Project Title

NUHS@Home: Home-Based Inpatient Substitute Care

Project Lead and Members

Project Lead: Dr Stephanie Ko

Project Members: Johnny Chan, Tay Yee Kian, Yeo Ai Wah, Jennifer Lu, Emily Chung, Wong Zhi Xin, Agnes Kua

Organisation(s) Involved

National University Health System

Healthcare Family Group(s) Involved in this Project

Medical, Nursing, Pharmacy, Healthcare Administration Allied Health

Applicable Specialty or Discipline

Advanced Internal Medicine

Project Period

Start date: Sep 2020

Completed date: Sep 2021 (2022: Phase 2)

Aim(s)

- Provide selected inpatient-level services at home, including regular visits by doctors, nurses and therapists, intravenous therapy, simple investigations and 24/7 access to doctors; while
- Supported by remote monitoring and telecommunication technologies; to
- Achieve high standards of clinical care, patient and provider safety; and
- Without incurring any additional expense to the patient, achieved by funding strategies equivalent to a usual inpatient stay.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

NUHS@Home has piloted the programme in Sep 2020 – Sep 2021 and extended the programme to support COVID-19 cases in Sep 2021. The project team has learnt and identified barriers to scaling and implementation:

- Funding: The key barrier to adoption that have been recognised in overseas programmes are sustainable funding mechanisms. In countries where payers (government or insurance) pay for such care equivalently to inpatient hospitalisation, programmes have grown rapidly. The results of this pilot would be used to inform the feasibility of funding such programmes in an equivalent manner to an admission to a hospital ward (i.e. use of Medisave and Medishield).
- Cultural norms and attitudes: The assumption that hospital is a safe and desirable place for care may restrict patient and provider acceptability. However, our pilot had an acceptance rate of 50%, which does suggest substantial proportion of patients and family do prefer home-based care. Further developments in this field may encourage shifts in attitudes over time. For providers, shifting care into the community also requires a paradigm shift in our mind set. Unlike a hospital where SOPs are well established and there are many levels of safety, the team have to learn to adapt on the go, and to do what is safe and practical.
- Shifting family setup and caregiving dynamics: For patients that require assistance in ADLs, this would depend on the availability and willingness of caregivers to provide basic care at home during the treatment period. As caregiving dynamics

shift, we will need to explore alternative caregiver arrangements during the treatment period, such as temporary caregivers to assist patients with basic care at home.

Conclusion

See poster appended/ below

Additional Information

Inpatient hospitalisation has been the conventional strategy to care for acutely ill patients within our healthcare system. Designed around the concentration of resources in large hospitals to treat acute diseases, this model of care is expensive to build ($1.48 million per general hospital bed) and to operate (8,270 staff for 1,200 beds), regardless of patient need and acuity. This will be unsustainable in Singapore given limited resources.

Hospitalisation in itself also carries potential risk, especially for elderly patients, with increasingly potent nosocomial infections, and risk of hospital-acquired deconditioning.

Bringing inpatient care into homes is a viable long term solution to address Singapore's challenges of ageing population and healthcare manpower shortage. Remote vital signs monitoring, teleconsultations and episodic nursing visits when required will increase productivity and reduce costs by pivoting away from current in-hospital round-the-clock care regardless of clinical need.

Furthermore, hospital-at-home programmes are gaining momentum globally, especially in the United States, due to recent changes in financing structures to enable reimbursement of care equivalently to inpatient care. As such, there is a need to reimagine care delivery to address the impending healthcare issues in Singapore.

Project Category

Care Continuum, Population Health, Chronic Care, Intermediate and Long Term Care & Community Care, Home Care, Care & Process Redesign, Valued Based Care

Keywords

Home Based Care, In-Patient Care in Community, Hospital-At-Home Care Model

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NUHS@Home Home-based Inpatient Substitutive Care

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NUHS National University Health System

BACKGROUND

NUHS@Home seeks to address the **impending shortage of hospital beds** by reimagining the way we deliver inpatient care by **bringing hospital-based services to patients within the comfort and safety of homes**. The concept is internationally known as hospital-at-home, and has been well established to be a less costly way to provide inpatient care with comparable clinical outcomes.

OUTLINE OF ISSUE

Due to its ageing population, Singapore is projected to have **insufficient number of hospital beds** within the next decade. There will also be **insufficient doctors and nurses** to staff these beds. The **COVID-19 pandemic** and the demand it placed on our hospital resources further increased the need to reimagine the delivery of care to meet these challenges, by bringing inpatient care to the community.

