Maximizing Patient Engagement in Rehabilitation Through Accessible Voice-Assistant Technology

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> "Alexa can help me with a number of different tasks in my room, so I don't always have to call my nurse to do small things for me. I think it's really important to give people the feeling of being able to do something for themselves."

BACKGROUND

Patient engagement, especially as it relates to engagement in their care, is a fundamental topic in consideration of health outcomes for people living with paralysis. Broader considerations of patient engagement and experience have coalesced with technological development, bringing many new healthcare assistive technologies to the market. Debra Ruh noted "Technology can promote improvements in efficiency, reliability, and speed, and can reach across boundaries of class, gender, and geography to deliver the benefits to all." Our aim was to integrate accessible technology within an advanced rehabilitation setting to demonstrate a comprehensive approach toward improving patient outcomes. We desired to demonstrate patient independence and engagement that facilitates improved outcomes in a rehabilitation program.

METHODS

We integrated voice assistant technology using the Amazon Echo Dot 5th generation on a 30-bed unit serving persons with spinal cord injury in November 2024. Through integrations provided by Aiva Health, the smart speaker can deliver information, provide entertainment, manage TV controls, with the goal to maximize self-care and advocacy. The project, funded by the Craig H. Nielsen Foundation and Sheltering Arms Foundation, allows patients to use voice commands ("Alexa") to access music, games, relaxation skills, reminders, facility frequently asked questions, and GetWell Network features including the television. Moreover, staff can use the voice assistants to make small tasks, like muting the TV, more efficient. The devices have an admission/discharge/transfer (ADT) integration to allow for the device to be configured specifically for the patient in the room at the time and to be "reset" for the next patient. Our process to go-live consisted of several categories of steps which required collaboration of therapy, nursing, information technology, and marketing teams (see Figure 1.)

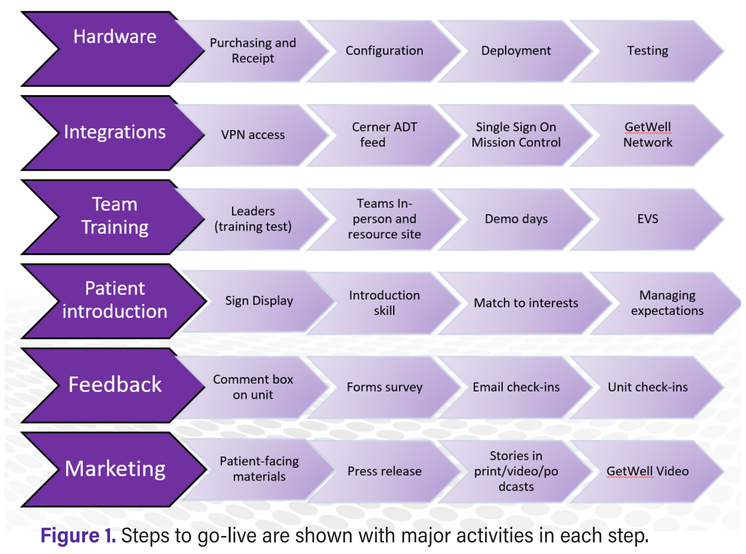
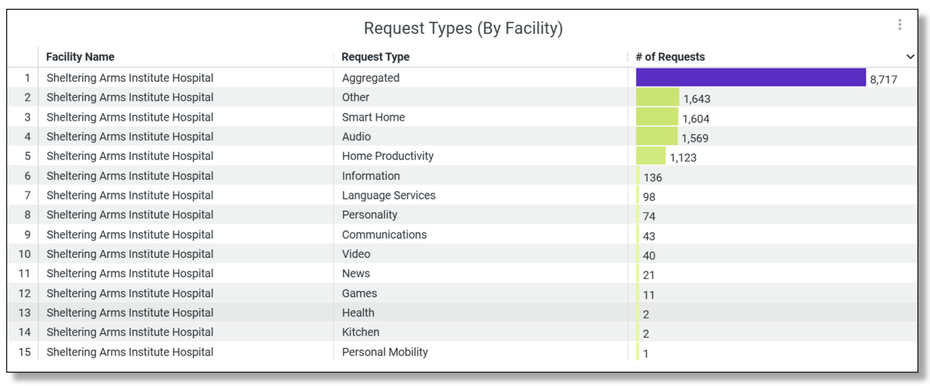


Figure 1. Steps to go-live are shown with major activities in each step.



Request Types (By Facility)

	Facility Name	Request Type	# of Requests
1	Sheltering Arms Institute Hospital	Aggregated	8,717
2	Sheltering Arms Institute Hospital	Other	1,643
3	Sheltering Arms Institute Hospital	Smart Home	1,604
4	Sheltering Arms Institute Hospital	Audio	1,569
5	Sheltering Arms Institute Hospital	Home Productivity	1,123
6	Sheltering Arms Institute Hospital	Information	136
7	Sheltering Arms Institute Hospital	Language Services	98
8	Sheltering Arms Institute Hospital	Personality	74
9	Sheltering Arms Institute Hospital	Communications	43
10	Sheltering Arms Institute Hospital	Video	40
11	Sheltering Arms Institute Hospital	News	21
12	Sheltering Arms Institute Hospital	Games	11
13	Sheltering Arms Institute Hospital	Health	2
14	Sheltering Arms Institute Hospital	Kitchen	2
15	Sheltering Arms Institute Hospital	Personal Mobility	1

Figure 2. Since implementation, over 14,000 requests have been received by the voice assistants.

