

Literature Review: Strategies for Addressing Language Barriers During Humanitarian Relief Operations

Carlo Rossi, MD, MTMH; Sylvain Grenier, B Pharm, PharmD;
Régis Vaillancourt, B.Pharm, Pharm D, FCSHP, FFIP, FOPQ

ABSTRACT

Humanitarian relief operations (HUMRO) represent a nexus between military diplomacy and global health engagement, and may play an increasing role in military operations in the near future. Language barriers between providers and the individuals being assisted are a significant constraint on HUMRO. A literature review was conducted to identify recommendations to address patient-provider language discordance in the international HUMRO context. This was supplemented by a North Atlantic Treaty Organization and US Department of Defense doctrinal review to identify existing best practices for addressing language barriers. Four general themes were identified: (1) print-based aids, (2) information technology, (3) bilingual responders, and (4) the effective use of medical interpreters in the HUMRO setting. Each strategy is reviewed. Informed by expert opinion, we provide concrete leadership and training recommendations for how HUMRO providers might more effectively communicate with patients in a deployed language-discordant context.

Key Words: health literacy, disaster medicine, public health professional, education

Humanitarian relief operations (HUMRO) involve rapidly deployable response elements whose goals are to preserve life and alleviate suffering in the aftermath of disasters. The unpredictable nature of these operations requires medical responders to be ready to deploy on short notice, or to re-direct efforts from training international partners to providing direct medical aid to vulnerable people. One element of preparedness for such responders is to familiarize themselves with strategies that enable effective communication within distinct cultural and linguistic contexts.¹ Medical providers face the additional challenge of overcoming language barriers to relay health concepts and complex medical terminology.²

Patient-provider language discordance (when a patient and provider lack proficiency in the same language) has serious implications for the quality of services a patient receives.³ The inability to communicate effectively with a health-care provider limits access, erodes trust, and may lead to inaccurate diagnosis and/or treatment.⁴ This has been recognized by the international aid community including the United Nations High Commissioner for Refugees (UNHCR), the United Nations Children's Fund (UNICEF), the International Committee of the Red Cross (ICRC), the World Health Organization (WHO) as well as organizations charged with establishing best practices such as the Humanitarian

Accountability Partnership (HAP) and the Sphere Project.⁵⁻¹⁰ These organizations all emphasize effective communication in the language(s) of the affected peoples as a key measure of success. A further consensus of Humanitarian Assistance and Disaster Relief (HADR) organizations has identified the presence of a translator (a surrogate measure for "effective" communication) as critical performance metrics for HUMRO evaluations.¹¹

Low health literacy can have a significant impact on a patient's health outcome including, for example, suboptimal compliance with prescribed medications, poorer recall of medical information discussed with providers, and decreased ability to ask questions / provider accurate answers to health-care providers. The desired end state of addressing patient-provider language discordance is improved health literacy, defined by the Centers for Disease Control define as "the degree to which individuals have the capacity to obtain, communicate, process, and understand basic health information and services needed to make appropriate health decisions".¹² The intent of this review article was 2-fold; (a) to consolidate the available experiential opinion on best practices in addressing communication barriers during HUMRO; and (b) provide our opinion on how responders can more effectively communicate with patients in a deployed language-discordant context.

TABLE 1

Search Terms Used for Literature Review	
Database	Search Criteria
EMBASE	'disaster medicine' OR 'disaster' AND ('language barrier' OR 'language') AND [2005-2015]/py AND [english]/lim AND [abstracts]/lim AND [1-1-2005]/sd NOT [1-1-2015]/sd
PsychINFO	[exp Natural Disasters/ or exp Disasters/] AND [exp Language/ or interpret*.mp] (2005:2015) AND English[lang]
PubMed	("Disaster Medicine"[Mesh] OR "Disasters"[MESH]) AND ("Communication Barriers"[Mesh] OR "Language"[Mesh]) Filters: Publication date from 2005/01/01 to 2015/01/01; English
Web of Science	Topic: [disaster OR disaster response OR disaster relief OR disaster recovery] AND Topic:[communication barrier OR language] Refined by: Languages: (english) AND document types: (article) AND publication years: (2015-2005) Indexes=SCI-EXPANDED, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, CCR-EXPANDED, IC

METHODS

A literature review was conducted between November 2016 and February 2017 in 4 major databases using the search terms listed at Table 1. Inclusion criteria were restricted to articles published in the English language between January 1, 2005, and December 31, 2015, that specifically addressed communication strategies between language discordant health-care providers during humanitarian missions in a deployed (nondomestic) setting. A single reviewer (Rossi) read all abstracts identified by the search strategy and applied the inclusion criteria. Full text of selected articles were obtained for second level review. The references for each retained article were also reviewed in an effort to locate additional resources that met our inclusion criteria but were not identified by our search strategy (Table 1).¹³⁻¹⁹

