

Management of Community-Based Home Hospitalization (CBHH) in Israeli Public Health System

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Abstract

Increased utilization of health and hospital services around the world due to growth in aging population has been important for national policies as it affects the allocation of national resources and budgets. Home-based care is one of the solutions for dealing with the growing demand for hospital beds and for reducing the length of hospital stays and their costs, which are derived from institutional hospitalisation. It refers to various services provided in the home to support patients. Home hospitalisation services are gradually becoming part of the standard care in many health systems around the world. Various community-based home hospitalization (CBHH) models have been developed for a wide range of acute, chronic, rehabilitative, and end-of-life medical conditions. Recent studies have reported that CBHH programs carry fewer costs and have greater patient satisfaction compared to equivalent traditional inpatient hospitalizations; however, studies on the organizational aspects of implementing CBHH are scarce. In 2017, a model for CBHH for acute medical conditions was implemented for the first time in Israel at Maccabi Healthcare Services. So far, 779 patients (50% males, average age, 72 years) have been treated within this model, mostly (76%) for infections. Most patients expressed high overall satisfaction with this service, especially in terms of dignity, attitude and care of the professional team. Both patients and physicians perceived that CBHH provides a suitable mental and emotional environment, which also reduces the risk of exposure to infections. The Israeli Ministry of Health has recently decided to provide financial incentives to HMOs that will develop community outpatient models as a substitute for acute and continuing hospitalization in accordance with the established principles.

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1. Introduction

The rise in life expectancy in the western world, together with the rise in the number of patients with acute, chronic, and terminal diseases, such as cardiovascular diseases, diabetes, osteoporosis and glaucoma, has increased the need for providing economic, medical and social assistance to its population through informal, systems, such as family members and friends, and using formal systems, including welfare and healthcare systems [McPake B, Mahal A.,2017].

The increased utilization of health and hospital services by the aging population has great significance in terms of national policy and involves allocation of national resources and budgets. Home-based care is one of the solutions for dealing with the growing demand for hospital beds and for reducing hospital stays and costs incurred by institutional hospitalisation and it refers to various services provided in the home to support patients. These services include home-based primary care, provision of skilled services, such as nursing or physiotherapy, caregiving, CBHH, and hospice services [Landers S, Madigan E, Leff B et al,2016].

The purpose of home hospitalisation is to reduce hospitalisations, provide medical care at standards that are not inferior to inpatient care, and also to reduce medical complications associated with hospital stays, as well as improve patient satisfaction, and lower costs derived from institutional hospitalisation. Healthcare systems in various countries have investigated alternatives to traditional inpatient care for a high number of medical conditions. Home hospitalisation services are gradually becoming part of the standard care in many healthcare systems as different service models that are being provided for an extensive range of diagnoses. Today, the main countries developing such services are the United Kingdom, the United States, Canada, New Zealand, Sweden and Australia.

2. Medical Home Care in Israel

The Israeli health system

Israel is a small democracy in the Middle East, with a population of 9,062,000, as of July 2019 [Israel Central Bureau of Statistics 2019]. It is a member of many large international organisations and it has been a full member of the Organization for Economic Cooperation and Development (OECD) since 2010. Its economy is characterised by an open market with a growing gross domestic product per capita.

Israel's National Health Insurance Law entitles every citizen to receive health services from one of the four health maintenance organizations (HMOs). The purpose of this law is to increase government's control over the main elements of the public health system and to provide equitable and high-quality health services to all citizens, including access to health services and to high health standards by regulation of various health services. All HMOs are non-profit organisations funded by the government through a progressive health tax, which is paid by citizens, and by using a budgeting method based on capitation, a formula which combines such

parameters as age, gender, place of residence and other elements. The budgetary source is constructed using the governmental budget, health tax, and client deductibles. It is mandatory for each HMO to provide, at least, a minimum home-based health services based on a national basket of health insurance. The basket of services is regulated by law and it includes a list of medical services, technologies and medications that each HMO must provide to its members considering their medical needs, free of charge or at reduced cost.

The Israeli health system puts into practice a policy of disease prevention, high accessibility to primary medical services, together with strict regulation of hospital beds number and accessibility of advanced technologies. Its healthcare is considered to be efficient, its level of service matching health standards in Western countries [Rosen B, Waitzberg R, Merkur S. Israel, 2015].

Comparison between the healthcare system of Israel and other OECD countries

National health expenditure in Israel is relatively low compared to the OECD average (7.3% compared to 8.9% of the gross domestic product [GDP]). Also, regular public health expenditure as a proportion of national expenditure is low (62.5%) compared to the OECD average (73.6%) [Bruchim M, Kini D., 2018].

