Case Study: Translated for Care

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Radiologists create a translation tool that increases efficiency and improves the patient experience for greater health equity.

Key Takeaways:

- Radiologists at Massachusetts General Hospital (MGH) leveraged artificial intelligence to develop a translation tool to enhance care and improve health equity among non-English-speaking patients.
- The web-based tool delivers common imaging exam instructions, such as "hold your breath," in Spanish and soon other languages at the push of a button.
- Since MGH deployed the tool, preliminary data shows that exam times are more predictable for standard chest X-rays while enhancing the patient experience.

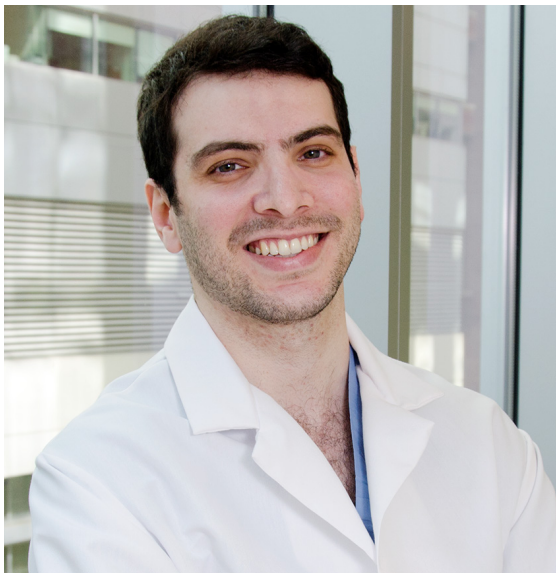
By Jenny Jones

During imaging exams, technologists often provide directions about how patients should position themselves to ensure the best image acquisition and quality. But when language is a barrier, providing optimal patient care can be difficult. While in-person translators and telephone-based translation services can help, connecting with those services can sometimes slow down care. It's a challenge the radiology team at Massachusetts General Hospital (MGH) has overcome with development of an web-based translation app that it is sharing with other specialties and healthcare institutions to help improve patient care across the country and around the world.

MGH radiologists created RadTranslate™, a web app that currently delivers imaging instructions in Spanish, Mandarin, and Portuguese — the three most-common languages, after English, that MGH patients speak — after the radiology team at the MGH Chelsea HealthCare Center indicated that they struggled to communicate with members of the predominantly Spanish-speaking community, particularly during the initial COVID-19 surge in early 2020. Research shows that COVID-19 disproportionately impacts non-white and non-English-speaking people in the U.S.[1]

"Chelsea is located just across the river from Boston and has about 40,000 residents, upward of 70% of whom speak Spanish," says Patricia Daunais, operations manager for MGH Health Center Imaging. "At Chelsea HealthCare, some of us can navigate a few key phrases in Spanish, such as *hold your breath*, but the language barrier became pronounced during the initial COVID-19 surge. Patients were so sick that they were unable to comprehend what we were trying to say and waiting for a translator caused care delays."

Members of the radiology department's Diversity, Equity, and Inclusion (DE&I) Committee, which includes radiologists and staff, and MGH's Medically Engineered Solutions in Healthcare (MESH™) Incubator collaborated with the Chelsea HealthCare group to develop RadTranslate. The team launched the web app in late April of 2020 at Chelsea HealthCare, and a few months later, it also began piloting the tool at an MGH mammography screening site. At these two locations, technologists now use the tool between 15–25 times per day and rate it 4.8/5 stars for its ease of use and positive impact on patient care. The most-used phrases include general explanations of the exams and instructions for disrobing and removing jewelry.[2]



Marc D. Succi, MD, emergency radiologist and founder and executive director of MGH's MESH Incubator, led development of RadTranslate to help technologists communicate with non-English speaking patients.

"Preliminary data shows we can reduce the variability in exam times and therefore better predict and reduce patient wait-times on a standard 10-minute chest X-ray when RadTranslate is used for non-English-speaking patients versus traditional interpreters," says Marc D. Succi, MD, emergency radiologist and founder and executive director of MGH's MESH Incubator. "In addition, the care experience is more user friendly and equity and inclusion is enhanced because patients receive the care they need more quickly and in a more understandable way."

