

# Participation in Hospital in the Home for patients in inner metropolitan Sydney: implications for access and equity

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## Abstract

**Objective.** The aim of this study was to identify whether the Hospital in the Home (HITH) program was taken up equitably by eligible patients in relation to their age, sex, country of birth, place of residence and primary diagnosis.

**Methods.** This study presents results of a descriptive analysis of the administrative records of 3552 people with specific conditions who met the study criteria of potential eligibility to HITH and resided within the health district boundary.

**Results.** Systematic differences were found for participation in HITH and in-patient care according to sex, language spoken at home and socioeconomic status based on place of residence. This suggests that people from higher socioeconomic backgrounds who speak English at home were more likely to participate in and benefit from HITH. Tailored interventions were identified as a potential way to reduce the gap in access to quality health care for women and people who speak a language other than English at home. If HITH is the optimum treatment available, then these differences could be considered potentially avoidable and unfair.

**Conclusion.** Data analysis through an equity lens can effectively identify who is accessing health services and who is missing out. Further analysis is required to understand patient and system barriers to accessing HITH.

**What is known about the topic?** Advances in medical and surgical treatments and pharmaceuticals reduce the need for in-patient hospitalisation. For some conditions, home-based treatment is safer, cheaper and preferable to the patient and carers, particularly some older people who may experience deteriorating cognitive and physical functioning related to hospitalisation. It is well known that health and access to health care is not equally distributed in society.

**What does this paper add?** This study represents the first effort to quantitatively evaluate differences in patterns of participation in HITH related to socioeconomic and language characteristics. There are underutilised opportunities for improved participation in HITH by identifying who is not accessing programs at a comparable rate and therefore not benefitting from optimal health services. By exploring why this may be occurring at an individual and system level, we can be more informed to address these reasons and achieve better health and social outcomes.

**What are the implications for practitioners?** It is important to consider both consumer and service provider views in shaping current and future service models. Comprehensive assessment of support needs to participate in HITH for patients and carers, as well as communicating potential benefits in ways patients understand, can improve participation and satisfaction, reduce health costs and improve health outcomes.

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## Introduction

Increasing participation in the Hospital in the Home (HITH) program is a current priority among health services because it has been shown to improve health outcomes for most conditions, including reducing mortality, readmissions and complications, with the largest benefit for older people.<sup>1,2</sup> There is also greater carer satisfaction for most conditions.<sup>3</sup> HITH is defined as care occurring in the patient's place of residence within an episode of care for an admitted patient.<sup>2</sup> Most published HITH models are nurse based, but may include doctors and allied health professionals.<sup>3</sup>

The availability of HITH programs in Australia is rapidly expanding. In 2015–16, 578 000 days of HITH care was reported for 100 000 admissions,<sup>4</sup> a 6% increase over the previous year. The average length of stay (LOS) for public hospital admissions that reported HITH care days was 10.1 days, of which 8.7 days were provided through HITH. The LOS had also decreased more than 20% for all admissions in 2015–16 compared with the previous year.<sup>4</sup> Victoria accounted for 42% of HITH activity in Australia in 2015–16, and New South Wales (NSW) for 22%.<sup>4</sup>

The drive for the increase in HITH care is multifaceted, and includes considerations of costs, risks to patient care, changes in medical and surgical treatments and growth in the demand of in-patient care in the context of shifting demographic characteristics and limited public hospital supply.

Economic drivers relate to the need for hospital managers to reduce health care expenditure due to an aging population, rising population growth and increasing costs of drugs, infrastructure and equipment. Advances in medical technologies, such as portable delivery devices, and better drugs reduce the need to be in hospital.<sup>2</sup> These changes have affected health policy, significantly changing the practices of staff and decreased length of time in hospital.

HITH may be more receptive to particular conditions and, as such, there are significant differences in the uptake of HITH for targeted Australian-refined diagnosis-related groups (DRGs). The rates of referral and uptake in NSW vary significantly across different in-patient facilities. For example, cellulitis had the highest admission rate to HITH, with 52% (range 25–93%) across the state in 2015 (NSW Ministry of Health, unpubl. data) suggesting there is an opportunity to increase the overall uptake by aligning HITH capacity to meet the needs of local communities.

