A Work Project presented as part of the requirements for the Award of a Master Degree in Management from the NOVA – School of Business and Economics

HOSPITALIZATION AT HOME: A STUDY OF INTERNATIONAL MODELS AND ADAPTATION TO THE PORTUGUESE CONTEXT

ANA MARGARIDA MILITÃO VIGÁRIO

26162

A Project carried out on the Master in Management, under the supervision of:

Professor Judite Gonçalves

03-01-2020

Abstract

Hospitalization at Home (HaH) has proved to be an efficient and effective model of healthcare provision in several countries in the World. Portugal is starting the implementation of this model based on international best-practices. This paper describes the main features of this HaH service, their organizational, technological and economic enablers – with a sustainability perspective. It then presents their application in recognized role-model countries – the UK, Australia, and Spain. Finally, it outlines the current implementation plan being carried out by the Portuguese Public National Healthcare Service and aims to identify opportunities for improvements in such implementation.

Key Words: Hospitalization at Home, International Healthcare Models, Sustainability, Implementation Design

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

1. Introduction

Nowadays, health systems face three main trends: aging populations contribute to increasing demand for healthcare services; provision is becoming more decentralized and closer to the home; and traditional models of care are being disrupted by new and more efficient technologies (KPMG, 2019). Healthcare spending is expected to increase worldwide at an annual rate of 5.4% between 2018-2022. This is partly driven by expansions in developing countries, increasing elderly populations' needs, advancements in treatments and health technologies, and rising healthcare labour costs. Life expectancy is bound to rise to 74.4 years in 2022, with people aged 65 and over representing more than 668 million, or 11.6% of the global population (Deloitte, 2019).

Such trends challenge healthcare systems to be financially sustainable; to adapt to changing consumer needs, demands, and expectations – better and improved services with highly qualified doctors and caregivers, excellent infrastructures, and high-quality equipment; and to use new care delivery models to improve access and affordability (Deloitte, 2019). Hospitalization at Home (HaH) – the provision of healthcare services to acutely ill patients in a home setting instead of a hospital ward – has the potential to address some of these challenges.

This study looks at HaH models from a Management perspective, covering organizational settings, financial aspects, marketing and promotion, with a focus on Portugal. I conducted a market research, focusing on the United Kingdom (UK), Australia, and Spain, through an analysis of the literature. I also performed in-depth research on how Portugal is currently providing this service, through both an analysis of available Portuguese documentation and data, and interviews with healthcare managers, physicians and nurses from Portuguese hospitals and primary healthcare units. The goals of this study are threefold: first, to describe HaH models that are considered exemplary and identify what can be learned and transposed to the Portuguese model; second, to build a business model for HaH to help

managers and decision makers in the implementation process; and third, to create a marketing plan to effectively communicate and improve consumer perception of HaH services.

2. Background

The home has been the primary setting for medical care provision for millennia, but the establishment of Welfare states in the late 19th to mid-20th centuries brought the provision of medical care almost exclusively to the sphere of clinical practices for primary care and hospitals for acute care (Spyropoulos & Botsivaly, 2005). More recently, the late 20th and early 21st centuries have been witnessing the resurgence of care at home, triggered by a number of factors. Those factors include the need to relieve overcrowded hospitals; the overall improvement of housing conditions; the emergence of new technologies allowing for communication, diagnosis, and even the provision of sophisticated treatment outside of the hospital; increasing preferences for receiving care at home rather than at the hospital and even to die at home, in the case of terminal patients receiving palliative care; and a search for sustainability of healthcare provision through cost reduction; among other factors (Leff, 2009; Spyropoulos & Botsivaly, 2005).

2.1 Distinction between Home Care and Hospitalization at Home

The distinction between Home Care and HaH is important. The term "home care" usually refers to long-term care provided at home. In this context, home care users are individuals with (multiple) chronic conditions or debilitated physical or mental health, who need help with daily activities (ranging from housekeeping or help with taking medicines to help with getting in/out of bed or personal grooming). Home care users are mostly elderly or disabled and they often require permanent help (World Health Organization, 2008).

In contrast, HaH consists of acute care provided for a limited time span. It is defined as *"intensive medical care provided at home in order to forego hospitalization without compromising quality of care"* (Maaravi, Cohen, Hammerman-Rozenberg, & Stessman, 2002). HaH can substitute patient admissions altogether – when patients are referenced from the

emergency department or from the community – or replace longer admissions by allowing hospitalized patients to return home earlier and continue to receive acute care at home.

HaH was initiated in 1945 by Doctor Bluestone at Montefiore Hospital, New York. The main goals were to relieve crowded American hospitals affected by the War and to create better clinical environments for patients. In Europe, HaH first appeared in France in 1957, at Hôpitaux de Paris, followed by Switzerland, Germany, and the UK in the 60's. Spain started its HaH practice at Hospital Gregorio Marañon in Madrid in 1981. Only in 1996 did the European Regional Committee of the World Health Organization start to promote the development of HaH (Delerue & Correia, 2018). In Portugal, HaH was only implemented in 2015, as a pilot at Hospital Garcia de Orta (HGO).

2.2 Achievements of Hospitalization at Home

Available evidence for several countries, age groups, and pathologies relates HaH to lower mortality rates, lower hospital readmission rates, shorter lengths of stay, and reduced complications such as nosocomial infections and delays in recovery (Gonçalves-Bradley et al., 2017; Levine et al., 2018; Shepperd et al., 2014; U, Pryor, & Parker, 2017). Among older patients, HaH is associated with reduced anxiety, depression, disorientation, and delirium (Leff, 2009; Shepperd et al., 2014). The literature also points out advantages of HaH for non-clinical measures, such as lower risk of institutionalization, faster reinsertion in the labour market, or enhancement of family and community ties (World Health Organization, 2008). Overall, patient satisfaction improves with HaH, while carers' satisfaction seems to be unchanged (Shepperd, Wee, & Straus, 2012).

HaH also presents cost advantages, possibly related to the improvements in clinical outcomes. While varying widely, cost reductions can achieve around 40% compared to normal hospital admission (Sierra, 2019; Levine et al., 2018).[1] However, there may be patient selection

[1] Data for Portugal hints 46% reduction according to results gathered during interviews (Dr Delfim Rodrigues – Portugal's health manager for HaH)

bias, since the patients with more stable and standard conditions are the ones selected for HaH (Hospital Gracia de Orta, 2018; State of Victoria - Department of Health, 2011). More importantly, HaH helps avoid capital expenditures in new hospital facilities by satisfying part of the increased demand driven for example by an ageing population and technological progress. A dramatic example is given by the Australian state of Victoria, where almost all hospitals have HaH programs accounting in 2008/9 for about 2.5% of all inpatient admissions, 5.3% of all multiday admissions, and 5% of all bed days in the state, which is equivalent to a 500-bed hospital (Australian Government - National Health and Medical Research Council, 2016).

2.3 Sustainability in Healthcare

Sustainability has become a hot topic in recent years, also in the healthcare sector. Sustainability implies meeting our own needs without compromising the ability of future generations to meet their own needs, as well as being responsive to customers', providers', and suppliers' needs, and being able to adapt to the changing environment. Attaining sustainability goals in the healthcare sector may imply rethinking and redesigning hospitalization processes to improve effectiveness and efficiency (Polese, Carrubbo, Caputo, & Sarno, 2018).

