Project Title

Reducing Diabetes Mellitus (DM) Related Admissions in Emergency Department (ED)

Project Lead and Members

Project Lead: Dr Esther Tan (EMD), Norhafizah Tajut Rin (RHSO)

Project Members: Dr Situ Wangmin, Dr Tiong Yee Sian, Janna Goh, Ng Kai Xin, Kelvin Lew, Ng Yan Jun, Tammy Wong

Organisation(s) Involved

Ng Teng Fong General Hospital

Healthcare Family Group Involved in this Project

Medical, Nursing, ED Operations

Applicable Specialty or Discipline

Endocrinology

Project Period

Start date: July 2022

Completed date: Sep 2023

Aims

Reduce DM related admissions from NTFGH ED attendances from 67.5% to 53% by September 2023

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

Be flexible on implementation process

• System changes in EPIC often takes months to be built and tested. The team needs to be open to adopting alternative methods and commence testing of our change ideas on a smaller scale to avoid delay in bringing the benefits to our patients

Importance of taking human factors into consideration, generalized referrals may not necessarily bring higher yield

• Despite repeated broadcast reminders, number of discharged DM patients referred to H2H remained low as it is not intuitive for clinicians to refer patients to H2H without specified criteria/ reasons for referral

• When all DM patients were referred to H2H, acceptance was low as many relatively well patients do not see the benefit

Adopt technology and implement system changes for improvement ideas to be sustainable

Conclusion

See poster appended/ below

Project Category

Care Continuum

Intermediate and Long Term Care & Community Care, Right Siting

Chronic Care, Primary Care, Self Care

Keywords

Reducing Diabetes Admission

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REDUCING DIABETES MELLITUS (DM) RELATED ADMISSIONS IN EMERGENCY DEPARTMENT (ED)

❑ SAFETY ✓ QUALITY ❑ PATIENT EXPERIENCE ❑ PRODUCTIVITY ❑ COST

MEMBERS (SEE FULL LIST[1] OF MEMBERS):

Dr Esther Tan (EMD), Dr Situ Wangmin (EMD), Norhafizah Tajut Din (RHSO), Dr Tiong Yee Sian (Endocrinology), Janna Goh (EMD Ops), Ng Kai Xin (EMD Ops), Kelvin Lew (QI), Ng Yan Jun (QI), Tammy Wong (QI)

Define Problem, Set Aim

Problem/Opportunity for Improvement

Between July 2021 and April 2022, 67% of all patients with DM related diagnosis* were admitted to inpatient ward. Out of these admissions, approximately 20% stayed for only 1 or 2 days, indicating less complex cases where admission may be potentially be prevented.

***DM related diagnosis**

Defined as patients with the following ICD-10 codes as primary diagnosis E10, E11, E13, E14 (including all sub-codes), E16.2 and R73.

Aim

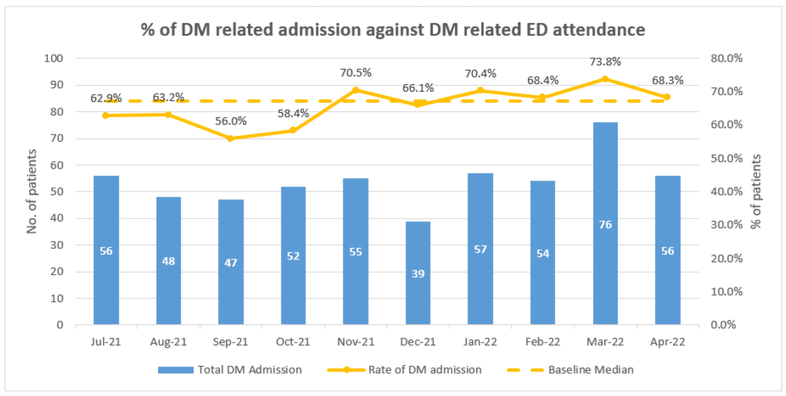
Reduce DM related admissions from NTFGH ED attendances from 67.5% to 53% by September 2023.

