

Beyond Data Publication: Benchmarking Validity, Rating Misinterpretation, and Measure Transparency in Home Health Public Data Use

Ali Alsarhan¹ | Gunes Koru² | Ali.Alsarhan@umbc.edu | Gkoru@uams.edu

1 University of Maryland, Baltimore County | 2 University of Arkansas for Medical Sciences

Background. At H3IT 2025, we reported foundational findings from a qualitative study on home health stakeholders' use of publicly available CMS data, establishing four themes: healthcare improvement priorities, stakeholder data needs for benchmarking and comparison, limitations in public data awareness and usability, and visualization and portal design preferences. This submission advances that work with findings our prior work did not capture. Four critical gaps remained unaddressed: (1) no existing tool supports contextually valid like-agency benchmarking, as agencies cannot meaningfully compare against structurally similar peers; (2) CMS's star rating methodology anchors three stars to average national performance through relative quintile ranking [1,2], creating a systematic misinterpretation mechanism invisible to most stakeholders; (3) the interpretability barrier is rooted in measure construction itself, as a public metric such as "90% of patients improved in walking" encodes OASIS scoring movement opaque even to clinical staff, requiring portal design to pair visualization with embedded measure definitions; and (4) a structural data asymmetry persists, as agencies access more granular CMS data through proprietary platforms while public-facing tools provide only aggregated views, constraining informed decision-making by patients and caregivers.

Objectives. This research bridges the gap between data availability and real-world usability by pursuing three objectives: (1) to identify the core information needs, barriers, and challenges that prevent meaningful use of public data across diverse stakeholder groups; (2) following a Design Science Research approach [3,4], to derive differentiated portal design requirements tied to a stakeholder typology framework and develop a user-centered visualization portal that transforms publicly accessible CMS datasets into useful, interpretable, and actionable information with embedded measure definitions; and (3) to systematically evaluate the portal's perceived usefulness and ease of use, iteratively refining it based on stakeholder feedback.

Methods. This study applies the Design Science Research Methodology (DSRM) [3], with the qualitative phase addressing problem identification and solution objectives, and the portal representing the designed artifact. We employed the Framework Method [5] with semi-structured interviews across three purposively sampled stakeholder groups: home health agency professionals (leaders, administrators, clinical managers, quality improvement personnel, and care coordinators), healthcare consumers (patients and family caregivers), and government and policy professionals. Seventeen interviews are complete (N=17), with recruitment ongoing toward a target of 30-35. Concurrent analysis, member checking, external peer review of coding decisions, and end-of-interview quantitative surveys ensured trustworthiness and rigor.

Results. Findings directly address the four gaps. First, like-agency benchmarking emerged as the most critical unmet need, as no public platform supports comparison against structurally similar peers; one executive director reported manually reconstructing a peer cohort from raw CMS data as her primary workaround. Second, CMS's star rating system produces systematic misinterpretation, as a three-star agency representing average national performance is routinely perceived as mediocre by patients and executives applying commercial rating logic [1,2]. Third, the interpretability barrier extends below presentation design, as the metric "90% of patients improved in walking" encodes OASIS scoring movement requiring hours of clinical staff training to interpret. Fourth, a structural data asymmetry was confirmed, as agencies access more granular CMS data through proprietary platforms than is publicly available. Additional findings reveal that timeliness metrics are shaped by operational and geographic complexity invisible in public data, and that even sophisticated users fail at AI-assisted tasks such as deriving VBP scores from public data, revealing a computational accessibility barrier that visualization alone cannot resolve. Three stakeholder typologies emerged: Comply, Improve, and Compete, each demanding a distinct portal design profile tied to differentiated information needs and decision contexts.

Discussion. These findings reveal that public home health data fails stakeholders through four compounding structural gaps: absent peer-grouping infrastructure, a rating methodology misaligned with consumer mental models, measures opaque below the presentation layer, and an information asymmetry disadvantaging patients and caregivers. Grounded in DSRM, the Comply-Improve-Compete typology serves as the requirements foundation for a stakeholder-differentiated portal artifact, confirming that persona-driven design is required rather than a single interface. The AI finding signals that the problem extends into data infrastructure, strengthening the case for a portal that pre-computes and contextualizes derived metrics. Together, these findings inform an evidence-based visualization portal that advances the goal of bridging the gap between data availability and real-world usability.

References

1. Centers for Medicare & Medicaid Services. Quality of Patient Care Star Rating Fact Sheet. Baltimore, MD: CMS; 2016. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/Downloads/QoPC-Fact-Sheet-For-HHAs_UPDATES-7-24-16-2.pdf
2. Centers for Medicare & Medicaid Services. Home Health Quality of Patient Care Star Rating Provider Preview Report. Baltimore, MD: CMS; April 2025. <https://www.cms.gov/files/document/hhqualityofpatientcarestarratingapril2025sampleproviderpreview.pdf>
3. Peffers K, Tuunanen T, Rothenberger MA, Chatterjee S. A design science research methodology for information systems research. *J Manag Inf Syst.* 2007;24(3):45-77. doi:10.2753/MIS0742-1222240302
4. Hevner AR, March ST, Park J, Ram S. Design science in information systems research. *MIS Q.* 2004;28(1):75-106. doi:10.2307/25148625
5. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess R, eds. *Analysing Qualitative Data.* London: Routledge; 1994:173-194.