Home Hospitalization Worldwide and in Israel

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ABSTRACT: Global trends, such as the aging population, the increase of chronic morbidity, soaring costs of healthcare services, and work overload in hospitals, raise the need to find innovative solutions for providing quality medical services. One solution adopted by healthcare systems around the world is "home hospitalization," that is, providing an array of necessary health services in the patient's home, instead of in the hospital department. The aim of this article was to explore the spread of home hospitalization worldwide and examine the challenges and pathways for its adoption and implementation. Many countries, including the United States, Canada, the United Kingdom, and Australia, operate home-based hospitalization programs. In Israel, the service is in its infancy, but in view of the extreme workload and the high mortality rate from infections in acute care hospitals, home hospitalization has recently gained public interest and political support, which may encourage its further development.

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Global trends, including the aging population, the rise in chronic morbidity, soaring costs of healthcare services and work overload in hospitals, raise the need to find innovative solutions for providing quality medical services. For example, the share of people aged 65 years and older in the Organisation for Economic Co-operation and Development (OECD) countries is currently about 17% of the total population, and is expected to increase to 28% by 2050. Their share in the Israeli population during this period is expected to increase from 11% to 18% [1]. Occupancy rate of acute care hospitals in Israel is one of the highest in the world, and averages around 95% annually [2]. In certain hospital departments, especially during wintertime, occupancy rates soar to over 100%, and many patients are treated in the corridors [3,4]. The high burden contributes to the development of antibiotic-resistant infections in hospitals, which are estimated to cause the death of 4000 to 6000 patients every year [5].

Home hospitalization receives global attention as one possible solution for current insufficiencies of health systems

One solution adopted by health systems around the world to improve patient care and alleviate the existing problems in the hospitalization system is "home hospitalization," sometimes referred to as "hospital-at-home" or "home-based care". Home hospitalization programs aim to provide an array of necessary health services in a patient's home. This option became possible largely through the development of telemedicine and technology. Internet and information systems enable the provision of remote health services, for at least some patients, enabling them to be treated at their homes and not in hospital wards [6,7]. Some see this innovative option as a paradigmatic change in the way medical services are provided, and even compare it to the "printing revolution" that took place hundreds of years ago [8].

The aim of this article is to explore the spread of home hospitalization and to examine challenges and pathways for its adoption and implementation.

HOME HOSPITALIZATION AROUND THE GLOBE

Many countries, among them the United States, Canada, the United Kingdom, and Australia, operate home-based hospitalization programs. In the Unites States, policies that encourage efficiency and cost-saving spur interest in home hospitalization. Pilots of the model have already achieved savings of 30% percent and more per admission. The Johns Hopkins Hospital at Home program, operating since 1994, is considered a nationwide leading program. According to early trials of the program, the total cost of at-home care was 32% less than traditional hospital care, and the mean length of stay of patients was shortened by one-third. No difference was found in rates of subsequent use of medical services or readmissions. In addition, with regard to the home setting, higher satisfaction was reported by patients and family members [6,9].

In Canada, INSPIRED, a holistic hospital-to-home form of care, provides support to patients with late-stage chronic obstructive pulmonary disease (COPD). INSPIRED stands for Implementing a Novel and Supportive Program of Individualized Care for Patients and Families Living with Respiratory Disease. Services include self-management education, psychosocial and spiritual care, and care planning [10].

The latest INSPIRED results indicate a reduction of 64% in hospital readmissions and a 52% decrease in emergency department visits among the 2000 participating COPD patients. It is estimated that if the program can reach 5800 patients annually by 2021, it would be possible to prevent approximately 70,000 emergency department visits and 400,000 hospital bed days. This would represent a total savings of about 688 million dollars in acute care costs. Every dollar invested in INSPIRED could save 21 dollars in hospital-based costs [10].

In the United Kingdom, the National Health Service (NHS) encourages efforts to deliver more care for patients outside acute hospitals and closer to their homes [11]. Multiple schemes to avoid hospital admissions enable early discharge or reduce length of stay. For example, the Airedale NHS Foundation Trust Telehealth Hub provides remote support to patients and practitioners via a video link, with the aim of reducing visits to A&E and admissions into the hospital. The service provides remote support and advice to patients, and coordinates referral to other services when required. Similarly, Kent Community Health NHS Foundation Trust operates an Enhanced Rapid Response Service (ERRS). The service helps patients in crisis avoid a stay in an acute hospital, where clinically appropriate. After initial clinical triage, the service assesses the patients in their own home and then provides medical, nursing and therapy support. Important features of the service include leadership by the consultant geriatrician, who manages a team of specialist physicians and enhanced practitioners, and an engagement program with primary care, the mental health trust, social care and the ambulance trust, to boost uptake of the service [12].