Establish Measures

Type of Measure	Category	Measure Name
Outcome		1) % of DM related admission against DM related diagnoses* ED attendance
Process	**Non-admission avenue of DM patients**	2a) Number of DM patients admitted to EDTU under Hyperglycaemia Protocol
		2b) Number of DM patients admitted to EDTU under Hypoglycaemia Protocol
Process	**ED Interventions of DM patients**	3a) No. of DM related diagnoses* patients referred to Diabetic Nurse Educator (DNE)
Process	**Transition support of DM patients**	4a) No. of patients with DM related diagnoses* discharged and referred to H2H
		4b) No. of discharged DM patients referred to H2H by ED Case Managers
Process	**Disposition to DM Care Network#**	5a) % of discharged DM related diagnoses* patients referred to DM care network#
		5b) No. of patients with DM related diagnoses* discharged and referred to Endocrine SOC
		5c) No. of patients with DM related diagnoses* discharged and referred to NUP Polyclinic
		5d) No. of patients with DM related diagnoses* discharged and referred to Primary Care/GP/Polyclinic
Balancing		6) Rate of 72-hour ED Re-attendance for DM or DM related diagnoses*

#DM Care Network refers to Specialty Outpatient clinic/ Polyclinic

Outcome Measure (Jul21 – Apr22): Median = 67.2%

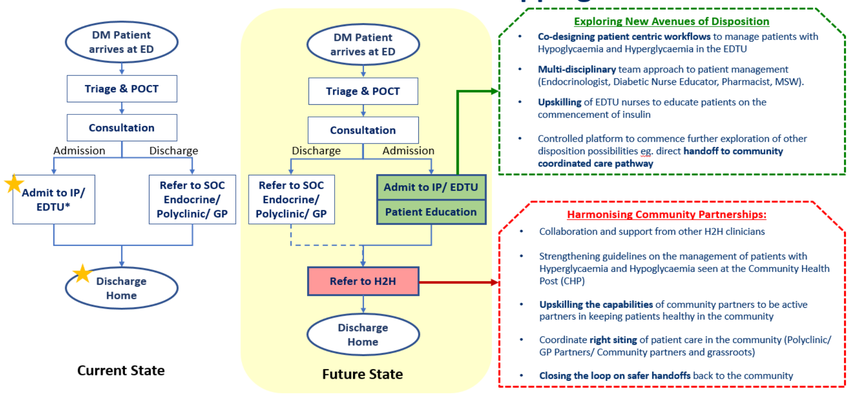


Balancing Measure: Median = 0

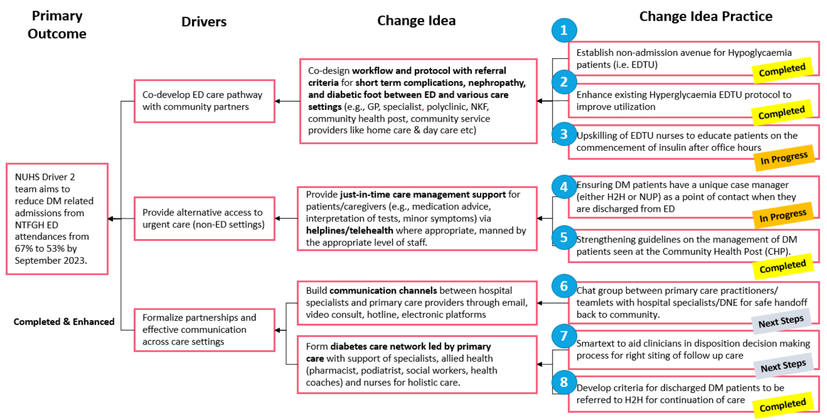
Analyse Problem & Select Changes

The team drafted the current state vs future state process map and brainstormed on how the future state could be achieved. 2 key areas were identified – Explore new avenues of disposition and Harmonizing community partnership.