Health personnel: The rate of physicians employed in Israel per one thousand people is 3.1, lower than the OECD average of 3.3. The rate of nurses employed in Israel per 1,000 people is 5.0, lower than the OECD average of 9.3 [Bruchim M, Kini D., 2018].

Hospital beds: The rate of hospital beds (per 1,000 people) in Israel is significantly lower than the OECD average – 3 beds per person versus the OECD average of 4.7 beds per person.

Hospitalisation: The average hospital stay in Israel is relatively low compared to the OECD average (5.2 vs 6.4 days). This is in line with the low rate of beds and high occupancy, and with full utilization of bed infrastructure. The occupancy of hospital beds in Israel is 93.8%, second highest of all OECD countries – preceded only by Ireland. Low bed ratio per capita is a result of a long-standing government policy aiming to transfer as many treatments as possible to community and control hospitalisation costs [Bruchim M, Kini D., 2018].

Percentage of citizens aged over 65: The proportion of the elderly in Israel is significantly lower than in most OECD countries. This is related among other things to the proportion of children in the population, which is relatively high in Israel; however, the proportion of the elderly population in Israel is expected to continue to grow significantly. This forecast requires policy makers to increase the budget in order to expand the healthcare and nursing services, as well as the additional support services. In light of this, the “community aging” trend has emerged. For policymakers, this is a way of ensuring the assistance required for the older population at much lower costs than if they were required to be hospitalized in institutional settings. However, such policy may prove beneficial to the aging

population trend as it is largely nourished by the desire to enable the older population to live in better living conditions matching their wishes, and to have a good quality of life.

Medical home care in Israel

Low rates of hospital beds and healthcare personnel, together with the increase in the aging population, require an organizational change in the Israeli public health system. This change leads to a transition towards medical home-based hospitalization. Medical home care is not a new health service in Israel. In the last three decades, the four Israeli HMOs have provided home-based healthcare services in Israel which include intravenous feeding and medication, chronic home care, end-of-life hospice, home rehabilitation, and home healthcare units. Home healthcare units comprise a multi-professional team monitoring and providing medical treatment to various population groups who, due to the nature of their illness, are confined to their homes and cannot otherwise access healthcare facilities to receive treatment. Such home healthcare units treat various medical conditions that may cause complications or deterioration of health. Although these units are intended to meet the needs of different patient populations, based on the nature of the illness and the required medical care, in practice, most unit patients are elderly patients aged over sixty-five.

In the 1990s, Clalit Health Services HMO introduced a home hospitalization service within its geriatric unit for elderly patients living in the city of Jerusalem. The aim of the program was to shorten or prevent hospitalization of the elderly, including prolonged institutional hospitalization. Home hospitalization service was intended for complex patients with heart failure, patients after cerebrovascular accidents, who needed rehabilitation, patients on ventilation machines and terminally-ill patients. In this model, the home hospitalization period was defined as one month stay, with one-month additional extension option an option [Iecovich E,2011]. Except for this program, designed only for the geriatric unit patients living in Jerusalem, there was no home hospitalization model in Israel until Maccabi Healthcare Services came with its CBHH model back in 2017.

Maccabi Healthcare Services – the CBHH Model

In December 2017, Maccabi Health Care Services was the first HMO in Israel to implement an acute CBHH program as an alternative to inpatient care.

Target populations in the program model include patients with infectious diseases, such as pneumonia, urinary tract infections, skin and skeletal infections, patients with chronic diseases, such as CHF and COPD, who require hospitalization due to disease complications, and patients with metabolic disorders, such as dehydration. Contraindications for home hospitalization include electrolyte and homeostasis disorders, hemodynamic and respiratory instability, acute or new

medical conditions (e.g., active bleeding, new disorders), psychiatric conditions, immune and hematologic system decline.

The main goal of the program is to shorten or prevent hospitalization of patients identified as eligible for CBHH. Additional goals include reducing inpatient-related complications such as infections, falls and confusion; administration of personalized medical care, reducing costs associated with hospitalization and increasing satisfaction among patients, their families and caregivers.

