity, income, education) in each city. Sample sizes were determined using G*Power 3.1: assuming a medium effect size ($d=0.5$), $\alpha=0.05$, and $\text{power}=0.80$, we calculated a required sample size of 1,200 per city, resulting in a total sample of 3,600 respondents.

Surveys were administered online via region-specific platforms: Qualtrics (New York, Sydney) and Naver Survey (Seoul, Korea's leading survey platform). To reduce non-response bias, we offered incentives tailored to each city: \$10 Amazon gift cards (New York), ₩10,000 convenience store vouchers (Seoul), and AUD 15 Coles/Woolworths gift cards (Sydney). We also sent two reminder emails to non-respondents after 1 and 2 weeks. The overall response rate was 70% (New York: 68%, Seoul: 75%, Sydney: 67%), which is above the average response rate for urban public health surveys ($\approx 60\%$) (Pew Research Center, 2023).

3.4.2 Survey Instrument

The survey (Appendix A) included six sections, developed based on existing scales (e.g., the Public Health Compliance Scale by Jones et al., 2022) and adapted for cross-cultural use:

Social media usage and exposure: Measures frequency of social media use (e.g., “How often do you use Twitter/X to access health information?”: 1=Never to 5=Daily) and exposure to official health content (e.g., “How often have you seen posts from NYC DOHMH/SMG/NSW Health on social media in the past 6 months?”: 1=Never to 5=Daily).

Perceived message effectiveness: Rates how well social media health messages align with cultural values (e.g., “The health messages I see on social media reflect the values of my community”: 1=Strongly disagree to 5=Strongly agree) and clarity (e.g., “The health messages I see on social media are clear and easy to

understand”: 1=Strongly disagree to 5=Strongly agree).

Public compliance: Measures adherence to health guidelines (e.g., “How often do you wear a mask in indoor public spaces during an influenza outbreak?”: 1=Never to 5=Always) and health behaviors (e.g., “Have you gotten a flu vaccine in the past year?”: Yes/No/Planning to).

Misinformation exposure and susceptibility: Asks about exposure to false health claims (e.g., “How often have you seen claims that ‘COVID-19 vaccines cause blood clots’ on social media?”: 1=Never to 5=Daily) and belief in these claims (e.g., “How true do you think these claims are?”: 1=Definitely false to 5=Definitely true).

Trust in government and health institutions: Rates trust in official sources (e.g., “I trust the information provided by NYC DOHMH/SMG/NSW Health on social media”: 1=Strongly distrust to 5=Strongly trust).

Demographics: Collects age, gender, ethnicity, income, education, and pre-existing health conditions (e.g., “Do you have a chronic illness that increases your risk of severe illness from infectious diseases?”: Yes/No).

The survey was translated into Korean (for Seoul) by professional translators and back-translated into English to ensure accuracy (Brislin, 1970). A pilot test with 100 respondents per city ($n=300$) was conducted to refine the instrument: ambiguous items (e.g., “health guidelines”) were clarified (e.g., “mask-wearing, vaccination, social distancing during outbreaks”), and response options were adjusted to fit local contexts (e.g., adding “KakaoTalk” to the list of social media platforms for Seoul respondents).

3.4.3 Data Analysis

Survey data were cleaned (removing incomplete responses: $n=54$) and analyzed using SPSS 28.0 and R 4.3.0. We used descriptive statistics (mean, frequency) to summarize social media exposure, compliance, and misinformation susceptibility across cities. To test the impact of social media communication on compliance (Research Objective 3), we used multiple

regression analysis: the dependent variable was compliance (average score on health behavior items), and the independent variables were communication strategy (instructive/adjustment/emotional support), cultural framing (individualist/collectivist), trust in government, misinformation susceptibility, and demographic variables (age, income, health status). We also conducted moderation analysis to test if cultural framing moderates the relationship between communication strategy and compliance (e.g., does instructive strategy have a stronger effect in low-context vs. high-context cultures?).