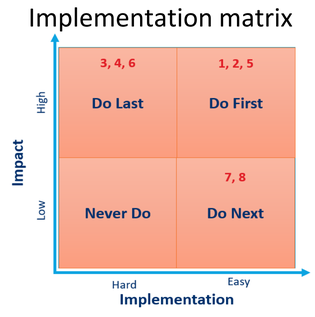
Current vs Future State Process Mapping



Using the driver diagram, the team developed 8 change idea practices:



The change idea practices were also ranked and implemented according to the Impact vs Implementation matrix



Spread Changes, Learning Points

What are/were the strategies to spread change after implementation?

- Different stakeholders (ED Clinicians, Endocrine, Nurses, DNE, Case Managers etc) were engaged throughout the project for feedback and kept updated on the progress which garnered support for the team for smooth implementation of PDSAs.

What are the key learnings from this project?

- Be flexible on implementation process
  - System changes in EPIC often takes months to be built and tested. The team needs to be open to adopting alternative methods and commence testing of our change ideas on a smaller scale to avoid delay in bringing the benefits to our patients.
- Importance of taking human factors into consideration, generalized referrals may not necessarily bring higher yield
  - Despite repeated broadcast reminders, number of discharged DM patients referred to H2H remained low as it is not intuitive for clinicians to refer patients to H2H without specified criteria/ reasons for referral
  - When all DM patients were referred to H2H, acceptance was low as many relatively well patients do not see the benefit
- Adopt technology and implement system changes for improvement ideas to be sustainable

NUHS Driver 2 of MOH Collaborative - Improving Diabetes Care and Reducing Diabetes Admissions through the Effective Integration of Primary, Acute & Community Care for the management of diabetes and its complications.

[1]***Project sponsor:*** *Dr Lim Ghee Hian* ***Cluster Integrator:*** *Dr Gary Choa* ***Project lead/ Co-leads:*** *Dr Esther Tan (EMD), Dr Situ Wangmin (EMD), ANC Norhafizah Tajut Din (RHSO)* ***Project Managers:*** *Janna Goh (EMD Ops), Ng Kai Xin (EMD Ops)* ***QI Facilitators****: Kelvin Lew, Ng Yan Jun, Tammy Wong*
Members: *Dr Tiong Yee Sian (Endocrinology), NC Praveen Kaur (NTFGH DNE), SNC Fadilah Ahmed (NTFGH DM CM), Chay Yu Xuan (Specialty Ops), Dr Chen Jiawei (NUP), ANC Nirmala Arunkumar (Care Manager, NUP), ANC Nooradlin Marina (Care Manager, NUP)*