### *Differentials in accessing health care*

It is well known that health and access to health care is not equally distributed in society. Some of the reasons for differential access stem from communication problems, low health literacy, social isolation and economic hardship.<sup>5</sup> Sociodemographic characteristics, including sex, level of education, where you live, age and language skills, also contribute to the gap in access and health outcomes.<sup>6</sup>

At the system level, access to health care is determined, in part, by the location, affordability and appropriateness of health-care services. It is also determined by patients' ability to perceive the need for care, to know about the healthcare services available to them, have the means to access the service and the ability to engage and participate in treatment decisions.<sup>7</sup>

Candidacy theory offers potential to understand access to and the utilisation of healthcare services. It argues that access to health care is jointly negotiated between patients and the health-care system.<sup>7</sup> The concept suggests that an individual's identification of his or her 'candidacy' for health services is structurally, culturally, organisationally and professionally constructed, and helps explain why those with low health literacy in deprived circumstances make less use of services than the more educated and affluent.<sup>8</sup> The framework suggests that there are seven overlapping stages in the process of negotiating candidacy that are suggestive of a journey into and through services.<sup>6,8</sup> Inequitable uptake of services by socioeconomic circumstances and by public provision, either because services are not allocated by need or because of differential patterns of uptake between the most and least affluent groups, exacerbates the existence of inequalities. There is evidence that universal public provision, which often paradoxically operates with explicit goals to reduce inequalities, can exacerbate the existence and experience of such inequalities through a range of implicit mechanisms that advantage the most privileged.<sup>8</sup> These mechanisms include demand characteristics, associated with potential users and characteristics of those who supply healthcare resources. Supply factors include the extent to which services are sufficiently resourced to target need and the degree to which systems work to overcome barriers of accessibility.<sup>7</sup> As such, health services play a key role in understanding the multiple factors affecting access to services and ensuring all members of the community make informed decisions about health choices and benefit from services. Some populations whose circumstances may contribute to them being sicker and in greater need of health care may need specific mediations to benefit from health services, such as communicating in their preferred language and making services more accessible for people with low health literacy or economic hardship. Thereby, reducing barriers to access programs such as HITH can reduce, or at least not worsen, relative health inequalities.<sup>9,10</sup>

Despite the increase in HITH admissions, little is known about the factors that may influence patients to participate in HITH or standard in-patient care. The aim of this study was to explore the patterns of access to HITH for patients residing within the Sydney Local Health District (SLHD), NSW, who were admitted to a hospital with a primary diagnosis of specified conditions amenable to HITH care. Patient data were analysed to explore variations in participation in HITH by age, sex, country of birth, place of residence and primary diagnosis on admission. The study was undertaken to inform the further development of the HITH services within SLHD.

## Methods

### *HITH services and location*

HITH operates from four hospitals and outreach services within the SLHD. The service has expanded rapidly since its establishment in 2007 and has seen an increase in participation from 400 patients in 2013 to 1500 in 2015.

Eligible patients are referred to HITH by any clinical staff within the health system. Patient admission to HITH is determined by the HITH consultant and dependent on clinical assessment and the suitability of the patient for HITH services.

Ongoing care is provided at the HITH clinic and/or during home visits by district nurses with medical oversight. Access to a short-term package of care, 'ComPacks', is available to support home-based care and independence.

#### Program eligibility

Candidates considered appropriate for HITH are those with Australian-refined DRGs as appropriate for entry to the HITH service, namely cellulitis, community-acquired pneumonia (CAP), pyelonephritis, deep vein thrombosis or pulmonary embolus and atrial fibrillation.

Other conditions that meet the criteria of substitution or prevention of in-hospital care may be considered suitable for treatment in HITH depending on local need and local hospital agreements with the HITH consultant.