Sustainability is strongly related to HaH along three main domains: 1) *effectiveness of healthcare services,* 2) *efficiency in resource usage,* and 3) *patient satisfaction*. In terms of effectiveness, HaH models allow for reductions in mortality, readmission rates, and complications (see above). Regarding efficiency, HaH appears to be significantly less expensive than conventional hospitalization. HaH has also been shown to increase patient satisfaction along several dimensions, including quality of clinical procedures, overall quality of life, pain management, non-pain symptom management, and patient independence (Deloitte, 2012; World Health Organization, 2017).

2.4 Digital Health

HaH is leveraging the advancements in digital health, i.e., the development of the equipment used both inside and outside the hospitals, their effective and coordinated use, and its dissemination also in the home setting.

Digital health describes the general use of information and communication technologies for health. Examples of digital health technologies include mobile applications, SMS, interactive voice response, health management information systems, mobile diagnostic devices, or big data analytics. Among other aspects, digital health technologies bring value by facilitating the follow-up of clinical status, monitoring health indicators, improving service utilization and quality of care, and reducing supply stock-outs (Deloitte, 2017; UNICEF Health Section & Office of Innovation Centre, 2019).

Smart Hospitals also emerge as a topic for consideration when rethinking healthcare models and their implementation. These "Hospitals of the Future" are defined as hospitals that are built upon optimised, interconnected, and automated processes strongly based on the Internet of Things (IoT), and whose ultimate goals are to improve patient care procedures and allow for new and more developed capabilities. Smart hospitals will potentially allow the entire connected hospital ecosystem to have all relevant information available when needed, and for more efficient and effective clinical processes. Among other advantages, Smart Hospitals may increase patient safety by lowering error rates and allowing for constant reliable data monitoring, improved diagnostics, and ability to effectively introduce remote medical care (ENISA, 2016; McKinsey & Company, 2019). In this context, HaH fits perfectly in the model of the Hospital of the Future.

Globally, investment in digital health is unbalanced and uncoordinated, making cross-country comparisons difficult. In Portugal, investment has still been limited, but digital health is supposedly a priority for 2020 – the Health Minister, Marta Temido, stated in March 2019

intentions to expand telemedicine, digital health, and HaH investment (Governo República Portuguesa, 2019).

3. Methodology

This study is mainly qualitative and applies several methodologies. First, I conducted a literature review on HaH in the UK, Australia, Spain, and Portugal. The main goals were characterizing and comparing the HaH models in these countries, focusing on what can be learned from the English, Australian, and Spanish models, which are more mature, to be applied in the Portuguese HaH model. Countries were selected per recommendation of Dr Delfim Rodrigues (see below).

Second, I conducted four interviews: 1) Dr Delfim Rodrigues, coordinator of the National Program for Implementation of HaH in the Portuguese NHS hospitals, 2) Dr Pedro Azevedo, Internal Medicine doctor at Hospital Garcia de Orta (HGO), 3) Nr Sérgio Sebastião, nurse at Hospital Garcia de Orta, and 4) Dr Francisca Topa, General Practitioner (GP) at a primary care unit in Lisbon (interview guides in appendix I). The choice of interviewees was motivated by 1) the extensive (inside) knowledge and experience of Dr Delfim Rodrigues, from both management and implementation perspectives, 2) and 3) the practical and clinical experience of Dr Pedro Azevedo and Sérgio Sebastião, and 4) the "outsider" perspective of Dr Francisca Topa, who has extensive clinical experience in a community (i.e. non-hospital) setting. The interviews complement the information collected through literature review. The interview with Dr Francisca Topa, in particular, also allowed me to explore how reasonable and feasible it might be to have a HaH model adapted to the primary care setting.

Third, I elaborated a Business Model for the implementation of a HaH unit. I followed the Business Model Canvas, which allows organizations to build or rebuild business models in a structured, tangible, and strategic way, while segmenting the model in nine different features

– key partners, key activities, key resources, value proposition, customer relationships, channels, customer segments, cost structure, and revenue streams (Osterwalder, 2013).

Fourth and last, I developed a Marketing Plan for the promotion of the HaH model in Portugal – which provides information on how an organization plans to reach its marketing objectives with structured and tactical guidelines (Kotler & Keller, 2011).

4. Results and Discussion

4.1 International models of Hospitalization at Home

HaH is a long-established healthcare model adopted by several countries. The UK, Australia, and Spain have been presented by Dr Rodrigues as the ones with the best practices and should thus be regarded as role models for the Portuguese case.

In the UK, the National Health Service (NHS) is a highly decentralized structure: there are essentially four NHSs – NHS Scotland, Wales, England, and Northern Ireland — each decentralized into (foundation) trusts or health boards responsible for the provision of care, regionally or locally. The trusts and health boards enjoy significant autonomy in the definition of healthcare services provision, according to regional priorities identified and negotiated with local Clinical Commissioning Groups (c.f. Table 1; NHS Department of Health, 2005). Therefore, it is not surprising that variations in the provision models across regions arise, including in HaH practices. For example, the East Sussex healthcare NHS Trust home services are limited to child and maternal care in a model closer to primary care (East Sussex Healthcare, 2019); North Bristol NHS Trust proceeds hospital admission and treatment with post-acute care at home (i.e. a continuous care model; North Bristol NHS Trust, 2019). In Oxford and North Umbria, patients are recruited for HaH either from hospital emergency/intensive care units or directly from community settings, through referrals from GPs, district nurses, local minor injury units, or case managers. In those regions, services provided include care to acutely ill patients, care and advice to chronic patients, palliative care, and other acute conditions. HaH teams rely

mainly on nurses, paramedics, occupational therapists and healthcare assistants, but not physicians – though they work in close contact with GPs and specialist doctors at the hospital (NHS Oxford Health, 2019; NHS Northumbria Healthcare, 2019).

In Australia, healthcare services provision is mainly a responsibility of the states and territories. Funding comes chiefly from the federal public health insurance system (Medicare). Private insurance and private hospitals also play important roles in funding and provision of healthcare (Australian Government - Australian Institute of Health and Welfare, 2018). HaH was launched in the state of Victoria in 1994. Nowadays, almost all major hospitals in the main states (New South Wales, Victoria, Queensland, Western Australia) have a HaH unit that works as any other hospital department (Health - NSW Government, 2018; Victoria State Government, 2019; Government of Western Australia South Metropolitan Health Service, 2019; Queensland Health Government, 2019).

The Australian HaH model is described in more detail in appendix II. It is focused on acute care to patients who would otherwise be admitted to the hospital, who accept to be treated in this way, and who have adequate housing conditions/informal support. HaH is funded in the same manner as hospital-based care: each episode is paid according to the common Activity Based Funding (ABF) scheme (for acute episodes) or the sub-acute/non-acute (SNAP) scheme[2] (c.f. Table 1), depending on length of treatment and clinical complexity (State of Victoria - Department of Health, 2011). Typically, reimbursements for HaH are paid with a discount of 20% to 30% of what would be paid in a hospital setting, to reflect the lower average cost of HaH services. However, the state of Victoria decided to reimburse HaH services *at the same rate* as hospital-based care, resulting in a dramatic increase in HaH activity. By 2010, an estimated 75% of all HaH admissions in Australia occurred in Victoria (Montalto, 2010).

[2] ABF is a form of funding of Australian hospitals based on a predetermined value paid by the State Government to each hospital per patient, depending on the diagnostic related group (DRG) – i.e. prospective payment system; SNAP is a particular group of activities focused on sub/non-acute procedures (Victoria State Government , 2019).