RESULTS

We reviewed 214 identified references by title and/or abstract and selected 17 articles for further review (Figure 1). To be included, articles must have addressed communication barriers during international disaster relief operations where medical providers and patients did not speak the same language. Of the 17 articles identified for further review, 6 were retained and were supplemented by 3 additional sources identified through a manual review of bibliographies (Table 2). Available North American Treaty Organization (NATO) and US Department of Defense (DoD) documentation referencing communication barriers as they relate to international HUMRO was also reviewed (Table 3). An assessment of risk of bias across included studies was not done as the literature included universally reflected experiential opinion and nonresearch evidence. In each case, the opinion was assessed as being of good quality as the authors' expertise

appeared credible and fairly definitive and evidence-informed conclusions were drawn in each article. After review of this literature, data were extracted by thematic group and consolidated into 4 general communication themes: (1) print-based aids, (2) information technology, (3) use of bilingual responders, and (4) the effective use of medical interpreters. These strategies will be discussed in detail and followed by the suggestions for evidence-informed practices to address language barriers in HADR operations. Informed by this expert opinion, we have provided concrete recommendations for how HUMRO providers might more effectively communicate with patients in a deployed language-discordant context (Tables 2 and 3).

Print-Based Language Aids

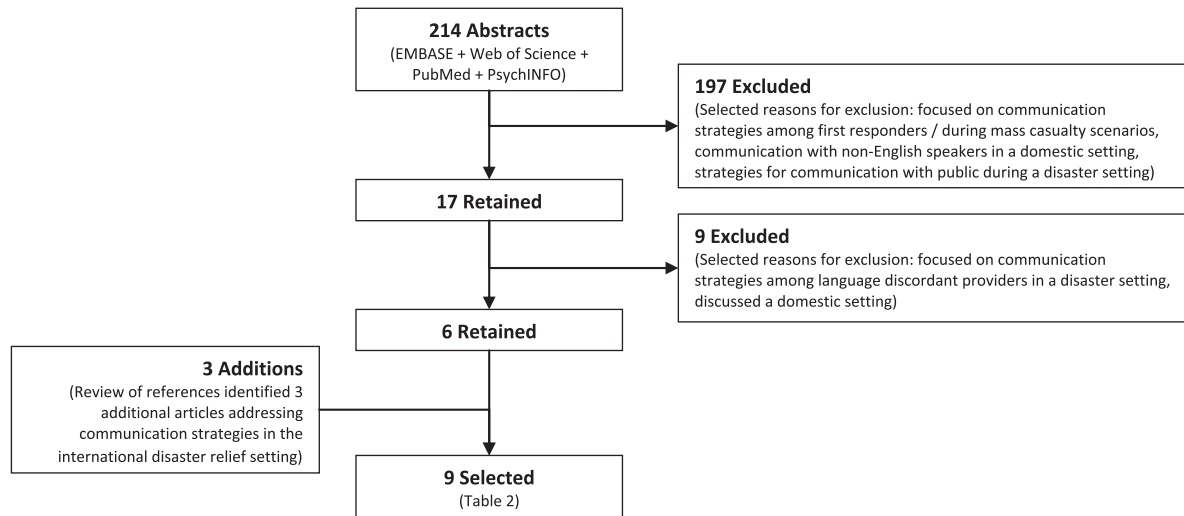
For the purposes of this document, print-based language aids refer to the spectrum of "commercial off-the-shelf" (COTS) technologies, graphic or text-based, that may assist in communication. In the United States, picture-based tools have demonstrated a positive impact on health-care outcomes. In a randomized emergency room setting, for example, access to such guides resulted in English-language providers being more than twice as likely to identify a non-English speaking patient's primary medical concern.²⁰ In the same study, the risk of catastrophic medical errors due to unrecognized patient medication allergies was also significantly reduced.

Pictograms are descriptive symbols that are designed to help convey information or instruction. Unlike written or verbal communication, they are expected to be understood by speakers of different languages. Their use helps to reduce the amount of reading required and motivates patients to follow medication instructions, therefore, leading to a positive effect on the patient's ability to recall and retain medication instructions.²¹ Pharmacists in the Military and Emergency Pharmacy Section (MEPS) of the International Pharmaceutical Federation are involved in providing humanitarian care for patients, often where they do not have a language in common. For these reasons MEPS developed a project to design and develop pictograms to label medications. Research has shown that the use of pictograms along with text leads to improvement in understand of health information across a variety of both disease processes and cultural/geographic areas.²²⁻²⁴ Therefore, pictograms can be a valuable tool to help bridge the gap in communication that can exist between HUMRO providers and patients.