Many countries, including the United States, the United Kingdom, Canada, and Israel, operate home hospitalization programs

In Australia, every metropolitan and regional hospital in Victoria has a hospital at home program 6% .of all hospital bed-days are provided that way. For specific conditions, such as deep venous thrombosis (DVT) and acute cellulitis, the use of at-home care is significantly greater [6].

Other countries develop and operate home hospitalization programs as well, such as France, the Netherlands, New Zealand, Spain, Sweden and Brazil [13-17].

HOME HOSPITALIZATION IN ISRAEL

The service in Israel is in its infancy, but is gaining public interest against the backdrop of current conditions aforementioned: Extremely high occupancy rates in acute hospitals and thousands of deaths annually due to complications of hospital-acquired infections, and a financially strained public healthcare system.

One such project, conducted by the Maccabi HMO together with "Sabar Health," recruited 280 patients and was designed to move patients from the crowded Internal Medicine wards to hospitalization at home. The project, perceived as a possible solution to the current hospitalization system crisis, is encouraged by a political will to address this subject [18].

CHALLENGES AND PATHWAYS TO HOME HOSPITALIZATION

Against the backdrop of the growing interest in the home hospitalization model, it is worth mentioning that in spite of their rapid global proliferation, two recently published Cochrane systematic reviews conclude that more evidence is needed in order to examine the clinical and economic impact of home hospitalization programs [19,20].

It seems that certain challenges and barriers still stand in the way of successful worldwide implementation of home hospitalization programs, such as concerns for patient safety in remote care, and the legal perspective of malpractice issues on the side of health professionals [21,22]. In addition, the financial aspect plays a part, since fewer admissions might lead to less hospital revenues, particularly in the absence of sufficient alternative reimbursement models. In addition, sometimes it is just easier to admit patients in the old and familiar way, than introduce a novel and relatively unfamiliar model such as at-home hospital service.

Therefore, in order to enhance the use of home hospitalization programs, adequate pathways for adoption and implementation of this innovative model should be created, among them as follows:

- Creating appropriate financial arrangements
- Establishing professional mechanisms such as protocols, guidelines and quality assurance for home care
- Setting legal and regulatory frameworks for professional liability
- Creating educational and cultural change on the part of all stakeholders
- Collecting additional scientific evidence of quality of care and cost savings.

CONCLUSIONS

Home hospitalization received global attention as one possible solution for current insufficiencies of healthcare systems. In spite of multiple barriers and challenges, it has a potential to improve health outcomes, reduce costs and improve patient satisfaction, while fundamentally impacting the organization and structure of health services. Currently, it seems that more evidence is needed in order to encourage the adoption of home hospitalization programs, and open a path for its successful implementation in Israel and worldwide.

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Capsule

Born to be a wildling

Inbred laboratory mouse strains are used extensively in basic and translational immunology research. However, the commensal and pathogenic repertoire of resident microbes encountered in the wild is not replicated in a lab setting. This can substantially distort how the immune system develops and functions, leading to false assumptions of how our own "wild" immune system works. **Rosshart** and colleagues circumvented this dilemma by implanting lab-strain embryos into wild mice. The resultant "wildlings" had a systemic immune phenotype and a bacterial, viral, and fungal microbiome much closer to those of their wild counterparts. In two preclinical experiments, where lab mice had previously failed to predict the human response to drug treatments, wildlings accurately phenocopied patient outcomes.

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Capsule

Building a better RSV vaccine

Respiratory syncytial virus (RSV) causes severe respiratory disease, especially in infants and the elderly. However, attempts to produce effective human vaccines have largely been unsuccessful. Structure-based design has been used to generate an RSV fusion glycoprotein stabilized in its prefusion conformation (DS-Cav1). This immunogen is highly effective in mice and macaques. **Crank** and co-authors reported the results of a phase I vaccine clinical trial using the stabilized prefusion DS-Cav1 molecule. Four weeks after immunization, these vaccines elicited substantially more high-quality antibody titers than those typically generated using earlier RSV immunogens. The findings provide a proof of concept for how structural biology can contribute to precision vaccine design.

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