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An Investigation into the Accuracy of LiDAR Technology for In-Home Rehabilitation Planning: A Proof-of-Concept Study

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Abstract

Background: Accurate home assessment is essential for safe hospital discharge and aging-in-place, yet staff shortages create significant delays. The integration of technology into discharge pathways could augment occupational therapy services and optimize health system resources.

Methods: This proof-of-concept study had three aims: (1) identify priority occupational therapy home assessment components through expert survey (n=30 occupational therapists); (2) evaluate consumer LiDAR device accuracy (iPhone 13 Pro Max, iPad Pro 11-inch, Leica BLK360 G1) against tape measurement (±0.1 cm) across varying light conditions (54-1051 LUX); and (3) determine which assessment components can be objectively measured by LiDAR versus requiring clinical evaluation.

Results: Survey respondents identified 59 priority assessment items across six domains. LiDAR devices demonstrated high measurement reliability: iPad Pro (ICC=0.989-1.000), iPhone (ICC=0.967-0.999), and Leica (ICC=0.998-1.000). Analysis of measurability revealed that 50.8% of assessment items (n=30) can be measured by LiDAR technology, while 49.2% (n=29) require clinical assessment through questionnaires or in-person evaluation. Notably, lower-priority items demonstrated higher measurability (61.1%) compared to highest-priority items (50.0%), indicating that critical assessment domains involve complex person-environment interactions beyond spatial measurement capabilities.

Conclusions: Consumer LiDAR technology offers accurate measurement of home dimensions for rehabilitation planning. A hybrid assessment model combining automated LiDAR measurement with clinical expertise is recommended, potentially reducing assessment time while maintaining quality and targeting in-person visits to items requiring professional judgment.

Introduction

Occupational therapists' role in accurately determining an individual’s safety to be at home and live a meaningful life in their home is integral to planning effective management, discharge planning and a critical component of rehabilitation programs [1, 2]. A number of long-term conditions are associated with a gradual decline in physiological systems, rendering an individual with less physical and cognitive reserve and increasingly vulnerable to stressors, characterised by a lack of resilience affecting an individual's ability to be independent in activities of daily living [3–5]. Both preventing hospital admission and return from hospital to the home depends on accurate specialist assessment of the person in the home environment, typically carried out by occupational therapists [6]. Pre-discharge home assessment visits conducted by occupational therapists have been shown to reduce the risk of falls (risk ratio 0.68, 95% CI 0.49–0.94) and hospital readmissions, while increasing participation in daily activities [7]. Home visits typically result in multiple recommendations for environmental modifications, with a median of 10 recommendations per visit [8]. The Centre for Disease Control and Prevention now recommends referral to occupational therapy when home hazards are likely, recognising the effectiveness of individualised environmental assessment and modification in reducing falls [9]. However, there are typically delays, affecting personal journeys and services, due to staff shortages of skilled rehabilitation professionals, as

highlighted by the World Health Organization (WHO) [10]. Currently, clinicians typically employ measures to evaluate how a person performs in their home necessitating the involvement of a multidisciplinary team member to travel and carry out physical measurement, which is neither time nor cost-effective [11]. The use of technology within discharge or admission pathways to assess home environments without requiring healthcare professional visits has the potential to augment current occupational therapy services and optimize health system resources. Through stakeholder engagement workshops with rehabilitation professionals, technology-enhanced home assessment emerged as a priority need to support discharge planning for older adults [12]

The WHO have suggested the potential for using technology to augment sustainable services [13, 14]. Portable light detection and ranging (LiDAR) systems on phones offer a potential means to accurately assess home dimensions which form one part of the assessment [15]. The potential for such systems in LiDAR, which uses light as a pulsed laser to measure distances, can create detailed 3D maps of the home, providing precise measurements of room sizes, hallway widths, heights of tables, chairs and other spatial features [16–19]. An alternative approach, such as using a LiDAR system, could be used to augment and accurately measure house dimensions to determine the need for a home assessment [20–23].

However, there is a need to determine the potential for using a portable LiDAR system for healthcare environments, particularly in addressing lighting conditions and user handling challenges to ensure reliable measurements [22, 23]. Previous research has emphasised the importance of accurate home assessments, of which home measurement form a critical part to support rehabilitation for individuals with frailty [24].