3.5 Phase 3: In-Depth Interviews with Public Health Communicators

3.5.1 Participant Selection

We conducted semi-structured interviews with 30 public health communicators (10 per city) who were directly involved in designing and implementing social media crisis communication strategies (2021–2024). Participants were selected using purposive sampling based on their role:

New York: 4 from NYC DOHMH (Social Media Team), 3 from the NYC Mayor’s Office of Media and Entertainment, 3 from non-profit partners (e.g., NYC Health + Hospitals).

Seoul: 4 from SMG Health Bureau (Digital Communication Division), 3 from the Korean Ministry of Health and Welfare (Local Support Team), 3 from private PR agencies (e.g., Cheil Worldwide) partnering with SMG.

Sydney: 4 from NSW Health (Communication Branch), 3 from the Australian Department of Health (Urban Crisis Response Team), 3 from academic institutions (e.g., University of Sydney’s Centre for Health Communication) advising NSW Health.

All participants had at least 2 years of experience in public health communication and were familiar with social media analytics. Interviews were conducted in English (New York, Sydney) or Korean (Seoul, with a professional interpreter) and lasted 45–60 minutes.

3.5.2 Interview Guide

The interview guide (Appendix B) included open-ended questions organized around four themes:

Strategy design: “What social media strategies do you prioritize for public health crisis communication in [city]?” “How do you tailor messages to different cultural or demographic groups in the city?”

Cultural challenges: “What cultural barriers have you faced when communicating health guidelines via social media?” “How do you adjust your strategies to address these barriers?”

Misinformation response: “How do you identify and counter misinformation about public health crises on social media?” “What resources do you have for misinformation countering (e.g., fact-checking teams, partnerships)?”

Evaluation and learning: “How do you measure the effectiveness of your social media strategies (e.g., compliance, engagement)?” “What lessons have you learned from past crises that will inform future communication?”

The guide was pilot-tested with 3 communicators (1 per city) to ensure clarity, and questions were revised to avoid jargon (e.g., replacing “cultural framing” with “tailoring messages to different communities”).

3.5.3 Data Analysis

Interviews were audio-recorded (with participant consent) and transcribed verbatim. We used thematic analysis (Braun & Clarke, 2006) to identify key themes:

Familiarization: Researchers read all transcripts to gain an overview of the data.

Coding: Transcripts were coded using inductive codes (e.g., “multilingual content challenges”) and deductive codes (e.g., “collectivist framing rationale”).

Theme development: Codes were grouped into themes (e.g., “resource constraints for misinformation countering”).

Review: Themes were reviewed to ensure they captured the data accurately, and minor adjustments were made (e.g., merging “celebrity partnership benefits” and “influencer trust” into “trusted messenger”).

strategies”).

Definition: Each theme was defined and supported with participant quotes (e.g., “Seoul’s use of K-pop: ‘BTS has a huge youth following—their vaccination posts got more engagement than any government post we’ve ever done’ – SMG Health Bureau Specialist”).

Inter-coder reliability was measured using Cohen’s Kappa ($K=0.82$, “substantial” agreement) between two researchers, and discrepancies were resolved through discussion.

3.6 Ethical Considerations

This study adheres to the ethical guidelines of the International Communication Association (ICA) and the IRBs of the researchers’ institutions (Columbia University IRB #2024-0031, Seoul National University IRB #SNU-IRB-2024-018, University of Sydney IRB #USYD-IRB-2024-029). Key ethical measures include:

Informed consent: Survey respondents and interview participants received a consent form explaining the study’s purpose, data usage, and privacy protections (e.g., anonymization of responses).

Anonymity: Interview participants are referred to by role (e.g., “NYC DOHMH Social Media Manager”) rather than name, and survey data are stored with anonymized IDs.

Misinformation protection: Survey items about false health claims were followed by corrective information (e.g., “The claim that ‘vaccines cause blood clots’ is false—studies show vaccines are safe”) to prevent respondents from retaining misinformation.

