Human Guide Training to Improve Hospital Accessibility for Patients who are Blind: Needs Assessment and Pilot Process Evaluation

Tyler G. James, Sarah Hughes, Christa Moran, Sherry Day, Michael M. McKee

Submitted to: JMIR Rehabilitation and Assistive Technologies
on: July 23, 2024

Table of Contents

Human Guide Training to Improve Hospital Accessibility for Patients who are Blind: Needs Assessment and Pilot Process Evaluation

Tyler G. James[1] PhD, MCHES; Sarah Hughes[1]; Christa Moran[2] MEd, NIC, CoreCHI; Sherry Day[3] OD, FAAO; Michael M. McKee[1] MD, MPH

[1]Department of Family Medicine and Center for Disability Health and Wellness University of Michigan Ann Arbor, MI US
[2]ASL Interpreter Services, Office of Patient Experience Michigan Medicine Ann Arbor, MI US
[3]Department of Ophthalmology and Visual Sciences University of Michigan Ann Arbor, MI US

Corresponding Author:
Tyler G. James PhD, MCHES
Department of Family Medicine and Center for Disability Health and Wellness
University of Michigan
1018 Fuller St.
Ann Arbor, MI
US

Abstract

Background: People with disabilities are a priority population for health services research. People who are blind/low vision (B/LV) are a segment of this priority population, who experience difficulty to accessing healthcare facilities due to architectural and navigational barriers. These barriers persist despite disability civil rights law in the U.S.

Objective: The purpose of this manuscript is to report on a program that was developed to train way finders in human guide technique for people who are B/LV.

Methods: This study took place at Michigan Medicine, an academic medical center in southeast Michigan. We conducted a needs assessment through cohort discovery and soliciting expert feedback. The human guide training program was developed using the PRECEDE-PROEED health promotion program development model, and targeted healthcare volunteers and staff. The intended components included in-person training, an online module, and tip sheets. Due to COVID-19, the in-person training was not implemented. We report findings from a process evaluation, measuring reach, knowledge, behavioral capability, and satisfaction pre- and post-program.

Results: 87 participants completed the training, most of them were Michigan Medicine volunteers. There were significant improves in behavioral capability related to human guide technique. Participants were satisfied with the training, and provided recommendations for more detailed demonstrations and scenarios in future training sessions.

Conclusions: The training improve participants' knowledge and confidence in providing wayfinding assistance to patients who are B/LV. However, further in-person training is recommended to provide hands-on experience and detailed feedback. Addressing architectural barriers and providing accessible patient education materials is crucial for improving healthcare accessibility for patients who are B/LV.

(JMIR Preprints 23/07/2024:64666)
DOI: https://doi.org/10.2196/preprints.64666

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**

Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Original Paper

Human Guide Training to Improve Hospital Accessibility for Patients who are Blind: Needs Assessment and Pilot Process Evaluation

Tyler G James, PhD, MCHES[1]. ORCID: 0000-0002-0694-4702

Sarah Hughes[1]

Christa Moran, MEd, NIC, CoreCHI[2]

Sherry Day, OD, FAAO[3]

Michael M. McKee, MD, MPH[1]. ORCID: 0000-0002-5561-9885

[1]Department of Family Medicine and Center for Disability Health and Wellness, University of Michigan, Ann Arbor, MI

[2]ASL Interpreter Services, Office of Patient Experience, Michigan Medicine, Ann Arbor, MI

[3]Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, MI.

Author contributions:

- TGJ: Conceptualization; Formal analysis; Funding acquisition; Investigation; Methodology; Writing – original draft; Writing – review and editing
- SH: Writing – original draft; Writing – review and editing
- CM: Conceptualization; Writing – review and editing
- SD: Writing-review and editing
- MMM: Conceptualization; Writing – review and editing; Supervision

Keywords:
Blindness; visually impaired persons; health services accessibility; orientation and mobility; navigational accessibility

Data availability: Data from this study are not available for secondary analysis. The training is freely available at https://disabilityhealth.medicine.umich.edu/clinical/accessibility-disability-accommodations/human-guide-michigan-medicine.

Abstract

Background. People with disabilities are a priority population for health services research. People who are blind/low vision (B/LV) are a segment of this priority population, who experience difficulty to accessing healthcare facilities due to architectural and navigational barriers. These barriers persist despite disability civil rights law in the U.S. The purpose of this manuscript is to report on a program that was developed to train way finders in human guide technique for people who are B/LV.

Methods. This study took place at Michigan Medicine, an academic medical center in southeast Michigan. We conducted a needs assessment through cohort discovery and soliciting expert feedback. The human guide training program was developed using the PRECEDE-PROEED health promotion program development model, and targeted healthcare volunteers and staff. The intended components included in-person training, an online module, and tip sheets. Due to COVID-19, the in-person training was not implemented. We report findings from a process evaluation, measuring reach, knowledge, behavioral capability, and satisfaction pre- and post-program.

Results. 87 participants completed the training, most of them were Michigan Medicine volunteers. There were significant improves in behavioral capability related to human guide technique. Participants were satisfied with the training, and provided recommendations for more detailed demonstrations and scenarios in future training sessions.

Conclusion. The training improve participants' knowledge and confidence in providing wayfinding assistance to patients who are B/LV. However, further in-person training is recommended to provide hands-on experience and detailed feedback. Addressing architectural barriers and providing accessible patient education materials is crucial for improving healthcare accessibility for patients who are B/LV.