Graphic aids are generally easy to use, easily accessible, and inexpensive, but they do have potential limitations. In the case of images or pictograms generated by software, having access to a computer, a printer, even the Internet for solutions only available online, may pose a logistical challenge in many situations where HUMRO are conducted. An individual's cultural background will influence their ability to interpret "standard" representations of physical and/or psychological

FIGURE 1

Article Selection Pathway.



symptoms.²⁵ A recent study conducted by Clawson and colleagues investigated the efficacy of pictorial representations among 186 medical humanitarian assistance providers assigned to a US Navy Hospital Ship Medical Civic Action Program (MEDCAP). In their analysis, pictograms were reported as useful aids for conveying simple concepts such as medication schedules or instructions on how to properly use a medical device. They noted, however, that nonnative English speakers as well as people from different cultural backgrounds interpret pictorials representing complex ideas differently.²⁶

The interpretation of pictograms by patients will also be affected by the context around the population in which the pictograms are being used. In areas where the only potable water is available through water bottles, a pictogram depicting drinking water coming from a faucet may not be understood and vice-versa. Pictograms used to warn about avoiding the use of alcohol are also highly influenced by the context in which the population accesses alcohol. In several countries and regions, a bottle of wine or a can of beer will be easily understood as depicting alcohol. In other regions of the world where alcohol is mainly artisanal and available in jugs or jerry cans, the pictogram would differ greatly.²⁴

Text-based medical phrasebooks are another commonly used print-based language aid. They have been advocated as effective and inexpensive communication adjuncts during international operations.²⁷ Many phrasebooks are organized by symptom cluster or by physiologic system, reducing the length of time required for a provider to find related follow-on questions to ask their patients.²⁸ Limitations of this technology include the need for patients to have an adequate

level of health literacy and the potential difficulty in matching patient answers to available pretranslated phrases.

Information Technology

The use of information technology (IT) to bridge the language gap in HADR operations is becoming increasingly common. Machine Foreign Language Translation (MFLT) algorithms have advanced considerably beyond simple word translation and are increasingly able to decode meaning in 1 language and re-encode the same meaning in another language. IT solutions to patient/provider language discordance have begun to shift from literal translation (word-for-word) to a more interpretative capacity. IT solutions are available that allow providers and patients to interact in the languages of their choosing by means of touch screen interfaces while their selections are instantaneously translated to speech in a language their counterpart can understand.²⁹ Like print-based pictorial representations, however, icon-to-speech technology is limited by the available preprogrammed response selections, and the difficulty in expressing complex medical processes through icons.

Two-way speech-to-speech (S2S) foreign language communication software is the desired end goal of many MFLT developers. In the United States, the Defense Advanced Research Project Agency (DARPA) has led the way in developing S2S technology through the Spoken Language Communication and Translation System for Tactical Use (TRANSTAC) initiative. Although these platforms were designed specifically for the US DOD war-fighter community, they are currently operating with over a 100,000 word capacity and are increasingly including some medical terminology to the lexicon.³⁰

TABLE 2

Literature Addressing Communication Strategies for HUMRO

Author	Title	Reference	Communication Strategy
Samarasinghe	Disaster management: lessons from immediate responses to the tsunami.	<i>Ceylon Med J.</i> 2005;50(1):25-7.	Self-identified bilingual staff volunteering to act as translators in a medical capacity (ad hoc) did not mitigate all communication issues / concerns. More comprehensive measures to enhance communication between providers and affected peoples is encouraged [bilingual responders, interpreters].
Bridgewater, et al.	Team Echo: observations and lessons learned in the recovery phase of the 2004 Asian tsunami.	<i>Prehosp Disaster Med.</i> 21(1): s20-25.	Given the high degree of psychological trauma in disaster survivors, fluency and cultural communication skills were as important as medical vocabulary when using ad hoc interpreters. Consideration should be given to recruiting specifically qualified interpreters [bilingual responders, interpreters].
Merchant, et al.	Health care volunteers and disaster response—first, be prepared.	<i>N Engl J Med.</i> 2010;11;362(10):872-3.	Pre-disaster planning and training are critical to an optimal urgent medical response to a disaster; health care providers can be more quickly identified and used in a disaster if training (including communication/cultural awareness focused) is conducted routinely in anticipation of future crises [print-based aids, interpreters].
Wegner, et al.	Bringing comfort to Haiti.	<i>Plast Surg Nurs.</i> 2010;30(3):133-49; quiz 150-1.	Formal training on the use of interpreters provides an additional avenue to educate about the spectrum of cross-cultural issues that will impact effective communication strategies in DR settings [interpreters].
Zoraster, RM	Working with interpreters during international health responses.	<i>Disaster Med Public Health Prep.</i> 2011;5(2):159-63.	No formal guidance exists for emergency health care providers using interpreters in foreign settings related to DR. It is important that providers are prepared to optimize the relationship with the interpreter (includes non-traditional interpreter roles) and be aware of potential pitfalls [bilingual responders, interpreters].
Clawson, et al.	Using pictograms for communication.	<i>Mil Med.</i> 2012;177(3):291-5.	Validated images (medical picture books) may be a reliable method of temporary communication in situations where medical providers and patients cannot communicate verbally [print-based, IT].
Babcock, et al.	The academic health center in complex humanitarian emergencies: lessons learned from the 2010 Haiti earthquake.	<i>Acad Med.</i> 2012;87(11):1609-15.	Pre-selecting teams from a large pool of volunteers based on communication ability was endorsed as an effective communication strategy if sufficient resources are available. This team preferentially selected members based on both prior experience (working in resource-limited settings) and language skills in Haitian Creole and French [bilingual providers, interpreters].
Powell and Pagliara-Miller	The use of volunteer interpreters during the 2010 Haiti earthquake: lessons learned from the USNS COMFORT Operation Unified Response Haiti.	<i>Am J Disaster Med.</i> 2012;7(1): 37-47.	Bilingual medical staff was critical in assisting with informed consent, family reunification processes, explanation of medical care, comfort to patients and families in, and helping healthcare professionals to understand the cultural context of medical care in Haiti [bilingual providers].
Ripp, et al.	The response of academic medical centers to the 2010 Haiti earthquake: The Mount Sinai School of Medicine experience.	<i>Am J Trop Med Hyg.</i> 2012;86(1): 32-5.	A major source of providers' stress during the response was identified as "cultural and language barriers". Basic concepts in cultural competency and how to use language interpreters are necessary skill sets that should be incorporated into pre-disaster provider training [all strategies].

