Hospital at Home for acute medical illness: The 21st Century Acute Medical Unit for a changing population

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Abstract

Recent trends across Europe show a year on year increase in the numbers of patients with acute medical illnesses presenting to hospitals, yet there are no plans for a substantial expansion in acute hospital infrastructure or staffing to address demand. Strategies to meet increasing demand need to consider the fact there is limited capacity in acute hospitals and focus on new care models in both hospital and community settings. Increasing the efficiency of acute hospital provision by reducing the length of stay entails supporting acute, ambulatory care, where patients receive daily acute care interventions but do not stay overnight in the hospitals. This approach may entail daily transfer between home and an acute setting for ongoing treatment, which is unsuitable for some patients living with frailty. Acute Hospital at Home is a care model which, thanks to advances in point of care diagnostic capability, can provide a credible model of acute medical assessment and treatment without the need

for hospital transfer. Investment and training to support scaling up of Hospital at Home is a key strategic aim for integrated healthcare systems.

1. Demand and supply in the acute medical pathway

The acute-care pathway is often conceptualised with the hospital at its core.[1] This centralisation of acute care resource and expertise has led to improved outcomes across a range of conditions. Hospitals are able to absorb risk arising in other elements of the system by providing a default place of safety not restricted by opening hours. When concern arises in the community and the level of risk dictates the need for urgent further investigations or treatment there are few options other than to escalate care to the hospital setting. This model of care is threatened by sustained growth in demand in the context of relatively fixed capacity. (Figure 1A)

In the United Kingdom (UK), the number of emergency admissions is increasing at a rate which exceeds population growth.[2] There has been significant growth in the proportion of patients over the age of 65 attending the Emergency Department (ED) and requiring emergency admission[3] The complexity of emergency admissions is also increasing. Over a third of patients requiring emergency admissions have five or more health conditions, compared with only one in ten a decade ago.[2]

Hospitals have absorbed year-on-year increases in emergency admissions despite substantial reductions in the number of acute beds (Figure 1B).[4] A broad match between demand and capacity has been maintained by dramatically reducing the average length of stay (LOS) associated with emergency admissions[2] This pattern is not unique to the UK, over the last 20 years, the average number of hospitals beds per 1000 population has fallen by approximately twenty percent across Europe and by as much as a third in some European countries.[5] The average LOS has fallen by twenty five percent across the same time period.[5]

The ability to manage increasing demand by pursuing further efficiencies in LOS may not provide a sustainable solution, in part because this strategy still relies on

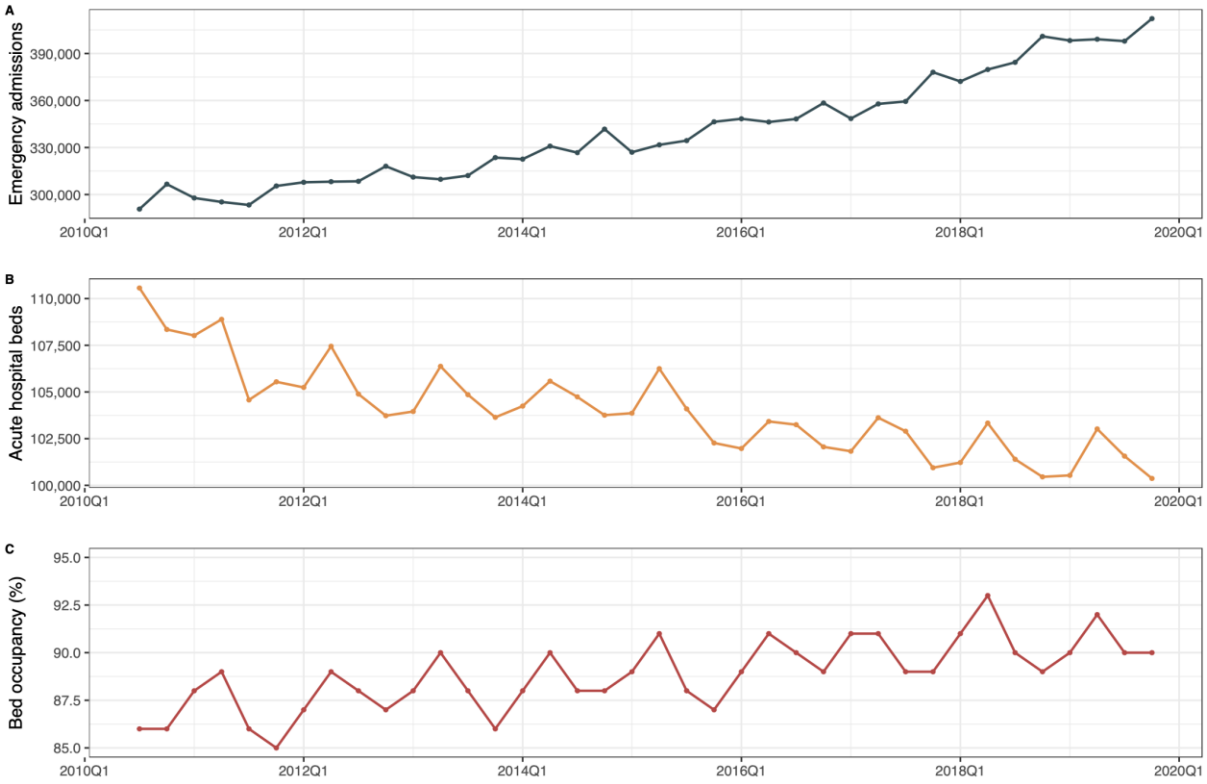
transfer from home to an increasingly congested acute care setting. In recent years, the NHS has seen significant deterioration in key metrics of performance.[6] Emergency Department (ED) overcrowding is the most visible manifestation of a model of acute care delivery under stress. Problems typically arise when restricted down-stream bed capacity prevents patients deemed to require ongoing in-patient care from being transferred to other areas of the hospital.[7]