Introduction

Over 12.8 million adults in the U.S. report vision difficulty (i.e., are blind/low vision [B/LV]) [1]. This number is projected to increase as the population ages, in addition to an increase in chronic conditions that lead to being B/LV. For example, recent estimates indicate that the number of people who are legally B/LV over age 40 in the U.S. is expected to double to more than 8 million by 2050, and another 16.4 million are expected to have difficulty seeing with correctable vision loss [2]. People who are B/LV are more likely than those who are not to have chronic conditions including diabetes, heart disease, hypertension, injuries, depression, and premature death [3-8]. The etiologies of B/LV are numerous and vary widely ranging from genetic, congenital, or acquired conditions and

may be stable or progressive. Patients who are B/LV require comprehensive care coordination approach, which includes accessible healthcare facilities and healthcare providers with B/LV expertise.

Disability civil rights law in the U.S. mandates accessible healthcare environments for people with disabilities, including people who are B/LV. The primary legislation addressing accessibility in healthcare settings is the Americans with Disabilities Act (ADA) of 1990 [9]. The ADA prohibits discrimination against individuals with disabilities in all areas of public life, including employment, transportation, public accommodations, and access to state and local government services. Regarding healthcare specifically, the ADA requires healthcare providers, facilities, and programs to ensure equal access for individuals with disabilities. This includes making reasonable modifications to policies, practices, and procedures to accommodate the needs of people with disabilities, providing effective communication, and removing architectural and other barriers that may prevent access. In addition to the ADA, other laws and regulations may also impact accessibility in healthcare settings, such as Section 504 of the Rehabilitation Act of 1973 and the Patient Protection and Affordable Care Act (ACA) of 2010. These laws further emphasize the importance of ensuring equal access to healthcare for individuals with disabilities. More recently, the Patient Protection and Affordable Care Act's (ACA) Section 5307 mandates the U.S. Department of Health and Human Services to collaborate with external organizations to develop, evaluate, and disseminate curricula to address "cultural competency, prevention, public health proficiency, reducing health disparities, and aptitude for working with individuals with disabilities" [10].

Despite these mandates, patients who are B/LV experience disability-related accessibility barriers in healthcare settings [11-13]. Among these include inaccessible information, lack of communication support, navigational/wayfinding challenges, inaccessible medical equipment, digital accessibility issues, and attitudinal barriers. Print materials such as forms, brochures, and instructions are often

not available in accessible formats, such as braille, large print, or electronic text, making it challenging for B/LV patients to access important healthcare information independently. Secondly, B/LV patients may encounter challenges in communicating with healthcare providers if there are no provisions for alternative communication methods such as screen readers for electronic health records, tactile sign language interpreters (for people who are DeafBlind), large print materials or audio description of visual information and instructions [12]. In addition, patients who are B/LV may also encounter attitudinal barriers from healthcare providers or staff who may have misconceptions or lack awareness (due to lack of training) about the capabilities and needs of B/LV individuals, leading to stigma, discrimination, or inadequate care [12,13].

B/LV patients often encounter various architectural barriers in healthcare settings that can hinder their ability to navigate independently and access healthcare services effectively [12,14]. Architectural features such as narrow doorways, high thresholds, stairs without handrails or tactile indicators, and uneven flooring can pose significant challenges for B/LV individuals to navigate safely. Healthcare facilities with complex layouts, multiple corridors, and interconnected buildings can be particularly challenging for individuals who are B/LV to navigate independently without clear signage and wayfinding cues. This can make it challenging for B/LV individuals to find their way to reception areas, exam rooms, or other healthcare services [14]. Addressing these navigational barriers is necessary to ensure accessibility (and compliance to disability civil rights law) and requires addressing the environment through which a B/LV patient moves.

Orientation and Mobility for People who are B/LV

The process through which a person navigates indoor and outdoor environments is known as orientation and mobility. Orientation and mobility encompass a range of skills and techniques to understand one’s surroundings, move around confidently, and achieve greater independence. In the case of people who are B/LV, orientation and mobility skills can be used to compensate for reduced

visual information [15]. Orientation skills focus on understanding one's position within a given space, such as a room, building, or outdoor environment. Orientation skills help individuals create mental maps of their surroundings, including landmarks and spatial relationships, through training on auditory cues, feeling changes in terrain, and using other senses to gather information about the environment. Mobility skills focus on how individuals move safely and efficiently through different environments. This includes techniques for walking with a white cane or guide dog and using public transportation.

Orientation and mobility training teaches people who are B/LV how to problem-solve and facilitates independence when faced with challenges or unfamiliar situations, and is tailored to the individual's needs, goals, and vision loss. These skills are particularly important in environments that are not designed explicitly for accessibility, such as a hospital. Through using orientation and mobility skills, a person who is B/LV can find alternative routes, seek assistance from others, or use technology to gather information about the environment before arriving or in real-time. Despite these benefits, not all people who are B/LV receive orientation and mobility training. To our knowledge, there are no prevalence estimates of the number of B/LV people who receive orientation and mobility training, but access to this training is impacted by type of vision condition and other disabilities, access to social services, and geographic region [16,17].

Human guide

A human guide (historically called a "sighted guide") is someone who assists a B/LV person in navigating their surroundings safely and independently. Human guides provide physical assistance and verbal guidance to help the B/LV individual move through various environments with confidence [18]. This assistance can be particularly helpful in unfamiliar or crowded settings where navigation may become challenging. Particularly, the use of human guides in healthcare may serve as a facilitator to patient wayfinding, ensuring B/LV patients can navigate architecturally complex and

crowded hospital or clinic settings. Human guide technique is a method used by sighted individuals to assist B/LV or visually impaired people in navigating their surroundings safely and independently. It involves the guide providing physical support and verbal cues to aid the B/LV individual move through various environments with confidence. Tasks and responsibilities of the human guide include but are not limited to offering an arm, providing verbal directions, describing surroundings, and assisting with obstacles. It's most important for human guides to communicate effectively with the patient who is B/LV, respecting autonomy and independence while providing assistance in a supportive and respectful manner.

