

<b>Linguistics (Interpreter) Services</b>	<b>Pg</b>
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Local Service Category:	<b>Linguistics Services</b>
Amount Available:	<b>To be determined</b>
Unit Cost:	
Budget Requirements or Restrictions ( <b>TRG Only</b> ):	Maximum of 10% of budget for Administrative Cost.
DSHS Service Category Definition	<p>Support for Linguistic Services includes interpretation (oral) and translation (written) services, provided by qualified individuals as a component of HIV service delivery between the provider and the people living with HIV (PLWH), when such services are necessary to facilitate communication between the provider and PLWH and/or support delivery of Ryan White-eligible services.</p> <p>Linguistic Services include interpretation/translation services provided by qualified interpreters to people living with HIV (including those who are deaf/hard of hearing and non-English speaking individuals) for the purpose of ensuring communication between PLWH and providers while accessing medical and Ryan White fundable support services that have a direct impact on primary medical care. These standards ensure that language is not barrier to any PLWH seeking HIV related medical care and support; and linguistic services are provided in a culturally appropriate manner.</p> <p>Services are intended to be inclusive of all cultures and sub-cultures and not limited to any particular population group or sets of groups. They are especially designed to assure that the needs of racial, ethnic, and linguistic populations severely impacted by the HIV epidemic receive quality, unbiased services.</p>
Local Service Category Definition:	To provide one hour of interpreter services including, but not limited to, sign language for deaf and /or hard of hearing and native language interpretation for monolingual people living with HIV.
Target Population (age, gender, geographic, race, ethnicity, etc.):	People living with HIV in the Houston HIV Service Delivery Area (HSDA).
Services to be Provided:	Services include language translation and signing for deaf and/or hearing-impaired HIV+ persons. Services exclude Spanish Translation Services.
Service Unit Definition(s) ( <b>TRG Only</b> ):	A unit of service is defined as one hour of interpreter services to an eligible PLWH.
Financial Eligibility:	Income at or below 300% Federal Poverty Guidelines.
Eligibility for Service:	People living with HIV in the Houston HSDA
Agency Requirements ( <b>TRG Only</b> ):	Any qualified and interested agency may apply and subcontract actual interpretation services out to various other qualifying agencies.
Staff Requirements:	ASL interpreters must be certified. Language interpreters must have completed a forty (40) hour community interpreter training course approved by the DSHS.
Special Requirements ( <b>TRG Only</b> ):	Must comply with the Houston HSDA <b>Linguistic Services Standards of Care</b> . The agency must comply with <b>the DSHS Linguistic Services Standards of Care</b> . The agency must have policies and procedures in place that comply with the standards <i>prior</i> to delivery of the service.

***FY 2024 RWPC “How to Best Meet the Need” Decision Process***

<b>Step in Process: Council</b>		Date: <b>06/08/2023</b>
Recommendations:	Approved: Y: _____ No: _____ Approved With Changes: _____	If approved with changes list changes below:
1.		
2.		
3.		
<b>Step in Process: Steering Committee</b>		Date: <b>06/01/2023</b>
Recommendations:	Approved: Y: _____ No: _____ Approved With Changes: _____	If approved with changes list changes below:
1.		
2.		
3.		
<b>Step in Process: Quality Improvement Committee</b>		Date: <b>05/2023</b>
Recommendations:	Approved: Y: _____ No: _____ Approved With Changes: _____	If approved with changes list changes below:
1.		
2.		
3.		
<b>Step in Process: HTBMTN Workgroup #3</b>		Date: <b>04/20/2023</b>
Recommendations:	Financial Eligibility:	
1.		
2.		
3.		

# Why Medical Translation and Medical Interpretation Services are Key in Quality Healthcare

*Unlike other forms of language translation and interpretation, there is zero room for mistakes in the healthcare arena.*

By **Mark Blackwood** - Medically reviewed by **Patricia Salber, MD, MBA** - July 9, 2020



*It is important that doctors and patients look at each other, not the medical translator. Photo source: iStock*

All industries need translators and interpreters who are trained in different languages. Although some items, symbols, and/or actions may be universally understood, you still need to convey subtle meanings and instructions across cultures. It is especially important to overcome language barriers in healthcare. That is why the need for medical translation and interpretation is so critical.

Translation and interpretation activities in the health domain are numerous. They can range from simultaneous or consecutive interpretation, translation of medical files, correspondence between doctors and patients, and much more. This article will provide a complete overview of language translation and interpretation in healthcare. We will attempt to answer the questions:

- Who does it?
- How does it work?
- How much does it cost?

And we will provide some predictions for the future.

## Medical translation vs medical interpretation

In the language services industry, we differentiate between two concepts related to transferring the meaning from one language to another: interpreting and translation.

- **Interpreting** refers to the act of real-time, in-person transferring of communication from one language to another.
- **Translation** refers to written documents and is usually not carried out in real-time.

These activities are distinct and require different training and skillsets. However, it is common to use the term medical translation and medical interpretation interchangeably. I will try to point out the distinctions as we explore the profession in this article.

## Why medical translation and interpretation are so important

Medical translation and interpretation together comprise one of the most sensitive fields within the industry of translation. Unlike some other forms of translation and interpretation, there is zero-tolerance for mistakes in healthcare.

This is because incorrect translation might harm someone's health or well-being. It could lead to interventions, like surgery or prescription of powerful medications that are associated with a risk of serious complications. Thus, it is clearly an activity that has to be carried out by highly proficient people who exercise a great deal of concern in order to ensure the quality of their work.

### • Worldwide patterns of migration drive demand

The medical translation field has become even more critical with the rise of migration. Large numbers of people move from one country to another without speaking the language. When they require health care, particularly in emergencies, they can be in trouble without interpreters.

For many people who are outside the industry, it may seem surprising that there is such a high demand for language interpretation in medical services. However, [statistics show](#) that it's anything but surprising. For example, in the US, more than 45 million people don't speak English as their primary language. And, an additional 21 million said that they don't speak English "very well".

## • The impact of international tourism

Along similar lines, until the onset of the COVID-19 pandemic, international tourism was increasing every year. Again, this can lead to people becoming stranded in emergency rooms where they cannot speak the language. Again, this is where medical interpreters come in.

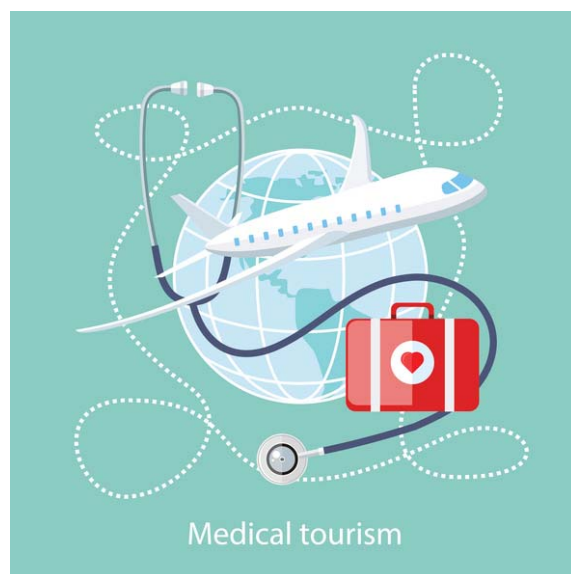
## • Medical tourism and interpretation

Another opportunity for increased demand in healthcare interpreting is medical tourism. This is an industry that has been on the rise with the expansion of international flight connections and globalization in general.