TABLE 3

Selected US DoD and NATO References Addressing Communication Strategies for HUMRO

Document*	Recommendation(s)
NATO Allied Joint Medical Support Doctrine ¹³	Suggests that interoperability of medical teams requires “breaching language barriers and achieving effective translation” among multinational provider teams (1-37). Mandates the “reduction of language barriers” as they are responsible for differences in interpretation of the mission amongst providers themselves and because the effective communication between a patient and their medical staff is essential (2-2, 2-16).
NATO Allied Joint Civil-Military Medical Interface Doctrine ¹⁴	Emphasizes aspects to effective communication other than language. Notes that while basic language skills are “desirable”, military health care providers should be specifically aware of the social, cultural and political situation of the local populations they are serving (5-2). On the basis of cumulative experiences from past HUMRO deployments recommends that medical planners ensure that all care provided is (a) religiously acceptable, (b) ethnically acceptable, (c) culturally acceptable for both genders, and (d) communicated in the locally appropriate language.
DOD Support to Foreign Disaster Relief: Handbook for JTF Commanders and Below ¹⁵	Emphasizes the use of professionally trained “linguists” that provide a “critical language and cultural awareness capability”. Advises commanders (and by extension medical planners) to formally request these resources as soon as feasible in order to minimize the amount of time without formal linguistic support. Recommends explicit identification of bilingual personnel that may assist in a communication capacity (regardless of their primary military occupation). In the absence of available trained or ad hoc interpreters, suggests the use of “pictures and other graphics” as a means of communicating (4-8). Mandates evaluation of communication barriers as an element of a formal HUMRO needs assessment (5-11). Makes a “Medical Officer Pre-Deployment Recommendation” that personnel be trained in both the health threats in their response area and the “language, social, religious, cultural, and political factors that may impact the provision of medical support” in these areas (7-49).
Foreign Operations Guide (FOG) for Disaster Assessment and Response ¹⁶	Encourages communication with liaison officers that have been in-country for some time before the disaster event occurred. Suggests that leveraging the experience of these officers should provide planners with an intimate understanding of both the requirement of specific language skills and relevant cultural information.
Joint Publication: Civil Military Operations ¹⁷	Notes that medical planners must consider language, cultural and social customs for their planned area of operations (AOR), and recommends using responders that are proficient in the affected nation’s language and have regional relevant cultural expertise in the area.
Navy Warfare Publication: Disaster Response Operations ¹⁸	Recommends that the Navy’s Center for Language, Regional Expertise, and Culture (CLREC) be leveraged to provide tailored training products for responders on an affected state’s “history; peoples and ethnic groups; language; religious influences; society and norms; behavior and etiquette”. Also recommends that commands pre-identify, publish and update their members available “occupational speciality” skill sets to include knowledge of “foreign languages”. Determining if any “member(s) of Navy force speak affected population language(s)” is a listed a specific Disaster Response Operations preparedness item (B.2.5).
Joint Publication: Foreign Humanitarian Assistance JP3-29 ¹⁹	Recommends deploying responders with known foreign language(s) and cultural competency applicable to the affected state.