Ng Teng Fong General Hospital

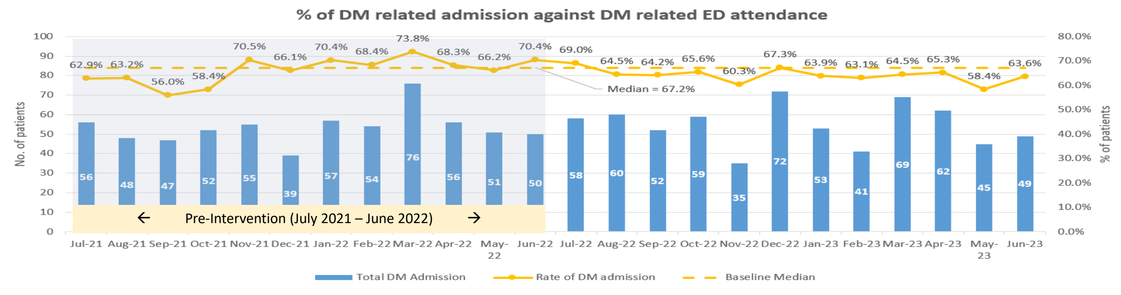
Jurong Community Hospital

Test & Implement Changes

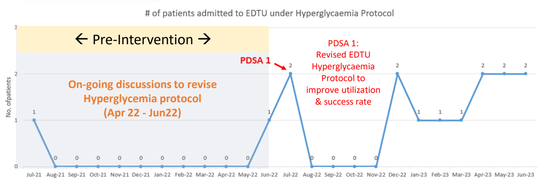
CYCLE	PLAN	DO	STUDY	ACT
1 Change Idea Practice 2	Hyperglycaemia accounts for 28% of all DM admissions but only 1 patient was put under the EDTU Hyperglycaemia protocol between 1 Jul 21 to 30 Apr 22. The team concurred and set out to revise the EDTU Hyperglycaemia protocol for better utilisation to prevent admission.	The team revamped the existing EDTU Hyperglycaemia Protocol in Apr 22 by: a) Reviewing inclusion and exclusion criteria b) Including referral to DNE and H2H as part of protocol The team tested the enhanced EDTU protocol from Jul 22 and incorporated the changes into Epic on 29 Jul 22. This was also broadcasted to all ED doctors on 4 Aug 22 and 20 Mar 23	**77% of patients were successfully discharged** (10 out of 13 admissions avoided across Jul 22 – Jun 23) with the revised protocol. No. of patients / Jul 22 / Dec 22 / Jan 23 / Feb 23 Admitted to EDTU: 2 / 2 / 1 / 1 Discharged: 2 / 1 / 1 / 1 Returned to ED within 72 hrs: 0 / 0 / 0 / 0 No. of patients / Mar 23 / Apr 23 / May 23 / Jun 23 Admitted to EDTU: 1 / 2 / 2 / 2 Discharged: 1 / 1 / 2 / 1 Returned to ED within 72 hrs: 0 / 0 / 0 / 0	**ADOPT** The utilisation of EDTU Hyperglycaemia protocol increased with EPIC enhancement and repeated broadcast despite EDTU being partially closed between Aug and Nov 22 to manage the overwhelming workload in ED. Using the hyperglycaemia EDTU protocol as a guide, the team developed a hypoglycaemia EDTU protocol to prevent admission as well.
2 Change Idea Practice 1	Similarly, the team found that Hypoglycaemia accounts for 43% of all DM admissions and having an alternate disposition avenue could help observe patients over 24 hours instead of being admitted to inpatient ward.	Using the Hyperglycaemia Protocol as a guide, the team developed an EDTU Hypoglycaemia protocol in May 22. The team piloted the EDTU protocol on 1 patient on 22 July 2022 (who fit the inclusion criteria). The team subsequently incorporated the changes into Epic on 31 Aug 22, and broadcasted to all ED Doctors on 4 Aug 22 and 20 Mar 23.	**69% of patients were successfully discharged** (9 out of 13 admissions avoided across Jul 22 – Jun 23). No. of patients / Jul 22 / Oct 22 / Nov 22 / Dec 22 / Jan 23 Admitted to EDTU: 1 / 1 / 0 / 1 / 0 Discharged: 1 / 1 / 0 / 1 / 0 Returned to ED within 72 hrs: 0 / 0 / 0 / 0 / 0 No. of patients / Feb 23 / Mar 23 / Apr 23 / May 23 / Jun 23 Admitted to EDTU: 1 / 0 / 1 / 5 / 2 Discharged: 0 / 0 / 0 / 5 / 2 Returned to ED within 72 hrs: 0 / 0 / 0 / 0 / 0	**ADOPT** There was a steady increase in the utilisation of Hypoglycaemia protocol despite EDTU being partially closed between Aug and Nov 22. As such, the protocol was finalised and adopted. **In May and Jun 23, all patients were successfully discharged (7 patients).**