Medical tourism occurs when people from countries, like the United States with a high costs of healthcare choose to get services in countries where healthcare is high quality, but much cheaper. They often combine it with a vacation.

It is most often done in the fields of cosmetic surgery and dentistry. However, you can now find overseas opportunities to receive a broad range of services, including joint replacements, organ transplantation, and cardiovascular surgery, amongst others.

Naturally, medical tourism's only issue is the language and cultural gap. This is why many organizations who are dealing with these types of medical services often have language interpreters on call.



*The increasing popularity of medical tourism is one of several drivers for more and better medical translation services (Graphic source: iStock)*

According to experts, both [medical tourism](#) and [telemedicine](#) will increase the demand for interpreting in healthcare services in the near future.

## What is language translation in healthcare settings?

In general, [medical translation](#) (encompassing translation and interpretation) is defined as any process of translation that serves healthcare professionals to provide the necessary treatment for patients who speak (or read) another language.

As you are aware, it's incredibly important that medical professionals are able to communicate with their patients effectively. As I have mentioned that's not the case, the entire care and treatment process is endangered. Medical interpreting and translation, therefore, primarily deal with these tasks:

- simultaneous interpreting of doctor-patient communication
- translation, including but not limited to, of any of the following documents:
  - doctor-patient written correspondence
  - patient's medical history in another language
  - lab test results, findings, and so forth.

When you need any type of medical translation, you should contact experts who are experienced in that particular field. Don't contact just *any* translation agency or company – it's important that the company you're working with has had previous experience with these types of documents because they have special terminology.

## You need to specify if you need medical interpreting or medical translation

When you're looking for language services, you need to specify whether you're looking for interpreting or translation. If you want someone to be in the hospital or at a doctor's appointment with your family member, look for interpreting services.

If you want to get a medical document, lab test results, or any other written document translated to another language, you're looking for a *translation*.

The benefits of interpreting include an opportunity to have a private, intimate conversation with a doctor and to ask questions as they pop up into your mind. It's also much faster than translation because it has to be done in real-time. The drawback is that there is more room for error as the interpreter has to react quickly and sometimes under pressure.

Translation, on the other hand, is done at a much slower pace. As a result, the translator has the opportunity to step back and take the time needed to decrease the chances of error. However, this may not be applicable in a medical setting because information usually has to be processed as soon as possible.

## Put your self in the patient's shoes when thinking about medical translation and interpretation

Just imagine a regular visit to the doctor and being unable to explain what the issue is. Simply put, healthcare heavily relies on the patient's subjective and objective description of what they are experiencing. Further, care and treatment depend on the fact that patients understand, trust, and listen to doctors' instructions. In fact, non-native English speakers in the US often report that they are unsatisfied with the medical care they receive and they risk medical errors more than native speakers.

Unfortunately, the vast majority of healthcare organizations do not provide sufficient interpreting services. Usually, people who help non-native speakers are found "randomly." They are family members or friends who speak both languages, not trained interpreters.

There are many problems with involving family members in interpretation including violating the patient's privacy, failure to fully translate what the patient said because of embarrassment on the part of the patient or the family member. Sometimes there is a failure to fully understand the question or the answer.

Unfortunately, in many healthcare settings, patients have to rely on family members or secure healthcare interpreting services on their own. Sometimes the healthcare organization will help find the interpreter but the patient will be charged for the extra expense. Sometimes, the patient has to find a language professional on their own and pay out of pocket.

## Telephonic services for medical interpretation

Another increasingly used language service is hiring telephone interpreters in a medical setting. In recent years, many big translation and interpreting companies have started expanding their offer portfolio to cover this service as well.

If you're considering hiring a telephone interpreter in a healthcare setting, make sure they are certified medical interpreters. The issue with tele-interpreters is that many people and organizations around the world offer this service with varying quality. Unfortunately, it may be hard to differentiate between expert interpreters and amateurs.

If you're sure you have access and cooperation set up with a certified medical telephone interpreter, that's a good solution. If you're not sure, it's better to opt for some other interpreting options.

## The price of medical interpretation and translation

The greatest issue with language interpretation in healthcare is that organizations don't



contract with regular interpreters because of the financial burden these services may impose.

Among all translation niches and fields, medical is one of the most expensive ones. Also, simultaneous interpretation is notably more expensive than a written translation.

Affordable services that can help you with medical translations are widely available. You can search the internet for medical interpretation and translation services to see what kinds of prices are being charged.

You will find that the pricing may differ wildly from one organization to the next. For example, some healthcare clinics offer free interpreting services for patients who don't speak the language. Others will charge it as an additional service along with your medical bill.

Remember, the benefits far outweigh the costs when you decide to hire a professional medical interpreter compared to a non-trained professional.

## How to carry out professional and accurate language interpreting in healthcare?

If you're a healthcare professional who is communicating with a non-native speaker for the first time, a patient who doesn't speak a foreign language or an intermediary, here are some of the basic tips to keep in mind during the interpreting process:

### • Introduction

It sounds obvious, but it would surprise you how many times people forget about this. Present all the people who are taking part in the conversation: patient, patient's partner, parents, and so forth.

### • Speak slowly

Keep in mind that someone will be translating everything you say. Slow down the tempo and speak clearly. This is especially important if you are a naturally fast speaker.

### • Speak to each other

When an interpreter is present, many people feel like they should speak to them instead of the doctor/patient. You should talk directly to the doctor/patient instead.

### • Take breaks more often

Don't combine dozens of sentences and questions and wait for the interpreter to make sense of all that. Take frequent breaks from speaking to give the interpreter enough time to present what you just said.

## • Set aside more time

When you have an appointment with an interpreter, it will last at least twice as much as a “regular” appointment. Make sure you take that into consideration when you schedule these types of appointments.

For many people, this is a new situation that takes some getting used to. Namely, a visit to the doctor is, for most people, a private and intimate process. It involves communication about your personal issues with a person you trust.

When an interpreter enters this equation, the social dynamics of the doctor-patient conversation can become a little awkward. Nevertheless, it’s a prerequisite for good understanding and to ensure that a patient receives proper care.

### Related Content:

[Listen to Your Patients – They’re Telling You the Diagnosis!](#)

[5 Things Not to Do When Delivering Bad News to Patients](#)

## Conclusion

Medical interpretation is sensitive. It is best when it is carried out by professionals. If a healthcare organization doesn’t have its own interpreter (which it probably doesn’t), you can hire someone to help you. Make sure you hire someone with experience in healthcare particularly because mistakes really can be costly.

Avoid getting interpreting services from amateurs and non-trained persons if at all possible. As you probably know, even the tiniest bit of information that’s exchanged in doctor-patient communication is important. Omitting something or adding a fact that’s not there can seriously harm care and treatment. To avoid this, I recommend you work with professionals.