To specifically design and validate medical S2S capabilities, researchers at the Telemedicine and Advanced Technology Research Center (TATRC) began the Medical Application of Speech Translation (MAST) program.³¹ They have benchmarked over numerous COTS S2S applications in a capability gap analysis and have identified 3 main shortcomings of currently available systems: (a) insufficient vocabulary specific to the health/medical domain; (b) lack of publicly available evidence to demonstrate effectiveness, and (c) need for independent validation of software function.

The field of IT solutions for communication needs is rapidly progressing and is likely to provide significant benefits for medical providers deploying in support of HUMRO missions. At present, however, most commercially available platforms remain limited in their ability to correctly interpret medical conversation, although they are increasingly proficient at word-for-word factual translation.

Bilingual Responders

In some situations, the availability of bilingual staff can provide an element of built-in interpretation capacity. The strategy of recruiting bilingual responders was used successfully by many organizations in response to the 2010 Haiti earthquake. United States based disaster relief organizations were able to recruit medical staff that spoke French and/or Creole and used these responders to bridge the communication gap before local interpreters could be identified.³² A major advantage of using bilingual workers is that they can understand the cultural context of conversation and address the cultural implications of events as they occur in real-time.³³

In other disaster relief operations, recruiting bilingual staff as a communication strategy has been less successful. In the recovery phase of operations after the Asian tsunami of 2004, the Australian government deployed a specialized team to provide medical care and conduct public health

assessments. This team recruited 2 self-identified team members with the intent of having these individuals assist in an interpretative capacity. In their after-action report, the team noted that affected nation peoples were “distressed by their inability to communicate” effectively despite the presence of embedded ad hoc interpreters.³⁴ This finding is in keeping with a larger synthesis of opinion regarding medical disaster relief operations in response to the 2004 Asian Tsunami, which concluded that, to be effective, bilingual staff required high fluency in the language, cultural competency, and “a mastery of medical vocabulary.”³⁵

The Australian experience indicates that the combination of cultural appropriateness, expert fluency, and medical competency may not be universally present among self-identified bilingual providers. In fact, these qualities may need to be specifically recruited for among bilingual providers. In support of this statement, a comprehensive analysis of the international relief effort in response to the Asian tsunami specifically noted that “a predominance of inappropriate ‘Western’ profiles, with poor language skills and an inadequate understanding of context and culture” bore significant responsibility in dampening response effectiveness.³⁶

If appropriate bilingual providers can be identified, the preferential use of these members might introduce a selection bias within the team that needs to be acknowledged (ie, selecting for immigrant medical providers may influence how the team interacts with disaster-affected peoples). This is an important consideration as there are no assurances that language proficiency equates to being culturally representative of a community.³⁷ This concern is the basis for UNHCR’s recommendation to recruit local nationals rather than relying on bilingual responders.³⁸ This policy, however, may encourage highly skilled local nationals to move from their usual areas of employment toward the higher salaries earned in support international HADR operations.

Using Medical Interpreters

In the aftermath of a disaster/humanitarian emergency, identifying skilled host-nation interpreters can be a significant logistical challenge. Medical planners should be aware that, even if a sufficient number of interpreters are identified, securing access to these resources may not equate with solving communication issues. In the domestic setting, medical providers routinely underuse interpreters when they are readily available, even if the provider recognizes their insufficient language skills may be compromising clinical care.³⁹

Part of the underuse of interpreters may be due to a training deficit on how to effectively use available interpreters. In a nationally representative study of US resident physicians, over half of all respondents claimed never to have received training on effective strategies for interpreter use.⁴⁰ A survey

of curricula demonstrated the majority of US and Canadian medical schools do not provide formal instruction on the effective use of interpreter services.⁴¹ Professional certification, therefore, cannot be used as a reliable marker for the ability to work with interpreters either in the domestic or international settings. It has also been established that providers who do receive targeted training on the negative impact of language barriers will engage with interpreters more effectively.⁴²

In the context of HUMRO, interpreters may take on helpful roles beyond enhancing patient-provider communication. Babcock and colleagues highlight some of these additional interpreter roles to include the following: (a) leveraging interpreter contacts for public health disease surveillance; (b) using interpreters to provide culturally appropriate health risk communication messages; and (c) using interpreter contacts as a source of “on-the-ground medical intelligence” to help direct aid.³²

These additional roles were evident in the aftermath of the 2010 Haiti earthquake when interpreters actively assisted in tracking down patients’ relatives when immediate family members were missing or presumed deceased.⁴³ In view of these expanded roles, training on effective interpreter use should include exposure to the entire spectrum of value-added services an engaged interpreter staff may provide.