Patients are not eligible if: (1) they can be accommodated in an existing outpatient setting; (2) there is a risk of violent activity or aggressive behaviour by the patient or others cohabiting; (3) the patient is confused or from a nursing home and a carer or staff must accompany the patient; (4) the patient's lifestyle or current accommodation has risks that would preclude them from going home with an intravenous cannula *in situ*; and (5) safe clinical governance and service provision cannot be assured.

#### Data collection

For this study, all patients who were admitted to a public hospital within SLHD Between December 2013 and March 2015 with a principal diagnosis of cellulitis (J64B), kidney and urinary tract infection (L63B), venous thrombus (F63B), respiratory tract infection or inflammation (including CAP; E62C), osteomyelitis (I64A) or non-malignant breast disease (mastitis; J63A) were eligible for inclusion in the study, and their data were extracted from the electronic medical record (EMR). The EMR includes patient characteristics, such as demographic information (age, sex, country of birth, interpreter required), principal and additional reasons for admission, admission and discharge dates and facility codes. Data collected included all treatment episodes (by either HITH or an in-patient service) for six common International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) primary diagnosis codes (J64B, L63B, F63B, E62C, I64A, J63A), facility and patient demographic characteristics.

#### Socioeconomic disadvantage

The quintile of disadvantage was assessed for each patient based on the Socioeconomic Indexes for Areas (SEIFA), constructed by the Australian Bureau of Statistics using 2011 census data.<sup>11</sup> The SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) was assigned to the patients' postcode of residence.

Between December 2013 and March 2015, 4488 adults were admitted to SLHD hospitals with an eligible primary diagnosis. Of these, 3552 people resided in postcodes within the SLHD boundaries.

#### Data analysis

Descriptive statistics were used to describe referral to HITH and explore the system and patient factors that were associated with referral to HITH. Pearson Chi-squared tests were used to compare patient demographic and clinical characteristics. Statistical

significance was set at two-tailed  $P < 0.05$ . Logistic regression was used to investigate the relationships between participation in HITH and hospital and patient factors. Adjusted odds ratios (OR) with 95% CI were computed. ORs were adjusted for person-related covariates, namely age, sex and language spoken at home. Variables that were highly correlated were modelled separately and the choice of covariates was based upon the examination of bivariate correlation coefficients. Data were analysed using SAS v9.1 (SAS Institute, Cary, NC, USA).

#### Ethics approval

This study was approved by the SLHD institutional human research ethics committee (Ethics Clearance no. X15-0105).

## Results

### Descriptive characteristics

Of the 3552 patients identified for inclusion in the study, 931 (26%) participated in HITH.

### Conditions

Table 1 summarises the number of patients with specific conditions who participated in HITH or standard in-patient care across all hospitals in the study period (January 2013–December 2015).

These data show that the greatest proportion of patients with a primary diagnosis of cellulitis (42%), venous thrombosis (35%) and osteomyelitis (30%) participated in HITH.

Patients with respiratory infection (9%) and kidney infection (8%) were less likely to participate in HITH. Importantly, acuity of illness and comorbid conditions affect participation in HITH. These were not able to be accurately determined from patient administrative data.

### Demographic characteristics

#### Age

HITH patients were significantly younger than in-patients (median age 51 vs 55 years respectively ( $P < 0.001$ ); Study cohort age range 18–98 years, mean age 57.5 years). As expected, participation in HITH increased by age, with those in 55–75 years age group significantly more often participating in HITH than those in 35–55 or 18–35 years age groups (OR 1.64 vs 1.57 and 1.0 respectively; Table 2). However, people aged over 75 years were less likely to participate in the program. This is likely to be due to higher levels of acuity, multiple morbidities and functional

**Table 1. Participation in Hospital in the Home (HITH) according to primary reason for admission DRG, diagnosis-related group**

Primary DRG	No. patients (%)	No. receiving HITH (%)
Cellulitis	1696 (47.7)	708 (41.7)
Kidney infection	1021 (28.7)	83 (8.2)
Respiratory infection	540 (15.2)	50 (9.3)
Venous thrombosis	150 (4.2)	54 (35.0)
Osteomyelitis	87 (2.4)	26 (29.9)
Non-malignant breast (mastitis)	58 (1.6)	10 (17.2)
Total	3552 (100)	931 (26)