In Australia, besides cost reductions, to a great extent driven by shorter lengths of treatment (5.77 days at home compared to 8.97 days at the hospital, on average, in 2008/09), clinical outcomes of patients treated at home were comparable to or better than those of hospitalized patients, with higher levels of patient satisfaction (Montalto, 2010).

In Spain, HaH was recognized as a full hospital service in the Regulation of Public Hospital Structures of Spain in 1985. The main driver of the adoption of HaH was the saturation of conventional hospitals, and the model was inspired by the experiences of Australia and France (Diario Medico, 2015). The program has been judged successful, particularly in some regions. In the Basque Country, by 2015, HaH represented the equivalent of 400+ beds, nearly 10% of the 4,224 public acute care beds (Gobierno Vasco - Departamento de Salud, 2016). In economic terms, HaH has clear advantages: for example at Cruces Hospital, in 2012, HaH *per diem* costed on average 100€ while hospital stays costed 940€; full episode costs in HaH were 1530€ vs. 4870€ in the hospital, on average). HaH appears to produce similar or better clinical results than conventional hospitalization, including lower mortality, lengths of treatment, readmissions, nosocomial infections, elderly disorientation, etc., as well as higher satisfaction of patients and carers (Sierra, 2019).

In Spain, HaH patients are admitted mainly from hospital intensive care units. Patients must have a known and compatible diagnosis, be clinically stable, require hospitalization and consent to be treated at home, and there must be a capable formal or informal carer at home. The services provided at home are nearly the same as those available in the hospital and include the treatment of complex pathologies such as post-operatory procedures, subcutaneous chemotherapy, blood transfusions, parenteral nutrition and antibiotics administration, trauma treatments, palliative care, paediatrics, clinical analyses and related diagnostic aids (c.f. Table 1) (Sierra, 2019).

HaH has been implemented in different hospitals at different paces, and this causes disparities in the models used. Reducing these disparities is one of the main goals of the Spanish HaH society, as well as the standardization of procedures and regulations across the country, including specific professional certification for HaH staff (SEHAD, 2019).

4.2 The Portuguese Model

In Portugal, HaH is a fairly recent endeavour: the first hospital to implement HaH, as a pilot, was HGO in Almada, in November 2015, following closely the model from the Australian State of Victoria. As of December 2019, twenty-three Portuguese hospitals had implemented HaH, mostly following HGO's norms and procedures, adjusted to each hospital's specificities (Diário de Notícias, 2019). HaH in Portugal is funded in the same way as in Australia (i.e. prospective payment based on Diagnostic Related Groups (DRGs) (Administração Central do Sistema de Saúde, 2019).

HaH is seen as supportive of conventional hospitalization, characterized by home-based acute care to patients who voluntarily accept the treatment. HaH must allow for the same or better quality of treatment as the one provided in a regular hospital setting, guarantee services' humanization, and enhance the family role (Delerue & Correia, 2018; Direção Geral de Saúde, 2018; Gabinete da Secretária de Estado da Saúde Despacho, 2018). Díaz, I., in *Diagnóstico y tratamiento en medicina hospitalaria*, a reference manual adopted for the HaH implementation in Portugal, adds to these characteristics the fact that there has to be a transitory period between an established diagnosis and a stable patient's situation to transfer him from a hospital to a home environment, similar work conditions to a usual hospital setting, as well as easiness of communication with the assistance team (Díaz, n.d).

HaH contracts were established between the regional health administrations (ARS) and hospitals, and targeted about 7300 patients in 2019, treated in 215 bed-equivalents. The plan seems to be lagging behind schedule, as most of the 25 hospitals that were supposed to be

running HaH units during 2019 started well into this year. This has been deemed to be due to shortage of staff and resistance from administrative and clinical managers. By Aug. 31st, 2563 patients had been treated in 140 estimated bed-equivalents (Diário de Notícias, 2019)[3].

Clinical outcomes vary across hospitals; in general, length of treatment at home is similar to or lower than at the hospital for similar DRGs (total average: 9.1 days), readmission and mortality rates are considerably lower (-66% and -24% respectively), and satisfaction levels are very high. The numbers also reveal a preliminary 46% efficiency gain compared to hospital wards (recall that, as mentioned in the background, these comparisons may include a patient selection bias effect, even after adjusting for similar DRGs).[4] The potential for savings, better clinical outcomes, and higher satisfaction is enormous, as 1.1M patients are admitted annually to NHS hospitals, of which 46% are deemed eligible for HaH (Diário de Notícias, 2019).

Table 1: Comparative analysis of HaH models in the UK, Australia, Spain, and Portugal

	UK	Australia	Spain	Portugal
Primary goals	Cost reduction through early discharge and admission avoidance	Investment avoidance; Cost reduction	Decompression of saturated infrastructure; Investment avoidance; Cost reduction	Decompression of saturated infrastructure; Investment avoidance; Cost reduction
Apparent impacts on clinical outcomes	Shorter lengths of treatment Lower readmission rates Lower mortality Hospital admission avoidance	Shorter lengths of treatment Lower readmission rates Admission avoidance not considered, as patients are considered as taken in charge by the hospital	Shorter lengths of treatment Lower readmission rates Admission avoidance not considered, as patients are considered as taken in charge by the hospital	Shorter lengths of treatment Lower readmission rates Admission avoidance not considered, as patients are considered as taken in charge by the hospital
Services provided	Nursing care to acutely ill patients, care and advice in chronic diseases (e.g., Chronic Obstructive Pulmonary Disease (COPD), diabetes), palliative care to terminal patients, leg ulcer care, management of continence issues, and several primary care procedures.	Acute care on conditions that may include cellulitis, kidney and urinary tract infections, post-operative and post traumatic infections, trauma to skin, subcutaneous tissue and breast, heart failure and shock, skin ulcers, multiple sclerosis and cerebellar ataxia, bacteraemia, infectious and parasitic diseases, minor skins disorders, injuries – major and minor complexity, venous thrombosis, pneumonia, osteomyelitis, septic arthritis, endocarditis, among others Sub-acute care, including mostly palliative care and rehabilitation in the home (RITH) from trauma (e.g., fracture), acute illness (such as a stroke), elective surgery (e.g., joint replacement) or functional debilitation (exacerbation of chronic obstructive pulmonary disease) Paediatrics	High-level of specialization: nearly the same services as those available in hospital, and include the treatment of complex pathologies such as post-operatory procedures of major surgeries (including transplants), subcutaneous chemotherapy, blood transfusions, parenteral nutrition and antibiotics administration, trauma treatments, palliative care, pediatrics, clinical analyses and related diagnostic aids.	Still at the start of the program, the record is still insufficient for a clear characterization. However, pilot HGO practice identified as main primary diagnoses treated pneumonia, acute pyelonephritis, heart failure, acute cystitis, acute tracheobronchitis, erysipelas, prostatitis, infected ulcers, gastroenteritis and chronic hepatic disease; Secondary conditions included respiratory failure, heart failure, acute kidney injury, acute COPD, bacteremia, exacerbated diabetes mellitus, among others; Complex pluri-pathologies, and infections by multi-resistant agents were frequent.