Cultural sensitivity: Survey and interview questions were reviewed by local public health experts (e.g., a Seoul-based epidemiologist) to avoid cultural insensitivity (e.g., not framing mask-wearing as “mandatory” in cultures where individual choice is valued).

Data security: All data are stored on password-protected servers with encryption, and access is limited to the research team.

4. Results

4.1 Phase 1: Social Media Communication Strategies (Research Objective 1)

4.1.1 Communication Strategies Across Cities

Table 1 presents the distribution of communication strategies for each city. Overall, instructive strategies were the most common globally (42%), followed by misinformation countering (23%), adjustment (18%), and emotional support (17%). However, significant differences emerged between cities:

New York: Instructive strategies dominated (48% of artifacts), focused on actionable resources and individual behavior guidance. Examples included Twitter threads listing free testing sites (“Get tested at X, Y, Z locations—no appointment needed”) and Instagram posts explaining how to book vaccination appointments (“Step 1: Visit nyc.gov/vaccine...”). Misinformation countering was the second most common strategy (25%), primarily addressing anti-vaccine claims and false information about mask effectiveness (e.g., “Masks reduce transmission—here’s the CDC data”).

Seoul: Collectivist-focused instructive strategies were most prevalent (45% of artifacts), emphasizing community protection. For example, Instagram posts featuring K-pop celebrities stated: “Get vaccinated to protect your family and neighbors,” and KakaoTalk messages reminded users: “Our community’s safety depends on everyone following guidelines.” Emotional support was more common in Seoul (22%) than in New York or Sydney, with posts like “We know this is hard—call our mental health hotline for support” during COVID-19 surges.

Sydney: Adjustment strategies were most common (30% of artifacts), reflecting its focus on environmental health crises (e.g., wildfire smoke). Facebook posts advised: “Stay indoors if air quality index > 150—here’s how to use air purifiers,” and Twitter threads shared real-time air quality maps. Science transparency was a key sub-strategy: 28% of Sydney’s artifacts included expert commentary (e.g.,

“Dr. Emma Wilson explains why wildfire smoke is harmful to respiratory health”).

4.1.2 Cultural Framing and Content Type

Cultural framing varied significantly by city, aligning with Hofstede’s and Hall’s theories (Table 2):

New York: Individualist framing was dominant (55% of artifacts), with messages like “Vaccination reduces *your* risk of severe illness” and “Choose to wear a mask to protect *your* health.” Low-context communication was also prevalent (68%), with explicit instructions and fines for non-compliance (e.g., “Mask mandate in effect—\$500 fine for violations”). Multilingual content was common (32% of artifacts), with posts in Spanish (18%), Korean (8%), and Mandarin (6%) to reach diverse communities.

Seoul: Collectivist framing was the most common (62% of artifacts), emphasizing social norms and community responsibility: “80% of Seoul residents are vaccinated—join them to protect our city” and “Mask-wearing is how we care for each other.” High-context communication was used in 45% of artifacts, such as photos of masked families celebrating

Chuseok (Korean Thanksgiving) with no explicit text—relying on cultural familiarity to convey mask-wearing norms. Celebrity/influencer endorsements were most common in Seoul (35% of artifacts), with K-pop stars, actors, and athletes partnering with the city to promote health behaviors.

Sydney: Mixed individualist-collectivist framing was used (45% individualist, 35% collectivist), reflecting its diverse population. Individualist messages included “Get a flu shot to protect *your* health,” while collectivist messages focused on vulnerable groups: “Wear a mask to protect the elderly and immunocompromised.” Low-context communication dominated (72%), with detailed, data-driven content (e.g., “Wildfire smoke has increased respiratory hospitalizations by 15%—here’s how to stay safe”). Expert commentary was the most common content type (28% of artifacts), with epidemiologists and environmental scientists featured in Facebook Live Q&As.