**Table 2. Participation in Hospital in the Home (HITH) according to demographic characteristics**  
OR, odds ratio; CI, confidence interval; LOTE, language other than English

Demographic characteristics	HITH (%)	Multivariate OR (95% CI)	P-value
Age group (years)			
18–34	159 (17.1)	1.0 (reference)	–
35–54	318 (34.2)	1.57 (1.25–1.98)	<0.001
55–74	299 (32.1)	1.64 (1.30–2.08)	<0.001
≥75	155 (16.6)	0.7 (0.54–0.91)	0.007
Sex			
Male	522 (56)	1.0 (reference)	–
Female	409 (44)	0.61 (0.52–0.71)	<0.001
Language spoken at home			
English	824 (28.5)	1.0 (reference)	–
LOTE	107 (16.2)	0.62 (0.48–0.81)	<0.001
Place of residence (IRSD quintiles <sup>A</sup> )			
5 (least disadvantaged area)	512 (55)	1.0 (reference)	–
4	116 (12.4)	0.39 (0.18–0.72)	<0.001
3	193 (20.7)	0.8 (0.28–1.13)	0.729
2	21 (2.2)	0.49 (0.34–0.67)	<0.001
1 (most disadvantaged area)	89 (9.6)	0.50 (0.36–0.77)	<0.001
Total	931		

<sup>A</sup>The Index of Relative Socioeconomic Disadvantage (IRSD) is an area-based measure of socioeconomic disadvantage published by the Australian Bureau of Statistics.<sup>11</sup>

abilities related to age and exclusion criteria for people residing in residential aged care facilities (RACF) deeming them not eligible for HITH.

#### Sex

Women were significantly less likely to participate in HITH than men (44% vs 56%;  $P < 0.001$ ; OR 0.61; Table 2).

#### Language spoken at home

One-quarter of the cohort spoke a language other than English (LOTE) at home but were significantly less likely to participate in HITH than English speakers (137 vs 738 respectively;  $P < 0.001$ ; OR 0.62, 95% confidence interval 0.48–0.81; Table 2).

#### Socioeconomic disadvantage

Of the 3552 people in the cohort, approximately 10% (361 people) lived in the most disadvantaged 20% of the NSW population by postcode (IRSD Quintile 1) and 50% (1780 people) lived in the least disadvantaged postcodes (IRSD Quintile 5).<sup>11</sup> People residing in more disadvantaged suburbs (Quintile 1) were significantly less likely to participate in the HITH program (9.6%) compared with people residing in more advantaged suburbs (55% for Quintile 5; Table 2).

## Discussion

To the best of our knowledge, this study represents the first effort to quantitatively evaluate differences in patterns of participation in HITH related to socioeconomic and language characteristics.

We comparatively analysed participation of three social characteristics (people who do not speak English at home, women and place of residence).

HITH is unusual in that patients have already accessed health services but need to be convinced of a potentially superior option

to in-patient care if they have carers with the skills, confidence and resources to provide care and for these groups to be offered the service. As expected, people who participated in HITH were younger due to fewer comorbid conditions and complications associated with age and residents of RACFs not being eligible for the program.

Adequate risk stratification is an important dimension to admission to HITH programs. A risk assessment is conducted on all eligible patients, including support and adequacy of the home environment. Inclusion is determined on the basis of the clinical judgement and suitability for the program as deemed by an HITH medical consultant. Referrals are limited by service capacity and only accepted if safe clinical governance and service provision can be assured; this includes assessment, monitoring and treatments in the patient's home with the Sydney District Nursing Service with medical governance provided by an HITH doctor.

Factors such as sex, language spoken at home and socioeconomic status based on residence were significantly associated with participation in the HITH program. If we assume that participation in HITH is the best type of care, these systematic differences may be considered unfair and warranting attention. These differences only matter if outcomes from participation in HITH are better for the patient and carers, and it is possible to address the issues. The evidence for good outcomes from HITH are based on strict eligibility criteria (outlined in the Methods). Patients may be excluded from HITH based on the level of risk to patients or providers in providing care in this way. These risks (e.g. safety in the home environment) may be related to socioeconomic factors, but are unlikely to be independently related to gender or language.