Although LiDAR technology has been used in various fields for spatial measurements, its application in healthcare, particularly for the planned use of assistive devices in patients' homes, remains relatively unexplored [17, 22, 24, 25]. Given the significance of providing timely accurate home measurements, this study set out to determine the potential for using technology to support occupational therapy assessment of the person in the home [26].

This study had three aims: (1) to identify priority components of occupational therapy home assessment through an expert survey of practising occupational therapists; (2) to evaluate the accuracy and reliability of consumer LiDAR devices (iPhone and iPad) compared with professional-grade equipment and standard tape measurement for capturing home dimensions relevant to rehabilitation planning; and (3) to determine which assessment components can be objectively measured by LiDAR technology versus those requiring clinical assessment through questionnaires or in-person evaluation.

Materials and Methods

This study employed a two-phase mixed-methods approach: (1) an expert survey to identify key components of occupational therapy home assessments, and (2) a proof-of-concept evaluation of LiDAR technology for capturing home measurements.

Ethical exemption for this study was granted by the University of Manchester Research Ethics Team (Ref: 2025-22555-39932), confirming that formal ethical review was not required in accordance with University policy.

2.1 Phase 1: Expert Survey on Home Assessment Components

Participants and Recruitment: Licensed occupational therapists were recruited through professional networks and occupational therapy associations. Eligibility criteria required current licensure and active practice involving home assessments. Participants provided informed consent before completing the survey.

Survey Design: An online survey was developed to identify essential components of home assessment for rehabilitation planning. The survey comprised 60 items covering six domains: (a) home access and entry (13 items), (b) living area assessment (12 items), (c) bedroom assessment (8 items), (d) bathroom and toilet assessment (16 items), (e) hallways and circulation (6 items), and (f) stairs and level changes (11 items). Respondents rated each item using a three-point Likert scale: "Very Important", "Somewhat Important", or "Not at all Important".

Analysis: Items were scored as follows: Very Important = 3, Somewhat Important = 2, Not at all Important = 1. Total scores were calculated for each item and items were ranked by total score to identify priority assessment components. Demographic data including country of practice and practice setting were summarised descriptively.

2.2 Phase 2: LiDAR Proof-of-Concept Evaluation

Study Setting: There is tremendous variability in housing types in the UK, with older people reporting a preference for ageing in place while recognising the benefits of single-level living [27]. Therefore, the house for this study was chosen carefully to have a ground-floor bedroom, kitchen, connecting corridor, and a conservatory repurposed as a laundry room, detailed in Appendix A.

Equipment: Three LiDAR-equipped devices were evaluated: (1) iPhone 13 Pro Max using the built-in LiDAR scanner, (2) iPad Pro 11-inch using the Scaniverse app (Version 3.0.2), and (3) Leica BLK360 G1 professional laser scanner (Version 5.1.0) with Cyclone FIELD 360 software. A tape measure (EU class I, accuracy ± 0.1 cm) served as the reference standard.

Researchers: Two researchers operated the iPhone devices: Researcher 1, a 181 cm tall female with a background in rehabilitation therapy for older adults and registered with the Health and Care Professions Council (HCPC), and Researcher 2, a 163.3 cm tall female specialising in public health. A third researcher, a 175 cm tall male with an engineering background and expertise in LiDAR systems, operated the Leica BLK360 G1. The decision to use different devices was made to allow comparison of effectiveness and user-friendliness across varying expertise levels.

Procedure: Researchers conducted walkthroughs in five areas: bedroom, kitchen with dining area, bathroom, corridor, and laundry room (conservatory). Each area was scanned using the LiDAR equipment to capture spatial features including furniture placement, doorways, and room dimensions. All researchers held the equipment at face level with both hands, though angles varied as researchers adapted to capture lower features. Following video recordings, room dimensions (width, length, height) were measured with the tape measure for validation. Environmental light levels in each room were recorded using a LUX light meter app (Google Pixel 3a).