Serendipitous Moment

The idea for RadTranslate grew from an initiative that was unfortunately sidelined because of the COVID-19 pandemic. Before the pandemic unfolded, Daniel B. Chonde, MD, PhD, radiology resident at MGH and co-chair of the radiology department's DE&I Committee on Education, was working with Succi and other

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Daniel B. Chonde, MD, PhD, radiology resident at MGH and co-chair of the radiology department's Diversity, Equity, and Inclusion Committee on Education, conceived the idea for RadTranslate with other members of his committee.

committee members to develop a hackathon, an event that brings community members together to develop new ideas, focused on addressing DE&I challenges in imaging. As the team discussed the hackathon, some committee members expressed doubt about their ability to conceive viable solutions during the event.

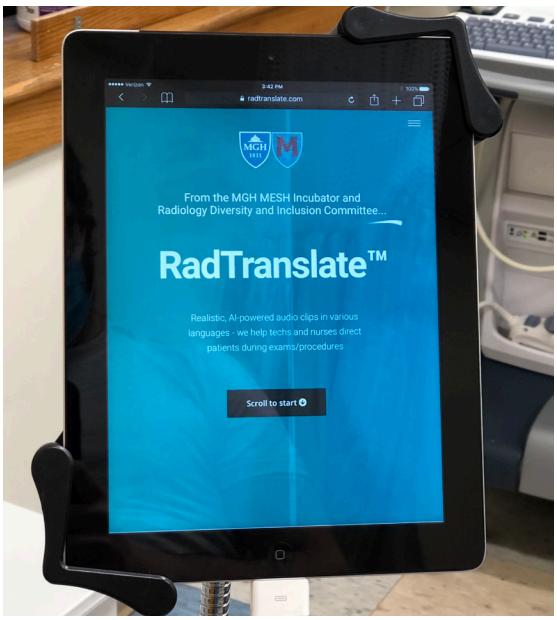
"It seemed really scary to some people because the premise was that you just showed up, thought of an idea, and developed it," Chonde says. "Back in January, before the pandemic hit, I asked the committee to run through an exercise and think of something in the hospital that posed a challenge, and then we'd try to come up with an interesting solution. That's when one of the technologists mentioned that it was hard to get in-person interpreters, particularly overnight, so they would just kind of pantomime to the patient what they wanted them to do during the exam — such as take a deep breath or stand up. Then someone said, 'Oh, wouldn't it be cool if we had an app that had all of the languages, and you could just press a button and it would vocalize the directions?' And I was like, 'See, in 5 minutes we came up with a great idea; imagine what we could do in 10 minutes.'"

The exercise gave committee members confidence about hosting the hackathon. They planned to hold the event in March of 2020, but as the pandemic swept across the country, they canceled it for safety reasons. Instead, committee members reached out to Chelsea HealthCare to see what they could do to help the clinic as COVID-19 ravaged the city, which saw nearly 430 reported cases and 11 deaths by mid-April. "The Chelsea team told us that their workflow was getting crushed because they didn't have enough in-person interpreters and that using our telephone-based interpreter system was challenging because the phones, which aren't wireless, are difficult to move around the clinic," Chonde recalls. "That's when we shared the concept for the translation app that came up during the hackathon demo, and the Chelsea team was immediately interested in the idea."

Rapid Development

Chonde met with Succi to discuss the possibility of developing such a tool. Succi, who has a background in web design, coding, and device development, was eager to help and promptly started contemplating the best format for the tool — with accessibility as the top priority. "In a lot of these situations, you may not know that your next patient is Spanish-speaking, so you don't really have time to download a translation app to your phone. Plus, a lot of hospital networks don't allow you to download apps like that," Succi explains. "We wanted this to be as accessible as possible, so we decided to make it a website."

From there, Succi visited Chelsea HealthCare and spoke with the technologists about which phrases they most frequently needed to communicate to care for patients and about how they might use the tool in the exam room. He then built the website and used an artificial intelligence (AI) speech program to translate and vocalize the phrases that the technologists provided into Spanish. "The main reason I used the AI-powered speech program was for standardization," Succi notes. "This way, the pitch and the tone are exactly the same



A web app that currently delivers imaging instructions, RadTranslate is easily accessible at the point of care.

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for each translation. That is important for reducing variability in the quality of the translations so that patients can easily understand them for an improved care experience."

Over a weekend, Succi had a prototype ready for sharing. He went back to Chelsea HealthCare and set a computer tablet on a stand near the technologist and placed a wireless speaker on the other side of the room so that the patient could easily hear the translation. He then asked the technologists to test the tool and provide feedback for improvement.