IMPLEMENTATION

Patient Journey

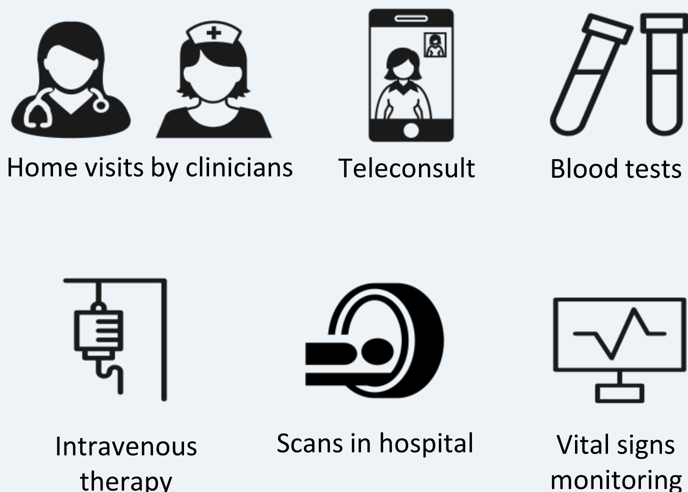
Identification
- Patients may be identified from different sources, e.g. Inpatient, ED and community.
- Patients will be screened for suitability by the NUHS@Home team.

Set-up
- Nursing assessment through physical home visit or via tele-consult.
- Set up vital signs monitoring equipment, educate patients and caregivers on self-management of medications.

Daily Treatment
- Daily multidisciplinary team meeting to discuss care plans.
- Patients are assessed if they required any additional procedures, e.g. scans, investigations, physiotherapist visit.

Discharge
- When patients fit discharge criteria, patients will be discharged with discharge medications, hospitalisation leave, and arrangement for SOC or polyclinic follow up.

Elements of Care



Team Composition

Consultant : Assumes overall responsibility of care and develop protocols

Resident: Assists with ward rounds via tele-consult or physical review and standby for after office hours on call duties

APN: Oversees staff nurses and 3rd party service provider to ensure protocols are adhered

Staff Nurse: Assumes nursing responsibility of care through physical or virtual assessment

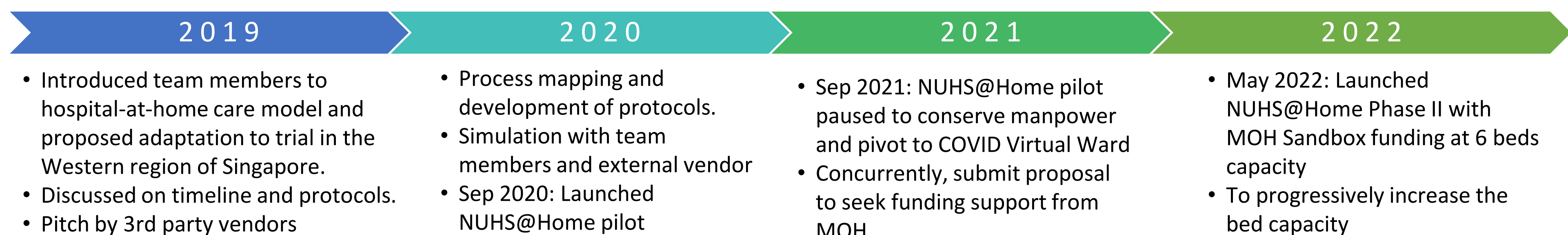
Care Coordinator: Escalates potential abnormal sign to clinicians via remote vital signs monitoring

Pharmacist: Prepares medication and develop medication dispensing protocols

Program Coordinator: Coordinates with internal and external stakeholders to facilitate patient transfer

Other Allied Health: Assessment on as required basis

Development Timeline of NUHS@Home



DEVELOPMENT OF IMPROVEMENT FROM NUHS@HOME PILOT

Clinical Outcome
- **14.6%** 30-day readmission rate
- **0.83%** mortality rate

Costs
Direct cost saving of **50% - 70% lower** than usual hospitalisation due to avoidance of fixed hospital charges in inpatient setting

Length of Stay (LOS)
Hospital bed days saved per NUHS@Home patient – Average LOS 4 days (median length of stay)

Experience
Positive patient and caregiver satisfaction with the programme.

SUMMARY

- Inpatient hospitalisation has been the conventional strategy to care for acutely ill patients within our healthcare system. Hospitalisation in itself also carries potential risk, especially for elderly patients, with increasingly potent nosocomial infections, and risk of hospital-acquired deconditioning.
- Bringing inpatient care into homes is a potential long term solution to Singapore's challenge of addressing the healthcare manpower shortage which will be exacerbated by our aging population.