Operating close to the limits of bed capacity has important implications for the safety and quality of care beyond the ED. Bed occupancy levels above 85% have been linked to bed shortages, intermittent bed crises and increased incidence of healthcare-acquired infections.[8] High bed occupancy rates are associated with higher risk of readmission[9] and excess mortality.[10] Acute bed occupancy in the NHS is progressively rising and now consistently exceeds 90% (Figure 1C).

During surges in demand association with the winter months, bed occupancy in excess of 95% is not uncommon.[4] Consistently working at the boundaries of capacity has important implications for the provision of elective care as the ability of a hospital to undertake planned surgical or diagnostic work is curtailed. Reversing trends in hospital bed numbers is an unpalatable solution to health-care providers operating under conditions of fiscal restraint. Established care models may no longer be fit for purpose under these conditions and new approaches to acute care are becoming an unavoidable necessity.

Figure 1

Rising acute care demand in the context of fixed bed capacity. 1A: number of emergency hospital admissions. 1B number of acute and general hospital beds. 1C Proportion of acute and general beds occupied. Data obtained from NHS digital.



A key policy response in the UK has been to advocate increased provision of same day emergency care (SDEC).[11] SDEC is built on the premise that many emergency admissions to hospital are due to acute illnesses that can be effectively diagnosed and managed in a short time frame by providing rapid access to diagnostic tests and senior clinical decision makers, thereby reducing the need for in-patient care and overnight stays in acute hospital beds.[12] The approach selectively targets patients at low risk of clinical deterioration. The SDEC philosophy is increasingly applied to the design of acute services for older patients living with frailty.[13] However, this approach is difficult to apply in the context of severe acute illness necessitating ongoing treatment or functional impairment which precludes discharge. This is particularly relevant when trying to conceptualise an acute care system optimised for the challenges ahead. Frailty and severe acute illness tend to occur in tandem.[14] Modern services must be able to accommodate these elements simultaneously.

SDEC does not offer a panacea for hospitals struggling to cope with the volume and complexity of patients presenting to hospital. SDEC services are no less susceptible to saturation in the face of rising demand than the hospitals they operate within. This is a design feature of an acute care pathway that consolidates the tools required to risk stratify and treat acute illness in the hospital setting. The need for some hospitals to emergently re-allocate the space dedicated to SDEC delivery in order to provide additional inpatient bed capacity highlights a potential drawback of this approach.[15] Reducing the capability to undertake SDEC may be maladaptive in the medium term, but a hospital at maximum capacity requires an immediate solution. Distributing some of the hospital functions to other parts of the acute care pathway may create a more resilient system by reducing dependence on the fixed capacity within the existing hospital infrastructure.