### Mark Blackwood

<https://thewordpoint.com/>

**Mark Blackwood** is a professional translator and localization expert. He is an editor at [TheWordPoint](#), a translation and localization service. Mark translates for various businesses, academic institutions, and medical practices/facilities around the world.

Mark earned his Master’s Degree in the German language at the University of New York, Department of Linguistics. He is a member of the Linguistic Society of America.

He’s passionate about traveling, European literature, sports, and marketing. Mark is currently traveling around Asia while working as a freelance translator remotely.



# Improving Medical Outcomes with Professional Interpretation

*By: Chelsea*

For those people living in the US with Limited English Proficiency (LEP), even simple day-to-day tasks that native English speakers take for granted can prove difficult. From ordering food at the butcher counter to making deposits at the local bank, modern life in our English speaking culture is a constant challenge. According to the US Census Bureau, as of 2017 more than 20 percent of the US population (61.8 million people) speaks a language other than English at home. [1] The resulting language barrier can be frustrating, if not life threatening, when it comes to healthcare. Imagine getting hurt or falling ill in a foreign country and trying to communicate your symptoms to a doctor who doesn't share your language. Imagine filling out intake forms, trying to read warning labels, or following prescription regimens all written in a language you don't speak. As you can see, obtaining medical care can quickly become overwhelming.

The truth of this becomes apparent as we take a closer look at recently reported doctor-patient outcomes when a language barrier is present. According to an article published by Harvard Medical School, recent studies "indicate that patients with limited English proficiency receive less preventive care, are less likely to adhere to medication regimens, and are more likely to leave the hospital against medical advice." [2] The reason for this? Hospitals and medical care facilities are simply not properly equipped to handle the number of patients that require language assistance. Research conducted in 1996 revealed that an alarming 74% of Spanish-speaking patients went without an interpreter when admitted to the ER. [3] Although this data is more than two decades old, there is little evidence to suggest the situation has significantly improved. For example, at St. Luke's Hospital in Lehigh Valley, Texas there are only ten full-time interpreters on staff serving more than 40,000 Spanish-speaking patients. Meanwhile, at Parkland Hospital in Dallas County, Texas, although there are 85 available interpreters (the largest number of on-staff interpreters at any US hospital), nearly half of the hospital's patients require language assistance. That equates to 1,000 visits a day where an interpreter is needed. [4]

There are numerous reported instances that demonstrate the dire consequences that can occur when a patient is not provided with an interpreter. In 2013, for instance, the Huffington Post reported that a Spanish-speaking woman in California had a devastating miscommunication with her doctor: The doctor informed his patient that she was three months pregnant, and she was thrilled. However, the patient had a limited understanding of English, her doctor did not speak Spanish, and no interpreter was provided. After misunderstanding her doctor's question about wishing to keep the baby, the patient believed she had been given a prescription for prenatal care; unfortunately, she had instead taken medication to induce an abortion. A 2010 study conducted by the University of California, Berkeley School of Public Health on the relationship between language barriers and medical malpractice highlights other recent cases where a language barrier, combined with a lack of proper interpretation, resulted in negligence and, in five cases, death. [5]

A dangerous approach often taken by health care workers when confronted with patients who do not speak English is to enlist family members as interpreters. Several cases in the UC Berkeley School of Public Health study report the use of a child, sibling, or parent as an interpreter, since he or she could speak the languages of both the patient and the doctor — but this approach can backfire drastically. First, a bilingual family member is unlikely to be conversant in the medical terminology needed to properly interpret a patient history or diagnosis. Second, family members cannot be impartial. They may lie or omit information in order to avoid dealing with painful circumstances or to protect their loved ones from difficult truths. The use of family members who are children for medical interpreting, as occurred in several cases highlighted in the study,

is particularly risky. In some cases, the children who were acting as interpreters were also the patients. A child receiving medical treatment is already likely to be scared and overwhelmed. Adding the burden of asking that child to act as a medical interpreter is only going to make the situation worse for the patient.

A major hurdle to overcoming this language barrier in the medical field involves a lack of proper training for doctors and other medical professionals when confronted with non-English speaking patients. As reported by UC Berkeley, in more than one case described in the study, conflicting records show that healthcare workers were not even certain what language the patient spoke.

*This problem was more common with Asian patients because many providers tend to aggregate the diverse Asian languages and cultures as “Asian” or “Chinese.” Providers were confused about the distinctions between Cantonese, Mandarin, other Chinese dialects and Vietnamese; and the nationalities, races, and cultures of patients from Hong Kong, Taiwan, Vietnam and Macau. Even if the patient was correctly identified as Chinese, providers failed to consider the possibility of further barriers manifested in different language dialects – Mandarin, Cantonese or other Chinese dialects. None of the cases noted any provider asking the patient for clarification of their primary language.[6]*

Effective training needs to be administered during medical school in order to ensure that professionals know what steps to take when dealing with LEP patients, including how to identify the language being spoken. The current state of LEP patient education was recorded by a Harvard Medical School survey in which 70 percent of fourth-year students admitted that they felt inadequately prepared to care for LEP patients, while one third of residents nationally confessed to using a child under the age of twelve to interpret. More than half of those surveyed also reported dismissive attitudes among attending physicians and fellow students when it came to caring for patients with limited English.[7] In fact, only 23 percent of teaching hospitals offer training courses on how to work with an interpreter and in most cases this training is fully optional.[8] It is this lack of proper training that often results in the use of ad hoc interpreters, whether they are family members present during exams and emergency situations, or fellow staff members who are not trained in professional medical interpreting, but have a conversational grasp of the patient’s language.

In order to reduce the number of instances where non-English speaking patients fail to receive the care they need, it is vital that hospitals and other healthcare facilities provide proper interpretation services. As a study published by Health Services Research reports, the “use of professional interpreters is associated with improved clinical care more than is use of ad hoc interpreters, and professional interpreters appear to raise the quality of clinical care for LEP patients to approach or equal that for patients without language barriers.”[9] Additionally, professional interpreting not only improves the quality and outcome of patient care, but also results in financial gains for patients and doctors alike. When a patient does not understand their primary care provider’s instructions for at-home treatment, they may fail to take the proper steps to treat their illness, resulting in return visits. When a doctor does not understand their patient’s symptoms they prescribe ineffective medication or schedule unnecessary tests. Every time a patient must return to their physician or take another test, it puts an additional financial burden on that patient. And, since the passing of the Health Care Law in October 2012, this financial burden is also shared by the healthcare facilities since the law requires them to pay the costs for those patients readmitted within thirty days. Misdiagnoses and subsequent return visits also take up valuable time for both the patient and the physician. When a doctor is able to communicate clearly with their patient and vice-versa, it increases the chances of an accurate diagnosis and proper treatment the first time around. This in turn alleviates the possibility of malpractice and subsequent lawsuits.