Statistical Analysis: The Intraclass Correlation Coefficient (ICC) using a two-way mixed effects model assessed absolute agreement between each LiDAR device and tape measurements using SPSS version 29. Following Koo et al. [28], ICC values were interpreted as: <0.50 poor reliability, 0.50–0.75 moderate reliability, 0.75–0.90 good reliability, and > 0.90 excellent reliability. Pearson's correlation coefficients examined relationships between measurement deviation and (a) light levels and (b) researcher height. Due to the small3. Results

LiDAR Reliability Testing

3.1.a Reliability testing:

Bedroom: The bedroom's environmental light was 76 LUX. A high degree of reliability was found between Tape and iPad Pro LiDAR measurement with the average measure ICC of .999 with a 95% confidence interval from .998 to 1.000 ($F(13,13) = 1744.205$, $p<.001$), iPhone Pro max LiDAR for researcher 1, with the average measure ICC was .991 with a 95% confidence interval from .972 to .997 ($F(12,12) = 111.423$, $p<.001$), iPhone Pro max researcher two LiDAR measurement with average measure ICC was .997 with a 95% confidence interval from .992 to .999 ($F(13,13) = 417.437$, $p<.001$), professional LiDAR measurement with the average measure ICC was 1.000 with a 95% confidence interval from .999 to 1.000 ($F(11,11) = 3384.350$, $p<.001$). (Table 1 & 2)

Table 1
Bedroom assessment with *76 LUX*

Item	Tape EU class I (± 0.1 cm) measurement	iPad Pro	Professional Laser LiDAR	iPhone LiDAR Height 163.2	iPhone LiDAR Height 182
Door Width (cm)	80	82	78.3	77	77
Door Height (cm)	198	192	199	200	200
Bed with Mattress Height (cm)	52	52	52.1	57	51
2 Beds together Width (cm)	184	186	181	170	200
2 Beds together Height (cm)	52	52	52.2	58	51
2 Beds together Length	190	182	190	190	230
Bedside table Width (cm)	28	29	27.8	22	23
Bedside table Height (cm)	45	43	43.9	41	41
Bedside table length	30	28	29.8	22	23
Bed to wall Width (cm)	60	62	57.7	66	56
chair Width (cm)	56	54	48.8	52	54
chair Height (cm)	40	38		37	34
chair length	49	48		39	58
chair arm Height (cm)	47.5	47	47.9	48	

Table 2
Reliability Analysis Table

Room	Device	Average Measure ICC	95% Confidence Interval	F-Statistic	p-value
Bedroom Lux = 76	iPad Pro LiDAR	0.999	0.998 to 1.000	1744.205	< 0.001
	iPhone Pro Max LiDAR (R1)	0.991	0.972 to 0.997	111.423	< 0.001
	iPhone Pro Max LiDAR (R2)	0.997	0.992 to 0.999	417.437	< 0.001
	Professional Laser LiDAR	1.000	0.999 to 1.000	3384.350	< 0.001
Bathroom Lux = 86	iPad Pro LiDAR	0.999	0.995 to 1.000	678.066	< 0.001
	iPhone Pro Max LiDAR (R1)	0.991	0.963 to 0.998	98.159	< 0.001
	iPhone Pro Max LiDAR (R2)	0.996	0.986 to 0.999	222.689	< 0.001
	Professional Laser LiDAR	0.999	0.998 to 1.000	1366.697	< 0.001
Corridor Lux = 54	iPad Pro LiDAR	0.989	0.921 to 0.999	91.00	< 0.001
	iPhone Pro Max LiDAR (R1)	0.986	0.576 to 0.999	184.129	< 0.001
	iPhone Pro Max LiDAR (R2)	0.967	0.741 to 0.997	37.189	0.002
	Professional Laser LiDAR	Not processable	-	-	-
Kitchen Lux = 353	iPad Pro LiDAR	0.999	0.997 to 1.000	2033.275	< 0.001
	iPhone Pro Max LiDAR (R1)	0.999	0.996 to 1.000	1001.769	< 0.001
	iPhone Pro Max LiDAR (R2)	0.997	0.992 to 0.999	344.082	< 0.001
	Professional Laser LiDAR	0.999	0.998 to 1.000	2120.083	< 0.001
Laundry Room Lux = 1051	iPad Pro LiDAR	1.000	0.998 to 1.000	3133.743	< 0.001
	iPhone Pro Max	0.999	0.992 to 1.000	1675.563	<