The model is illustrated in Figure 1. Patients considered suitable for CBHH are identified by a Maccabi Healthcare Services nurse in the emergency department or in other hospital departments, or in the community. These patients are referred to CBHH as an alternative to hospital admission. The first visit by a physician or nurse is conducted within 2 to 4 hours of the patient's start at CBHH, followed by daily visits by a nurse and physician, and additional healthcare staff (e.g. social worker, physiotherapist) according to the treatment plan. The treatment package also includes blood collection for laboratory tests, complete supply of all required equipment and drug treatment in all routes of administration according to the prescribed doses, hydration, regular catheterization, or drainage treatment, wound treatment, control of pain and associated symptoms and imaging tests. The duration of CBHH is limited to 3-5 days, but the stay may be extended according to patient's medical condition. Patient is discharged from CBHH when the prescribed treatment goal has been reached. Patients whose health had worsened during their CBHH are referred to the hospital from which they had been discharged and admitted to the ward in an orderly process that is defined by the hospital's management. A telephone answering service for medical advice is available at all times.

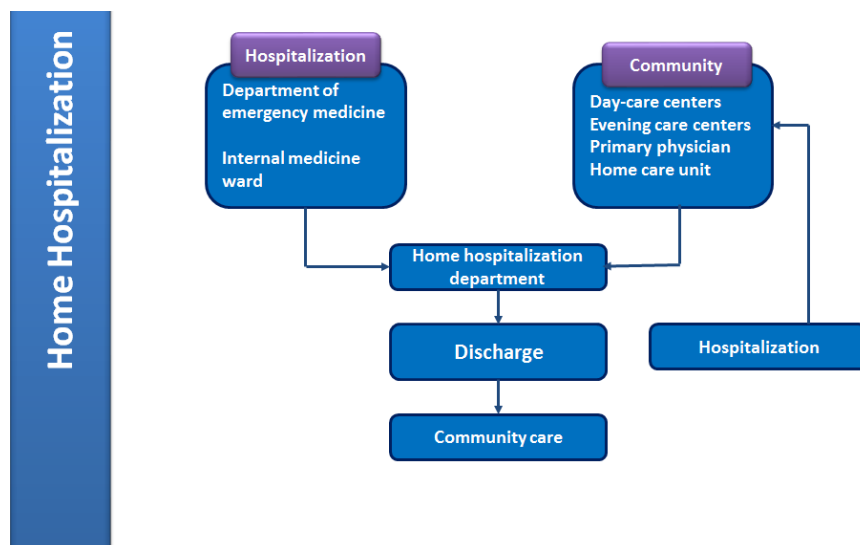


Figure 1. Maccabi CBHH model

The entire inpatient health care regimen is documented as soon as the treatment is over, and is typed into a specific computer system that interfaces with Maccabi systems. The medical record enables communication between the staff and is part of patient's medical record at the HMO.

Preliminary assessment of Maccabi Healthcare Services' CBHH Model

So far, 779 patients (50% males), aged 19-98 (average, 72 years), have been treated within this model. Fifty-seven percent of them have been referred to CBHH from hospitals and 43% from the community. Most patients (76%) were admitted due to infections. The most common reasons for admission were cellulitis (195/779, 25%), pneumonia (157/779, 20%), UTI (142/779, 18%), and exacerbations of CHF (105/779, 13%), (Figure 2). The average CBHH length of stay was 3.5 days (median, 3 days) and the average pre-early discharge length of hospital stay was 1.5 days (median, 1 day). Thus, the average total length of stay for this population of patients was 4.3 days (median, 4 days).