Lastly, hospitals and healthcare facilities need to provide professional interpreting for non-English speaking and LEP patients because it is the law. Both federal and state laws provide coverage for patients who require language assistance. Title VI of the Civil Rights Act of 1964 and the Affordable Care Act (ACA) both state that any provider who receives federal funds

(including from Medicare, Medicaid, and other federal health programs) must provide interpreters for LEP patients. Additionally, as of 2016, Section 1557 of the ACA states that “providers must use qualified medical interpreters when treating LEP patients” and also grants those patients the right to “sue providers for language access violations.”<sup>[10]</sup> Any violation of the above stated federal laws are considered civil rights violations and so are not covered by medical malpractice insurance. It is therefore imperative that providers know and understand these federal laws in order to ensure compliance and avoid any malpractice lawsuits. There are also language access laws in effect in all 50 states, meaning healthcare professionals must additionally familiarize themselves with their state’s specific laws if they want to avoid future lawsuits.<sup>[11]</sup>

The best way to guarantee non-English speaking and LEP patients are provided with the interpretation services they require is to have a professional medical interpreter present during the visit. What is meant by “professional medical interpreter”? Unlike someone who simply speaks both English and the language of the patient, a professional medical interpreter is someone who has been trained in interpreting for the medical industry. They have in-depth knowledge of both the necessary medical terminology as well as the culture of the language they are interpreting. Unqualified interpreters (i.e. staff who speak the patient’s language or friends and family members of the patient) will face difficulties when it comes to providing accurate interpretations since they will either fail to understand key medical terms and concepts, or they will be unable to bridge the cultural divide.

What sets professional medical interpreters apart is that in addition to having knowledge of medical terminology, they can also properly handle issues of cultural taboos. For example, in a 2012 article the Voice of America news site reported that when interpreting for many African nations, medical interpreters must often resort to euphemisms when speaking about sexual health — including body parts — due to African cultural taboos.<sup>[12]</sup> The process of communicating necessary medical information while respecting cultural norms is a delicate one and it requires a trained professional. It is for this reason that a medical provider’s best approach to overcoming the language barrier is to enlist the aid of a professional Language Service Company (LSC). For any hospital or health care provider, locating and hiring experienced interpreters can be an arduous and time-consuming endeavor. When you work with a language service company, like Accredited Language Services, the difficult work of screening and scheduling interpreters is done for you. At Accredited Language, all of our medical interpreters are fully vetted and adhere to strict medical regulatory compliance. We also offer a range of different interpreting services to meet your specific needs including on-site and remote interpreting.

When faced with a language barrier, the preferred form of interpreting is in-person interpretation. When interpreters are physically present during a medical examination, they are able to provide the most accurate translations. It also often sets the patient more at ease when someone who speaks their language is in the room with them. However, this option is often not the most cost effective and is not always feasible due to language requirements and in emergency situations. For instance, on-site interpretation works great when you know a Spanish-speaking patient has an upcoming appointment. In this scenario, you simply contact your trusted LSC and they can schedule an interpreter to be on location at the requested time. But if an LEP patient arrives unannounced with an emergency situation or they speak an uncommon language, on-site interpretation is no longer the best option, as it can take several hours for an unscheduled interpreter to arrive onsite and, if the language is especially uncommon, there may not even be anyone in the area who can interpret.

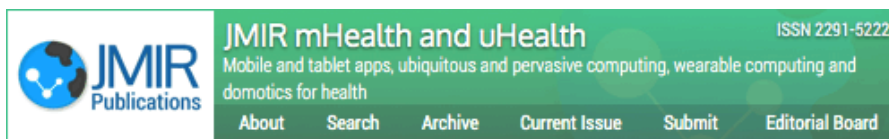
Another great interpreting option, which provides more flexibility, immediacy, and affordability, is remote interpretation. Current technology offers two forms of remote interpretation: telephonic (over-the-phone) interpreting and video remote interpreting (VRI). Telephonic interpreting works much the same way as a conference call. All three participants – the medical provider, the patient, and the interpreter – will be on the line. Generally, the medical professional will speak first in English. The interpreter will then repeat back what the provider said in the patient’s language. After the patient supplies their response in their native language, the interpreter will relay that information back to the medical professional in English.

Telephonic interpreting works well in emergency situations and when the language that the patient speaks is not widely spoken. However, because telephonic interpreting is a purely auditory experience, it is not considered the most reliable approach to medical interpreting.

Non-verbal gestures and expressions account for more than 90 percent of human communication and studies have shown that “body language is as accurate a reflection of our thoughts as the words we use.” [13] For this reason, video interpreting is a much more effective means of remote interpretation. As with over-the-phone interpretation, VRI allows interpreters to communicate simultaneously with medical professionals and their patients located anywhere in the United States. VRI, however, has the added benefit of enhanced communication. Interpreters not only hear what patients are saying, but can also observe their body language and physical gestures, improving interpretation accuracy.

Communication is key to delivering effective health care. It is therefore vital that medical professionals provide non-English speaking and LEP patients with qualified interpreting services through the use of a Language Service Company. Not only will doing so improve medical outcomes, but it also saves time and money, and reduces the potential for malpractice lawsuits.

Whether you decide to seek on-site interpretation in the form of in-person interpreters, or utilize the benefits of remote interpreting, Accredited Language Services can help. [Contact us today](#) for a free consultation to learn more about how we can address all your medical interpreting needs.



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## Language Translation Apps in Health Care Settings: Expert Opinion

Monitoring Editor: Gunther Eysenbach

Reviewed by Urs-Vito Albrecht, Katherine Chen, and Haihong Guo

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### Abstract

#### Background

Currently, over 300 languages are spoken in Australian homes. People without proficient English from non-English speaking countries may not receive equitable care if their health care workers do not speak their primary language. Use of professional interpreters is considered the gold standard; however, for a variety of

reasons, it is often limited to key aspects of care such as diagnosis and consent. With the emergence of mobile technologies, health care workers are increasingly using digital translation tools to fill this gap. However, many of these technologies have not been developed for health care settings and their use has not been evaluated.

### Objective

This study aimed to evaluate iPad-compatible language translation apps to determine their suitability for enabling everyday conversations in health care settings.

### Methods

Translation apps were identified by searching the Apple iTunes Store and published and grey literature. Criteria for inclusion were that the apps were available at no cost, able to translate at least one of the top 10 languages spoken in Australia, and available for use on iPad. Apps that met inclusion criteria were reviewed in 2 stages. Stage 1 was the feature analysis conducted by 2 independent researchers, where apps were evaluated for offline use, input and output methods, and number of languages. Stage 2 was the analysis of suitability for everyday communication in the health care setting, conducted by 2 independent professionals with expertise in translation and cross-cultural communication. Apps that enabled key aspects of care normally within the realm of professional interpreters, such as assessment, treatment and discharge planning, and seeking consent for medical treatments, were considered unsuitable.

### Results

In total, 15 apps were evaluated. Of these, 8 apps contained voice-to-voice and voice-to-text translation options. In addition, 6 apps were restricted to using preset health phrases, whereas 1 app used a combination of free input and preset phrases. However, 5 apps were excluded before stage 2. In addition, 6 of the 10 remaining apps reviewed in stage 2 were specifically designed for health care translation purposes. Of these, 2 apps were rated as suitable for everyday communication in the health care setting—culturally and linguistically diverse Assist and Talk To Me. Both apps contained simple and appropriate preset health phrases and did not contain conversations that are normally within the realm of professional interpreters.

