



Supplementary Fig. S1 Patient Journey - Risk Score and Interventions.

Supplementary Table S1 Independent variables for model development

S/N	Independent variables	Data type	Derivation of variables	Extracted from EMR clinical notes
1	Patient demographics			
	Age	Continuous	The difference between patient's admission date and date of birth	Administrative
	Gender	Categorical	Male or female	Administrative
	Race	Categorical	Chinese, Malay, Indian, or Others	Administrative
2	Previous health care utilization			
	Number of hospital admissions	Ordinal	Total count of hospital admissions 1-year prior index admission	Encounter history
	Number of emergency attendances	Ordinal	Total count of emergency attendances half-year prior index admission	Encounter history
3	Intensive care unit			
	Current admission to ICU	Dichotomous	Admission to ICU for current episode (yes or no)	Encounter history
	Previous admission to ICU	Dichotomous	Admission to ICU 1-year prior current episode (yes or no)	Encounter history
4	Length of stay (in days) during the index hospitalization	Ordinal	Duration between admission date and discharge date	Flow sheets
5	Functional components	Categorical	Derived based on five components of activities living including feeding, dressing, toileting, turning in bed, and ambulation (independent, needs assistance or dependent)	Nursing flow sheets
6	Current and previous comorbid conditions			
	CCI	Ordinal	Weighted comorbid conditions according to CCI calculation based on current and previous one year primary and secondary diagnosis	Doctors' orders
	Number of chronic medications	Ordinal	Total counts of medications based on the chronic medication groups	Doctors' orders, pharmacy prescriptions
7	Socioeconomic factors			
	Staying at government housing rental flat	Dichotomous	Derived from patient's postal code and map against postal codes of rental flat (yes or no)	Flow sheets
	Medical social referrals	Dichotomous	Referral to medical social workers during current or 1-year prior to current admission (yes or no)	Medical social workers' orders
	Patient ward class	Ordinal	Patient ward class upon discharge from hospital	Administrative

Abbreviations: CCI, Charlson Comorbidity Index; EMR, electronic medical record; ICU, intensive care unit.

Supplementary Table S2 Intervention bundle elements

S/N	Intervention bundle element	Description
1	Risk Stratification	The tool automatically generates a “readmission risk score” based on patient information in the records, which is then displayed through various interfaces and flow sheets in hospital EMR. The implementation of transition in care bundle elements would then be assigned to low- and high-risk scores.
2	Comprehensive and accurate discharge summary	A discharge summary serves as a direct communication and information tool from the hospital providers to primary care physicians. Kripalani et al ³³ found that discharge summaries often lacked information essential for the continuity of care and services. As each physician does a discharge summary differently, we provide training to the junior doctors on quality standard discharge summary. The hospital copy of discharge summary includes (1) reason for hospitalization with specific primary problem and diagnosis; (2) other active problems; (3) significant findings; (4) procedures and treatment provided; (5) patient’s discharge condition, and (6) discharge plan. The discharge summary is available on the NEHR, a secure system containing patient health records across various health care providers including primary care providers (government polyclinics and private clinics). The patient copy of discharge summary also contains a complete list of medications on discharge. In addition, a memo, containing a short and to-the-point communication, is provided to the patient to hand-deliver to their physician to ensure timely handoff. In the future, the memo will be incorporated into the next generation EMR and NEHR, hence removing human error such as misplacing the memo.
3	Medication reconciliation	Medication errors may lead to admission for drug-related problems. The doctor and pharmacist verify the list of current medications with information available on EMR (medication list and clinical notes), NEHR, medications brought in by the patient and the patient’s primary caregiver, in person or via telephone calls, and clarify its indications and dosage. The pharmacist performs medication reconciliation, an extremely important intervention to reduce avoidable readmissions. ³⁴
4	Postdischarge phone call	Follow-up phone calls after hospital discharge have been shown to reduce readmission rates. ³⁵ Thus, we developed a program for postdischarge nurses to call all high-risk patients within 72 h after hospital discharge. These calls are designed to identify risk factors for readmission by focusing on education and review of the recent hospitalization such as identifying early treatment failures, medication adverse reactions, social issues, treatment plan compliance, and reconciling all medications. The postdischarge nurses play an important role linking the patients to various care providers within the health care system.
5	Posthospital visits at specialist clinic or polyclinic within 1 wk	Hernandez et al ³⁶ reported a correlation between time of posthospital visit and risk of 30-day readmission. Three hot clinics per week were created for the general medicine teams to refer patients with high-risk score. A centralized contact center for National University Polyclinics provides a follow-up appointment date within 3 days of request. Should the patient not be given the appointment date upon discharge, a hospital clerk will inform the patient via telephone calls. This ensures timely review in outpatient clinics, which is typically scheduled within a week postdischarge.
6	Posthospital home visit	Suitable patients, who are assessed to have high risk of readmission based on the risk model, are enrolled by the case management through the hospital-to-home (H2H) program under NUHS CareHub. ³⁷ It provides home visits to the patients to ensure smooth postdischarge transition and holistic coordinated care in the community to prevent medical complications and readmission. The CareHub program administrators update the consultant in charge of enrolment and progress.
7	Initialization of advance care planning	ACP is the process in which patient communicates and document his/her values and wishes regarding the future health care options. ³⁸ Everyone, regardless of health condition or age, can complete the ACP. A significant proportion of our inpatient cohort are elderly patients with chronic medical issues and multiple hospital admissions. Many of these patients have poor quality of life, for example, bedridden with enteral tube feeding. They or their family members are encouraged to think through, discuss their goals, values, beliefs, wishes, and preferences for care at the end of life. The ACP provides guidance to health care practitioners in making decisions when the patient turns critically ill, including provision of end-of-life care at the patient’s primary residence.
8	Complex-case conference for patients staying more than 14 d and high risk of readmission	Kaboli et al ³⁹ found that patients with longer length of stay have higher readmission rates. Many of the patients who are readmitted to the hospital have multiple hospital admissions over a 1-year period and stay in the hospital for more than 14 days. Patients who have surpassed the 14-day mark are brought up for discussion at a multidisciplinary conference made of up physicians, therapists, and a medical social worker. At the conference, team members share and identify gaps in patient care, access to resources, barrier to discharge, and create a consistent care plan.

Abbreviations: ACP, Advance care planning; NEHR, national electronic health record.