The hospital environment may not provide the optimal location of care for some patient groups. There is extensive commentary in the literature on the iatrogenic harms associated with hospital admission.[16] [17] This is particularly relevant to older

people with frailty and multi-morbidity who are disproportionally affected by adverse events during in-patient care.[18] In-patient care can be complicated by falls[19], delirium[20], pressure sores, urinary incontinence, hospital acquired infection[21] and functional decline. [22] [23] The risk does not terminate abruptly at the point of discharge. Post-hospital syndrome describes a period of generalised risk to a range of adverse events in the immediate period following discharge.[24] The syndrome is felt to reflect stressors such as deconditioning, disturbed sleep and nutritional deficiency which occur during the course of inpatient care which compound the physiological effects of illness and result in susceptibility to complications during recovery. A causal relationship between complications occurring during the course of inpatient care and the hospital environment is difficult to prove unequivocally. This should not preclude a search for potentially safer alternatives.

2. Introducing hospital at home as a model of assessment and intervention

Hospital at Home (HaH) provides short-term, targeted interventions equivalent to that delivered within an acute hospital, but within an individuals' usual place of residence. HaH is delineated from other community-based services by its role in managing acute conditions at a level of severity or complexity that would invariably require escalation to the hospital if the HaH option was unavailable.

This definition of HaH is important and frequently debated. The HaH term has been used in association with disparate models of care with different characteristics, many of which do not replicate hospital bed-based care. The need to establish a clear HaH identity is important given the plethora of services which operate in the community healthcare space. Some community services share features with HaH which can generate confusion. HaH services administer intravenous medications at home, but HaH is not primarily a home antibiotic service (commonly referred to as an Outpatient Parenteral Antimicrobial Therapy (OPAT) service in the UK).[25]

HaH services are multidisciplinary and give functional recovery high priority, but they are not reablement services[26] or restorative services[27] which provide short term interventions to improve functional recovery following resolution of an acute illness.

Establishing a common language is important to ensure patients, clinicians, commissioners and policy makers have a clear understanding of the remit of the model.

HaH models are primarily distinguished from other services by the acuity and complexity of the patients they care for, frequently defined conceptually as patient group that would otherwise be in an acute hospital bed. The threshold for hospital admission, though, is ill-defined and whether the patient would otherwise have required hospital assessment is dependent on a degree of counterfactual thinking. Focussing instead on the processes of care that are delivered allows for a clearer understanding of whether 'hospital level care' is in fact being delivered in the home or care home.

The management of acutely unwell patients at home requires access to diagnostic tests, access to hospital level interventions and access to clinical decision makers all within a timeframe consistent with the clinical urgency of the problem. These key features have been summarised by the UK Hospital at Home Society (see box). The exact specification of any individual HaH service is likely to be influenced by local need and existing infrastructure. The extent to which HaH care substitutes for the hospital may vary. A common form of HaH selects appropriate patients within the ED and provides ongoing care at home as if they were an inpatient. Conceptually, this can be imagined as the patient being transferred to a hospital ward, but the hospital ward is located in the patient's usual residence and contains only one bed. The treatment regimen, clinical review and monitoring are provided by the HaH team and when resolution is achieved the patient is discharged back to the care of their general practitioner.

UK Hospital at Home Society: Key features of Hospital at Home

- The **acuity and complexity** of the, patient condition differentiates Hospital at Home from other community services

- It provides urgent access to **hospital-level diagnostics,** (such as endoscopy, radiology, or cardiology) and may include bedside tests such as point of care (POC blood tests) and point of care ultrasound (POCUS).
- It provides **hospital level interventions** (such as access to intravenous fluids, therapy and oxygen)
- It requires **daily input** from a multidisciplinary team and sometimes multiple visits and provisions for 24 hour cover with the ability to respond to urgent visits.
- It requires secondary care level **specialist leadership** and clear lines of clinical responsibility.
- Defined **inclusion and exclusion criteria**, with defined target population for example for over 18 or over 65
- These programs deliver a **time limited short-term intervention** of 1-14 days
- Hospital at Home patients have **equity of access to other specialty advice** as though an inpatient.

Patients managed in HaH model are typically considered as equivalent to patients receiving care in a hospital bed allowing privileged access to more sophisticated hospital level diagnostics, such as cross-sectional imaging or endoscopy. Care can still be escalated to an acute-hospital bed if the prevailing clinical condition dictates. HaH models may be particularly well suited to meet the care needs of older patients living with frailty. Frailty and comorbid conditions such as cognitive impairment and functional dependence are associated with prolonged LOS in patients admitted acutely to hospital.[28 29]. The potential operational advantages of a care delivery model that preferentially targets medically complex patients with above average LOS are self-evident.