### Conclusions

All iPad-compatible translation apps require a degree of caution and consideration when used in health care settings, and none should replace professional interpreters. However, some apps may be suitable for everyday conversations, such as those that enable preset phrases to be translated on subject matters that do not require a professional interpreter. Further research into the use of translation technology for these types of conversations is needed.

**Keywords:** health care, communication, language, technology

### Introduction

#### Background

The widespread prevalence of telemedicine and telehealth has led to an increasing acceptance of technology in health care. Although there is limited evidence for the effective use of translation technology in medical and health care settings, clinicians anecdotally report the use of internet and mobile apps for language translation purposes. This raises potential concerns as most apps have not been specifically developed or validated for use in a medical or health care context. However, there is potential for



technology to be used to improve everyday clinical communication between patients and staff in the health care setting when used as an adjunct to professional interpreters [1].

Australia is one of the most ethnically and culturally diverse countries in the world [2]. According to the Australian Bureau of Statistics [2], almost half of all Australians were either born overseas or had at least one parent who was born overseas. In 2015, Australia had the ninth largest population of people born overseas worldwide and a higher proportion of overseas-born people (26%) compared with other countries founded on migration such as New Zealand (23%), Canada (22%), and the United States (14%) [2]. Net overseas migration continues to increase in Australia and has shown periods of influx linked to major world events. For example, following the Second World War, Australia saw a high proportion of European migrants. In more recent times, migration has predominantly been from China, India, and the Middle East, with Asian countries now making up 8 out of the top 10 migration countries to Australia [3]. In 2016, there were over 300 different languages spoken in Australian homes and more than one-fifth of Australians spoke a language other than English at home [2]. After English, the 10 most common languages spoken at home in Australia are Mandarin, Arabic, Cantonese, Vietnamese, Italian, Greek, Hindi, Spanish, Punjabi, and Tagalog [2].

The ability to convey essential care needs (eg, addressing pain, help with hygiene), communicate simple safety messages, and provide orientation cues are essential in health care settings. People without proficient English from non-English speaking (NES) countries may not receive equitable care if their health care workers do not speak their primary language [4,5]. The use of professional interpreters is considered the gold standard [6]. However, because of issues related to cost, access, availability, and time constraints [7,8], use of professional interpreters in health care is often limited to specific aspects of care, such as comprehensive assessments, procedural consent, diagnosis, and the development of treatment plans. Everyday communication between health care workers and clients, when there is a language barrier, generally occurs without professional interpreters and has been described in the literature as *getting by*, where health care workers rely on gestures, facial expressions, and knowledge of minimal key words in the target language [9,10]. The *getting by* approach has the potential for miscommunication, which may lead to inappropriate or inadequate care provision and patients' needs being unmet. At worst, the *getting by* approach can result in the provision of inappropriate or nonbeneficial treatments and care as highlighted by Runci et al (2012) [11], finding a higher frequency of prescription of antipsychotic drugs for Italian speaking residents in English-speaking residential care facilities than their counterparts in language specific facilities.

Although using an interpreter remains the gold standard for complex medical and legal discussions in all settings, in some situations, it is not appropriate or feasible to use an interpreter, yet communication remains an issue. Through the widespread uptake of mobile devices, technology enabling language translation has been identified as a potential way to improve communication between patients and staff in health care settings when used as an adjunct to professional interpreters [1]. Very few studies have evaluated the use of translation apps in medical and health care settings and even fewer have compared multiple translation apps or examined the contexts in which their use may be suitable.

Although early studies of Web-based language tools, such as Google Translate, highlight high levels of user satisfaction [12], the risks relating to accuracy when used in the clinical setting have become more apparent [12-15]. One study evaluated text translation of 10 common questions relating to medical history and assessment from English into 10 languages and found a wide discrepancy in the accuracy depending on the target language [13]. Vietnamese and Polish translation had the lowest accuracy (10% correctly translated), whereas Spanish had the highest accuracy (80% correctly translated). Another study evaluated the accuracy of 10 medical phrases in 26 languages [14]. Of the total translations, approximately 58% of the translations were accurately translated from English. However, the accuracy among the different languages also showed

variability, with African languages scoring the lowest accuracy (42%), followed by Asian languages (46%), then Eastern European languages (62%), and Western European languages (74%). The authors reported the presence of some phrases where the translation resulted in considerable changes to the intended meaning when using complex medical terminology in high-risk situations. For example, “Your child is fitting” was incorrectly translated to “Your child is dead” in Swahili and “Your husband has the opportunity to donate his organs” was incorrectly translated to “Your husband can donate his tools” in Polish. As a result, the authors cautioned against the use of Google Translate when obtaining consent for surgery or other medical procedures and participation in research.

Beh and Canty [15] also reviewed the accuracy of Google Translate in a simulated preanesthetic consultation between an English-speaking anesthetist and a Mandarin-speaking patient. In total, 24 English phrases and 13 Mandarin phrases were tested and an independent anesthetist fluent in both English and Mandarin assessed the translation accuracy. The accuracy of translation from English to Mandarin was 72% and from Mandarin to English was 67%, improving with short or simple phrases that did not contain technical information or when speaking clearly and slowly. The authors concluded that Google Translate was not accurate enough to replace professional interpreters but might be useful if an interpreter was not available.

Albrecht et al [16] conducted a 6-week trial of a German translation app called *xprompt-multilingual assistance*, designed for use in health care settings. The app allowed for preset health phrases to be translated and was used for basic conversations. Nursing staff were then surveyed about their experiences. Although most staff reported that the translation tool was helpful for communicating with patients who spoke another language, was easy to use, and that there were no obvious problems with the usability of the device, some reported that the technology was not practical, was too time consuming, and did not integrate well into existing workflows. They also reported difficulties using the technology with older patients who were unfamiliar with technology or unable to use the app because of visual impairment or illiteracy. The staff also reported that the desired target language was not always available. Explaining the menu items in the app caused problems in some instances.

## Objectives

Given the availability and widespread acceptance of language translation apps by the general public and anecdotal evidence of their use in health care settings, more research is required to evaluate their use, particularly in health care situations when professional interpreters are not normally used, such as everyday clinical conversations, and with particular cohorts, such as older people from NES backgrounds. To date, research evaluating language translation technology in health care settings has done so in complex situations, such as those that involve seeking consent [14], conducting medical assessments [13], or engaging in technical or complex medical conversations [15].

A previous study [17] evaluated mobile medical translation apps where the authors identified key features and scored each app on the basis of usability and functionality. This evaluation aims to provide an overview of iPad (Apple Inc) compatible language translation apps (at no cost) and considerations for use in real-world health care settings. This study uses experts in the field of health care translation and cross-cultural communication to evaluate the content of translation apps and provide expert opinion regarding their suitability for health care situations in which an interpreter would not be available, such as providing orientation cues and conveying essential care needs, including identifying pain or the need for toileting. This is the first study to evaluate translation apps on the basis of their suitability for everyday conversations in the health care setting.