Objectives

The aim of this study was to develop a program to improve navigational access for patients who are B/LV by developing and evaluating a human guide training for staff and volunteers at a large academic medical center in southeast Michigan. Specifically, our objectives were to:

1. Develop and implement an in-person awareness and skill-building training for hospital staff and volunteers, teaching how to provide Human Guide Technique.

2. Adapt the in-person training for electronic delivery.

3. Conduct a process evaluation of the in-person training and online learning module.

As described in the forthcoming sections, the in-person training was not implemented due to infection prevention precautions. Information on the design of the in-person training is provided to facilitate implementation in other settings.

Methods

Setting

Michigan Medicine is the academic medical center operated by the University of Michigan Medical School. Located in southeast Michigan, Michigan Medicine operates a level 1 trauma center emergency department for adults and children, and operates an adult and children's hospital, and specialty centers in ophthalmology, oncology, and cardiovascular medicine.

Needs Assessment

A needs assessment was conducted through two methods: (1) cohort discovery and (2) discussions with subject matter experts. These methods were chosen based on recommendations from the Centers for Medicare and Medicaid Services [19,20] to identify the number of people who are B/LV and identify barriers at points of contact throughout the health system.

Cohort discovery

We identified the prevalence of patients who are B/LV within Michigan Medicine through DataDirect, a cohort discovery tool managed by the University of Michigan's Data Office for Clinical and Translational Research. DataDirect can be used for cohort discovery to estimate frequencies of patient groups based on specified criteria. For cohort discovery, we searched for the frequency of living patients who have an ICD-9-CM/ICD-10-CM diagnosis code indicating blindness or vision impairment.

Subject matter expert feedback

Subject matter experts were solicited for feedback prior to the creation of the intervention. We met through the University of Michigan's Center for Disability Health and Wellness Accessibility Task

Force, a group of researchers, clinicians, and staff at the University of Michigan and Michigan Medicine dedicated to improving accessibility for patients with disabilities. Experts included the (1) ASL Interpreter Services Supervisor, (2) Patient Civil Rights Coordinator, (3) ADA Compliance Officer, and (4) a community member who is low vision. We asked for feedback on the need for a patient accessibility program for people who are B/LV, and how this program might be developed and implemented.

Human Guide at Michigan Medicine Training Program

Situation and priorities

The U.S. Centers for Medicare and Medicaid Services recommends that hospitals disseminate effective training programs to address barriers to healthcare accessibility for blind patients.[20] Prior to the implementation of the Human Guide at Michigan Medicine Program, there was no organization-wide training teaching skills to improve accessibility for patients who are B/LV. In addition, in mid-2021, clinic staff members reported to the Office of Patient Complaints and the Office of Patient Experience that blind patients were arriving late or missing their appointments due to wayfinding accessibility issues within Michigan Medicine facilities. This presented an immediate need for a program to be responsive to policy- and patient-level needs.

Initially, this training program was conceived as a collaboration between the Center for Disability Health and Wellness and the Office of Patient Experience, specifically the latter's HOPE Ambassadors Program. The HOPE Ambassadors are a group of volunteers who serve as on-site guides, assisting patients and visitors with navigating the healthcare facility. Before the COVID-19 pandemic, there were approximately 160 HOPE Ambassadors across three facilities who spoke 13 different languages. Given the HOPE Ambassadors' role in guiding patients and knowledge of routes within the hospitals, we determined that expanding their role to serve as Human Guides would serve

the addressable need.

Concurrently with the conceptualization of this program, the Center for Disability Health and Wellness was leading the implementation of the Disability and Accommodations Tab: a standardized data collection instrument for patients to report disability-related accommodation needs through the electronic health record [21]. Given the inclusion of navigation via a Human Guide being included in this questionnaire and the applicability of Human Guide-related skills in the clinical setting, we decided to expand the scope of the training from HOPE Ambassadors to all Michigan Medicine staff and volunteers.

Program development

Program development was led by a Master Certified Health Education Specialist (MCHES) with nine years of experience in health promotion program planning and evaluation, and seven years of experience working with people who are B/LV (T.G.J.). A MCHES is a person who has demonstrated skills and training in health promotion program planning, implementation, and evaluation [22]. The core program planning group included stakeholders from: Michigan Medicine's Center for Disability Health and Wellness (M.M.M., Co-Director); Michigan Medicine's Office of Patient Experience (Q.D., HOPE Program Coordinator); Michigan Medicine's Interpreter Services (C.M., American Sign Language [ASL] Interpreter Services Supervisor); Ann Arbor Center for Independent Living (W.P., Director of Planning and Program Development) who also provided a patient perspective; and, a Certified O&M Specialist and Teacher of the Vision Impaired (L.B.).

We applied methods from health promotion program planning, including aspects of the PRECEDE-PROCEED Model [23,24], identifying stakeholders, developing a logic model, and aligning theory with program methods [25]. Typically, the PRECEDE-PROCEED Model is applied to understand quality-of-life issues among a priority population (*social diagnosis*), and then an *epidemiological*

assessment is completed before identifying modifiable predisposing, enabling, and reinforcing factors (*ecological assessment*) [24]. Through this process, program planners align administrative, policy, and educational interventions with changeable factors affecting the quality-of-life of the population. Given the established priority of developing a Human Guide intervention, which would be responsive to patient- and policy-level needs, we did not conduct the preparatory phase of identifying interventions to change behavioral antecedents. Instead, we focused on a high need intervention with high probability of implementation – increasing the capacity of existing volunteers (e.g., HOPE Ambassadors) and staff to improve accessibility for B/LV patients. A logic model of the program is provided in Figure 1, and theory-alignment is provided in the next section.