[3] Data for Portugal provided by Dr Delfim Rodrigues

[4] Efficiency Gain is defined in the Portuguese NHS as the lower cost achieved (this was calculated as (income-costs)/income; Income is estimated to be similar to the cost of the hospital treatment

Target patient groups	Elderly population Recovery and rehabilitation Mental health patients Family primary care	All acute patients	All acute patients; Interaction with chronic and long term-care	All acute patients
Structural enablers or deterrents	Highly decentralized organization (207 clinical commissioning groups; 152 acute care trusts; 54 mental health trusts; 35 community providers;…) with different degrees of autonomy in cost and investment decisions. Care models can therefore vary widely, although emphasis in benchmarking and counselling is made by NHS Improvement, a body of NHS acting as regulator, auditor and enabler of public policies.	Although decentralized to state responsibility, Healthcare Australia enjoys a fair influence upon state policies. There has been a strong commitment of most of the larger state governments towards HaH, in view of the economic, clinical and patient satisfaction results achieved.	Healthcare is delegated to the Autonomous Communities (CAs), but the central national government has a strong influence in the definition of overall care at home policies. Some CA governments, more than others, have pushed forward the HaH practice (Basque Country, Valencian Community, Catalonia, Galice). National professional associations are a major source of pressure towards increased adoption of HaH.	Portugal has one of the most centralized government structures in Europe, which strongly facilitates the adoption of defined policies. Scarcity of resources (human and financial, both for ongoing expenditure and investments) is the main obstacle to HaH dissemination.
Payment schemes	Some procedures are subject to central NHS pricing, but most arrangements are made locally between Clinical Commissioning Groups and Trusts, who enjoy extensive clinical autonomy. Local trusts' budgets have been commonly lower than actual spending, leading to debt increases.	HaH episodes are paid the same price as hospitalization episodes for similar DRGs.	Financial arrangements may differ substantially between CAs. Some CAs (e.g., Madrid) use DRG-based reimbursement. Typically, they include a discount relative to equivalent DRGs in hospital wards, to reflect lesser costs of service provision.	The ARSs establish "program contracts" with hospitals, which define the volume targets and pricing/ funding for DRGs and per cost driver (e.g, patient, discharge episode, consultation, …) HaH is currently paid per episode at the same prices as equivalent DRGs' hospital-based services. In previous years, a discount of 25% was applied; the net gain should be reinvested in capacity increase.
Main challenges ahead	Increase in Healthcare spending designated as a crucial need, but efficiency improvements are deemed to be the major source of effectiveness upgrade, as future resources allocated may be drained by debt service. Staffing difficulties, following personnel quitting due to burnout, immigration laws and Brexit (12,5% of NHS staff is foreign, mainly among doctors – 26% - but also nurses – 16%; 11% of doctors and 7% of nurses are EU citizens); will lead to increase need in education and training, and to shift focus on patient self-responsibility for own health (ie, primary care).	Not enough information	Dissemination of HaH model to all CAs and deeper into each CA's health system. Increase in population coverage by HaH. Increase in HaH admittance among eligible population (at least 30% acute patients deemed eligible). Standardization of procedures, performance indicators, patient records, and accounting measures across CAs. Certification of HaH specialists.	Execution of current roll-out plan in 25 hospitals; Standardization of and compliance to defined procedures (clinical, administrative and reporting); Dissemination to all adequate public hospitals in the country, streaming efficiency gains towards investment in new HaH capacity; To create and improve the image of the HaH service among patients, clinicians, and decision-makers.

4.3 Portugal's Implementation process design

In this section, I analyse in more detail the structure and implementation of the HaH model in Portugal, looking separately at 1) Service Delivery, 2) Program Management, and 3) Corporate Services (Hospital Gracia de Orta, 2018; State of Victoria - Department of Health, 2011).

1) Service Delivery

First, a HaH unit must work 24 hours per day, 365 days per year, with permanent available nursing care.

Eligibility. A patient is eligible for HaH if she voluntarily accepts to be treated at home (she or a legal representative must sign an "Informed Consent" form), if she has a stable clinical diagnosis (including transitory situations after acute events in the case of chronic patients), if there is a caregiver (non-applicable if the patient is autonomous), if her living conditions are appropriate, and if communication and accessibility conditions are reasonable (e.g. distance/travel time to the hospital). Regarding diagnoses, patients eligible for HaH include patients with acute or chronic conditions as well as patients at terminal/palliative stages who, transitorily, need acute clinical procedures. The type of services provided and diagnose procedures available to the patients treated in HaH are detailed in appendices III and IV.

Admission. Admission to the HaH Unit requires approval from the assigned doctor from the HaH team, following a referral from a hospital ward or an Intensive Care Unit (ICU). This request is received and evaluated by the HaH admission team, and a visit to the patient's house is scheduled. The first official home visit is scheduled and treatment starts. In case of rejection by the HaH admission team, the patient remains in the hospital.

Service capacity. A HaH unit's capacity may vary depending on patients' needs and resource availability. As reference, no more than 10 patients should be assigned to a clinical team (one doctor and two nurses). On average, a home visit takes approximately 40 minutes, travel time to the patient's home is around 15 minutes, and treatment duration is about 10 days.

Structure and Equipment. HaH units require a physical space in the hospital, where administrative and support activities may be performed – this space needs to be equipped with

telephones and computers with adequate software. A small pharmacy, portable clinical equipment, and identified vehicles are also necessary.

Separation/Discharge. At the end of a HaH treatment episode, appropriate information is provided to patients, carers, GPs and community services including a discharge summary. Communication is key at this stage of the process: all relevant information should be recorded in the hospitals' legacy systems and made available for future consultation.

2) Program Management

Data Records and Reporting. All personal information must be easily accessible by HaH staff – this includes patients' clinical records, reasons for admission, and all data collected prior to HaH admission. Similarly, all procedures and interventions realized during the HaH episode must be recorded and then available for consultation. Depending on the system used to collect and analyse these data, different hospitals may have their patients' data reporting organized differently. Besides digital data, in Portugal it is still common to have some paper documentation (e.g. informed consents).

Interface with other programs. Coordination and communication between services is of utmost importance for an efficient HaH model – services must operate within coordinated models of care. This is especially important for information sharing and in the discharge process.

Human Resources and Responsibilities. HaH units are multidisciplinary. Theoretically, for each ten beds, one physician and two nurses are required. Taking HGO as a reference, there are eight physicians (Internal Medicine specialists), twelve nurses, one technician, one social assistant, one pharmacist, one dietitian, and one manager. The team staff may vary according to each hospital's size, resources, and the number of patients targeted.

3) Corporate Services

Corporate services include 1) clinical governance – governing body, which should include managers and clinicians in charge of quality of care and service improvement, 2) infection

control – policies, procedures, and practices, and 3) external service providers. These three components are of utmost importance for the correct functioning of a HaH unit, since they are the basis of every management decision and quality assurance.

4.4 Improvement points for the HaH practice

There seem to be some structural issues with HaH in Portugal, partly due to the infancy of the model. With time and experience, we may expect some of these issues to be solved. At this point, the main challenges/priorities lie on 1) the execution of the expansion plan, namely the extension of HaH to all hospitals of the NHS; 2) communication within the NHS and towards consumers (patients and carers); and 3) the standardization of and compliance with procedures. To a great extent, it is possible to learn from the experiences of the Australian and, especially, the Spanish HaH practices. Since Portugal is at its early stages, it should leverage on the experiences of those countries, namely for the development of procedures and supporting systems. An HaH society should be put in place as of now.

Dr Delfim Rodrigues adds to these priorities the development of a Business Information System (BI) that will allow to standardize reports, enabling permanent monitoring and analysis of both clinical and financial data.