## Methods

## Study Design

The study design involves 2 components:

1. A search for iPad-compatible language translation apps at no cost.
2. An evaluation of retrieved apps comprising 2 stages—feature analysis and analysis of suitability for everyday clinical conversations in health care settings.

### Component 1: Search for Available Language Translation Apps

Searching for iPad-compatible translation apps was conducted by first searching the Apple iTunes Store (Apple Inc) on 22 August, 2017, using the search terms in [Figure 1](#). Following this, grey literature (Google Search and Google Scholar) and published literature (PubMed) searches were conducted for published articles related to smartphone or tablet apps used in health care settings for translation purposes. Later, iMedicalApps, a website that reviews all medical apps, was searched using the terms in [Figure 2](#). Finally, any apps that the authors were familiar with from professional experience, which were not discovered in the previous searches, were included.

Translation apps were included if they were developed for or used for language translation purposes, were available at no cost, were available on iPad (Apple Inc), and enabled translation to or from English. Each app had to include translation to at least one of the top 10 languages spoken in Australian homes as of 2016 (Mandarin, Arabic, Cantonese, Vietnamese, Italian, Greek, Hindi, Spanish, Punjabi, and Tagalog, excluding English) [2]. The apps had to operate on iOS 10.3 that was available during August 2017 on the iPad. Apps that required a fee or were only available for use on Android devices were excluded as this project forms a part of a larger pragmatic evaluation of the use of iPad-compatible apps in health care settings, where budgetary limitations are known to prohibit health care providers use of paid apps.

### Component 2: Evaluation of Retrieved Apps

**Stage 1: Feature Analysis** Once identified, an analysis of all apps that met inclusion criteria was conducted by 2 independent clinical researchers (AP and RTJ). The researchers both had clinical backgrounds and extensive knowledge of technology. The researchers evaluated the apps according to the following key categories: offline use, input and output method, and languages available. Issues that may arise for use in the health care setting were also recorded, including ease of use on the basis of whether the app required a high level of user knowledge or required many steps to navigate through the app ([Multimedia Appendix 1](#)). A consensus approach was adopted by the 2 clinical researchers on all aspects of each app. Apps were excluded after the feature analysis stage if they required any in-app purchases or subscriptions, as this was considered a barrier to use in the health care setting as part of a larger study.

**Stage 2: Analysis of Suitability for Everyday Communication** The apps included were then evaluated on the basis of their suitability for everyday communication in health care settings by 2 independent professionals (EZ and MM) with expertise in translation and cross-cultural communication in health care. Both experts are academically qualified in language and cultural studies, are polyglots, and have extensive experience as language and cultural diversity managers in large public hospitals. This stage of the evaluation focused on the suitability of apps for situations in which an interpreter would not be necessary, such as providing orientation cues and conveying essential care needs, including identifying pain or the need for toileting. Apps were considered less suitable when they contained content or allowed for conversations that were considered critical points in health care. These critical conversations were defined, in line with the state government Language Services Policy [18], as those involving clinical assessment, provision of diagnoses, conversations about treatment and care planning, discharge planning, and medicolegal information such as seeking consent for medical treatments. These types of conversations were

considered beyond the scope of translation technology as they require a professional interpreter because of the need for a high degree of accuracy, the need to confirm understanding from patients, and the need to allow patients to ask questions. Other factors that could have an impact on suitability for everyday communication in health care settings were also identified. These included the type, content, and structure of phrases available for selection in the apps, taking into consideration the complexity and sensitivity of information and the ability to allow open-ended or 2-way conversation with appropriate responses available for selection by the patient. Recommendations for use in a health care setting were included in this stage (see [Table 1](#)). The evaluators were required to reach consensus about each aspect of each app.

## Results

In total, 15 apps met the inclusion criteria and were evaluated ([Figure 3](#)).

### Stage 1: Feature Analysis

An initial agreement of 93% (70/75) was achieved among the researchers regarding the features available within each app. Differences identified on the remaining aspects of an app were resolved via discussion. Most apps enabled free voice or text input, and this feature usually required an internet connection even after the language package had been downloaded. In total, 53% (8/15) of the apps were capable of voice-to-voice translation, 53% (8/15) of the apps were capable of voice-to-text translation, 33% (5/15) of the apps were capable of text-to-voice translation, and 33% (5/15) of the apps were capable of text-to-text translation. In total, 7 out of 15 apps (47%) enabled the translation of preset phrases. However, 6 of these 7 apps did not allow for free input. Furthermore, 33% (5/15) of the apps could be used offline, but they required language packages to be downloaded. Although TripLingo was capable of multiple input and output functions, it was not specifically designed for the health care setting and contained very few preset phrases that were considered suitable.

In addition, 6 of the 15 apps (40%) were related specifically to health care translation. These were CALD Assist, Canopy Speak, Dr. Passport (Personal), MediBabble Translator, Talk To Me, and Universal Doctor Speaker. All of these apps were limited to the use of preset phrases and did not allow free voice, text, or image input. Only 2 of the 15 apps (13%) were capable of 2-way conversation between a patient and health care worker—CALD Assist and Dr. Passport. In addition to containing closed questions that required a simple *Yes* or *No* response, CALD Assist also enabled some open-ended questions with limited selections to be made by the patient and some follow-up questions. An example of a follow-up question was “Have you lost weight in the last six months?” then “How much weight have you lost?” Several options were available on the screen for the patient to select. Dr. Passport also allowed for 2-way conversation between a patient and health care worker. However, this was only possible by enabling patients to select preset phrases to translate to their health care worker. This app is divided into preset health phrases for the patient and a separate section for health care workers. This app appeared to be intended for patient-led conversations and not for conversations led by health care practitioners.

Of the 15 apps evaluated in stage 1, only 10 continued to stage 2 ([Figure 3](#)). iTranslate, iTranslate Voice, and Speak and Translate were excluded as they required monthly subscriptions once the free trial period had ended. Waygo was excluded as it only translated captured images (ie, text within images). Dr. Passport was also excluded as it was only available for free when using it to translate from English to Japanese. All other language translations required a fee.

### Stage 2: Analysis of Suitability for Everyday Communication in Health Care Settings

An initial agreement of 73% (44/60) was achieved between the evaluators regarding the evaluation of the content of the translation apps. Differences identified on the remaining aspects of an app were resolved via

discussion.

Of the 10 apps evaluated for their suitability, none were entirely suitable (refer to [Table 1](#)). All 10 apps enabled conversations about assessment and all apps, except for one (MediBabble Translator), enabled conversations about treatment or care planning and discharge. Furthermore, 3 of the 10 apps did not enable conversations about diagnosis and medicolegal information. The apps that enabled conversations in the least number of critical points in health care were MediBabble Translator, CALD Assist, and Talk To Me. This contributed to an overall suitability rating of either high or low suitability. The 2 apps, CALD Assist and Talk To Me, were rated as highly suitable on this basis.