Room	Device	Average Measure ICC	95% Confidence Interval	F-Statistic	p-value
	LiDAR (R1)				0.001
	iPhone Pro Max LiDAR (R2)	0.997	0.997 to 1.000	548.519	< 0.001
	Professional Laser LiDAR	0.998	0.867 to 1.000	2120.083	< 0.001

3.1.b Impact of light on the LiDAR system accuracy: The accuracy of spatial measurements using various LiDAR technologies was evaluated under differing light conditions across five distinct room environments. A moderate positive correlation was observed between light levels and measurement deviations for the iPad Pro LiDAR (R = 0.54), suggesting that higher light conditions may slightly enhance accuracy. Conversely, the Professional Laser LiDAR exhibited a moderate negative correlation (R = -0.64) with light levels, indicating more stable or slightly improved accuracy under lower light conditions. For the iPhone LiDAR setups at heights of 163.2 cm and 182 cm, a slight negative correlation (R = -0.27) was noted, suggesting a minimal impact of light levels on their measurement accuracy. (Table 3)

Table 3
Summary of Measurement Deviations and Correlations

Device	Researcher Height (cm)	Average Deviation (cm)	Correlation with Light Levels	Room Types Analysed
iPad Pro LiDAR	N/A	1.5–2.2	R = 0.54	Bedroom, Bathroom, Corridor, Kitchen, Laundry
Professional Laser LiDAR	N/A	0.9–1.3	R = -0.64	Bedroom, Bathroom, Corridor, Kitchen, Laundry
iPhone LiDAR	163.2	3.5–5.0	R = -0.27	Bedroom, Bathroom, Corridor, Kitchen, Laundry
iPhone LiDAR	182	4.0–5.5	R = -0.27	Bedroom, Bathroom, Corridor, Kitchen, Laundry

According to this study result, a high degree of reliability was found between tape measurement and all the LiDAR-equipped devices in the bedroom, Bathroom, Kitchen and laundry room despite the researcher's height, room light difference and choice of devices for the assessment. However, in the corridor, iPhone 13 Promax iPad Pro showed a high degree of reliability, but data from professional laser LiDAR was not processable, which could be due to the room light (Table 2)

3.2 Expert Survey: Priority Home Assessment Components

Respondent Characteristics: Thirty occupational therapists participated in the survey, with 20 completing all sections (67% completion rate). Respondents were predominantly based in the United Kingdom (n = 21), with additional responses from Ireland (n = 1) and Germany (n = 2). The majority practised in community settings (n = 19), with others working in acute care (n = 8), inpatient rehabilitation (n = 8), and mental health (n = 6); several respondents worked across multiple settings.

Priority Rankings: Of the 60 assessment items evaluated, five items achieved the highest possible consensus score (151 points), indicating unanimous recognition as "Very Important" by 85% of respondents (n = 45) with the remaining 15% (n = 8) rating them "Somewhat Important". These top-ranked items were: (1) space to manoeuvre mobility aids, (2) space to fit access aids, (3) ability to get onto/out of bed easily and safely, (4) pathway from door to bed free from hazards, and (5) ability to get onto and off the toilet easily and safely. These findings indicate that mobility, bed transfers, and toilet access represent the highest priorities for home assessment (Table 4).

Items ranked in the second tier (scores 149–150) included: lighting adequacy, bed height, toilet location, presence of toilet rails, bath/shower accessibility, and grab rail availability. Bathroom and toilet assessments collectively represented the domain with the highest mean importance ratings.

Lower-ranked items (scores 104–107) included qualitative assessments of stair and step appearance, ramp dimensions, and stair lift accommodation. These items, while still rated as "Very Important" by the majority (63–71%), received comparatively more "Not at all Important" ratings than other items.

Implications for LiDAR Assessment: The survey results indicate that measurements of spatial dimensions (room widths, doorway clearances, furniture heights) and identification of hazards represent priority targets for technology-assisted home assessment. Specifically, the ability to measure: (a) clear floor space for mobility aids, (b) bed and toilet heights, (c) pathway widths and obstructions, and (d) door widths would address the majority of highest-ranked assessment needs.