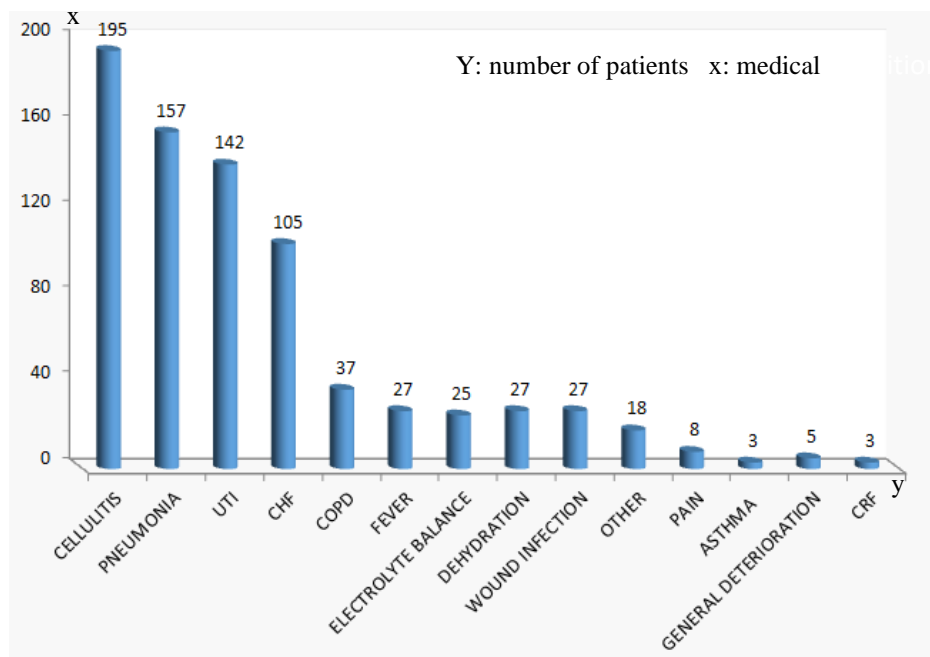


Figure 2. Diagnosis in Maccabi's CBHH

In a preliminary survey, conducted among 62 patients and primary carers, who were hospitalized at home within this program, most patients expressed high overall satisfaction with this service, especially with regard to the dignity, attitude and caring aspects of the professional team. Moreover, the patients perceived that CBHH provides a comfortable mental and emotional environment, which also reduces the risk for exposure to infections. Physicians involved in this program

perceived that this program provides a cleaner environment to the patient that is more comfortable mentally; patients are less exposed to infections and sleep better. They indicated that if the patients allocated for CBHH are correctly identified, there are no disadvantages to the program; however, there might be a disadvantage due to lack of 24-hour monitoring of patients. Physicians further perceived that the CBHH program contributes to the reduction of occupancy in internal medicine wards, thereby reducing loads in both internal medicine and emergency departments.

Adoption and implementation of new organizational practices depends on the organizational climate, which includes both the social context and the technical process. The extent to which an organizational climate predicts successful adoption of new delivery systems is unknown, particularly in primary care.

3. CBHH Models in Western Countries

Various models of CBHH were developed for a variety of acute, chronic, rehabilitative, and end-of-life medical situations. Home hospitalisation programs include early discharge from hospital as to provide medical care at home [Patel H, Shafazand M, Ekman I, Hojgard S, Swedberg K, Schaufelberger M., 2008], post-surgical home hospitalisation as an alternative to inpatient rehabilitation settings [Wells M, Harrow A, Donnan P,2004], and as an alternative to acute inpatient care after emergency room treatment [Mendoza H, Martin MJ, Garcia A et al.,2009]. In many countries a wide range of medical conditions are already being treated within various models of CBHH. The most prevalent acute conditions treated under CBHH include urinary tract infections (UTI) and infectious diseases that require lengthy care, such as pneumonia, osteomyelitis and endocarditis. Other medical conditions include patients with deteriorating chronic illnesses, such as heart failure, chronic pulmonary diseases and palliative patients [Dowell S, Moss G, Odedra K, 2018].

The National Health Service (NHS) of England encourages efforts to deliver more care for acute patients outside hospitals and closer to their homes [*Monitor*: National Health Service, 2015.]. First implemented in the England in 2006, the “virtual ward” is a CBHH model, which is a model for delivering multidisciplinary case management, in cooperation with the physician attending the community, delivered to people facing high predicted risk for unplanned acute care hospitalization [Lewis G, Wright L, Vaithianathan R., 2012]. The virtual ward uses a predictive model to identify people who are at high risk of future emergency hospitalization, and offers to these individuals a period of intensive, multidisciplinary preventive care at home using the systems, staffing, and daily routines of a hospital ward. Most of the communication with patients is conducted remotely by telephone calls or tele-medicine. Home visits are made when necessary [Lewis G, Wright L, Vaithianathan R.,2017]. This model was also adapted with various modifications in other locations in England, as well as in the United States (New York), and in Canada (Toronto, Ontario).

The Hospital in the Home (HITH) program started in 1994 in Victoria, Australia, uses hospital technologies and skills to manage acute inpatients at home