## Discussion

### Principal Findings

This study evaluated iPad-compatible language translation apps on the basis of their features and provided expert opinion on their suitability for everyday conversations in which an interpreter would not be available, such as providing orientation cues and conveying essential care needs, including identifying pain or the need for toileting, in a real-world health care setting. This is the first study to involve experts in health care translation and cross-cultural communication in the evaluation of translation technology suitability. This study's results show that only 2 apps could be considered suitable.

In total, 15 iPad-compatible language translation apps were identified from searches in the Apple iTunes Store and published and grey literature that met the inclusion criteria. These apps were evaluated in 2 stages to analyze features and suitability for everyday communication in health care settings. The feature analysis stage identified that the apps enabled translation of over 100 languages, enabled different input and output modes, which determined whether they could be used offline, and had been developed for a range of different purposes, most commonly for health care, travel, and business purposes. Apps that had been designed for other purposes, such as travel or business, were considered to have limited applicability to the health care setting. Of these 15 apps, 5 were excluded from stage 1 and 10 apps were then evaluated for their suitability of enabling everyday conversations in a health care setting. All apps evaluated in stage 2 required a degree of caution and consideration before being used in health care settings. However, the degree of suitability varied across apps. For example, apps that allowed free input of information to be translated were deemed less suitable as there were no limits to the way the apps could be used, whereas apps that only enabled translation of preset phrases had the potential to limit the contexts in which the apps were used and were deemed more suitable. Despite this, all the apps enabled conversations about topics considered to be critical points in health care, which would normally require professional interpreters, such as clinical assessment and conversations about treatment and care planning. Translating these conversations requires a high degree of accuracy and the ability to confirm understanding from patients and allow patients to ask questions, which are not met by these translation apps. Discussing these topics with translation technology could result in miscommunication, which might lead to serious negative health outcomes for patients.

Apps considered to be most suitable for the health care setting were CALD Assist and Talk To Me. Both enabled conversations in the least number of critical phase topics that required professional interpreters and limited the translation to preset phrases that were led by health care practitioners. Although MediBabble Translator limited topics of discussion to 2 critical phase topics and restricted input to preset phrases, the phrases were deemed to be outside the scope of everyday clinical conversations as they included highly detailed, sensitive and/or personal open-ended questions, such as "Do you think about harming yourself or others?"

A recent study [[17](#)] evaluated mobile medical translation apps where the authors identified key features and

scored each app on the basis of usability and functionality. Apps that were low cost, able to be used offline, and did not contain advertisements and in-app purchases were compatible with multiple platforms (iPhone, iPad, Android, and Nexus), were easy to navigate, and were well presented, and these apps scored highly. The study rated Canopy Medical Translator, Universal Doctor Speaker, and Vocre Translate favorably. However, these apps were either excluded at stage 1 of our evaluation on the basis of requiring payment or were rated as beyond the scope of everyday clinical conversations at stage 2. Given that this study focused on the clinical utility of translation apps for enabling everyday conversations in the health care setting and that eligibility for inclusion was determined on the basis of informing a larger pragmatic evaluation, which necessitated that the apps were available at no cost and were compatible with iPads, the ratings differed.

### Considerations for Clinical Use

This study evaluated translation technology features and provided expert opinion regarding their suitability for everyday clinical conversations, not necessitating professional interpreters. These factors are important considerations for use in health care settings and for the development of new translation technologies. In addition to these considerations, other factors such as current policy regarding the use of translation technology, data security, and confidentiality should be considered carefully in the design and use of apps for health care. Those that require access to the internet or that keep a record of conversations may require additional precautions, for example, not disclosing the patient's identity with the app, avoiding collection of personal or sensitive information with the app, avoiding the use of personal devices when using Web-based apps, and using a secure internet connection so that the individual device or location cannot be identified. Other considerations in design and development of apps may include avoiding use of a device with a small screen (eg, smartphone), which may pose difficulties for patients with visual impairments or reduced motor dexterity.

It is not possible to provide access to professional interpreters for a patient's entire health care episode, and there is an urgent need for effective, accessible, and safe tools, such as translation technology, to facilitate everyday communication to improve health outcomes. However, there is a risk that translation technology may become the preferred means of communicating with patients with limited English proficiency because of the perceived simplicity, accessibility, and timeliness. Over dependence and over reliance on this technology may impact negatively on establishing rapport and providing high quality care. CALD Assist and Talk To Me were the only apps included in this evaluation that provided users with a disclaimer about their limitations and stressed the importance of using professional interpreters where possible. CALD Assist and Talk To Me were specifically designed for health care settings and both restricted communication to preset phrases that were considered within the scope of everyday clinical conversations. They did not include topics and situations that were considered to require professional interpreters. Although Canopy Speak and MediBabble Translate were also specifically designed for health care settings, the evaluators found that these apps were difficult to navigate and contained content that was beyond everyday clinical conversations, requiring a professional interpreter.

### Limitations

It was beyond the scope of this study to examine translation accuracy and cultural suitability. These are important aspects of apps that would have an impact upon the effectiveness of use in health care settings and involve the suitability of translated words for the context, the syntax of the translated phrases (eg, order of words and grammar), and the ability to recognize different accents and dialects (when using free voice input). Previous studies have identified poorer accuracy for the translation of non-western languages in Google Translate [14-16]. Further research involving experts, health professionals, and consumers is required to evaluate the translation accuracy and cultural suitability of other apps and in other contexts.

Given how rapidly technology develops and changes, it was not possible to capture every available iPad-

compatible app. Therefore, this study provides a snapshot of the available iPad-compatible translation apps and considerations for use in the health care setting. As more apps become available, further research will be required. Furthermore, as this study excluded apps that were available at a cost, only available on Android devices, or involved languages other than English as the primary language, further research evaluating these apps is warranted.

## Conclusions

Overall, the findings of this evaluation have identified that iPad-compatible language translation technology requires careful consideration when used in health care settings, and it may be completely or partly prohibited by existing health care policies. The degree of suitability for health care settings varies on the basis of the content and features available within each app. Those that allow translation of free voice, text, or image information were deemed to be the least suitable for health care settings. Of the apps evaluated, only 2 were considered to be highly suitable for the health care setting, on the basis of their use of preset health related phrases; these were CALD Assist and Talk To Me. When the content was appropriate, preset health phrases were considered the most suitable because information was brief, simple, and contained. Although many apps featured preset phrases, the content was frequently considered unsuitable as phrases were overly complex, lengthy, contained sensitive information, and did not allow for an appropriate answer. When considering the use of translation technology in health care settings, clinicians are encouraged to consider the capabilities of the translation technology itself, as well as the particular situation, the patient, and any organizational policies. Translation technology is not an appropriate substitute for a professional interpreter and further research is required to evaluate its use for everyday conversations in real clinical settings. However, it is not logistically or financially possible to access a professional interpreter for every interaction in a patient's health care episode. Therefore, there is a pressing need to develop tools that facilitate this communication in a safe and effective manner. Translation technology can play an important role, but this research clearly shows the importance of considering the scope of its use.

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## Abbreviations

CALD culturally and linguistically diverse

NES non-English speaking

### Multimedia Appendix 1

Feature analysis stage.

## Footnotes

Conflicts of Interest: MMM was involved in the initial development and testing of the Talk To Me app. All other

authors declare no conflicts of interest.