3.3 System Measurability Analysis

Of the 59 home assessment items evaluated by occupational therapists, 30 items (50.8%) were identified as measurable through LiDAR spatial analysis, while 29 items (49.2%) required alternative assessment methods including questionnaires or direct clinical observation. Measurability varied across priority rankings: highest-priority items (ranks 1–10) showed 50.0% measurability (7/14 items), very high priority items (ranks 11–20) showed 45.5% measurability (5/11 items), high priority items (ranks 21–30) showed 33.3% measurability (2/6 items), medium priority items (ranks 31–40) showed 50.0% measurability (5/10 items), and lower priority items (ranks 41+) showed 61.1% measurability (11/18 items) (Fig. 1). Measurable items primarily included spatial dimensions (room measurements, pathway widths, heights), structural features (presence of handrails, step dimensions), and floor plans. Non-measurable items predominantly involved functional capacity assessments (e.g., ability to transfer on/off bed or toilet), subjective evaluations (lighting adequacy determined by clinical judgment), and questions requiring questionnaire-based data collection (e.g., space to fit access aids). Among

measurable items, 20 (66.7%) required additional user input such as editable captions for hazard identification, dimensional specifications, or start/end point labeling, indicating the need for human annotation to supplement automated spatial measurement.

Further Tables and Figures are as supplementary material.

Discussion

This study provides evidence for three key findings that define the role of consumer LiDAR technology in home assessment. First, occupational therapy priorities: thirty expert clinicians identified 59 essential assessment components, with space for mobility aids and access equipment ranked highest. Second, technical accuracy: consumer LiDAR devices (iPhone, iPad) demonstrated reliability equivalent to professional equipment (ICC = 0.967-1.000) across varied lighting conditions. Third, and most significant for clinical implementation: 50.8% of assessment items can be measured by LiDAR, while 49.2% require clinical evaluation—with highest-priority items showing lower measurability (50.0%) than lower-priority items (61.1%). This pattern reveals that the most critical assessment domains involve person-environment interactions beyond spatial measurement capabilities. These findings support a hybrid model combining automated LiDAR measurement with clinical expertise, rather than technology-based replacement of occupational therapist assessment. Below we examine the implications of these findings for clinical practice, telerehabilitation implementation, fall risk assessment integration, and measurement precision requirements.

Home-based measurements provide an understanding of an individual's living context in relation to their functional status in their own environment. Here, we explored the potential of augmenting or determining the need for home assessment using LiDAR technology to determine house measures. We found that using LiDAR across all devices was highly reliable compared to the usual practice of tape measurement. Lower lighting impacted on reliability.

Differences in researcher height had a minimal effect on the accuracy of measurements made using iPhone LiDAR devices. The devices operated by a taller researcher (182 cm) showed slightly higher deviations ranging from 4.0 cm to 5.5 cm across all room settings, compared to those operated by a shorter researcher (163.2 cm), who recorded deviations from 3.5 cm to 5.0 cm. This shows that the ergonomic factors associated with device operation, such as recording angle, might affect measurement accuracy, particularly for handheld devices like the iPhone LiDAR.

Across all tested conditions, the Professional Laser LiDAR consistently showed the least measurement deviation (0.9 cm to 1.3 cm), marking it as the most accurate and reliable device. However, data from professional laser LiDAR in a darker environment was not processable. The iPad Pro also maintained high reliability, with deviations that were typically within the range of 1.5 cm to 2.2 cm. The findings underscore the influence of both environmental lighting and ergonomic factors on the performance of measurement technologies, with significant implications for their application in precise spatial assessments.

LiDAR technology has the potential to assess the living environment and tailor rehabilitation programs to the home's specific features using everyday technologies such as smartphones.

Here, we propose that the iPhone and iPad, everyday devices, may give reliable and accurate results and the need for a feasibility study across a wider range of homes and across individuals. Further research is needed to compare data from different LiDAR devices with assessments conducted by healthcare professionals, carers and family members with minimal skills and engineers, we propose that there is potential for use either in community teams or in acute settings where the safety of a home environment needs to be quickly determined, within tailored strategies on improving outcomes for individuals with frailty. Future research is required to determine the optimal implementation framework, design specifications, and feasibility of integration into healthcare pathways.