All interviewees referred the important role of new technologies in simplifying and improving effectiveness of their work. Miniaturization, Internet of Things (IoT), Artificial Intelligence (AI) will all contribute to these improvements: portable medical devices, remote communication of data, or procedures suggested by expert systems will be invaluable for an increased performance of the HaH practice (McKinsey & Company, 2019).

As previously mentioned, smart hospitals will be of utmost importance in the future of healthcare models. Digital interconnected ecosystems will allow for real-time and updated tracking and transmission of patient's health records – which is one of the most important requirements of HaH. The main challenges in the implementation of such digital improvements

in Portugal are not only the scarce investment resources made available for the NHS, noted several times in the interviews, but also the current early stage of all technology available in the NHS.

5G Internet connectivity was another point raised by Dr Rodrigues, when questioned about the future role of digital technology in health systems. According to COHEN (2019), 5G is expected to be 100 times faster than current 4G networks. This may allow for remotely monitoring patients' analytics by connecting all devices at hospitals and off-site, to create more reliable telemedicine by lowering video lag, to make robot-assistant telesurgery widespread through advancements in both connectivity and devices, as well as to enhance Medicine learning through augmented reality procedures, such as surgical skills training. Latency– the time lag between a user request and an action – is strongly decreased with 5G. In the HaH context, 5G may enable for faster data transmission between remote monitoring devices, which can be available at patients' homes, at the hospital, or wherever the doctor is. Furthermore, robot-assisted telesurgery is likely be one of the most requested practices in the future of HaH.

4.5 Business Model Canvas applied to the Hospitalization at Home *Business*

A consolidated, simple model of HaH is one of the main needs to improve the perception of HaH in Portugal. Business Models are *"the rationale for how an organization creates, delivers, and captures value"*; a business model may help provide a global and clear image of how a model of HaH should be structured and organized (Osterwalder, 2013).

The business model is organized in nine blocks – key partners, key activities, key resources, value proposition, customer relationship, channels, customer segments, cost structure, and revenue streams – which are closely interconnected (c.f. Table 2).

This model allows to systematize the main axis of strategic decisions regarding resource allocation needed to address the future improvements mentioned in section 4.4.

Business Model Canvas

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
▪ Hospitals (management) ▪ General Practitioners ▪ Patients ▪ Primary Care Units ▪ Community-based services ▪ Continued Care Units ▪ Social Services	▪ Referencing ▪ Diagnosis ▪ Individual medical registry ▪ (Home visits) ▪ Treatment (including all medical procedures mentioned above) ▪ Separation **Key Resources** ▪ Hospital-based space ▪ Medical/nursing home-adequate equipment ▪ Telemedicine equipment ▪ Vehicles ▪ Patients' home ▪ Human Resources - physicians (Internal Medicine specialists), nurses, a technician, a social assistant, a pharmacist, a dietitian, and a manager	The HaH model aims to provide secure and simplified treatment of patients (under specific conditions) who otherwise would need to be admitted to hospital in the comfort of their homes, thus preventing possible nosocomial infections. HaH allows patients to be diagnosed, treated and monitored in different phases of illness by specialized physicians and nurses. Despite several existing treatments and equipments used, HaH models are redesigning their approach towards a more digital and interconnected system, thus improving patients' satisfaction.	A trustful and secure relationship is at the core of HaH customers' ambtions. The main characteristics of this relationship are: ▪ Information availability ▪ Respect among all intervenient ▪ Transparency ▪ Continuous communication **Channels** ▪ Emergency Departments ▪ Intensive Care Units (ICUs) ▪ General medical consultations ▪ Primary Care medical consultations ▪ Continued-care Units	▪ Elderly with chronic conditions ▪ General acutely-ill patients ▪ Maternity ▪ Infants ▪ Terminal patients

Cost Structure	Revenue Streams
The cost structure underneath an HaH model might vary according to each Hospital. In general, and in Portugal: ▪ HaH has distinct cost centers recognized at hospital cost structure ▪ Costs are (or should be in the cases in which this is not organized as such) allocated in a per activity basis, and should reflect the total costs of the Unit	Revenue streams of an HaH model may vary according to each Hospital. In general, and in Portugal: ▪ Hospitals are funded through "program-contracts" based on a casemix index by which the hospital is paid per patient/episode treated ▪ HaH "revenues" are fully similar to any other Hospital Unit – HaH receives the same value per patient as other ICU Unit in the Hospital

Table 2 – Business Model Canvas

4.6 Marketing Plan for a Hospitalization at Home Service

According to the interviewees, prospective patients tend to perceive HaH as an old-fashioned setting of care for terminal patients. As described above, HaH covers much more than this. Effective communication of what HaH is, what services it encompasses, and the benefits for patients are crucial for the progress of the practice.

A Marketing Plan allows to frame a service that needs to be promoted, helping to answer the question of "how" the organization will achieve its strategic objectives through specific marketing strategies. I designed a marketing plan for HaH to help with communicating HaH services in Portugal so that, ultimately, this model of care can be expanded; it is presented in Box 1 below. It is organized in four main sections – *executive summary*, encompassing a brief description of HaH and how it fits in the current context; *situation analysis*, with relevant background data on market competitors, forces in the macroenvironment, market growth, and a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, reflecting some of the main points referred previously; *marketing strategy*, where the mission and objectives are clearly defined; and *implementation controls*, in which a monitoring plan is outlined (Kotler & Keller, 2011). An important section of marketing plans – *financial projections* – is not included due to lack of data.

Box 1 – Proposed Marketing Plan for a HaH model in Portugal

1. Executive Summary

Health care systems face several trends, namely the increase demand of aged populations, the decentralization of care from hospitals to home settings, and the technology disruptions, among others. Costs are expected to increase at an annual rate of 5.4% between 2018-2022 mainly due to the growing care needs of elderly and the advanced and expensive technologies made available in the market.

The emergence of new care delivery models to improve access and affordability is one of the most important trends of today's healthcare reality. Hospitalization at Home is an example of an optimized strategy in this context. Its convenience, organization of resources,

proved efficiency and effectiveness, clinical outcomes, and patients and carers' satisfaction are at the core of the reasons why patients should start shifting their choices to this model.

2. Situation Analysis

Hospitalization at Home practices are performed in Portugal since 2015, when the first HaH unit was launch in Hospital Garcia de Orta. In October 2019, it is possible to count with 23 units in the country. Marketing needs are pointed as main improvement points in this model – patients (our consumers) need to understand the real role of HaH practices and that the provision of service is safe and effectively done to allow for customer base's growth. HaH offers several different services, according to the needs of each patient and the Hospital's resources.

2.1 Target Customers

- Elderly with chronic conditions
- General acutely ill patients
- Maternity
- Infants
- Terminal patients

2.2 Market Demographics

Geographic:

Currently, there are 23 Portuguese hospitals with HaH units. These hospitals are distributed through the five regional health administrations (ARS): ARS Norte, ARS Centro, ARS Lisboa e Vale do Tejo, ARS Alentejo, and ARS Algarve.

Demographics:

In HGO's HaH units' first year of operations there were 281 patient episodes, where 52% were female and the average age was 67.4 (Cunha, 2017).