RESULTS

Patients immediately utilized the device most frequently for television (TV) controls, followed by music, weather, and reminders (Figures 2 and 3). Over 14,000 requests have been logged with approximately 150 people served in this timeframe (93 requests per person if distributed equally). The most frequently used TV controls were changing the channel, mute, turning on TV, and adjusting the volume. We completed one interview to date with a patient to understand his experience with the device. He is 22-years-old and was hospitalized for a C4 traumatic spinal cord injury. He enjoyed using the device for music in his free time, but also noted increased independence with the TV controls and ability to see his daily schedule. Another patient with a thoracic level injury noted she used the device frequently for relaxation features during bowel and bladder programs. Speech therapists are frequently using the technology in treatment – patients can play cognitive games or listen to current events for exercises. No negative team member feedback has been collected through the survey opportunities provided. The hospital experienced one server downtime that affected device connectivity for 24-48 hours. Use can be tracked through the analytics platform provided by Aiva Health (Figure 4). One decrease in use was noted around winter holidays. With this visualization, communication was able to be sent to the clinical teams to remind them to encourage use of the voice assistants with patients, and subsequent use improved.

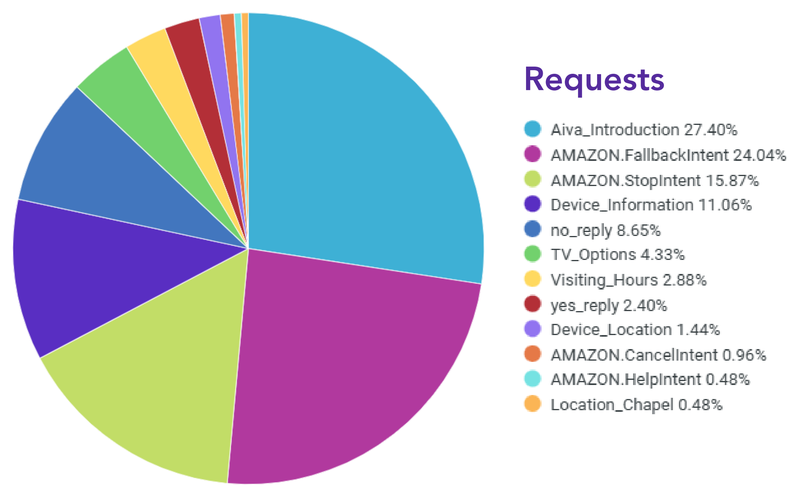


Figure 3. Request categorization (does not include smart room controls) since go-live.

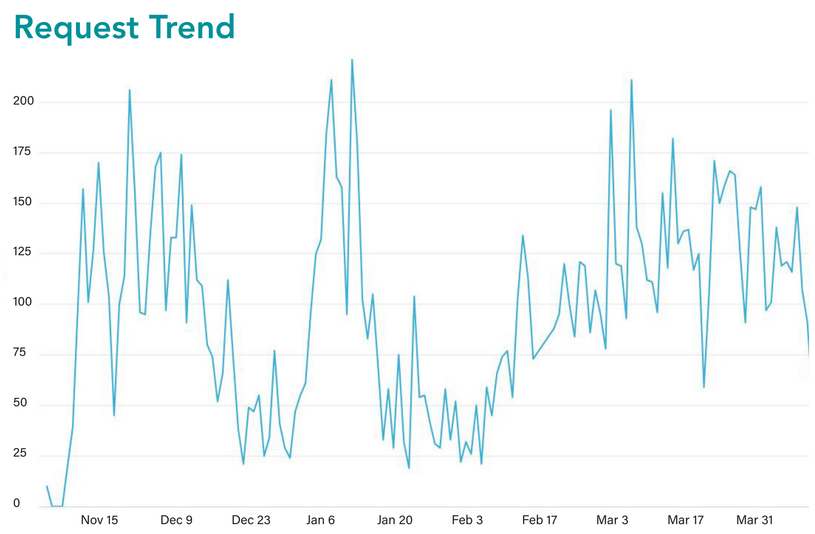


Figure 4. A dashboard for analytics of our voice assistants is available including showing use trends over time.

CONCLUSION

Voice assistant technology complements an advanced rehabilitation technology environment, allowing for accessible options for technology use when leaving a facility. One current optimization goal is to develop more training materials for people speaking different languages, primarily, Spanish. Additionally, the technology can deliver surveys and education to our patients who have limited ability to utilize a pillow speaker to navigate the patient engagement system. A focus on patient-centered technologies in addition to those that maximize care therapists can provide represents increased value toward persons who will live with physical disabilities. Few reports exist on how this technology may benefit people in an inpatient rehabilitation hospital setting and effect on care and outcomes. Rehabilitation professionals should also consider devices that would be easily transferred to community settings in the care of people with spinal cord injury.

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Sheltering Arms Institute
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