Figure 1. Logic model of the Human Guide at Michigan Medicine program.

INPUTS	ACTIVITIES	OUTPUTS	SHORT-TERM OUTCOMES[a]	MEDIUM-TERM OUTCOMES[b]	LONG-TERM OUTCOMES[c]
• **Funding:** CDHW. • **Trainees:** OPE volunteers, other medical professionals. • **Staff:** evaluator, OMI and Blind trainer(s), HOPE Program Coordinator. • **Training materials:** curriculum, photographs, script for MLearning video. • **Space:** for physical training. • **Learning resources:** tip sheets, one-pagers. • **Promotional materials:** advertising the program. • **A/V equipment:** to record and prepare online training. • **CDHW website:** for learning resources and training promotion.	• **In-person training** for HOPE Ambassadors, OPE volunteers and staff, and high need staff.	• Number of HOPE Ambassadors and staff at in-person training.	• **Increase in knowledge** about the needs of patients who are Blind. • **Increase in the perceived confidence** in providing safe Human Guide technique to patients and visitors who are Blind. • **Increase in skills** to provide safe Human Guide technique to patients and visitors who are Blind.	• **Increase in the number** of patients and/or visitors **receiving Human Guide services** (among those who need it). • **Decrease in the number** of patients and/or visitors with Blind **reporting accessibility issues** to the Office of Patient Experience or Patient Complaints for related navigation barriers. • **Decrease in the number** of Blind patients **who arrive late** to their appointment**.** • **Decrease in missed appointments** among Blind patients.	• **Decease in morbidity** among blind patients. • **Decrease in early mortality** among blind patients. • **Improve the quality of life** among blind patients and visitors.
	• **Online training** uploaded to MLearning future HOPE Ambassadors, medical assistants, and other Michigan Medicine staff.	• Number of online trainings completed.			
	• **Online training** uploaded to YouTube for external stakeholders.				
	• **Tip sheets and learning resources** for providing Human Guide hosted on the CDHW website.	• Number of website visits. • Number of tip sheet downloads.			

Situation and Priorities:	External factors:
• Align Michigan Medicine training opportunities with CMS recommendations. • Clinical staff have reported immediate accessibility barriers for blind patients to OPE. • CHDW mission: Develop and apply innovative educational strategies to address inequities. • OPE mission: Ensure an ideal experience for every patient, every time, across the entire health system.	• Patient transport at Michigan Medicine is unionized. Their role is different than that of Human Guides.

[a] Short-term outcomes are knowledge, attitudes, and skills.

[b] Medium-term outcomes are behavior and policy change.

[c] Long-term outcomes are changes/improvements in quality-of-life and health outcomes.

CDHW: Center for Disability Health and Wellness; OMI: Orientation and Mobility Instructor; A/V: audiovisual; OPE: Office of Patient Experience.

Program components and theory

The program had one overarching goal: increase the number of Michigan Medicine staff, volunteers, and contractors who have the skills to serve as Human Guides. To accomplish these goals, we intended to implement a three-component training program consisting of an (1) in-person training, (2) video-based online learning module, and (3) tip sheet/work guide. These three program components were designed to align with Social Cognitive Theory and theories of information processing (e.g., Consumer Information Processing Model) targeting behavior change constructs of behavioral capability, skills, and knowledge [25,26]. A description of how these constructs were applied in program development is provided in Table 1. As demonstrated in Table 1, the in-person training program targeted more theoretical constructs from Social Cognitive Theory related to behavioral capability (given the interactive nature of the in-person training).

The initial plan was to implement a training facilitated by a Certified Orientation and Mobility Specialist and B/LV co-facilitators. The training would be focused on delivering the most needed content knowledge and provide ample time for skills-based practice through roleplaying and simulations. This in-person training, however, was canceled after multiple scheduling attempts due to infection prevention concerns regarding the COVID-19 pandemic, and hospital restrictions on the number of volunteers permitted. The online learning module was designed as a very-brief, video-based, non-experiential training intended to serve as a ‘survival’ training. This format and length were chosen to accommodate the busy schedules and workflows of clinical staff in Michigan Medicine. Video content was planned to be filmed at the in-person training; however, due to the aforementioned changes, we instead filmed at a Michigan Medicine clinical

location. The training script and imagery was reviewed by subject matter experts, including a Certified Orientation and Mobility Specialist, for accuracy prior to distribution. The final training is available on the web, for free (see data availability statement).

Table 1. Theoretical alignment and application in the in-person and video-based Human Guide training program.

Outcome	Theory	Theory-based Method	In-person Training	Video-based Training
Knowledge of Human Guide	Theories of Information Processing (e.g., Consumer Information Processing Model, Cognitive Load Theory)	Alignment with information processing capacity	Teaching only the most important and useful points necessary to provide Human Guide safely and efficiently, thereby reducing information redundancy.	
		Chunking	Providing instruction on different types of O&M tools used by Blind people, followed by providing Human Guide technique under different scenarios.	
		Using imagery	Training in a setting similar to clinical/real-world contexts.	Using images and videos that are similar to real-world Human Guide scenarios.
Behavioral capability and skills related to Human Guide	Social Cognitive Theory	Active learning	Alternating between didactic and interactive/hands-on simulations.	-
		Enactive mastery experiences	Increasing the challenge of simulated tasks to help indicate ability.	-
		Feedback	Providing direct feedback to trainees about their skills and opportunities to improve Human Guide technique.	-
		Guided practice	Giving the opportunity for multiple repetitions of providing Human Guide technique, and de-briefing with facilitators and peers.	-
		Modeling/observational learning	Providing examples (through demonstration) modeling Human Guide in specific scenarios.	
		Verbal persuasion	Using messages that affirm the ability of participants to provide Human Guide.	
Awareness of Human Guide training	Diffusion of Innovations Theory	Observability	**Incentive:** Individuals who are not aware of the training program will observe their peers having a lapel pin and know they have adopted the training.	