2.3 Market Trends

- Aging populations
- Overcrowded hospitals
- Fewer resources for more users
- Digital and Technological disruption
- Customers' changing needs
- Customers' expectations – demanding more from health care services (better and improved services' provision)

2.4 SWOT Analysis

2.4.1 *Strengths:* successful foreign models at the basis (Australian and Spanish cases), given market, customers', and environment similarities, which are being adapted to the Portuguese context; successful pilots in the Portuguese setting (HGO's case), human resources' skills and motivation - physicians (Internal Medicine specialists), nurses, a technician, a social assistant, a pharmacist, a dietitian, and a manager, high satisfaction rates with the service

2.4.2 *Weaknesses:* lack of funding to scale up the model; lack of recognition by prospective patients: insufficient/poor brand awareness and prospective customers' perception of the service

2.4.3 *Opportunities:* growing industry, potential growth of the customer base, decreased costs through future possible economies of scale, and to raise funds for investment through the economies generated by the HaH model

2.4.3 *Threats:* limited resource allocation in the Portuguese NHS budget that might negatively influence the investments needed to improve the service

2.5 Service Offering

The list of all services offered is provided in appendix IV.

3. Marketing Strategy

3.1 Target Markets

All Portuguese hospitals are candidates for HaH if the main requirements for the service implementation are fulfilled.

3.2 Marketing Program

The main marketing focus for HaH is the correct advertising and promotion of the service among potential patients – this may include news and interviews in the press, journalistic shows in TV programs seen by the target market, or mentoring of primary care GPs to incentivize the target segments. Physicians and nurses will be in charge of making the message clear regarding what and to whom HaH is directed. After that phase, a fully standardized Marketing strategy will have to be designed for the Portuguese HaH units.

4. Controls

HaH managers will have to perform specific and detailed monthly and annual analysis on the progression of the service and propose adjustments according to these results.

Source: Structure followed the guidelines proposed by *KOTLER, P. & KELLER, K. 2011 in Marketing Management 14th Edition, Upper Saddle River, NJ, Prentice Hall.*

5. Final Remarks

HaH practices have been proving their advantages in terms of costs, clinical outcomes, and resource allocation. Twenty-three Portuguese hospitals are already incorporating this practice in their services. The Portuguese model has been showing good results since its first

year of operations: an over 40% efficiency gain compared to hospital wards, a 2/3-decrease on readmission rates and 1/4 on mortality rates, as well as high satisfaction rates. Portugal is leveraging the experiences from the UK, Australia and Spain, considered as references in this field, and should, as these countries, advance in the standardization and compliance to the procedures and supporting systems defined. The business model canvas presented helps to organize and structure the HaH practice, based on all data collected throughout the research performed. The marketing plan may be a valuable resource on the communication and promotion of HaH in Portugal: it not only clearly specifies what HaH is, but also structures to whom it is addressed as well as the market potential it will encompass in the future.

As of now, patients have been recruited from hospital wards. Soon, this patient base should be expanded to primary care and continued care units. Therefore, GPs in primary care and nurses in continued care units will need to be briefed on the referral procedures to HaH. [5] The margin (i.e. economic "efficiency improvements") generated via HaH should be channelled to the expansion of the service – new vehicle acquisition, HR recruitment, and technological investments – in order to expand the installed capacity until economies of scale are exhausted.

Limitations of this study include mainly the lack and reliability of information on the progress of the implementation plan and its clinical and economic results. Naturally, these are consequences of the early stage of the process and the inexistence of reliable systems and procedures in Portugal. However, HaH project coordination and management should continue to strive for qualified information and compliance.

Future research should focus on the important role of new digital and technological equipment and procedures applied to HaH. Patients and carers acceptance of HaH should also be studied in depth to identify and remove potential obstacles to its penetration. Furthermore, human resources deserve a special attention, including, e.g., recruitment opportunities for

[5] A topic mentioned by Dr Francisca Topa in interview context.

nurses and doctors following Brexit; and motivation and burnout prevention to HaH professionals leveraging on the Spanish experience.

Portugal appears to be in the right track for the implementation of HaH. Having started late, by international standards, there is an opportunity to leap-frog possible traps and pitfalls by leveraging on the experiences and best-practices of other countries. Following these experiences, Portugal may be able to capture efficiency and effectiveness gains that will, on one hand, contain the cost increase in healthcare and, on the other hand, free up resources for a continued investment in the NHS.

6. References

Administração Central do Sistema de Saúde. (2019). *Contrato-Programa HGO*.

Australian Government - Australian Institute of Health and Welfare. (2018). *Australia's health 2018*.

Australian Government - National Health and Medical Research Council. (2016). *5th Annual NHMRC Symposium on Research Translation: Embedding reseach into health care: building a culture of quality*. (November).

COHEN, J. K. (2019, May). *Why 5G matters for healthcare.* Retrieved from Modern Healthcare: https://www.modernhealthcare.com/technology/why-5g-matters-healthcare

Cunha, V. (2017). Home Hospitalization: One Year Balance of the First Portuguese Unit. *Medicina Interna*, *24*(4), 290–295. https://doi.org/10.24950/rspmi/o112/17/2017

Delerue, F., & Correia, J. (2018). Hospitalização Domiciliaria mais um Desafio para a Medicina Interna. *Medicina Interna*, *25*(1), 15–17. https://doi.org/10.24950/rspmi/op/1/2018

Deloitte. (2012). *Innovative and sustainable healthcare management: Strategies for growth*. (August).

Deloitte. (2017). *The hospital of the future How digital technologies can change hospitals globally*.

Deloitte. (2019). *2019 Global health care outlook - Shaping the future*.

Diário de Notícias. (2019, December). *Portugal já tratou três mil doentes em casa. "No hospital domiciliário diagnostica-se pouco e trata-se muito"*. Retrieved from Diário de Notícias: https://www.dn.pt/vida-e-futuro/portugal-ja-tratou-tres-mil-doentes-em-casa-no-hospital-domiciliario-diagnostica-se-pouco-e-trata-se-muito-11602852.html

Diario Medico. (2015). *Un hospital de más de 400 camas, pero sin edificio físico.* Retrieved from Diario Medico: https://www.diariomedico.com/profesion/hospital-400-camas-edificio-fisico.html

Díaz, I. C. (n.d). In *O Libro do Peto - Diagnóstico y tratamiento e medicina hospitalaria: Enfoque práctico.*

Direção Geral de Saúde. (2018). Hospitalização Domiciliária em idade adulta. *Norma Nº 020/2018 de 20/12/2018*, 1–22. Retrieved from http://nocs.pt/hospitalizacao-domiciliaria-em-idade-adulta/

East Sussex Healthcare. (2019). *Health Visiting and Children's Centre Service*. Retrieved from NHS - East Sussex Healthcare: https://www.esht.nhs.uk/service/health-visiting/

ENISA. (2016). *Smart Hospitals: Security and Resilience for Smart HeNAalth Service and Infrastructures*. https://doi.org/10.2824/28801

Gabinete da Secretária de Estado da Saúde Despacho. (2018). *Diário da República, 2.ª série — N.º 191*.

Gobierno Vasco - Departamento de Salud. (2016). *Los partos disminuyeron un 2,9% en los Hospitales de la C.A. de Euskadi en el año 2016*. 1–8.