4.1.3 Engagement Metrics by City and Strategy

Engagement metrics (likes, shares, comments) varied by city and communication strategy (Table 3):

New York: Instructive strategies had the highest click-through rates (32%), as users sought actionable resources (e.g., testing site links). However, shares were low (18%) for misinformation countering posts, with users reporting that “fact-checks feel too long” in survey follow-ups. Twitter was the most engaging platform (average 12,000 likes per post), compared to Instagram (8,000 likes).

Seoul: Collectivist instructive strategies had the highest engagement overall: Instagram posts with K-pop celebrities averaged 50,000 likes and 15,000 shares—3x higher than government-only posts. KakaoTalk messages had the highest comment rates (25%), as users asked follow-up questions about health guidelines. High-context visual content (e.g., masked families) had 2x more shares than text-heavy posts.

Sydney: Adjustment strategies with expert commentary had the highest engagement: Facebook Live Q&As with epidemiologists averaged 10,000 views and 500 comments, with users praising “clear, science-based information.” Twitter threads with real-time air quality maps had high click-through rates (28%), as users sought up-to-date data during wildfire events.

4.2 Phase 2: Public Compliance and Social Media Impact (Research Objective 3)

4.2.1 Social Media Exposure and Perceived Effectiveness

Survey results revealed significant differences in social media exposure and perceived effectiveness across cities (Table 4):

Seoul: 85% of respondents reported daily exposure to official social media health content (the highest among the three cities), with 78% rating messages as “very effective” at aligning with cultural values. KakaoTalk was the most used platform (72% of respondents), followed by Instagram (65%).

New York: 70% of respondents reported daily exposure, with 62% rating messages as “effective” at

aligning with cultural values. Twitter was the most used platform (68%), followed by Instagram (55%). Multilingual content was rated “very helpful” by 58% of non-English speakers (e.g., Spanish, Korean communities).

Sydney: 75% of respondents reported daily exposure, with 70% rating messages as “very effective” for clarity. Facebook was the most used platform (65%), followed by Twitter (58%). Expert commentary was rated “very trustworthy” by 82% of respondents, the highest among all content types.

Perceived effectiveness was strongly correlated with trust in government: Seoul had the highest trust rating (mean=4.3/5), followed by Sydney (mean=3.8/5), and New York (mean=3.2/5).

4.2.2 Public Compliance with Health Guidelines

Public compliance (measured by adherence to mask-wearing, vaccination, and avoidance behaviors during crises) varied significantly by city (Table 5):

Seoul: Had the highest overall compliance (82% reported “always” following guidelines), with 90% of respondents reporting flu vaccination in the past year and 85% wearing masks during influenza outbreaks.

Sydney: Had moderate compliance (75% “always” following guidelines), with 80% flu vaccination rates and 78% mask-wearing during air pollution events.

New York: Had the lowest compliance (68% “always” following guidelines), with 70% flu vaccination rates and 65% mask-wearing during monkeypox outbreaks.

Multiple regression analysis showed that two factors were the strongest predictors of compliance across all cities: (1) perceived message alignment with cultural values ($\beta=0.42$, $p<0.001$) and (2) trust in government ($\beta=0.38$, $p<0.001$). For example, Seoul respondents who perceived messages as culturally aligned were 42% more likely to comply than those who did not.

Moderation analysis revealed that cultural framing moderated the relationship between communication strategy and compliance:

In Seoul (collectivist, high-context), collectivist framing strengthened the effect of instructive strategies on compliance ($\beta=0.45$, $p<0.001$).

In New York (individualist, low-context), individualist framing strengthened the effect of instructive strategies ($\beta=0.39$, $p<0.001$).

In Sydney (mixed, low-context), both framings were effective, but low-context communication (explicit instructions) had a stronger impact than high-context ($\beta=0.35$ vs. $\beta=0.22$, $p<0.001$).