Optimal medical care of acute frailty syndromes is not always reliant on investigations and treatments that need to be delivered in a hospital setting. The

provision of comprehensive geriatric assessment, a multi-disciplinary process designed to address patient orientated objectives with a focus on function, is as important as medical intervention when considering outcome following acute-illness.[30] Diagnostics and interventions routinely consist of common blood tests, plain x-rays, intravenous fluid, antibiotics and diuretics while pausing potentially harmful medications. It is much easier to imagine this level of hospital care being emulated in the home setting. The hospital infrastructure required to support more aggressive medical and surgical interventions, such as cross-sectional imaging and intensive care, may not always be critical components of high-quality care in this context. The acute-care pathway for older people with frailty does not need to be built around proximity to these resources, although access to them may be required.

The potential to reduce the incidence of delirium is a key argument in favour of HaH care. Delirium is a common presenting feature of acute illness in older people and frequently develops during the course of in-patient care.[31] Delirium is an independent risk factor for mortality[32], prolonged LOS[33] and care home placement[34] in the 12 month period following acute hospital admission. Delirium can precipitate the onset of dementia and accelerate its progression.[35] Delirium is a multifactorial condition, and the relative contribution of environmental factors has not been established empirically. However, the importance of strategies to increase orientation in the management of delirium suggests the incidence and severity of delirium may be ameliorated by providing care in more familiar surroundings.[36] Providing care at home may also reduce deconditioning and associated functional decline which typically accompanies acute illness in older patients living with frailty.

HaH, envisaged as model of care tailored to the needs of older patients with frailty must be mindful of the balance between escalation of treatment in the hope of recovery and the risk of exposing patients to the unnecessary burden of active treatment without realistic chance of success. The need for an emergency admission is an important adverse prognostic sign in older patients and can be the antecedent of future decline or represent transition to a terminal phase of illness. Mortality in patients over the age of 85 admitted to hospital with acute illness approaches 50 percent at 1 year, 5 times higher than patients under 60 years of age.[37]

The need to engage patients in conversation about their care preferences and record advance care plans (ACP) is a vitally important component of care which is frequently overlooked. Acute illness is often complicated by impaired capacity to participate in decision making which makes prior knowledge of a patient's preferences invaluable. The prevalence of ACP amongst patients admitted to UK hospitals with medical emergencies is low, even in specific patient groups who are well recognised as being at high risk of death within a year.[38] An effective ACP should ideally be concise, comprehensive and universally recognised across care interfaces.[39] It is common for people to express the wish to die at home when given the opportunity to declare a preference.[40 41] The objective is more likely to be achieved in patients that have also expressed a preference only to receive symptomatic management.[42] In a system that confines the resources required to manage acute illness in the hospital, a preference for active treatment and a preference to die at home are almost mutually exclusive.

When faced with potentially reversible acute deterioration, clinicians practising in the community are faced with a dichotomous decision between escalation of care to a hospital, or inferior active treatment at home. HaH provides a third option, by facilitating more aggressive active management at home while being well positioned to support the transition to a purely symptomatic approach in the absence of a positive response to treatment. Figure 2 highlights the essential processes of care of an acute medical HaH.

Figure 2 Processes of Care in HaH

3. Established models of HaH and the current evidence base

The HaH model is not an entirely new concept and services focussing on older patients have been described in Europe[43-45], North America[46 47] and Australia[48]. HaH care is understood and practised in a manner which reflects the local demand and existing healthcare infrastructure, as a result the models described are diverse in terms of organisation and clinical processes. The extent to which HaH has been adopted at the national scale is difficult to determine with clarity as the HaH literature is formed primarily of studies investigating individual services covering specific

geographical areas. International comparisons of HaH models are also challenging. HaH is specifically targeted at patients who would otherwise require admission to hospital but admission thresholds are ill-defined and the product of various clinical norms and cultural factors.

In the UK, access to HaH care is not universal, and the capabilities of individual HaH services vary considerably. The HaH model in Scotland is relatively mature, and supported by a number of governmental policy documents and guidelines to support a more consistent approach to service design and delivery.[49] This approach is less evident in other parts of the UK. A recent survey of acute hospitals in the UK suggested approximately half of hospitals were able to refer directly to a HaH service.[50] The majority of HaH services described in the survey did not have the capability to provide an assessment by a physician at home or access to point-of-care diagnostics. This infers the services described were not designed to manage acute illness at levels of acuity that would typically require inpatient admission.