(which, in addition to patient's own house could also be a hotel, a residential aged care facility, or the home of a family member or a friend's home). The program is in place in every regional and metropolitan hospital in the state of Victoria and provides intravenous infusions, including antibiotics for cellulitis, respiratory infections, deep vein thrombosis anticoagulant therapy, post-surgical complex wound dressings and diabetes management. Patients are regarded as hospital inpatients, and remain under the care of their treatment doctor in the hospital, receiving the same treatment as if they were in a hospital. The HITH team works closely with the referring patient's medical unit, relevant carers or family members in order to develop a realistic plan of treatment and care of patients in their home. The HITH nurses provide acute nursing care in the home, which involves support via a 24-hour on-call service, education and advice for the patient and its carer. Discharge planning is also implemented in consultation with the referring unit, general practitioner and the appropriate community-based services. Patients bear no cost for receiving HITH care [Montalto M., 2010]. In 2008-2009, 5% of all hospital days in Victoria were in home hospitalisation, which is the equivalent of a hospital with approximately 500 hospital beds. In Sweden, the Advanced Home Care Program is a CBHH program that was first implemented in the 1980s. This governmentally-supported program enables 24/7 home care through emergency or planned home visits, as well as through telephone consultations with a physician. Perroca and Ek described a home hospitalisation program in an area of Sweden, where the service is provided by an independent clinic associated with the geriatric departments of a university-affiliated hospital. The service is run by a physician and a head nurse, and is provided 24/7 to patients with acute illnesses, to patients requiring rehabilitation, or to palliative patients. All professional practitioners work independently and need extensive knowledge on necessary treatment and skills for making decisions on their own. Along with the need for independence, all staff members on home visits can arrange telephone consultations with the medical centre. Inclusion into the program is only possible with the consent of the patient's primary caregiver or family. The number of visits, length of visits, and period spent in the program are unlimited. The patient receives regular visits by a multi-professional team that includes a physician, a nurse, a dietician and a physiotherapist, and is entitled to be tested, benefit from assisting technologies, equipment, aides, and medication delivered to the home at no cost. Interventions in home hospitalisation include tests, symptom control, pain management, and provision of psycho-social and emotional support [Perroca MG, Ek AC., 2004].

Hospital at Home® Program was developed by researchers at the Johns Hopkins Schools of Medicine and Public Health in Baltimore, Maryland, and it was first implemented in 1995. The program is now in use in several locations across the United States [Cryer L, Shannon SB, Van Amsterdam M, Leff B., 2012]. A patient requiring admission for one of the target illnesses is identified in the Emergency Department or at ambulatory site. Staff assesses if the patient is a good candidate for the program using validated criteria. If the patient is eligible and consents to participate, the Hospital at Home® physician evaluates the patient and is then

transported home, usually by ambulance. At its home, the patient receives extended nursing care for the initial portion of its admission, and then, at least daily, nursing visits according to clinical need. Nurses are available 24 hours a day/7 days a week for any urgent or emergent situations. The patient is evaluated daily by the Hospital at Home physician, who makes an assessment and continues to implement appropriate diagnostic and therapeutic measures. The physician makes one or more home visits per day and is available 24 hours a day/7 days a week for any urgent or emergent situation. The clinicians use care pathways, including illness-specific care maps, clinical outcome evaluations, and specific discharge criteria.

The patient can receive diagnostic studies, such as electrocardiograms, echocardiograms, and x-rays at home, as well as treatments, including oxygen therapy, intravenous fluids, intravenous antibiotics, and other medication, respiratory therapy, pharmacy services, and skilled nursing services. Diagnostic studies and therapeutics that cannot be provided at home, such as computerized tomography, magnetic resonance imaging, or endoscopy, are available via brief visits to the acute hospital. The patient is treated until stable for discharge. When the patient is discharged by the Hospital to home physician, care reverts to the patient's primary care physician [Hospital at Home. How it Works. 2012].

The Catalonian health system developed four integrated care services, one of which is home hospitalisation. The program stressed out community-based continuity provided by skilled hospital staff for a defined period of no more than the expected hospital stay based on the patient's diagnosis. Suitable patients were transferred to home hospitalization from the emergency department or other hospital departments as shorten their hospital stay. The service included a nurse visit in the first 24 hours, daily visits by a nurse with access to patient's medical records, being given a wide authority to perform blood tests and analyse them in order to communicate them directly to a physician using tablet or a smart phone app [Hernandez C, Aibar J, Seijas N et al, 2018].

4. Economic Aspects of CBHH

Several studies have reported that CBHH programs carry fewer costs than equivalent traditional inpatient hospitalization. In a study that compared CBHH of community-dwelling persons aged over 65, who required acute hospital admission for an exacerbation of COPD, chronic heart failure (CHF), community-acquired pneumonia or cellulitis, with traditional hospitalization in three healthcare systems with different payment structures across the United States, total costs seemed to be lower when substitutive Hospital at Home care was available and not only the traditional acute hospital care for patients with CHF or COPD, but not for patients with community-acquired pneumonia or cellulitis. The authors suggested that due to use of limited technology for diagnosis and treatment of community-acquired pneumonia, the cost difference was small and not statistically significant between home and hospital-based hospitalization. In contrast, as diagnosis and treatment of COPD and CHF involve substantial technology, the difference in costs was

statistically significant for these conditions in favour of CBHH [Frick KD, Burton LC, Clark R et al, 2009].