4.2.3 Misinformation Exposure and Susceptibility

Misinformation exposure and susceptibility varied dramatically by city (Table 6):

New York: Had the highest exposure to misinformation (65% of respondents reported daily exposure) and susceptibility (32% believed at least one false claim, e.g., “Vaccines cause blood clots”). Anti-vaccine misinformation was the most common (45% of false claims), followed by misinformation about mask effectiveness (30%).

Sydney: Had moderate exposure (50% daily) and susceptibility (22% believed false claims), primarily about environmental health risks (e.g., “Wildfire smoke is not harmful”).

Seoul: Had the lowest exposure (35% daily) and susceptibility (12% believed false claims), with most misinformation focused on vaccine side effects (25% of false claims).

Susceptibility was negatively correlated with trust in government ($r=-0.62$, $p<0.001$) and exposure to official misinformation countering content ($r=-0.58$, $p<0.001$). For example, Seoul respondents who frequently saw official fact-checks were 58% less likely to believe misinformation than those with low exposure.

4.3 Phase 3: Practitioner Perspectives (Research Objective 2)

4.3.1 Rationale for Cultural Framing and Strategy Selection

Interviews revealed that cities tailored their strategies to cultural context and local needs:

Seoul: Practitioners emphasized collectivist framing to align with Korean cultural values. As an SMG Health Bureau Specialist explained: “Koreans prioritize community harmony—messages about ‘protecting your family’ work better than ‘protecting yourself.’” They also highlighted celebrity partnerships as a way to reach young audiences: “BTS and Blackpink have credibility with teens—their posts make vaccination feel like a ‘social norm.’”

New York: Practitioners focused on individualist framing and actionable resources to respect personal autonomy. A NYC DOHMH Social Media Manager noted: “New Yorkers value choice—we don’t tell people to ‘do this,’ we say ‘here’s how to protect yourself if you choose.’” Multilingual content was a priority for diversity: “We have 800 languages spoken here—if we don’t post in Spanish or Korean, we’re missing huge communities.”

Sydney: Practitioners used mixed framing and expert commentary to balance diversity and trust. A NSW Health Communication Officer said: “We have both individualist and collectivist communities—mixed messages work best. Experts add trust—Australians want to hear from scientists, not just politicians.”

4.3.2 Challenges in Social Media Crisis Communication

Practitioners identified three common challenges, with city-specific variations:

Misinformation countering: New York faced the biggest challenge due to limited resources: “We have a small fact-checking team—by the time we respond to a false claim, it’s already gone viral” (NYC DOHMH Partner). Seoul had dedicated government fact-checking teams and platform partnerships (e.g., KakaoTalk) to remove misinformation quickly, while Sydney relied on academic experts to debunk false claims.

Platform fragmentation: All cities struggled with managing multiple platforms, but Seoul and New York faced unique issues. Seoul’s practitioners noted: “KakaoTalk is essential for older audiences, but Instagram is for teens—we need separate strategies

for each.” New York’s team struggled with Twitter’s (X) algorithm changes: “The algorithm prioritizes engagement over accuracy—our fact-checks get less reach than sensational misinformation.”

Cultural adaptation for diverse communities:

New York and Sydney faced challenges with cultural sensitivity. A Sydney Academic Advisor explained: “We have large Indigenous communities—messages about ‘staying indoors’ during wildfires don’t account for those living in remote areas with no air conditioning.” New York’s team learned to involve community leaders: “We now work with Spanish-speaking pastors to co-create content—they know what resonates with their congregations.”

4.3.3 Lessons Learned and Future Plans

Practitioners shared key lessons for future crises:

Seoul: “Double down on trusted messengers—celebrities and community leaders have more impact than government accounts. We’re also investing in AI to detect misinformation faster.”

New York: “Prioritize multilingual content from the start—don’t just translate English posts. We’re also testing shorter fact-checks (15-second videos) to compete with misinformation.”

Sydney: “Expand expert partnerships—we’re training local doctors to be social media ambassadors. We’re also improving real-time data sharing (e.g., air quality maps) to keep audiences informed.”

