Home Sweet Hospital: Evaluating Evidence Gaps and Future Research Priorities for Hospital at Home

Graham C[1], Malcolm R[1], Ferrante di Ruffano L[1], Holmes H[1], MacDonald R[1], Hex N[1], McCool R[1]

[1] **York Health Economics Consortium, University of York, York, YO10 5NQ**

OBJECTIVES

Healthcare systems face significant strain due to growing demand, with urgent and emergency care centres particularly affected [1]. 'Hospital at Home' (HaH) has been identified as a potential solution, allowing patients to receive acute care at home or in community settings. HaH facilitates early hospital discharge (step-down care) or prevents in person hospital admission (step-up care).

HaH can be 'technology-enabled' (remote monitoring measurements can be inputted into a patient-facing app/website that feeds into a clinician platform for review) or 'manual' (communication of remote monitoring measurements occurs via telephone calls).

Objective: This research examines the challenges in generating evidence for technology-enabled HaH initiatives and highlights factors for future evaluation.

METHODS

A pragmatic literature review was conducted to assess safety, clinical effectiveness, and cost effectiveness of HaH initiatives. Gap analysis identified priority areas for future research and issues in evidence generation. While the literature review was primarily focused on England, the challenges are likely relevant worldwide. The authors leveraged their own experience from conducting an early value assessment for NICE on virtual wards for acute respiratory infection to inform the review and gap analysis.

RESULTS

Evidence, though limited, suggests HaH is potentially safe and effective. Clinical effectiveness varies by patient cohort and HaH model (step-up, step-down, mixed). Most studies were non-comparative or underpowered. Case studies of HaH initiatives in the NHS lacked peer review, involved small samples, and were not transparent about costs. Three main issues in evaluation were identified: variability in features between HaH initiatives, population and subgroup differences, and potential distortions in comparison with standard of care.

Challenge 1: Variation between HaH initiatives

There is a paucity of evidence comparing technology-enabled HaH initiatives to their manual counterparts. Therefore, the current evidence base does not allow us to ascertain whether the observed benefits associated with HaH are driven by technology enablement, the at-home model of care, or a combination of both.

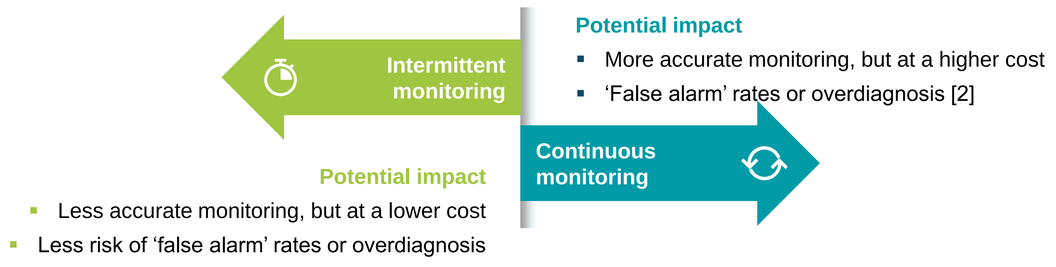
In addition to the core features of a technology-enabled HaH initiative, developers of HaH technologies may also provide a selection of additional features (Table 1).

These additional features could impact resource use and clinical effectiveness (Figure 1). It is challenging to evaluate which features of a technology-enabled platform may drive effectiveness – especially when this could vary according to indication.

Table 1: Features of technology-enabled HaH initiatives

Core features	Example additional features
▪ Patient facing app or website ▪ Medical devices that facilitate remote monitoring ▪ A digital interface for healthcare professionals that is interoperable with NHS systems	▪ Risk stratification ▪ Alarm-based monitoring ▪ Self-guided educational content ▪ 24-hour technology support ▪ Text messaging or video calling with clinical teams ▪ Offline functionality ▪ Continuous or intermittent monitoring ▪ AI for predictive monitoring

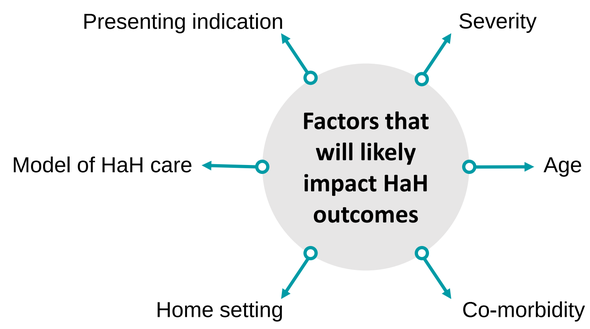
Figure 1: Continuous vs intermittent monitoring



Challenge 2: Varied patient populations and subgroups

Aspects that are likely to change a patient's response to HaH care includes the patient's presenting indication, the model of HaH care used (step-up or step-down) and the type of home settings where the patient received HaH care (private residence, nursing home or care home), amongst others (Figure 2). As the number of subgroups increases, it becomes more challenging to explore the impact of the subgroups on HaH-associated outcomes. This difficulty is amplified by the variation in HaH features (Challenge 1). A recent NHS evaluation on HaHs also identified inequalities in the people admitted to HaH, with black and minority ethic people consistently underrepresented [3].

Figure 2: Example subgroups in HaH evaluations



Challenge 3: Distortions in comparison with standard of care

Now that HaH initiatives have been established and are available in healthcare systems, we may observe a 'populations spillover' to a milder patient cohort. This is because people who do not otherwise need to be in hospital may be admitted to a HaH due to the more accessible and convenient care. This spillover could distort the true effectiveness of HaH initiatives in the target population and reduce potential cost savings by providing hospital-level care for little or no health benefit.

Before-after comparisons of step-up care may risk comparing different populations, which could distort the true treatment effect of HaH. Future evaluations should carefully monitor patient characteristics.

Considerations for future evaluations

- More comparative evidence is needed to demonstrate the effectiveness of HaH initiatives. RCTs are not practical to generate this data because HaH initiatives are already widely implemented across global health systems.
- Future evidence generation should prioritise prospective or controlled cohort studies comparing resource and outcome consequences of HaH to inpatient care.
- If possible, comparisons should be conducted between the models of care and home setting and closely record patient characteristics to identify patient spillover.
- A combination of quantitative and qualitative studies investigating clinical perspectives could be used to investigate the features of HaH programmes that are likely to underpin effectiveness.

CONCLUSIONS

While no evidence exists to say that HaH initiatives are unsafe, their true clinical efficacy, safety risks and cost effectiveness remains uncertain. Comprehensive evaluations are vital as HaH initiatives are rapidly implemented across global healthcare systems. Future studies should determine the effectiveness of HaH initiatives across different clinical areas, identify effective features, and be used to determine the optimal implementation and management of HaH in different settings.

REFERENCES

1. NHS England. Delivery plan for recovering urgent and emergency care services. 2023. **2.** Coon ER, Welch HG. J Hosp Med. 2018;13(6):431-2. **3.** NHS England. Summary of South East region virtual wards evaluation. 2024

CONTACT US

lavinia.ferrante@york.ac.uk

+44 1904 323620

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www.yhec.co.uk

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