Working With Interpreters in the Context of HUMRO

Much of the training on how to best work with interpreters domestically is grounded in the utilitarian model theory where interpreters act as passive/unobtrusive factual translators.⁴⁴ In a guide for the successful use of interpreters during domestic disaster and crisis responses based on his own operational experiences, Greenstone (2010) endorses the utilitarian method by advocating that:

“The interpreter only acts as a “word machine” for the primary provider - nothing more. Interpreters must say to the person exactly what the healthcare provider says and in the same way as the provider says it – word for word.”⁴⁵

The expectation is that interpreters will not influence the content of patient-provider interactions, a powerful method of preserving the traditional patient-provider relationship that reduces error by focusing on factual interpretation.^{46,47}

In the setting of HUMRO, however, interpreters are often required to provide both effective communication (factual translation) and socially competent communication (cultural interpretation). This requires that providers establish a strong rapport with their interpreters to be confident that they will intervene in provider-patient interactions to achieve effective, ethical, and culturally sensitive communication.⁴⁸ Using interpreters as cultural brokers, however, means accepting an increased risk of interpretation error as speech

becomes culturally editorialized by the interpreter. Providers must acknowledge the limitations of this approach, especially when using untrained interpreters which, regardless of the interpreter model adopted, have been shown to compromise clinical outcomes.^{47,49,50}

The US National Center for Disaster Medicine and Public Health (NCDMPH) has published a “disaster health pocket card tool” with practical suggestions on how to work with interpreters.⁵¹ Although domestically focused, these recommendations are relevant and are structured using a “before-during-after disaster” construct that lends itself to be easily incorporated into routine HADR training cycles.

Authors Recommendations for Bridging Language Barriers for HUMRO Providers

Leadership Priorities

- Establish a requirement for fluency testing for providers who identify themselves as bilingual.
- Mandate regular training to include didactic and scenario-based active participation (see Training Priorities) to evaluate performance in language-discordant scenarios.
- Broaden existing after action reviews to include communication-related concerns during HUMRO and associated training needs.

Training Priorities

- Develop curricular components focused on effective communication during medical support to HUMRO. Specific learning objectives for providers likely to be involved in HADR operations could include the following: (a) reviewing evidence linking poorer health outcomes with patient-provider language discordance, (b) emphasising accountability and professionalism during HUMRO and how that relates to improving communication and addressing health literacy, and (c) understanding the specific ethical considerations related to the use of interpreters and that these ethical considerations may change during HUMRO.
- Develop practical training scenarios (through the use of simulated patient encounters) that establish an individual provider’s and/or team’s ability to (a) use COTS and (b) demonstrate multiple strategies for working with interpreters.
- Curricular components should include built-in measures of effectiveness such as fact-based checks and/or self-reflective questions to assist in providing relevant metrics for HUMRO providers and planners.

CONCLUSIONS

Minimizing communication barriers during HUMRO is a mission-critical task. The inability to communicate effectively across cultures has been identified as an obstacle to effective HADR operations. The growing culture of accountability among HUMRO providers will make the ability to demonstrate skilled cross-cultural communication strategies increasingly important in the coming years. Although several

strategies for overcoming communication barriers have been proposed based on experiential opinion, there is insufficient evidence to recommend 1 strategy over another, and no strategy is without significant limitations. It is the opinion of these authors that the topic requires dedicated and rigorous study to build the evidence needed to make informed policy decisions about bridging communication barriers during HADR operations.

In the absence of such evidence, there are numerous limitations to this review and to the opinion we have provided. With the goal of being easily generalizable to the context of international medical disaster relief operations, we intentionally omitted research on effective communication strategies for language discordance in a domestic setting. Studies from the domestic sector may have provided higher level and quality evidence that may have been externally valid to the resource- and legislation-limited international disaster relief sector. Analyzing that body of evidence was beyond the scope of this review. Unexpectedly, our narrow inclusion criteria resulted in a strong regional focus with 2/3 of included studies detailed the experience of US-based disaster relief providers deploying internationally. It is possible that common national training standards (eg, US-based medical training) may impact the effectiveness of a given communication strategy and biased the opinions provided. Finally, we were expecting that real-time information technology solutions would have been widely advocated as first line tools to bridge language gaps, and while these solutions were identified, they did not overwhelmingly constitute recommendations for best practice. Perhaps our selected date range excluded more recent publications examining the role of these solutions in the disaster relief context. We believe a similar analysis to this should be conducted with a specific focus on the impact of rapidly evolving technology on communication in disaster relief.

Despite these limitations, the available literature does suggest that a leadership-driven emphasis on structured communication training for providers participating in HADR operations may be beneficial. Training could focus on the rationale for improved communication and practical scenarios that provide opportunities to exercise communication strategies. Targeted leadership recommendations include measures to ensure the maximum suitability of bilingual staff, the support of training initiatives, and a structured approach for conducting postdeployment reviews of performance. Defined, leadership-supported training on how to improve communication in the context of medical support to HUMRO may maximize the effect of such operations.