HaH has been investigated in multiple randomised controlled trials and has been the subject of several well conducted systematic reviews and meta-analyses. The literature can be broadly summarised into studies investigating HaH models in specific conditions, such as, decompensated heart failure[51] and exacerbations of obstructive airways disease[52] and studies which offer a more general appraisal of the approach.[53 54]. The HaH model consistently demonstrates equivalent or favourable outcomes in comparison with hospital bed-based care. Reduced incidence of delirium is a frequent, but not universal, finding in studies investigating HaH models in older people. [46 55-57] A recent UK multi-centre randomised controlled trial of a geriatrician led HaH services for older patients with acute medical illness demonstrated no difference in mortality, but lower rates of delirium and lower requirements for long term residential care in the patient group that received HaH.[58]

The HaH literature is characterised by trials with relatively small sample sizes and interventions which vary in both patient selection, clinical processes and operational design.[59] The absence of a universally accepted definition of HaH makes interpretation of the outcomes reported from meta-analyses difficult, as shown by the

variation in studies in Table 1. The potential for significant differences in the clinical processes which characterise each individual HaH model make estimates of the overall effect on outcome opaque. Meta-analyses which restrict study selection to HaH interventions that substitute hospital bed-based care for a substantial proportion of the acute care episode have demonstrated a statistically significant reduction in mortality.[54 60]

Table 1 Variation of HaH interventions in published studies (see uploaded table)

It is clear that patients that that receive HaH within clinical trials tend to have better experiences of their care when compared with patients that receive routine hospital bed-based care, however their willingness to be included in the trial in the first place creates a clear source of bias. The proportion of eligible patients recruited to clinical trials varies significantly, in one contemporary study over half of patients opted not to participate.[56] The reasons underpinning this resistance are not clear. A study which evaluated the reasons for accepting and declining HaH care cited added comfort, the presence of family, avoiding exposure to other unwell patients, prior negative experiences in hospital and fear of never coming home as factors influencing the decision to favour HaH care.[61] The reasons to opt for hospital bed-based care were less well articulated, but included the belief that HaH care would not be able meet their needs, and a reluctance to allow visitors into the home.[61]

Whilst the evidence base in support of HaH is imperfect, it does provide a degree of confidence that HaH achieves similar outcomes to hospital bed based care in selected patients. The practical execution of HaH trials is becoming more difficult as institutional enthusiasm to adopt HaH limits recruitment [56] and high hospital bed occupancy results in poor adherence to assignment (in the most recent instance, despite 2:1 allocation in favour of the HaH intervention).[58] The balance of risk is no longer in equipoise and the justification for further interventional trials to provide more precise estimates of the impact on HaH on mortality and other outcomes is waning. Future research may be better directed at establishing how HaH models should be integrated into existing acute care pathways, isolating the clinical processes that drive effectiveness and defining the spectrum of acuity that can be safely managed within HaH models.

4. Expanding the case for diagnostics in hospital at home

The established HaH evidence base is built on studies investigating the role of HaH models that lacked the opportunity to take advantage of technological advances in point-of-care diagnostics. Many of the studies recruited patients after initial hospital transfer for urgent diagnostic tests, rather than undertaking all processes of care outside the hospital. The deployment of diagnostic capability within the home and care home could offer the prospect of full replacement of hospital-transfer and admission. The availability of hand-held ultrasound equipment and blood testing equipment is a potentially disruptive technological development which could have profound influence on the spectrum of acute illness that can be safely managed within HaH models.

Point of care (POC) blood tests allow for rapid identification of biochemical abnormalities in HaH care. Clinical validations undertaken outside acute hospital settings show that diagnostic performance enables accurate identification of commonly encountered abnormalities in acute care of the older adult with frailty such as acute kidney injury.[62] Not only do POC blood testing platforms support clinical decision making in the initial assessment of patients, but crucially allow for ongoing monitoring during daily home visits where intravenous medications are given e.g. IV diuretics for heart failure with monitoring of electrolytes and renal function.

Point-of-care ultrasound (POCUS) and focused bedside echocardiograms are becoming embedded within all elements of the acute care pathway. There is a large body of literature defining the role of POCUS in the management of acute illness. Protocols have been developed which provide a standardised approach to critically unwell patients with respiratory failure [63], circulatory collapse[64] and assessment of fluid responsiveness in mechanically ventilated patients,[65] but the scope of practice is rapidly extending into applications relevant to the general internal medicine specialist.

