

Using machine translation in clinical practice

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While professionally trained medical interpreters remain the criterion standard for interpretation in clinical practice,¹ they are often not available in community-based practices. For this reason, physicians are beginning to turn to machine translation to supplement their communication. Originally developed to facilitate simple text-to-text translations, machine translation has evolved in recent years to facilitate more complex translations by incorporating more sophisticated algorithmic approaches.

How clinicians might use machine translation

Machine translators are available as commercial computer solutions (eg, SYSTRAN Enterprise Server and IBM WebSphere) or as free, Web-based applications (eg, Google Translate and Microsoft Bing Translator). Most machine translators are text based and provide instant translations between various languages, and sometimes there is an option for audio output. A range of language keyboards are sometimes available. For example, Google Translate has a keyboard icon that allows users to access different language scripts by toggling an on-screen keyboard. To access the virtual keyboard, pick the specific language you want to translate from (ie, ensure “Detect language” is not selected, and choose a language other than English). The virtual keyboard icon will appear in the lower left-hand corner of the text box. Smartphone applications that link to online machine translation programs are also emerging.

In a clinical encounter, a physician faced with a language barrier and no professional interpreter might choose to use a machine translator to assist in communicating with a patient. Machine translation might be used to clarify patient histories, review a clinical diagnosis, or restate the recommended treatment plan and follow-up to facilitate comprehension. Physicians might also encourage patients to ask questions or respond to queries by directing them to input text into the machine translator.

Search strategy and selection criteria

We reviewed the literature on the accuracy of machine translation and the effectiveness of machine translation in clinical practice. Search terms included *machine translation*, *Google Translate*, *cross-cultural communication*, *Bing*, etc. Given the recentness of the developments in this field, we also consulted experts in health communication.

Addressing potential pitfalls

Machine translation remains imperfect, and misunderstanding might arise in the case of inaccurate

translations. During any cross-cultural encounter, physicians should remain alert for dissonance and mitigate misunderstanding through regular feedback. For example, if a machine translator provides an expression that does not make sense in the context of what is being discussed, then the patient might have a confused or a blank facial expression. To facilitate understanding, a physician might rephrase or restate questions, or seek additional sources of interpretation. Finally, back-translation, which involves cutting and pasting translated text back into the translator, might help estimate accuracy and appropriateness of translations.

Verbal communication exchanged via machine translation represents only one of the many forms of communication that support interaction between doctor and patient; nonverbal communication remains an important element in face-to-face encounters. When one of these forms of communication is hindered, another form of communication is often emphasized to maintain effective clinical interaction.² Nonverbal cues might play a role in communication in the absence of shared verbal language. Across cultures, however, some nonverbal cues might be difficult to interpret.

The risk of misunderstanding is magnified for patients with low literacy and limited levels of health education. In addition, traditional health beliefs or unfamiliar health conditions increase the risk of patient-physician misunderstanding.³ While a professional interpreter can often identify dissonance and help broker an understanding between physician and patient, machine translators leave it up to the physician and patient to negotiate these misunderstandings. Thus, we suggest in the context of limited physician cross-cultural communication skills, patient mental illness, or low patient literacy, machine translators should be used with extreme caution.

In terms of privacy, patient confidentiality is a frequent concern with the use of interpreters. To a lesser degree, confidentiality can also be breached in machine translation if patient identifiers are used. Avoiding the use of patient identifiers, such as full names or birth dates, is an effective measure to address this privacy concern.

Current evidence for machine translation

In 2008, by mathematically evaluating simple translations completed by various machine translation systems, the National Institute of Standards and Technology found that Google Translate provided the most accurate translations relative to its competitors.⁴ At the moment, Google Translate also stands out among other machine

translators in terms of the number of languages it can manage, as it incorporates 65 languages and can translate between 4160 language pairs. Translation accuracy, however, can vary drastically among Google Translate's language pairs. In a 2010 accuracy assessment study, translation accuracy was determined to be poor among Asian and certain eastern European languages, but good among common European languages. For instance, translations involving English and French, Swedish, or Italian achieved high scores, whereas those involving English and Hindi or Vietnamese yielded low scores.⁵

There is currently limited evidence regarding the actual performance of machine translators in clinical practice. In a small randomized controlled trial of literate, French-speaking patients, patient satisfaction outcomes did not significantly differ between encounters using machine translation and those using trained interpreters, suggesting that machine translation might be a feasible alternative in the absence of a trained interpreter.⁶ However, more research is needed to substantiate these early findings.

What can we expect in the future?

Although machine translators are being used in clinical settings, we suggest they be used very cautiously and only in clinical encounters with literate patients. Machine translators are emerging as an accessible supplementary communication resource, but performance remains imperfect and can vary greatly between language pairs. We stress the importance of physician cross-cultural communication skills to recognize and manage dissonance, ensuring patient literacy skills when communicating through written translations, caution in the context of mental illness, and the need to

avoid identifiers to protect confidentiality. Risk of misunderstanding might be mitigated through attention to nonverbal forms of communication, verifying patient understanding, and use of back-translation. Finally, clinicians need to remain aware of the risk of misunderstanding inherent in any cross-cultural encounter. 🍁

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Competing interests

None declared

References

- Jacobs EA, Shepard DS, Suaya JA, Stone EL. Overcoming language barriers in health care: costs and benefits of interpreter services. *Am J Public Health* 2004;94(5):866-9.
- Damico JS, Wilson BT, Simmons-Mackie NN, Tetnowski JA. Overcoming unintelligibility in aphasia: the impact of non-verbal interactive strategies. *Clin Linguist Phon* 2008;22(10-11):775-82.
- Kirmayer LJ, Narasiah L, Munoz M, Rashid M, Ryder AG, Guzder J, et al. Common mental health problems in immigrants and refugees: general approach in primary care. *CMAJ* 2011;183(12):E959-67. Epub 2010 Jul 5.
- National Institute of Standards and Technology [website]. *NIST 2008 open machine translation evaluation—(MT08). Official evaluation results*. Gaithersburg, MD: National Institute of Standards and Technology; 2008. Available from: www.itl.nist.gov/iad/mig/tests/mt/2008/doc/mt08_official_results_v0.html. Accessed 2013 Mar 5.
- Aiken M, Balan S. An analysis of Google Translate accuracy. *Translation J* 2011;16(2). Available from: www.bokorlang.com/journal/56google.htm. Accessed 2011 Jan 30.
- Kaliyadan F, Gopinathan Pillai S. The use of Google language tools as an interpretation aid in cross-cultural doctor-patient interaction: a pilot study. *Inform Prim Care* 2010;18(2):141-3.

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