About the Authors

Canadian Armed Forces (Drs Lieutenant-Colonel Rossi); University of Ottawa and Canadian Blood Service (Dr Commander Grenier) and Childrens’ Hospital of Eastern Ontario (Dr Vaillancourt)

Correspondence and reprint requests to Lieutenant-Colonel Carlo Rossi, 713 Montreal Road, Ottawa, Ontario, Canada, K1A 0K2, (e-mail: carlo.rossi@forces.gc.ca).

REFERENCES

1. Gregg J, Saha S. Communicative competence: a framework for understanding language barriers in health care. *J Gen Intern Med.* 2007;22(Suppl 2):368-70.
2. Greenhalgh T, Robb N, Scambler G. Communicative and strategic action in interpreted consultations in primary health care: a Habermasian perspective. *Soc Sci Med.* 2006;63(5):1170-87.
3. Sears J, Khan K, Ardern CI, et al. Potential for patient-physician language discordance in Ontario. *BMC Health Serv Res.* 2013;13:535.
4. Woloshin S, Bickell NA, Schwartz LM, et al. Language barriers in medicine in the United States. *JAMA.* 1995;273(9):724-8.
5. Canadian Council for International Co-operation (CCIC). Code of Ethics and Operational Standards. 2009. https://www.bccic.ca/wp-content/uploads/2015/09/001_code_ethics_operational_standards_e.pdf. Accessed September 30, 2019.
6. Humanitarian Accountability Partnership. The 2010 HAP Standard in Accountability and Quality Management. 2010. <https://www.chsalliance.org/files/files/Resources/Standards/2010-hap-standard-in-accountability.pdf>. Accessed January 15, 2019.
7. The Sphere Project. Humanitarian Charter and Minimum Standards in Humanitarian Response. 2014. <http://www.sphereproject.org/handbook/>. Accessed January 15, 2019.
8. UNICEF. Emergency Field Handbook. 2005. http://www.unicef.org/publications/files/UNICEF_EFH_2005.pdf. Accessed January 15, 2019.
9. USAID. Field Operations Guide for Disaster Assessment and Response. 2005. https://scms.usaid.gov/sites/default/files/documents/1866/fog_v4.pdf. Accessed January 15, 2019.
10. World Health Organization (WHO). Emergency Response Framework. 2013. http://www.who.int/hac/about/erf_.pdf. Accessed January 15, 2019.
11. Daftary RK, Cruz AT, Reaves EJ, et al. Making disaster care count: consensus formulation of measures of effectiveness for natural disaster acute phase medical response. *Prehosp Disaster Med.* 2014;29(5):461-7.
12. Nielson-Bohlman L, Panzer A, Kindig D, eds. *Health Literacy: A Prescription to End Confusion*. Washington, DC: National Academies Press; 2004.
13. NATO. NATO Allied Joint Medical Support Doctrine AJP-4.10(A), 2006.
14. NATO. Allied Joint Civil-Military Medical Interface Doctrine AJMEDP-6, 2011.
15. Department of Defense (DOD). Department of Defense Support to Foreign Disaster Relief: Handbook for JTF Commanders and Below GTA 90-01-030. 2011.
16. United States Agency for International Development (USAID). Field Operations Guide for Disaster Assessment and Response Version 4.0. 2005.
17. Department of Defense (DOD). Joint Publication: Civil Military Operations JP3-57. 2013.
18. Department of the Navy. Disaster Response Operations NWP 3-29. 2011.
19. Department of Defense (DOD). Joint Publication: Foreign Humanitarian Assistance JP3-29. 2014.
20. Dowse R. Pictograms for conveying medicine instructions: comprehension in various South African language groups. *S Afr J Sci.* 2004;100(11):687-93.
21. Sorfleet C, Vaillancourt R, Groves S, et al. Design, development and evaluation of pictographic instructions for medications used during humanitarian missions. *Can Pharm J.* 2009;142(2). doi: [10.3821/1913-701X-142.2.82](https://doi.org/10.3821/1913-701X-142.2.82)
22. Malhotra R, Bautista MA, Tan NC, et al. Bilingual text with or without pictograms improves elderly Singaporeans' understanding of prescription medication labels. *Gerontologist.* 2019;59:378-90.
23. Doucette D, Vaillancourt R, Berthenet M, et al. Validation of a pictogram-based diabetes education tool in counselling patients with type 2 diabetes. *Can Pharm J.* 2014;147(6):340-4.
24. Grenier S, Vaillancourt R, Pynn D, et al. Design and development of culture-specific pictograms for the labelling of medication for first nation communities. *J Comm Health.* 2011;4(4):238-45.
25. Place RJ. Caring for non-combatants, refugees, and detainees. *Surg Clin North Am.* 2006;86(3):765777.
26. Clawson TH, Leafman J, Nehrenz GM Sr, et al. Using pictograms for communication. *Mil Med.* 2012;177(3):291-5.