Navigating a complex health system and identifying what care options are available or needed may be more challenging for people with lower health literacy and English language

proficiency and fewer resources. Candidacy theory reasons that access to health care requires effort on the part of the patient and the healthcare system to minimise the amount of difficulty associated with obtaining, processing and understanding basic health information and services needed to make appropriate health decisions.<sup>7</sup>

Studies repeatedly show that the use of formal health services is lower among migrant groups with low English proficiency. Patient-level barriers include lack of awareness of services, preference for family care and communication difficulties resulting in initial reluctance to access formal care.<sup>1,12</sup> At the organisational level, lack of cultural knowledge and language among healthcare workers and underutilisation of interpreter services were barriers to accessing health services.<sup>14,15</sup> In the present study, we found there was very little program information in languages other than English. There was also a low rate of interpreter use.

Underestimating patient understanding and patient need may be further compromised by the time required for busy clinicians to explain the program and potential benefits in ways patients understand, which, in turn, may translate to lower participation and inequities in health outcomes.<sup>16</sup> There may be some reason for concern for two reasons. Firstly, by health care providers not providing health treatment information tailored to individual needs and capacities patients are less likely to benefit from optimal early treatment, contributing to greater use of treatment services. Secondly, a large and increasing proportion of the local population are not proficient in English and are not provided the opportunity to make an informed decision and exert greater control over their health.

Research indicates that providing patients and/or significant others with both verbal and written information about care and treatment in a format they can understand is likely to improve understanding, knowledge and satisfaction of the HITH program.<sup>17</sup>

In the case of women's access to HITH, patient-level factors may include perceived or real care options at home. Issues such as older women more often living alone and older men often living with a more able female partner were not regularly considered by HITH staff. Organisational-level factors may include routinely asking about support and needs. Discussions with clinicians suggest promoting the use of additional home support, such as 'ComPacks', which is a non-clinical package of community care available for people discharged from NSW public hospitals, may support women to participate in the program in their home. The personal cost of transfer of care and costs of medicines may also contribute to different rates of participation.

There is strong evidence that people residing in disadvantaged areas have fewer resources, less education, greater risk factors for poor health and fewer quality health services.<sup>18</sup> Therefore, we may expect a higher proportion of people from disadvantaged areas in the study cohort, but this was not the case. We used the IRSD measure of education and income as a proxy for socio-economic advantage. People residing in disadvantaged areas were under-represented in the cohort and less likely to participate in HITH. One explanation is that those with fewer resources may not seek care, be treated in primary care or delay their presentation for care, resulting in progression of their condition, which renders them clinically unsuitable for HITH. Minimising

access barriers, suitability, support and patient safety are vital for HITH's continued support as an alternative to hospital admission.

### Study limitations

The present study has some limitations, namely that patient acuity and comorbidities could not be determined from administrative data and that people in RACFs are excluded from participation in HITH.

### Conclusion

The success of the Australian healthcare system is based on the provision of quality universal health care to protect and promote health and prevent illness and injury. However, universality is weakened when the organisation of the healthcare system and priorities and competencies of marginalised people are not aligned.

This study demonstrates how many systematic differences in access to best care (in this case HITH) relates to health system and patient characteristics. Importantly, this study exposed who is not accessing programs at a comparable rate so we can see who is not benefitting from optimal health services and explore why this may be occurring at an individual and system level. We can then be more informed to address these reasons and achieve better health and social outcomes for all groups in the community.

Targeted efforts are required to ensure under-represented populations can enjoy the health services they need and optimise the impact of the HITH model of care. Promotion, coordination and delivery of services need to account for the important role of family and carers in informal support while also addressing the access challenges posed by sex, personal resources, language, culture and literacy. This more informed understanding of patient need and changes to ways in which health services are provided will be essential to consider both consumer and service provider views in shaping current and future service models.

### Competing interests

The authors declare they have no competing interests.

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