Process Evaluation

This study was design as a process evaluation using methods common in health promotion program evaluation [27]. Process evaluations are a type of formative evaluation used to assess the quality and delivery of program activities and components. Although process evaluations can include a variety of measures, most process evaluations include measures of reach (i.e., how many people received the program) and early indicators of if the program is working as intended (i.e., early impact indicators) [27]. All activities involving human participants reported in this article were reviewed by the Medical Institutional Review Board at the University of Michigan and deemed quality improvement activities (HUM00208772).

In our process evaluation, we included four measures: (1) reach, (2) knowledge, (3) behavioral capability, and (4) satisfaction. Reach was measured based on the number of people who accessed and completed the training. Knowledge was operationalized through a 5-item program team-developed knowledge questionnaire focused on aspects included in the training. Participants were asked to respond to these knowledge questions as being true, false, or don't know. Incorrect and 'don't know' responses were recoded as incorrect. Behavioral capability, or self-reported understanding of having the skill needed to complete a task, was asked through three items focused on (1) providing clear directions, (2) providing human guide technique, and (3) providing human guide technique with a service animal. Satisfaction was operationalized through three questions: (1) relevance to the organization, (2) overall satisfaction, and (3) recommending to colleagues. Behavioral capability and satisfaction questions were responded to on a 5-point Likert-type scale (i.e., strongly disagree, disagree, neutral, agree, strongly agree), with a score of a 5 being 'strongly agree.' Individual questions are provided in the Results

section.

Data were analyzed in the R statistical environment using JASP (Jeffrey's Amazing Statistics Program). We summarize the reach and knowledge questions using frequencies and percentages. We calculated means to describe behavioral capability and satisfaction. Pre- and post-test scores for behavioral capability were assessed for change using paired samples t-tests with Cohen's *d* effect sizes.

Results

Needs Assessment

There are inadequate published definitions of diagnostic codes related to capturing patients who are B/LV. We used ICD-9-CM and ICD-10-CM diagnostic codes used by Ratakonda and colleagues (2023) [28] when studying potentially preventable hospitalizations among people with sensory disabilities. We identified that there were 55,159 B/LV patients who had an encounter in Michigan Medicine during the two years prior to the program.

Table 2. Patients with problem list diagnoses related to blindness.

	Number of patients	
High-level diagnosis	**Encounter between Dec. 31, 2021 and Jan. 1, 2023**	**Total number of patients in electronic health record**
Neurological vision impairment (e.g., visual field defect, central scotoma)	6,072 (53.2%)	11,412
Retina	12,739 (50.2%)	25,380
Age-related macular degeneration	25,977 (44.9%)	57,912
Other vision impairment (e.g., blindness and low vision, cortical blindness)	19,742 (54.3%)	36,381

Note. Patients may be in more than one high-level diagnosis category.

Subject matter experts agreed that navigating the healthcare system's clinics and hospitals was taxing on blind/low vision patients. The timeliness of addressing this issue was underscored by experts as the Office of Patient Experience recently reported there had been patients arriving late to appointments, despite having been on the premise before the appointment start-time, due to challenges visually navigating the environment. In these cases, not all patients were able to be worked back into the clinic's schedule leading to a delay in receiving care. In one instance, a complaint was escalated and social work became involved to better support the patient.

Process Evaluation

In total, 87 people completed the video-based training and were included in the process evaluation dataset. These participants took the training between February 21, 2023 and December 31, 2023. The majority of these trainees were volunteers at Michigan Medicine (51.7%, n=45). Over one-fourth (28.7%, n=25) of trainees were unaffiliated with Michigan Medicine or the University of Michigan (e.g., some trainees were from other states). Less than one-third of participants (27.9%, n=24) had previously completed a human guide training. The most common advertising sources for learning about the training was from the Office of Patient Experience (27.9%, n=24) and recommendations from friends or colleagues (27.9%, n=24).

Table 2. Trainee characteristics representing reach of the human guide training program.

Characteristics	**% (n) n=87**
Affiliation with Michigan Medicine	
Unaffiliated	28.7% (25)
Non-patient facing staff	8.0% (7)
Patient facing staff	11.5% (10)
Volunteer	51.7% (45)
Previously trained*	27.9% (24)
Advertising source*	
Center for Disability Health and Wellness	14.0% (12)
Office of Patient Experience	27.9% (24)
Recommended by friend or colleague	27.9% (24)
Web search	9.3% (8)
ADA technical assistance network	5.8% (5)
Other University of Michigan group	15.1% (13)

*One case missing.

Completing the human guide training required scoring a 100% on the 5-item knowledge quiz; therefore, we did not calculate pre- and post-test score changes. At pre-test, however, the most difficult question was “If a person identifies as blind, it is appropriate to call the person vision impaired” with almost 65% of participants scoring incorrectly (see Table 3). This contrasted to knowledge related to not making noises to distract service dogs (correct: 94.1%). There was a significant increase in self-reported behavioral capability of (1) providing clear directions, (2) providing human guide (without a service dog), and (3) providing human guide with a service dog. Effect sizes of the mean differences were high (*d*s > 0.9), but expected given the immediate post-test nature of the survey. Rainfall plots of pre- and post-training behavioral capability show that while there was large variability in pre-test responses, the responses at post-test clustered around 4 (‘agree’) and 5 (‘strongly agree’; see Figure 2).