3 Change Idea Practice 8	Key barriers to provision of care for DM patients were examined and patients are likely to return to ED when they encounter difficulty in managing their symptoms after discharge and before their follow up appointment. Referring discharged patients to H2H may potentially bridge this gap to handhold patients, who would more likely turn up for their follow up appointment.	The team met with Community Health Post (CHP) in Jul 22 to understand the existing community level protocols as well as H2H capabilities and this was shared with ED Clinicians during M&M. Broadcast was made to ED clinicians on 4 and 25 Aug 22 to refer all discharged DM patients to H2H for right siting and handover back to the community.	Despite repeated broadcast on referring discharged DM patients to H2H, on 5 out of 104 patients were referred to H2H between Jun – Oct 22 (4.8%). Jun 22 / Jul 22 / Aug 22 / Sep 22 / Oct 22 No. of referrals for discharged DM patients: 0 / 1 / 2 / 1 / 1	**ADAPT** The team learnt that repeated broadcasts may not be the most effective or sustainable way to refer DM patients to H2H and intend to explore ways to simplify/automate H2H referral process.
4 Change Idea Practice 8	The team intends to build Best Practice Advisory (BPA) in Epic to automatically prompt ED clinicians to refer suitable patients to H2H. An appropriate BPA trigger would need to be determined to capture only suitable DM patients, bearing in mind that frequent BPA prompts may lead to BPA fatigue.	1. Clinical notes of all DM patients discharged from ED between Jul 22 to Feb 23 were reviewed retrospectively to determine the types of patients that would most likely benefit and accept H2H services. 2. Retrospective H2H orders were also made for the same group of patients. 3. Outcome of referral is monitored	A total of 60 patients' clinical notes were reviewed and 32 retrospective referrals were made (with **69% of patients successfully recruited**). No. of referrals according to ED visit date / Jul 22 / Aug 22 / Sep 22 / Oct 22 3 / 2 / 3 / 6 Nov 22 / Dec 22 / Jan 23 / Feb 23 0 / 10 / 3 / 5	**ADOPT** With the high acceptance rate of referral, criteria to trigger BPA is confirmed to be: • Hba1c level > 9% • Non-compliance to follow up appointment • Non-compliance to medication • Psycho-social issues • Polypharmacy
5 Change Idea Practice 8	With the identified list of criteria, change request was submitted to build the BPA in Epic to automatically prompt ED clinicians to refer suitable discharged patient to H2H services.	The details of BPA were discussed and finalised by Mar 23, with UAT and BPA built in Apr and May 23. The number of patients referred to H2H with the BPA prompt and acceptance rate of referral were monitored weekly.	The initial number of referrals to H2H were low with 19% of patients referred to H2H (3 out of 16 patients) and 67% of patients successfully enrolled to H2H (2 out of 3 patients). Week (18 May – 28 Jun) / W1 / W2 / W3 / W4 / W5 No. of referrals: 0 / 2 / 1 / 0 / 0 no. of pts with DM Dx & BPA prompt: 5 / 1 / 4 / 2 / 4	**ADAPT** The team decided to review the patients prompted by the BPA prompt, at the same time the team will continue placing retrospective order and monitor the outcome. Project is still in progress.

Outcome

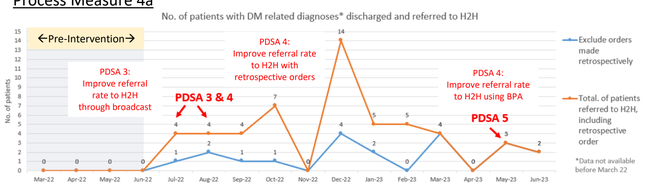
Outcome Measure (Jul 22 – Jun23): Median = 64.3% *(Reduced by 2.9%)*



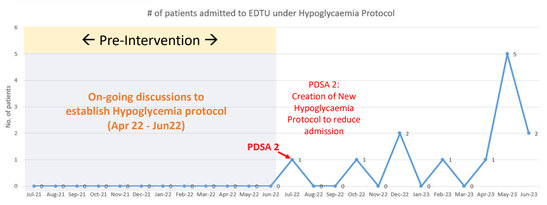
Process Measure 2a



Process Measure 4a



Process Measure 2b



Balancing Measure (Median = 0, No change after intervention)