27. British Red Cross (UK Department of Health). Emergency Multilingual Phrasebook; https://webarchive.nationalarchives.gov.uk/20070305203849/http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4073230&chk=8XboAN. Accessed January 15, 2019.
28. Chan YF, Alagappan K, Rella J, et al. Interpreter services in emergency medicine. *J Emerg Med.* 2010;38(2):133-9.
29. Ong WSS. *Sequoyah Foreign Language Translation System - Business Case Analysis*. Monterey, CA: Naval Postgraduate School; 2007.
30. Weiss BA, Schlenoff C. Performance assessments of two-way, free-form, speech-to-speech translation systems for tactical use. *J Int Test Eval Assoc.* 2011;32(1):69-72.
31. Rominiecki A (US ARMY). Tell me where it hurts: Army R&D improving translation technologies for OCONUS medics. https://www.cerdec.army.mil/news_and_media/tell_me_where_it_hurts/. Accessed January 15, 2019.
32. Babcock C, Theodosis C, Bills C, et al. The academic health center in complex humanitarian emergencies: lessons learned from the 2010 Haiti earthquake. *Acad Med.* 2012;87(11):1609-15.
33. Lee SK, Sulaiman-Hill CR, Thompson SC. Overcoming language barriers in community-based research with refugee and migrant populations: options for using bilingual workers. *BMC Int Health Hum Rights.* 2014;14:11.
34. Samarasinghe D. Disaster management: lessons from immediate responses to the tsunami. *Ceylon Med J.* 2005;50(1):25-7.
35. Temple B. Crossed wires: interpreters, translators, and bilingual workers in cross-language research. *Qual Health Res.* 2002;12(6):844-54.
36. Behar S, Benson Ii R, Kurzweil A, et al. Use of an emergency medical pictorial communication book during simulated disaster conditions. *Disaster Med Public Health Prep.* 2013;7(5):475-80.
37. Karliner LS, Jacobs EA, Chen AH, et al. Do professional interpreters improve clinical care for patients with limited English proficiency? A systematic review of the literature. *Health Serv Res.* 2007;42(2):727-54.
38. The UN Refugee Agency. UNHCR Handbook for Emergencies. 2007; pp201 http://www.ifrc.org/PageFiles/95884/D.01.03.%20Handbook%20for%20Emergencies_UNHCR.pdf. Accessed January 15, 2019.
39. Diamond LC, Schenker Y, Curry L, et al. Getting by: underuse of interpreters by resident physicians. *J Gen Intern Med.* 2009;24(2):256-62.
40. Lee KC, Winickoff JP, Kim MK, et al. Resident physicians' use of professional and nonprofessional interpreters: a national survey. *JAMA.* 2006;296(9):1050-3.
41. Kalet AL, Mukherjee D, Felix K, et al. Can a web-based curriculum improve students' knowledge of, and attitudes about, the interpreted medical interview? *J Gen Intern Med.* 2005;20(10):929-34.
42. Karliner LS, Perez-Stable EJ, Gildengorin G. The language divide. The importance of training in the use of interpreters for outpatient practice. *J Gen Intern Med.* 2004;19(2):175-83.
43. Powell C, Pagliara-Miller C. The use of volunteer interpreters during the 2010 Haiti earthquake: lessons learned from the USNS COMFORT Operation Unified Response Haiti. *Am J Dis Med.* 2012;7(1):37-47.
44. Hsieh E, Kramer EM. Medical interpreters as tools: dangers and challenges in the utilitarian approach to interpreters' roles and functions. *Patient Educ Couns.* 2012;89(1):158-62.

45. Greenstone JL. Use of interpreters with crisis intervention teams, behavioral health units, and medical strike teams: responding appropriately and effectively. *Int J Emerg Ment Health*. 2010;12(2):79-82.
46. Pollabauer S. Interpreting in asylum hearings: issues of role, responsibility and power. *Interpreting*. 2004;6(2):143-80.
47. Flores G, Abreu M, Barone CP, et al. Errors of medical interpretation and their potential clinical consequences: a comparison of professional versus ad hoc versus no interpreters. *Ann Emerg Med*. 2012;60(5):545-53.
48. Farooq S, Fear C. Working through interpreters. *Adv Psychiatr Treat*. 2003;9:104-9.
49. Bauer AM, Alegria M. Impact of patient language proficiency and interpreter service use on the quality of psychiatric care: a systematic review. *Psychiatr Serv*. 2010;61(8):765-73.
50. Flores G. The impact of medical interpreter services on the quality of health care: a systematic review. *Med Care Res Rev*. 2005;62(3):255-99.
51. National Center for Disaster Medicine and Public Health (NCDMPH). Working with an Interpreter in a Disaster Setting. 2011. <https://www.usuhs.edu/ncdmph-learn/ResourceReports/ResRep.htm>. Accessed January 15, 2019.