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## Figures and Tables

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**Figure 1**

technology, language, multilingual  
translate, translator, translation  
application, apps, app  
healthcare, health care, hospital

Search Terms for Apple Store.

**Figure 2**

(multilingual or language\*) and translat\*  
and  
app or apps or application\* or technolog\*  
and  
healthcare or health care or hospital\* or medical or health or clinical

Search Terms for Literature, iMedicalApps and Google Search.

**Table 1**

Analysis of suitability for everyday conversations in the health care setting.

App name	Can the app be used for critical points in health care requiring professional interpreters					Other factors or comments
	Ax <sup>a</sup>	Dx <sup>b</sup>	Tx <sup>c</sup>	D/C <sup>d</sup>	Medicolegal <sup>e</sup>	
CALD <sup>f</sup> Assist	Y <sup>g</sup>	N <sup>h</sup>	Y	Y	N	Some phrases and questions are lengthy or complex. (phrases relating to assessment, treatment, and discharge everyday clinical conversations (eg, “Do you have pain in your bladder”; “You are leaving hospital today”).
Canopy Speak	Y	Y	Y	Y	Y	Many questions are lengthy, highly detailed, complex and are highly sensitive (eg, “Do you have thoughts of self-harm?”; “Do you feel dizzy, give you nausea?”; “Do you use tobacco now? In the past? How often?”).
Google Translate	Y	Y	Y	Y	Y	Free input allows for any information input to be translated beyond the scope of everyday clinical conversation.
MediBabble Translator	Y	N	N	N	Y	Many questions are lengthy, highly detailed, complex and are highly sensitive, which is beyond the scope of everyday clinical conversation (eg, “Do you take any medication?”; “Do you think about harming yourself?”; “Do you experience recurrent or persistent bleeding at irregular intervals or more frequently than expected?”; “Are you experiencing any symptoms?”).
Microsoft Translator	Y	Y	Y	Y	Y	Free input allows for any information input to be translated beyond the scope of everyday clinical conversation.
Naver Papago Translate	Y	Y	Y	Y	Y	Free input allows for any information input to be translated beyond the scope of everyday clinical conversation.
SayHi Translate	Y	Y	Y	Y	Y	Free input allows for any information input to be translated beyond the scope of everyday clinical conversation.
Talk To Me	Y	N	Y	Y	N	Only translates preset phrases. The phrases relating to everyday clinical conversation are considered within the scope of everyday clinical conversation (eg, “Do you have a fever?”; “Will your blood pressure will take your blood pressure?”).
TripLingo	Y	Y	Y	Y	Y	Free input allows for any information input to be translated beyond the scope of everyday clinical conversation.

[Open in a separate window](#)<sup>a</sup>Ax: assessment.<sup>b</sup>Dx: diagnosis.<sup>c</sup>Tx: treatment and care planning.<sup>d</sup>D/C: discharge.<sup>e</sup>medicolegal: medicolegal conversations including consent.

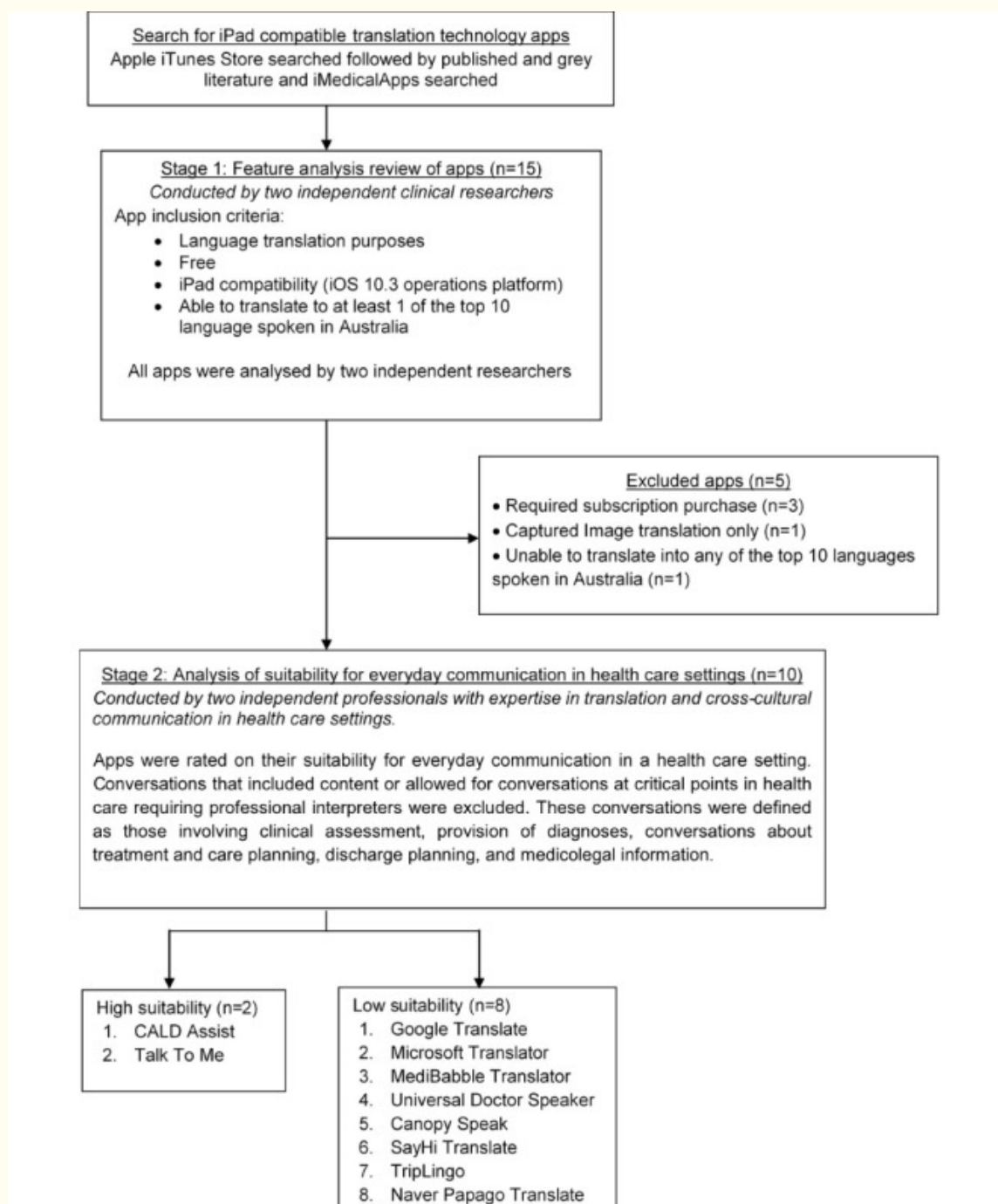
<sup>f</sup>CALD: culturally and linguistically diverse.

<sup>g</sup>Y: yes.

<sup>h</sup>N: no.

<sup>i</sup>U: unsure.

Figure 3



Flow diagram of the process used to identify eligible apps for languages translation. CALD: culturally and linguistically diverse.