POCUS is useful in differentiating common causes of acute breathlessness and is particularly sensitive in detecting acute decompensated heart failure.[66 67] The use of

POCUS to predict fluid responsiveness in spontaneously breathing patients is contentious[68], buts its accuracy in detecting elevated venous pressures and volume overload is unambiguous. POCUS can be applied to optimise diuretic therapy[69] and predict readmission in heart failure.[70] POCUS can be used to exclude renal tract obstruction in patients with kidney injury [71] and more advanced methods allow the quantification of systemic venous congestion and visceral oedema allowing renal injury to be predicted in advance.[72] [73] POCUS can be used to detect optic disc swelling in conditions associated with raised intracranial pressure.[74]

The ease with which conventional imaging can be obtained in a hospital and the familiarity of clinicians with obtaining and interpreting conventional imaging suggests the impact of POCUS on patient centred and operational outcomes in the hospital context are likely to be marginal, at least in the short term. The advantages of POCUS are clear cut in the HaH setting, where obtaining equivalent diagnostic investigations would inevitably involve transfer to an acute hospital setting.

5. Hospital at home in a world with COVID19

The emergence of Coronavirus disease (COVID-19) has had a profound global impact and posed fundamental questions regarding how health-care systems should be organised. Whilst the immediate threat of surges in demand is beginning to recede with large scale vaccination, the challenge of local outbreaks and emergence of new variants remains. Resilient health-care systems are not solely defined by their ability to tolerate stress, but to adapt and improve in response.

COVID-19 disproportionately affects specific patient groups; frailty is closely associated with the risk of hospitalisation [75], mortality [76], and increased care needs in survivors.[77] The mainstay of treatment is supportive, providing supplemental oxygen, steroids and fluid alongside symptomatic relief where appropriate. The majority of hospitalised patients do not require advanced levels of organ support, either because the severity of illness did not demand it or critical care was not deemed to be in a patient's best interests.[78] [79] As the need for contingencies less reliant on in-patient beds became abundantly clear, interest in models of care capable of

emulating elements of hospital care at home have peaked.[80] Several HaH models designed specifically to manage COVID-19 pneumonia have been described.[81 82]

Hospital admissions for non-COVID-19 related acute illness fell sharply during periods of lockdown and the mortality associated with common conditions requiring emergency admission, such as respiratory illness, pneumonia and sepsis were significantly higher compared with the pre-pandemic period.[83] Changes in health-care seeking behavior during the pandemic are not yet fully understood but it is clear that for some patients the fear of contracting COVID-19 was a deterrent to hospital attendance, a well-founded concern as 20% of COVID-19 cases in hospital were estimated to be nosocomially acquired.[84] In the absence of credible alternatives to hospital admission this may have compounded the inequalities in outcomes experienced by older patients with frailty by creating a barrier to health care access and denying the opportunity for potentially life-saving treatment.

In the context of a pandemic, HaH serves a dual purpose, by providing supportive care to those affected directly and an additional option to manage alternative pathology without exposure to the unnecessary risk of nosocomial infection. This logic can easily be extended to seasonal outbreaks of influenza and norovirus which can have a dramatic impact on acute-care delivery during the winter months,

6. Mitigating risk and medical training pathways

HaH represents a significant divergence from traditional models of acute care delivery. In order for HaH to become an established component of the acute care pathway organisational and clinical attitudes towards risk will need to be re-framed. HaH is predicated on the idea of hospital-based clinicians practising outside their usual clinical environment. This contextual change to clinical decision-making has important implications. The hospital is perceived as a place of safety, this thinking permeates clinical practice and is reflected in the guidelines which direct treatment of acute conditions. The constant presence of other health care professionals and the use of routine physiological observations combined with standardised escalation policies provide a contingency against the unexpected. These factors may mitigate risk in some circumstances, but they also act as a powerful cognitive bias. An

adverse event occurring in hospital may be judged differently to an adverse event occurring at home. The first instance can easily be thought of as an inevitable consequence of acute illness, the second leaves open the possibility that care in hospital would have progressed differently.

This line of thinking is recognisable to most practising clinicians but fails to acknowledge the possibility of direct harm caused by bed-based care. The potential for harm is compounded in a full hospital forced to operate beyond the margins of safety. In this scenario, the balance of risks is more finely balanced, and it is legitimate to pose the question, would this event have occurred had I cared for this patient at home?