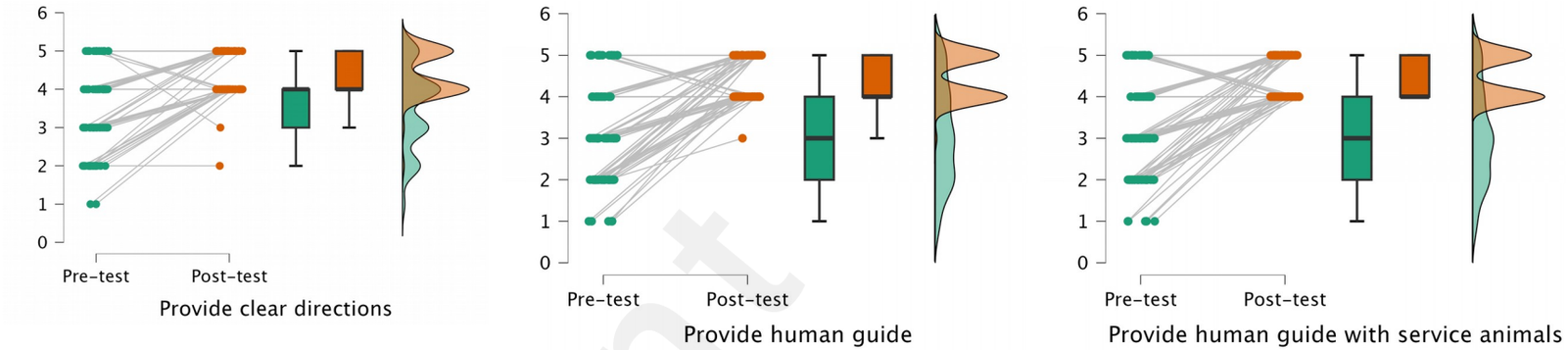
Trainees reported being satisfied with the training (M = 4.5) and would recommend it to their colleagues.

Table 3. Pre- and post-training knowledge, behavioral capability, and satisfaction reported by human guide trainees.

Domain	**Score**
Knowledge	**Pre-test percent correct (n)**
People with blindness cannot see at all. [False]	90.7% (78)
There is a legal definition of blindness and low vision. [True]	88.1% (74)
Age-related macular degeneration is a common cause of vision loss. [True]	83.5% (71)
If a person identifies as blind, it is appropriate to call the person vision impaired. [False]	35.3% (30)
When I see a service dog, I am permitted to make noises that may distract the dog as long as I do not touch the dog. [False]	94.1% (79)

Behavioral capability	**Pre-test M (SD)**	**Post-test M (SD)**	**Cohen's *d* (95% CI)**
I can provide clear directions to patients/visitors who are blind/low vision.	3.48 (1.04)	4.377 (0.60)	0.93 (0.64 to 1.21)
I can provide Human Guide technique to patients/visitors who are blind/low vision.	3.12 (1.20)	4.50 (0.53)	1.09 (0.79 to 1.38)
I can provide Human Guide technique to patients/visitors who are blind/low vision, who use service animals.	3.07 (1.16)	4.50 (0.50)	1.23 (0.91 to 1.54)
Satisfaction	**Post-test M (SD)**		
This training is relevant to providing patient care at Michigan Medicine.	4.56 (0.62)		
Overall, I was satisfied with this presentation.	4.50 (0.57)		
I would recommend this training to my coworkers.	4.58 (0.53)		

Figure 2. Rainfall plots of pre- and post-training behavioral capability as reported by human guide trainees.



Note. Green color indicates pre-test scores and distributions, while orange color indicates post-test scores and distributions.

Recommendations for improvement

Participants were asked to provide feedback on how to improve the video-based training; 16 participants provided free-text comments. Although some of these comments were positive, most responses provided critical feedback about trainees' expectations and needs. These needs were well aligned with the goals of the in-person training, including more demonstration, enactive mastery experiences, and simulation in clinical settings.

> *I was a little confused about how to offer your hand and some other minor details about guiding, so a full video scenario would be helpful and just many videos of watching guides interact with patients over and over would help too*.

Trainees also indicated concern with navigating through doorways.

> *I would only recommend extending the camera view of walking through doorways. This is a hard skill and I was hopeful to have more of a view from both sides about how to best navigate in this area.*

Other comments indicated that the training was "informative, but also rather general." This trainee further indicated that having additional practice would be needed for proficiency. Other trainees commented that they wanted to be asked additional knowledge questions related to human guide to ensure they understood the content. Lastly, three comments focused on platform or technology issues, including the training platform not allowing full screen for the videos and also a captioning error which was fixed.

Discussion

Patients who are B/LV face obstacles in physically navigating healthcare environments, particularly complex and maze-like hospitals. These obstacles serve as barriers to effectively and efficiently engaging in healthcare, and may implicate healthcare systems due to regulatory requirements with the ADA and ACA. Therefore, it is necessary to improve accessibility to effectively navigate healthcare facilities. We developed and implemented a web-based video training focused on teaching human guide technique, to improve wayfinding assistance for people who are B/LV. This training was aligned with priorities set by the U.S. Centers for Medicare and Medicaid Services and needs in the local setting – particularly given the priorities to address poor patient experiences due to navigational barriers.