5. Discussion

5.1 Key Findings and Alignment with Theory

This study’s findings validate and extend existing public health crisis communication and cultural theory. First, we confirmed that cultural framing mediates the effectiveness of social media strategies—aligning with Hofstede’s (2001) individualism-collectivism framework. Collectivist framing was most effective in Seoul (collectivist culture), individualist framing in New York (individualist culture), and mixed framing in Sydney (mixed culture). This supports Park et al.’s (2022) research on cultural adaptation in health

communication but adds a city-level, social media-specific dimension.

Second, we found that social media engagement metrics (likes, shares) correlate with public compliance only when messages align with cultural values. Seoul's collectivist, celebrity-endorsed posts had the highest engagement and compliance, while New York's individualist, resource-focused posts had lower engagement and compliance—likely due to lower trust in government. This extends the SMCCM (Austin et al., 2021) by showing that two-way communication (engagement) is not enough; messages must also be culturally relevant to drive behavior change.

Third, misinformation susceptibility is strongly linked to trust in government and exposure to official fact-checks. Seoul's high trust and robust fact-checking infrastructure reduced susceptibility, while New York's low trust and limited resources increased it. This supports Lazer et al.'s (2021) research on misinformation in public health but highlights the role of city-level policies (e.g., dedicated fact-checking teams) in mitigating risks.

Fourth, platform selection should align with cultural communication styles: high-context Seoul prioritized visual, community-focused platforms (KakaoTalk, Instagram), while low-context New York and Sydney favored information-rich platforms (Twitter, Facebook). This extends Hall's (1976) high-low context theory to social media, showing that platform affordances (e.g., visual vs. text-heavy) must match cultural communication preferences.

5.2 Theoretical Contribution: The Crisis Communication Adaptability Framework

Building on our findings, we propose a **Crisis Communication Adaptability Framework** for city-level social media public health communication (Figure 1). This framework integrates cultural theory, social media strategy, and public health outcomes to guide practitioners in designing effective, context-specific strategies. The framework has four core components:

Cultural Context Assessment: Cities first map the cultural traits of their population (individualism-

collectivism, high-low context) and demographic diversity (e.g., language, ethnicity). For example, New York's assessment would highlight its individualist, low-context culture and diverse, multilingual population.

Strategy and Framing Selection: Based on cultural context, cities choose communication strategies and framing:

Collectivist, high-context cultures (e.g., Seoul): Instructive strategies with collectivist framing ("protect the community"), trusted messengers (celebrities, community leaders), and visual platforms (Instagram, local messaging apps).

Individualist, low-context cultures (e.g., New York): Instructive strategies with individualist framing ("protect yourself"), actionable resources (testing links, appointments), and text/resource-rich platforms (Twitter, multilingual content).

Mixed cultures (e.g., Sydney): Mixed framing, adjustment strategies for environmental risks, expert commentary, and balanced platform use (Facebook for live Q&As, Twitter for updates).

Misinformation Mitigation: Cities implement context-specific misinformation countering:

High-trust cities (e.g., Seoul): Dedicated fact-checking teams, platform partnerships to remove misinformation, and trusted messengers to debunk false claims.

Low-trust cities (e.g., New York): Short, engaging fact-checks (videos, infographics), community leader co-creation, and multilingual debunking.

Evaluation and Iteration: Cities track both engagement metrics (likes, shares) and outcomes (compliance, trust) to refine strategies. For example, Sydney might adjust expert commentary frequency based on Q&A view rates, while New York might expand multilingual content based on user feedback.

This framework fills a gap in existing theory by providing a practical, city-specific tool that integrates cultural adaptation with social media strategy—moving beyond one-size-fits-all national models.

5.3 Practical Implications for Public Health Communicators

The findings offer actionable insights for city-level public health communicators:

Prioritize Cultural Alignment Over “Best Practices”: Avoid adopting strategies from other cities without adapting to local culture. For example, a collectivist city like Seoul should not copy New York’s individualist messaging—instead, focus on community-focused framing.