Medical practice in HaH demands a range of skills that do not map to conventional training curricula. Primary care clinicians are at home in the community environment, but their level of comfort with managing severe acute illness and familiarity with point of care diagnostics is a potential obstacle. The converse is true of general internal physicians. If the HaH becomes established the logical solution is the development of a new specialty, accompanied by a bespoke training pathway. This training would foster the skills required for a new generalism, equally equipped to operate on both sides of the community-hospital interface.

In the medium-term, responsibility for delivering HaH care is likely to fit most naturally with general internal medicine physicians with a background in acute or geriatric medicine. The competencies required to realise the promise of point-of-care diagnostics are not currently universal within this professional group. A survey of UK hospitals showed the skills and equipment required to deliver POCUS are unevenly distributed.[85] Limited access to training is frequently cited as a barrier to adoption.[86] The incorporation of competencies in POCUS into the core curriculum for UK trainees specialising in acute internal medicine, alongside growing exposure to POCUS in undergraduate curricula [87] highlights the attempts being made to address this gap at a system level.

7. Cost implications

Cost-analysis is frequently incorporated within trials and observational studies of HaH and the majority report cost efficiencies in favour of HaH care. Several systematic reviews addressing the question of cost suggest HaH may be less expensive than hospital bed-based care, with the caveat that the available evidence is not sufficient to assert this claim with great confidence.[54 88 89]
The heterogeneity amongst studies which clouds accurate measurement of the impact of HaH models on patient centred outcomes has similar implications for economic analysis. The argument that HaH is cost efficient is built on the simple premise that care in an acute hospital bed is expensive and that reducing the amount of time spent in this setting will create savings. Analysis along these lines has been criticised for inflating the cost of acute hospital bed days by using average costs per day which do not adequately account for case-mix or the changing cost of care at different time points during inpatient admission.[90] The cost of informal care by relatives is often unaccounted for in HaH models which creates an additional source of bias and potential over-estimation of cost savings.

Accurately measuring and comparing the direct and indirect costs of different models of acute care delivery is complex. However, given the need to increase capacity to of acute-bedded care, the costs of achieving this aim by investment in HaH provision is insignificant relative to the cost of a new hospital.

8. Hospital at home as part of an integrated care system

Health-care systems in most advanced economies were initially designed to provide episodic care in the context of acute illness, as more people are living longer, and

the number of people with complex and interacting long-term health conditions grows, the organisation of care at the system level must adapt in response. Health-care provision is often fragmented, with different providers addressing different aspects of the same problem, often without adequate coordination. Integrated care is an approach to planning, funding and delivering care which brings health-care and social-care providers together with commissioners to collectively design service provision for a geographical area.[91] The pursuit of greater integration is not unique to the UK, although the statutory framework and policy levers utilised to achieve the objective are contextually specific to individual countries.[92]

The transition to integrated care is likely to be a key system enabler for HaH, as the model does not have a natural home in the siloed care system which places a strong divide between acute hospitals and community services. A crucial determinant of the sustainability of HaH models is the development of funding structures which appropriately reimburse health-care providers for the care delivered. The exact funding structures employed are specific to individual health-care systems, but, the principle of payments which recognise parity with hospital bed-based care are generalisable.

The strongest argument in support of greater access to HaH is our patients' enthusiasm for it. An unwillingness to be admitted to hospital is frequently encountered during consultations with patients, and this is also supported by the patient satisfaction scores observed within HaH trials.[54 93-97] Our patients are telling us to find a credible alternative to hospital-bed based care and we should collectively advocate on their behalf.

Conclusion

Distributing hospital level acute care into community settings is a logical response to the changing epidemiology of acute hospital admissions. Embracing HaH care would yield a more resilient acute-care system, better able to absorb inevitable increases in

demand without increasing the number of hospital-beds. This will require a fundamental reappraisal of what constitutes hospital level care. Delivering hospital at home at scale will require investment in diagnostic infrastructure, novel training pathways and broad cultural adaption to risk while working more collaboratively with the patients we serve. This will not just provide an operational solution to an acute-care system at the point of saturation, but also constitute a move towards better, more personalised care. HaH offers a future proofed alternative to current acute-care models fit for the 21st century.

Conflicts of Interest

The authors have no conflicts of interest to declare

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