This early process evaluation suggests that the training is accurately targeting the intended skills and knowledge related to human guide technique. This training has also been implemented in the HOPE Ambassadors program, improving the skillset of these wayfinding volunteers to meet the needs of people who are B/LV. The program could be improved, however. Results from the evaluation, and the early theory of change from the program, suggests the importance of providing in-person training allowing learners to practice human guide technique and receive just-in-time feedback. This would improve learners' experience, and also aid in cementing knowledge and behavior change.

Improving wayfinding assistance through human guide does not address the root cause of navigational inaccessibility in healthcare settings. Addressing architectural barriers requires a proactive approach to accessibility in healthcare facility design and renovation, as well as ongoing efforts to improve wayfinding and navigation assistance for people who are B/LV. This

may involve incorporating universal design principles, installing tactile signage and markings, ensuring clear pathways and accessible entrances, providing adequate lighting, training staff to assist patients and visitors who are B/LV, and providing web-based audio descriptions or tactile maps [29,30]. Some additional recommendations are provided in Table 4. By removing architectural barriers, healthcare facilities can create environments that are more inclusive and accessible for people with disabilities, including those who are B/LV.

Table 4. Recommendations to address barriers to inaccessibility in healthcare settings.

Recommendations
• Address **architectural** barriers including stairs without handrails, lack of tactile indicators and high contrast visual indicators, and narrow doorways. • Provide **educational materials** in accessible and alternative formats (e.g., large print, Braille). • Expand **medical education and training** to include disability competencies. • Improve accessibility and referral to **orientation and mobility** specialists. • Install tactile nurse call buttons and audible entry alarms in **patient rooms**. • Ensure physical and electronic **signage** is in large print, high contrast, and low glare. • Design **spaces** with attention to lighting, windows, and flooring and the amount of glare. • Facilitate **wayfinding** through use of floor guides with visual and tactile indicators (e.g., follow the black line to get to radiology), audible alerts in elevators and doorways, and the use of mobile GPS. • Enable **website and portal** customization options (e.g., increasing font size, contrast). • **Work with patients and visitors** who are blind/low vision to identify and address

accessibility concerns.

Limitations and Next Steps

There are several limitations to our program and program evaluation. First, the lack of full program implementation due to infection control policies led to potentially missed opportunities to provide just-in-time feedback to trainees on how to improve their human guide technique. This would have been responsive to trainee's needs, as indicated by the open-ended feedback. Despite this, the web-based training was liked by participants and had an associated increased in perceived behavioral capability. Still, we lack medium- and long-term outcome measurement. Collecting medium-term outcomes was too burdensome for this resource limited training, particularly given the low incidence of patients and visitors needing human guide. In addition, the immediate pre-test and post-test design is known to inflate effect size measures. To address these limitations, we recommend that future human guide trainings consider hosting an in-person training, in addition to web-based videos, and also consider longer post-test observations. The evaluation of this training could also be improved by reducing reliance on self-reported knowledge and behavioral capability, and instead use an observation checklist to evaluate trainees' skills. Orientation and mobility specialists may be particularly well-suited to evaluating trainee skills. This could serve a dual purpose as a data source and a feedback mechanism.

Conclusions

Patients who are B/LV experience barriers to physically navigating healthcare environments. Human guide is a technique that can be used to assist blind patients navigating the environment.

Participants who completed our very-brief, web-based video training reported improvements in behavioral capability with providing human guide technique to patients who are blind. We recommend the implementation of disability competency trainings in health provider preparation programs, and as required trainings for staff and volunteers working in clinical settings.

Acknowledgements

This program was funded by the University of Michigan's Center for Disability Health and Wellness which receives support from the University of Michigan Medical School. We would like to thank Mark Hymes and Lori Board for their assistance with developing the program.

Abbreviations

B/LV: blind/low vision

ADA: Americans with Disabilities Act

ACA: Affordable Care Act

MCHES: Master Certified Health Education Specialist

HOPE: Center for Disability Health and Wellness and the Office of Patient Experience

JASP: Jeffrey's Amazing Statistics Program

References

1. Varadaraj V, Deal JA, Campanile J, Reed NS, Swenor BK. National prevalence of disability and disability types among adults in the US, 2019. JAMA Netw Open. 2021 Oct 1;4(10):e2130358. PMCID: PMC8531993. PMID: 34673966

2. Varma R, Vajaranant TS, Burkemper B, Wu S, Torres M, Hsu C, Choudhury F, McKean-Cowdin R. Visual impairment and blindness in adults in the United States: demographic and geographic variations from 2015 to 2050. JAMA Ophthalmol. 2016 Jul 1;134(7):802–809. PMCID: PMC5116104. PMID: 27197072

3. Jones GC, Rovner BW, Crews JE, Danielson ML. Effects of depressive symptoms on health behavior practices among older adults with vision loss. Rehabil Psychol. 2009 May;54(2):164–172. PMID: 19469606

4. Crews JE, Chou CF, Sekar S, Saaddine JB. The prevalence of chronic conditions and poor health among people with and without vision impairment, aged ≥65 years, 2010-2014. Am J Ophthalmol. 2017 Oct;182:18–30. PMID: 28734819

5. Swenor BK, Wang J, Varadaraj V, Rosano C, Yaffe K, Albert M, Simonsick EM. Vision impairment and cognitive outcomes in older adults: the Health ABC study. J Gerontol A Biol Sci Med Sci. 2019 Aug 16;74(9):1454–1460. PMCID: PMC6696724. PMID: 30358809

6. Patel N, Stagg BC, Swenor BK, Zhou Y, Talwar N, Ehrlich JR. Association of co-occurring dementia and self-reported visual impairment with activity limitations in older adults. JAMA Ophthalmol. 2020 Jul 1;138(7):756–763. PMCID: PMC7226290. PMID: 32407444