Cryer et al. [21] reported that patients in home hospitalisation showed better health outcomes, higher satisfaction and lower overall costs than patients who were admitted to a hospital. The entire program achieved a reduction of 19% in the overall cost of patients in the program compared to the control group. Most of the reduction was derived from the shorter duration of treatment and less diagnostic and lab tests than for patients who were hospitalized [21]. Levine et al. reported reduced costs by 52% substitutive home-hospitalization compared to traditional in-hospital usual care [Levine DM, Ouchi K, Blanchfield B et al.].

Home hospitalisation appeared to be cheaper than inpatient care, despite differences in healthcare systems, in a meta-analysis of 16 randomised controlled trials with 1814 participants with various acute conditions – most of them the elderly from Australia, New Zealand, Romania, Spain, the UK and the US [Shepperd S, Iliffe S, Doll HA et al, 2016].

A meta-analysis of 61 studies found that the cost of home hospitalisation was about 73.5% of the cost of an average institutional hospitalisation [Caplan GA, Sulaiman NS, Mangin DA, Aimonino Ricauda N, Wilson AD, Barclay L.,2012]. Insufficient evidence of economic benefit was found in a systematic literature review that evaluated the effectiveness and cost of managing patients with early-discharge hospital at home compared with inpatient hospital care [Goncalves-Bradley DC, Iliffe S, Doll HA et al,2017]. A 10-year prospective evaluation of 4,165 patients with respiratory tract illnesses, as well as patients after surgery, cardiac, oncological, and other patients with acute illnesses also showed no difference in payment between CBHH and traditional hospitalization [Hernandez C, Aibar J, Seijas N et al., 2018].

5. Organizational Aspects of Implementing CBHH

Transition from inpatient to community-based care involves many challenges and it is important to examine various models in order to find the appropriate model for a specific health system.

Studies investigating the organizational aspects of implementing medical home care are scarce. Reddy et al. have examined the association between primary care providers' perception of organizational climate and medical home implementation. The study showed that communication, cooperation and orientation to quality improvement were associated with a statistically significantly higher percentage of primary care providers implementing structural changes to support the medical home model. Some aspects of a better organizational climate have also been linked to improved organizational processes of care. The study showed that providers' perceptions of an organization's ability to execute complex health service innovations were an important predictor of success [Reddy A, Shea JA, Canamucio A, Werner RM., 2015]. Klein et al. suggested that Hospital at Home programs had been more successful in countries where government controls both the funding and the delivery systems [Klein S, Hostetter M, McCarthy D., 2016].

The structure of Israel's public health system, the health insurance method and health budgeting differs from those of other countries that have implemented home-based care programs. In order to examine whether a home-based hospitalization program is appropriate for the Israeli healthcare system, it is necessary to analyse the program using parameters relevant to the place of implementation.

6. Summary

Several countries have been examining alternatives to traditional inpatient care for wide range of medical conditions. Home hospitalisation services are gradually becoming part of the standard care in many health systems around the world as different service models and for an extensive range of diagnoses.

It is evident that the need for home hospitalisation is increasing and that transition to home hospitalisation programs is significant, besides the reduction of hospitalisation costs. The benefits of home hospitalisation contribute to higher quality of life, patient safety, social and mental well-being of patients and hospital caregivers, and to higher efficiency of health systems around the world in handling challenges they confront with due to constant rise in life expectancy and chronic illnesses, together with the changing relationship between patients and health systems.

CBHH as a substitute for acute hospitalization is a new program in Israel that was implemented less than 2 years ago only at Maccabi Healthcare Services. The main purpose of the program is to prevent unnecessary hospitalizations and reduce hospital costs, while maintaining the best standard of care. Preliminary data show that infections can be treated under CBHH, as well as high patient and caregiver satisfaction can be reached. Longer duration of the study and a higher number of patients are required in order to further examine the economic and additional aspects of the program.

The Israeli Ministry of Health has recently decided to provide financial incentives to HMOs that will develop community outpatient models as a substitute for acute and continuing hospitalization in accordance with the established principles. This decision will undoubtedly be a catalyst for developing additional CBHH models by all HMOs in Israel.

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