Leverage Trusted Messengers: Partner with celebrities (Seoul), community leaders (New York), or experts (Sydney) to increase message credibility. These messengers have more impact than government accounts alone, especially in low-trust contexts.

Invest in Misinformation Infrastructure: Allocate resources to dedicated fact-checking teams (Seoul’s model) and platform partnerships. For low-resource cities, use short, visual fact-checks to compete with misinformation.

Tailor Platforms to Audience Needs: Use local platforms where relevant (e.g., KakaoTalk in Seoul) and balance platform use to reach diverse groups (e.g., Twitter for young New Yorkers, multilingual Instagram for Spanish-speaking communities).

Involve Communities in Content Creation: Co-create content with marginalized groups (e.g., New York’s Spanish-speaking pastors, Sydney’s Indigenous leaders) to ensure cultural sensitivity and relevance.

5.4 Limitations and Future Research

This study has three limitations. First, our sample focused on three global cities with relatively robust public health infrastructure—findings may not apply to smaller cities or those with limited resources (e.g., cities in low-income countries). Future research should include mid-sized and low-resource cities to test the Crisis Communication Adaptability Framework across diverse contexts.

Second, we measured compliance using self-reported surveys, which may be subject to social desirability bias (e.g., respondents overreporting mask-wearing). Future studies could use objective data (e.g.,

vaccination records, air quality-related hospitalizations) to validate self-reported compliance.

Third, we focused on three crisis types (infectious diseases, environmental risks)—findings may not apply to other public health crises (e.g., mental health crises, foodborne outbreaks). Future research should explore how social media strategies adapt to different crisis types.

Additional future research directions include:

Exploring the role of AI in cultural adaptation (e.g., AI-generated multilingual content, culturally tailored fact-checks).

Analyzing the impact of social media algorithms on the reach of official health content vs. misinformation.

Investigating how cultural adaptation affects equity (e.g., do multilingual strategies reduce health disparities in diverse cities?).

6. Conclusion

This study demonstrates that social media’s effectiveness in public health crisis communication depends on cultural adaptation—one-size-fits-all strategies fail to resonate across diverse global cities. Seoul’s collectivist, celebrity-driven approach achieved the highest compliance by aligning with Korean cultural values; New York’s individualist, resource-focused strategy struggled due to low trust and misinformation; and Sydney’s mixed, expert-led approach balanced diversity and clarity.

The Crisis Communication Adaptability Framework we propose provides a roadmap for cities to navigate these challenges: by assessing cultural context, selecting tailored strategies, mitigating misinformation, and iterating based on feedback, cities can turn social media from a challenge into a strength during public health crises.

As urban populations grow and public health threats evolve—from new infectious diseases to climate-related environmental risks—cities must prioritize culturally adaptive social media communication. By doing so, they can build trust,

reduce misinformation, and ultimately save lives. In an increasingly connected world, where public health crises transcend borders but communication remains deeply rooted in local culture, the ability to adapt social media strategies to cultural context is not just a best practice—it is a necessity.

This study's findings also highlight the importance of equity in crisis communication. Cities like New York and Sydney must ensure that marginalized communities—whether non-English speakers, Indigenous groups, or low-income populations—are not left behind by one-size-fits-all messaging. Co-creating content with community leaders, investing in multilingual resources, and addressing unique barriers (e.g., lack of air conditioning in remote Indigenous communities) are critical steps toward more equitable communication.

For public health scholars, this study reinforces the need for interdisciplinary research that bridges communication, culture, and public health. The Crisis Communication Adaptability Framework offers a starting point for future work, but it must be refined through studies in more diverse contexts—from small cities in low-income countries to multicultural urban centers with unique cultural blends.

In the end, social media is a tool—its effectiveness depends on how it is wielded. By grounding social media strategies in cultural context, cities can harness its power to protect public health, build trust, and create more resilient communities in the face of future crises.

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