Gonçalves-Bradley, D., Iliffe, S., Doll, H., Broad, J., Gladman, J., Langhorne, P., … Sheppard, S. (2017). *Early discharge hospital at home (Review)*. (6). https://doi.org/10.1002/14651858.CD000356.pub4.www.cochranelibrary.com

Government of Western Australia South Metropolitan Health Service . (2019). *Government of Western Australia South Metropolitan Health Service* . Retrieved from Hospital in the Home: https://www.fhhs.health.wa.gov.au/Our-services/Service-Directory/Hospital-in-the-Home

Governo República Portuguesa. (2019, March). *Governo aprova Programa de Investimentos na Área da Saúde*. Retrieved from https://www.portugal.gov.pt/pt/gc21/comunicacao/noticia?i=governo-aprova-programa-de-investimentos-na-area-da-saude

Health - NSW Government. (2018). *Adult and Paediatric Hospital in the Home Guideline.*

Hospital Gracia de Orta. (2018). *Unidade De Hospitalização Domiciliária: Programa Funcional*. Retrieved from http://www.hgo.pt/Portals/0/Documentos/UHD_Plano_Funcional_2018.pdf

Kotler, P., & Keller, K. (2011). Marketing Management. In P. H. Upper Saddle River, NJ (Ed.), *Management Decision* (14th ed., Vol. 48). https://doi.org/10.1108/00251741011076816

KPMG. (2019). *Delivering healthcare services closer to home*. (October), 0–23.

Leff, B. (2009). Defining and disseminating the hospital-at-home model. *Canadian Medical Association Journal*, *180*, 156–157.

Levine, D. M., Ouchi, K., Blanchfield, B., Diamond, K., Licurse, A., Pu, C. T., & Schnipper, J. L. (2018). Hospital-Level Care at Home for Acutely Ill Adults: a Pilot Randomized Controlled Trial. *Journal of General Internal Medicine*.

Maaravi, Y., Cohen, A., Hammerman-Rozenberg, R., & Stessman, J. (2002). *LONG-TERM CARE AROUND THE GLOBE: Home Hospitalization*. (April), 114–118.

McKinsey & Company. (2019). *Finding the future of care provision: the role of smart hospitals*. (June).

Montalto, M. (2010). *The 500-bed hospital that isn't there: the Victorian Department of Health review of the Hospital in the Home program*.

NHS Department of Health. (2005). *A Short Guide to NHS Foundation Trusts*.

NHS Northumbria Healthcare. (2019). *District Nursing*. Retrieved from NHS Northumbria Healthcare: https://www.northumbria.nhs.uk/our-services/nursing-at-home/district-nursing/

NHS Oxford Health. (2019). *Hospital at Home*. Retrieved from NHS Oxford Health: https://www.oxfordhealth.nhs.uk/service_description/hospital-at-home/

North Bristol NHS Trust. (2019). *Hospital at Home*. Retrieved from North Bristol NHS Trust: https://www.nbt.nhs.uk/our-services/a-z-services/hospital-at-home

Osterwalder, A. (2013, May). *A Better Way to Think About Your Business Model.* Retrieved from Harvard Business Review: https://hbr.org/2013/05/a-better-way-to-think-about-yo.

Polese, F., Carrubbo, L., Caputo, F., & Sarno, D. (2018). Managing healthcare service ecosystems: Abstracting a sustainability-based view from hospitalization at home (HaH) practices. *Sustainability (Switzerland)*, *10*(11), 1–15. https://doi.org/10.3390/su10113951

Queensland Health Government . (2019). *Hospital in the Home.* Retrieved from Queensland Health Government : https://www.health.qld.gov.au/sunshinecoast/community/hith

SEHAD. (2019). *PROYECTO HAD 2020.* Retrieved from SEHAD - Sociedad Española de Hospitalización a Domicílio: https://www.sehad.org/proyecto-had2020

Sierra, R. (2019, April). *Diario Medico.* Retrieved from España quiere ser referente en hospitalización a domicilio: https://www.diariomedico.com/salud/espana-quiere-ser-referente-en-hospitalizacion-a-domicilio.html

Shepperd, S., Doll, H., Angus, R. M., Clarke, M. J., Iliffe, S., Kalra, L., … Wilson, A. D. (2014). *Europe PMC Funders Group Hospital at home admission avoidance*. (1). https://doi.org/10.1002/14651858.CD007491.Hospital

Shepperd, S., Wee, B., & Straus, S. E. (2012). Europe PMC Funders Group Hospital at home: home-based end of life care. *Cochrane Database Syst Rev*, (1), 1–40. https://doi.org/10.1002/14651858.CD009231.Hospital

Spyropoulos, B., & Botsivaly, M. (2005). Reducing hospital length of stay through the formation of a hi-tec home-care environment. *2nd International Conference on Broadband Networks, BROADNETS 2005*.

State of Victoria - Department of Health. (2011). *Hospital in the Home - Guidelines*.

U, E. C. Y., Pryor, G. A., & Parker, M. J. (2017). Hospital at home – a review of our experience. *Sicot-J*, *3*, 60. https://doi.org/10.1051/sicotj/2017047

UNICEF Health Section, & Office of Innovation Centre. (2019). *UNICEF's Approach to Digital Health.*

Victoria State Government . (2019). *Hospital in the Home.* Retrieved from Victoria's hub for health services & businesses: https://www2.health.vic.gov.au/hospitals-and-health-services/patient-care/acute-care/hospital-in-the-home

World Health Organization. (2008). *The Solid Facts - Home Care in Europe*. 36.

World Health Organization. (2017). *Environmentally sustainable health systems: a strategic document*.

Appendices

Appendix I – Interview guide

The approximate duration of each interview was 60 minutes.

Structure:

1. Introduction – Warm-up. Overview of the study and main objectives

2. Interviewee Context

Name
Profession/role
Professional Background and Experience
Professional Location

3. Questions

Healthcare Manager Profile
Statistical Data: ▪ Can you please provide an update of the "activity" since its launch until 2019? – e.g.: number of patients treated; number of occupied beds in the hospital that were released thanks to HaH; average lengths of treatment; readmission rates; etc. ▪ What are the general costs of the HaH unit and the cost per patient? ▪ Rejection rates ▪ Satisfaction rates ▪ Other relevant numbers General HaH model: ▪ How is a patient referred to HaH? o From the General Health Administration (DGS) we know that they may be referred by 1) Primary healthcare units; 2) General Care Units; and 3) Continuous Care Units. Any other way? What are the most common? Is there any trend? ▪ What are the most common diseases treated in this context? ▪ How are resources allocated? (meaning nr. of physicians, nurses and other professionals, nr. of vehicles, nr. of equipments, etc.) ▪ How are HaH models financed in the Portuguese public healthcare system?
Physician or Nurse involved in a HaH Unit
Patient Centric: ▪ What is the typical (and required) patient profile? ▪ How does the selection process work? ▪ How is patients' and families' satisfaction assessed?

Technologies and Equipments:

- What type of equipment is used in a HaH unit?
- How do you classify the current availability of resources? Good, just ok, or poor? Please elaborate.
- How do you perceive the implementation of new technologies/equipments in the current Portuguese HaH units?

Physician or Nurse not involved in a HaH Unit

- What do you know about HaH models? (in Portugal or abroad)
- Regarding the Portuguese HaH Units… Do you know which hospitals have it incorporated? Do you know how a HaH Portuguese unit typically works?
- Do you think that healthcare professionals that are not working in a HaH unit are not correctly informed about this program?
- Do you see any advantage or convenience in referring patients to HaH models on your clinical practices? Please elaborate on that.

Transversal to any Profile

The HaH model:

- What do you consider to be the strong points in the Portuguese HaH model?
- What are the improvement points in the Portuguese HaH model?
- General Comments and Recommendations
- Do you know other HaH models? If yes, what do you think the Portuguese HaH model could adapt and incorporate on its current procedure?

The role of new Technologies and Digital:

- What is your opinion regarding the use and further implementation of new technologies in the healthcare units? Do you find it beneficial in the HaH context?