Functional Assessment Gap and Complementary Role of Technology

The measurability analysis highlights an important clinical consideration: LiDAR technology captures environmental factors but not functional capacity. This distinction aligns with the International Classification of Functioning, Disability and Health (ICF) framework, which differentiates between environmental factors and activity/participation domains [WHO ICF]. The highest-ranked items frequently assessed person-environment interaction (e.g., “Can the person get onto/out of bed easily and safely”), requiring clinical judgment about an individual’s physical and cognitive capabilities in relation to their environment. This finding reinforces that LiDAR-based assessment complements rather than replaces occupational therapy evaluation, serving as a tool to enhance rather than substitute professional clinical assessment.

Hybrid Assessment Model: Integrating Objective and Subjective Measures

Our findings support the development of a hybrid assessment model that leverages the complementarity of objective (LiDAR-derived) and subjective (clinical judgment) measures. Approximately half of the assessment items could be objectively measured through spatial analysis, while the remaining items required questionnaire-based or observational assessment. This distribution suggests an optimal workflow where LiDAR technology provides precise environmental data (dimensions, clearances, spatial relationships) that informs clinical decision-making about functional requirements. Such an approach could enhance assessment efficiency by allowing clinicians to focus their expertise on evaluating person-specific factors (mobility, cognition, safety awareness) while relying on automated systems for standardized spatial measurements. This model has particular relevance for telerehabilitation applications, where remote environmental assessment could support clinical triage and intervention planning.

Fall Risk Assessment and Integration with Validated Tools

Many of the measurable items identified in this study—including pathway hazards, dimensional clearances, and lighting conditions—are established components of validated fall risk assessment

instruments such as the Home Falls and Accidents Screening Tool (HOME FAST) [27] and the Westmead Home Safety Assessment (WeHSA) [28]. The high reliability demonstrated for LiDAR measurement of these environmental factors (ICC 0.967-1.000) suggests potential for integration with these standardized tools. For example, automated measurement of hallway width, door clearances, and step dimensions could provide objective data to supplement clinical observation of hazard presence and severity. Future research should investigate whether LiDAR-derived measurements can reliably feed into fall risk scoring algorithms, potentially enabling automated screening to identify high-risk home environments requiring prioritized occupational therapy intervention.

Telerehabilitation Readiness and Clinical Triage

The measurability findings support development of a technology-enhanced triage model for home assessment services. By identifying which homes require in-person occupational therapy visits based on the complexity of non-measurable high-priority items, healthcare systems could optimize resource allocation. For instance, homes with straightforward spatial requirements (adequate room dimensions, clear pathways, appropriate heights) but complex functional concerns might benefit from hybrid assessment combining remote LiDAR evaluation with focused in-person functional testing. Conversely, homes with concerning spatial constraints identified through LiDAR assessment could be fast-tracked for comprehensive occupational therapy evaluation. This stratified approach aligns with growing emphasis on sustainable healthcare delivery models [7, 8] and could help address workforce shortages by directing specialist expertise where it is most critically needed.

Measurement Precision and Clinical Significance

While this study demonstrated high statistical reliability of LiDAR measurements (ICC 0.967-1.000), the clinical significance of observed measurement deviations requires consideration. The iPhone and iPad Pro devices showed deviations of 3.5–5.5 cm from tape measure reference standards. For many home assessment applications, this level of precision is clinically acceptable: for example, determining whether a 91 cm doorway accommodates a standard 61 cm wheelchair includes sufficient safety margin to tolerate 4–5 cm measurement variation. However, for applications requiring millimeter precision, such as custom wheelchair fitting or determining exact clearances for powered mobility devices, the observed variability may be insufficient. Future research should establish minimum clinically important differences for various home assessment measurements and map these against device-specific measurement error profiles to guide appropriate technology selection for different clinical scenarios.

Limitations and strengths: Only a limited number of raters assessed each device, which may restrict the generalisability of the findings. We did not assess all possible light levels, although measurements were taken in a range of lighting conditions, including some darker rooms. Additionally, inter-rater reliability was not directly assessed, as the primary focus was on evaluating the accuracy of LiDAR technology against a standard tape measure rather than the consistency of measurements between different raters. However, measurements were collected by three researchers with different professional backgrounds and varying heights, offering some insight into potential variability in the use of each device. Future

research could systematically evaluate inter-rater reliability by having multiple raters measure the same environments with the same devices under controlled conditions. However, despite these limitations, this study is one of the first to evaluate the accuracy of LiDAR technology in the context of home-based rehabilitation planning, providing valuable data on the reliability of different devices under real-world conditions. The use of multiple LiDAR-equipped devices, including both professional-grade and consumer-level technologies, offers a practical comparison relevant to both healthcare professionals and non-specialist users.