"This is a fundamental component of user-centered design, where you go to the end-user and build from there," Succi says. "The technologists provided great feedback. For example, they told us that the question, 'What is your first and last name?' should be separated into two questions because some patients might not understand both phrases in one question."

Succi used the technologists' feedback to tweak the prototype. For future updates, he created an online form that users can fill out to suggest additional phrases or request that translations for additional modalities be incorporated into the tool. "In order to make the tool scalable, we have an online intake form that anyone can use to suggest a phrase," Succi notes. "So, if the technologists find themselves using additional phrases that we didn't include during the initial design, they can fill out the form. This provides an opportunity to do longitudinal iteration and updates."

Reduced Disparities

As the COVID-19 pandemic raged, Succi deployed the tool at Chelsea HealthCare about a week and a half after Chonde approached him with the idea. It was a welcome addition to the team's pandemic-fueled workflow as they used X-rays to image hundreds of patients with suspected COVID-19.

"Dr. Succi brought over the tablet and set it up on his way home one night," Daunais says. "I can't tell you what it meant to us, particularly during the COVID-19 surge. All we had to do was push a button, and the instructions came out in Spanish. Patients were really responding to it. You could see the comfort come over them, and it helped us improve our efficiency to get patients in and out. I don't know that we would have been able to achieve that level of efficiency without it. It upped our game and allowed us to help patients without delay."

With RadTranslate helping to provide more equitable care to Spanish speakers in Chelsea, Succi reviewed hospital data to identify the other most common languages that MGH's diverse patient population speaks. Based on that research, Succi has added Mandarin and Portuguese translations to the tool and has started working to include Arabic, Haitian Creole, and Italian, as well. "When you're trying to care for patients, you don't want to delay care because of someone's language," Succi says. "For straightforward exams, this one-way communication allows teams to provide more inclusive care."

In addition to loading more languages, Succi is working to deploy the tool across MGH. He has already partnered with Gary X. Wang, MD, PhD, radiologist at MGH and the Breast Imaging Division's community site liaison in the towns of Chelsea and Revere, to incorporate screening mammography instructions into the tool and deploy it at MGH's breast imaging center in Revere, which, like neighboring Chelsea, is home to many non-English speakers.

"During the COVID-19 surge, we paused mammography screening in support of public health measures and mandates, and some of the mammography technologists from Revere helped with chest X-rays at Chelsea," Wang explains. "When they saw how well RadTranslate worked for chest X-rays, they were eager to use it for mammography. I worked with Marc and the technologists to incorporate the mammography instructions and deploy it in Revere. The mammography technologists say that it contributes to a more welcoming and equitable experience for patients."

Succi hopes to expand RadTranslate's use not only throughout MGH but also at institutions across the nation and around the globe. To that end, he has made it open access so that anyone anywhere can use it immediately and without cost to improve patient care.

Gary X. Wang, MD, PhD, radiologist at MGH and the Breast Imaging Division's community site liaison for the towns of Chelsea and Revere, has incorporated RadTranslate into screening mammography.

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"As large academic medical centers with the means and resources, if we can use technology to help reduce health disparities, then it's our obligation to do it," Succi says. "Everyone deserves a high level of care, and this tool can help us deliver that level of care to all of our patients."

Endnotes

1. Clark E, Fredricks K, Woc-Colburn L, et al. Disproportionate impact of the COVID-19 pandemic on immigrant communities in the United States. *PLosNegl Trop Dis*. 2020; 14(7):e0008484 doi: 10.1371/journal.pntd.0008484

2. Chonde D, Pourvaziri A, Williams J, et al. RadTranslate: An artificial intelligence-powered intervention for urgent imaging to enhance care equity for patient with limited English proficiency during the COVID-19 pandemic. *J Am Coll Radiol*. 2021; doi: doi.org/10.1016/j.jacr.2021.01.013

Now It's Your Turn

Follow these steps to deploy RadTranslate at your institution and tell us how you did on Twitter at the hashtag #Imaging3 or through email at imaging3@acr.org:

- Analyze your patient population and determine whether your team could provide better patient care by incorporating RadTranslate into your workflow.
- Set up computer tablets and speakers to make it easy for your technologists to use the tool and ensure patients can hear the translations during imaging exams.
- Provide feedback through the online form to suggest additional phrases and modality instructions to include in the tool.

Share Your Story

Have a case study idea you'd like to share with the radiology community? To submit your idea please click here.

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