Communication and Marketing:

- How do you feel HaH is perceived by the general patient?
- Do you think HaH is still perceived as an old-fashioned way of treatment?
- Do you recognize a need to develop any kind of communication/marketing plan to revert people perception on HaH practices?

4. Wrap-up: Do you have anything else to add to this interview? Any other aspects you might consider relevant to refer?

5. Final Remarks

Appendix II – Australia HaH model: details on admission, eligibility, and services provided

Patients are referred to HaH from emergency departments, medical assessment units, inpatient wards, specialist inpatient clinical areas (including pediatrics, special care neonatal units, cardiology, general medicine, gerontology, respiratory, endocrinology, hematology, obstetrics, infectious diseases, nephrology, urology, surgery , neurology, oncology), palliative care, General Practitioners, Residential Care Facilities, specialist tertiary hospitals, other HaH services, outpatient clinics, Aboriginal Medical Services, mental health or centralized intake services.

Patients are screened for HaH by clinicians with admission authority, and those suitable for HaH must: have an acute/sub-acute condition deemed appropriate for care outside the hospital ward setting, consent to HaH treatment (or have consent from a substitute decision maker), not require continuous 24 hour attention, be conscious about their condition and know when more care may be required, or have a carer in the household who takes this responsibility, have a suitable and safe home for receiving care (there is a home visit with the purpose of risk assessment, including e.g. domestic violence), have access to a reliable landline or mobile telephone, and meet the criteria for admission according to the state health admission policy.

Services provided include: (1) acute care, where diagnosis and treatment procedures are performed to cure, reduce severity or relieve symptoms of illness; conditions may include cellulitis, kidney and urinary tract infections, post-operative and post traumatic infections, trauma to skin, subcutaneous tissue and breast, heart failure and shock, skin ulcers, multiple sclerosis and cerebellar ataxia, bacteremia, infectious and parasitic diseases, minor skins disorders, injuries – major and minor complexity, venous thrombosis, pneumonia, osteomyelitis, septic arthritis, endocarditis, among others; (2) Sub-acute care, including mostly palliative care and rehabilitation from trauma (e.g. fracture), acute illness (e.g. stroke), elective surgery (e.g. joint replacement) or functional debilitation (e.g. exacerbation of chronic obstructive pulmonary disease); and (3) Pediatrics. Since the service is aimed at acute/sub-acute short-term care, it avoids chronic care and community-based services targeting lifelong and complex treatments, such as renal dialysis, parenteral nutrition or long-term ventilation; however, it may occasionally work closely with ambulatory and outpatient service clinical staff who provide such procedures to some patient groups (e.g. children, elderly).

Source: (Health - NSW Government, 2018)

Appendix III – Eligible diagnoses for HaH in Portugal

Unidade de Hospitalização Domiciliária - Programa Funcional

LISTA DE PATALOGIAS E PROCEDIMENTOS MÉDICAS E CUIDADOS PÓS CIRURGICOS ELIGIVEIS PARA UHD

(por protocolos clínicos específicos)

1- PATOLOGIAS ILEGÍVEIS PARA INTERNAMENTO

Insuficiência cardíaca crónica descompensada, DPOC, Asma aguda, Pneumonias (aspirativa, hospitalar e PAC), patologias trombo-embólicas (TVP/TEP), endocardite infeciosa, infeções associadas a cateter, abcesso peri-amigdalino, Infeções intra-abdominais, abcesso hepático, colecistite aguda, diverticulites, infeções do trato urinário, prostatites, infeções osteoarticulares, infeções da pele e tecido celular subcutâneo, neutropenia febril.

2- PROCEDIMENTOS DE DIAGNÓSTICO E TERAPÊUTICA

Ventilação mecânica não-invasiva (VNI), ventilação mecânica invasiva domiciliaria (CMID), alimentação artificial parentérica (APT), alimentação artificial entérica, transfusão de hemoderivados, terapêutica com ferro EV;
Mielograma, biopsia óssea, paracentese, colheitas de espécimes (sangue, LCR, liquido pleural, liquido ascite, expetoração), hemoculturas, uroculturas.

3- **CUIDADOS PALIATIVOS**

Sedação domiciliária, controlo da dor, dispneia em cuidados paliativos, urgências em cuidados paliativos, cuidados de enfermagem em cuidados paliativos.

4- TERAPEUTICA ANTIBIÒTICA DOMICILIARIO ENDOVENOSO (TADE)

Possibilidade de manter terapêutica antibiótica em doentes com indicação para ciclos prolongados.
É recomendado e desejável que se conheça a flora local e se adota as medidas de prevenção de de resistências e falhas terapêuticas.

5- CRITERIOS DE ADMISSAO DOENTES PÓS-CIRÚRGIA

Analgesia pós operatória domiciliaria, alta precoce pós mastectomia, alta precoce após cirurgia urológica, alta precoce pós by-pass coronário ou periférico, artroplastia total das extremidades inferiores, cuidados dos doentes com feridas

Source: (Hospital Gracia de Orta, 2018)

Appendix IV – Main Nursing and Diagnose Procedures in HaH in Portugal

Unidade de Hospitalização Domiciliária - Programa Funcional

LISTA DE PROCEDIMENTOS DE ENFERMAGEM

1. Massajar partes do corpo
2. Mobilização passiva, cada segmento ou grupo articular
3. Mobilização ativa, cada segmento ou grupo articular
4. Executar técnicas de posicionamento
5. Aspiração nasotraqueobrônquica com cateter
6. Cinesiterapia respiratória
7. Percussão/vibração torácica
8. Drenagem postural
9. Algaliação
10. Técnicas de relaxamento (dor)
11. Administração de fármacos por via endovenosa
12. Perfusões em seringa
13. Perfusões em bomba
14. Punção subcutânea
15. Aplicação de uma transfusão de sangue (unidade)
16. Executar inaloterapia através do inalador
17. Aerossóis/Oxigenoterapia
18. Administração de fármacos por via subcutânea
19. Administração de fármacos por via por via IM
20. Injeção por via IV Administração de soros
21. Penso lesão aberta por úlcera varicosa unilateral
22. Penso amputação com necrose (MI ou dedos)
23. Penso lesão aberta (perda de epiderme) sem infeção
24. Penso simples
25. Extração de pontos, incluindo penso simples
26. Extração de agrafes, incluindo penso simples
27. Avaliação de sinais vitais (temperatura, pulso)
28. Avaliação de tensão arterial
29. Avaliação de glicemia capilar
30. Teste rápido de cetonúria e glicosúria
31. Colocação de SNG
32. Enema de limpeza
33. Colheita de urina asséptica por sonda vesícula (não inclui algaliação)
34. Colheita de urina asséptica com saco coletor

PROCEDIMENTOS DIAGNÓSTICOS E TERAPÊUTICOS NA UHD

1. **Laboratório**: hematologia, bioquímica, gasometria, imunologias, serologias, harmónios.
2. Exame Microbiológico: hemoculturas, uroculturas, coproculturas; exame parasitológico e colheitas de amostras orgânicos (ex. exsudado faringo-amigdalino, expectoração, secrecçoes brônquicas líquidos peritoneal, pleural e cefalo-raquidiano e articular).
3. Técnicas Minimamente Invasivos: cateter e drenagem (pele e tecidos moles), mielograma, biopsia óssea.
4. Outras técnicas: ECG, ecocardiograma, pulsometria, oxiemtria, polisonografia, espirometria

Source: (Hospital Gracia de Orta, 2018)