7. Varadaraj V, Munoz B, Deal JA, An Y, Albert MS, Resnick SM, Ferrucci L, Swenor BK. Association of vision impairment with cognitive decline across multiple domains in older adults. JAMA Netw Open. 2021 Jul 1;4(7):e2117416. PMCID: PMC8285732. PMID: 34269806

8. Centers for Disease Control and Prevention (CDC). Prevalence of disabilities and associated health conditions among adults--United States, 1999. MMWR Morb Mortal Wkly Rep. 2001 Feb 23;50(7):120–125. PMID: 11393491

9. Americans with Disabilities Act of 1990. Sect. 2, 104 Stat. 328, 101–336 1991.

10. Section 5307 of the Patient Protection and Affordable Care Act of 2010. 124 Stat. 119. Sect. 5307, 111–148 2010.

11. Spencer C, Frick K, Gower EW, Kempen JH, Wolff JL. Disparities in access to medical care for individuals with vision impairment. Ophthalmic Epidemiol. 2009;16(5):281–288. PMID: 19874107

12. Iezzoni LI, Rao SR, Ressalam J, Bolcic-Jankovic D, Campbell EG. Incidence of accommodations for patients with significant vision limitations in physicians' offices in the US. JAMA Ophthalmology. 2022 Jan 1;140(1):79–84. PMCID: PMC8640945. PMID:

29

34854912

13. Heydarian NM, Hughes AS, Morera OF, Bangert AS, Frederick AH. Perspectives of interactions with healthcare providers among patients who are blind. Journal of Blindness Innovation and Research [Internet]. 2021 [cited 2024 May 6];11(2). Available from: https://nfb.org/images/nfb/publications/jbir/jbir21/jbir110203.html

14. Ulldemolins AR, Lansingh VC, Valencia LG, Carter MJ, Eckert KA. Social inequalities in blindness and visual impairment: A review of social determinants. Indian J Ophthalmol. 2012;60(5):368–375. PMCID: PMC3491260. PMID: 22944744

15. Jacobson WH. The art and science of teaching orientation and mobility to persons with visual impairments. Amer Foundation for the Blind; 1993.

16. Lam N, Leat SJ. Barriers to accessing low-vision care: the patient's perspective. Can J Ophthalmol. 2013 Dec 1;48(6):458–462. PMID: 24314403

17. Kaldenberg J. Low vision rehabilitation services: Perceived barriers and facilitators to access for older adults with visual impairment. British Journal of Occupational Therapy. 2019 Aug 1;82(8):466–474.

18. Novi R. Orientation and mobility for sight deficients. 1998. p. 89–91.

19. Centers for Medicare and Medicaid Services. Improving health care for adults with disabilities: An overview of federal data sources [Internet]. Baltimore, MD: Centers for Medicare and Medicaid Services; 2020 Dec. Available from: https://www.cms.gov/files/document/federaldatadisability508.pdf

20. Centers for Medicare and Medicaid Services. Improving communication access for individuals who are blind or have low vision [Internet]. Baltimore, MD: Department of Health and Human Services; 2020. Available from: https://web.archive.org/web/20220114145439/https://www.cms.gov/files/document/omh-visual-sensory-disabilities-brochure-508c.pdf

21. Halkides H, James TG, McKee MM, Meade MA, Moran C, Park S. Spotlighting disability in a major electronic health record: Michigan Medicine's Disability and Accommodations Tab. JMIR Form Res. 2022 Dec 2;6(12):e38003. PMCID: PMC9758637. PMID: 36459406

22. Knowlden AP, Cottrell RR, Henderson J, Allison K, Auld ME, Kusorgbor-Narh CS, Lysoby L, McKenzie JF. Health Education Specialist Practice Analysis II 2020: Processes and outcomes. Health Educ Behav. 2020 Aug;47(4):642–651. PMCID: PMC10131085. PMID: 32460562

23. Green LW, Kreuter M. Health program planning: An educational and ecological approach. 4th ed. Boston, MA: McGraw-Hill; 2005.

24. Green LW, Carlson Gielen A, Ottoson JM, Peterson DV, Kreuter MW, editors. Health program planning, implementation, and evaluation: Creating behavioral, environmental, and

policy change. 1st ed. Baltimore, MD: Johns Hopkins University Press; 2022.

25. Bartholomew Eldredge LK, Markham CM, Ruiter RA, Kok G, Parcel GS. Planning health promotion programs: An intervention mapping approach. John Wiley & Sons; 2016.

26. Glanz K, Rimer BK, Viswanath K, editors. Health behavior: theory, research, and practice. 5th edition. San Francisco, Calif: Jossey-Bass; 2015.

27. Sharma M, Petosa RL. Measurement and evaluation for health educators. New York, NY: Jones & Bartlett; 2012.

28. Ratakonda S, Lin P, Kamdar N, Meade M, McKee M, Mahmoudi E. Potentially preventable hospitalization among adults with hearing, vision, and dual sensory loss: a case and control study. Mayo Clin Proc Innov Qual Outcomes. 2023 Aug 1;7(4):327–336. PMCID: PMC10391598. PMID: 37533599

29. Khan S, Nazir S, Khan HU. Analysis of navigation assistants for blind and visually impaired people: a systematic review. IEEE Access. 2021;9:26712–26734.

30. Williams MA, Dubin B, Amaefule C, Nguyen L, Abdolrahmani A, Galbraith C, Hurst A, Kane S. Better supporting blind pedestrians and blind navigation technologies through accessible architecture. Designing Around People: CWUAAT 2016. Springer; 2016. p. 237–246.