Declarations

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Table 4

Table 4 is available in the Supplementary Files section.

Figures

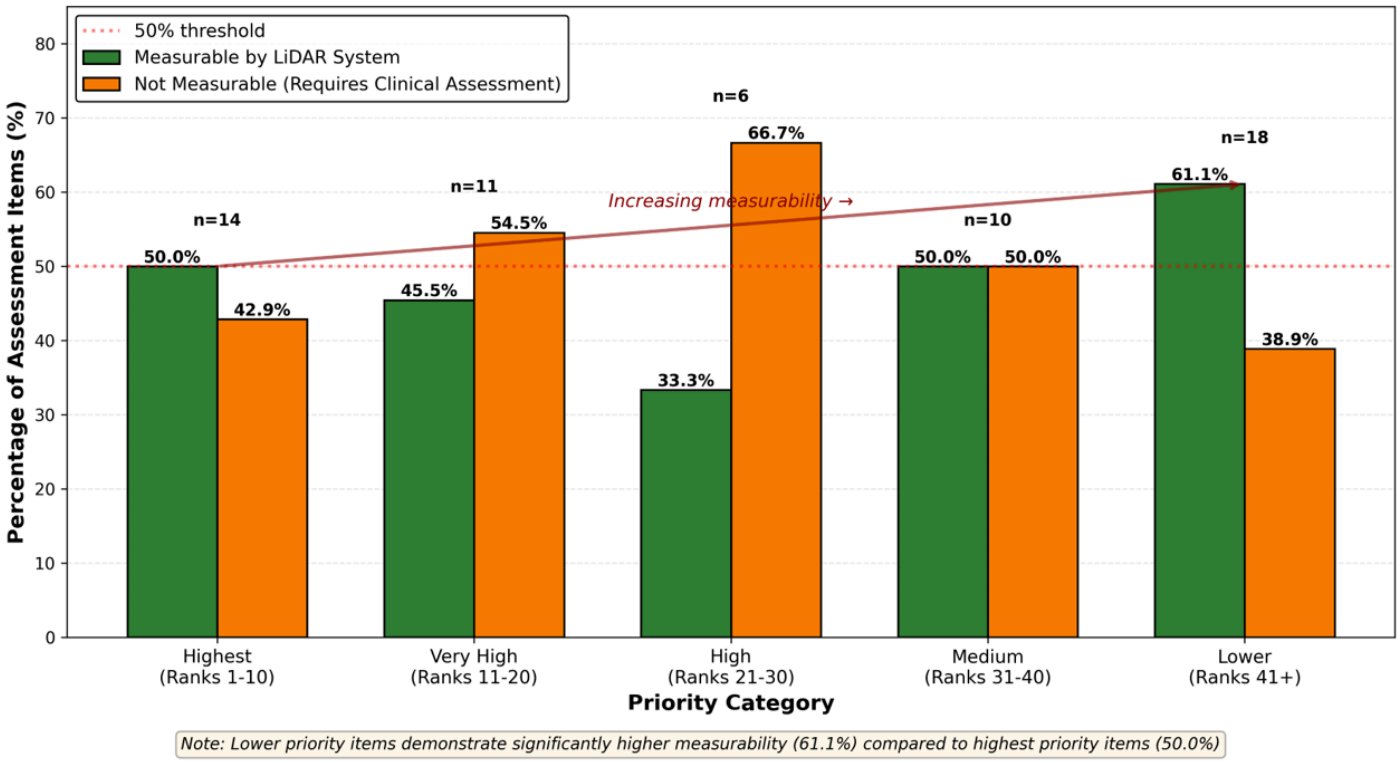


Figure 1

System measurability of home assessment items by priority ranking.

Supplementary Files

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- SupplementaryMaterial.docx
- Table4.docx