BC5: Care Coordination, Primary Coordinating Doctor (PCD)

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BACKGROUND & AIM

TTSH supports the largest and oldest population catchment in the Central Region and faces an increasing incidence of chronic diseases. Patients with complex medical conditions typically have multiple outpatient appointments with different medical specialties. Patients and their NOK may find it challenging to interact with different clinicians for different medical conditions and may get confused with various care plans, thereby affecting the effective management of their chronic illnesses.

Aligned with the TTSH2020 strategic plan for Better Care, the **Complex Care Coordination Workgroup** was established in 2016 with the intent to transform care provision from fragmented care that is managed at individual specialty-level to patient-centered care that is coordinated and aligned across all attending care providers for better care and outcomes. The workgroup seeks to review current outpatient care models with the aim of streamlining and optimising care for patients with complex care needs through new initiatives to coordinate and align care processes & goals among care providers.

PCD IN COMPLEX CARE COORDINATION

One key enabler of the complex care coordination initiative is the assignment of a **Primary Coordinating Doctor (PCD)** to each identified complex care patient. This PCD would provide oversight of care goals for each complex care patient assigned to them through active **medical care plan reconciliation** prior to and/or during their outpatient clinic reviews.

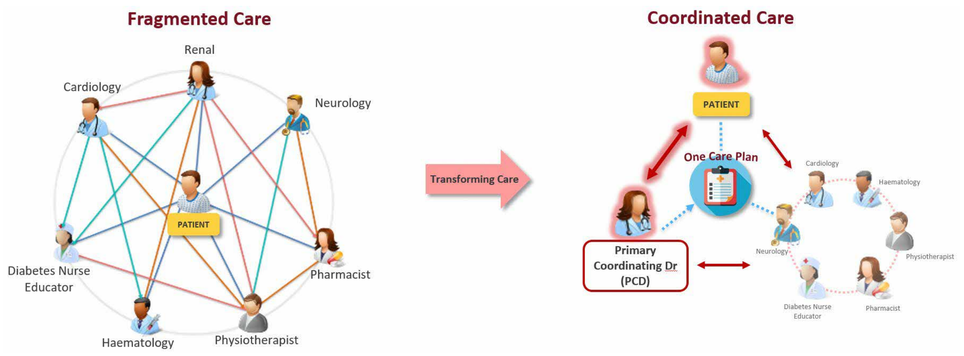


Figure 1: Coordinated care enabled by PCD and medical care plan reconciliation

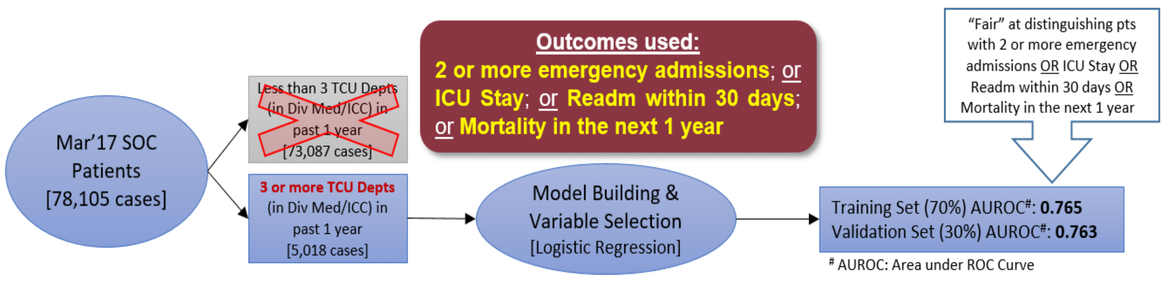
Along with inputs from other attending care providers, the PCD would put up a holistic care plan with documented care goals that are catered to individual patient's personal preferences and care needs in the electronic medical records system. This in turn serves as a reference for other care providers when managing care for patients, allowing better coordinated care that is aligned to each patient's individual care plan and care goals.

IDENTIFYING COMPLEX CARE PATIENTS

The workgroup initially employed the criteria of 5 or more TCU departments as a selection proxy for patients with complex care needs. As this administrative proxy method had 50% accuracy rate and still required manual case reviews[1] by doctors that were laborious and time-consuming, the workgroup recognised the need to devise a clinical rationale-based criteria set for more accurate identification of complex care patients.

[1] Based on initial clinical case review (Jun 2016) of 1559 patients with ≥5 TCU Departments, only 759 (48%) were deemed clinically complex.

To develop a robust and sustainable process, the workgroup worked together with the Office of Clinical Epidemiology, Analytics & kNowledge (OCEAN) to devise a new multivariate regression model that is able to score and predict clinical complexity. The model was statistically evaluated using available SOC patient data sets, and was validated by subsequent sample clinical case reviews of patients identified. In comparison with the initial administrative proxy selection method which involves laborious and time-consuming manual clinical case reviews, this regression model method negates the need for manual case review.



Selected Variable (for inputs)	Odds Ratio (95% CI)
Number of Inpatient Episodes with CCI Score >= 3 in past 1 year	1.31 (1.18, 1.45)*
Number of SOC appointments to Care & Counselling clinics in past 1 year	1.13 (1.03, 1.24)*
Number of visits to ED in past 1 year	1.09 (1.02, 1.17)*
Number of hospital admissions (emergency) in past 1 year	1.39 (1.26, 1.54)*
Number of SOC visits in past 1 year	1.02 (1.00, 1.03)*
Male	1.35 (1.13, 1.60)*
Age	1.03 (1.02, 1.04)*

* Statistically significant at 5% significance level

Figure 2: Multivariate Regression Model for scoring and prediction of clinically complex patients. Complexity is defined using proxy outcomes in the next 1-year: **(1)** ≥2 emergency admissions; or **(2)** ICU stay; or **(3)** readmission within 30 days; or **(4)** mortality in next 1 year; higher score = higher probability of achieving outcomes. Patients with 3 or more TCU departments & with regression score above 0.3157 were generally assessed to be clinically complex (80 percentile of test population as confirmed via sample clinical case reviews). Model was statistically validated using Mar 2017 SOC patients data set and shown to be fair in distinguishing complex patients (AUROC of 0.763).

PCD ASSIGNMENT ALGORITHM WORKFLOW

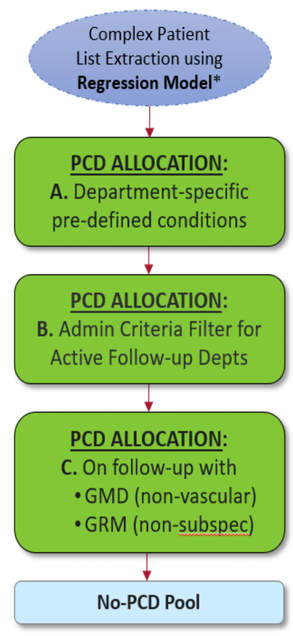


Figure 3: PCD Assignment Algorithm.

To circumvent the laborious manual case review required for assignment of each identified complex care patients to the appropriate primary coordinating department, the workgroup developed a PCD assignment algorithm workflow shown on the left.

The stepwise assignment algorithm is based on:

(A) patient's active medical conditions
i.e. patients who met any of the department-specific pre-defined conditions would directly be assigned to that department (e.g. heart failure patient to Cardiology Department)

(B) department(s) that patients have ongoing active and frequent follow-up with; and

(C) assignment to **Geriatric and/or General Medicine department** should they have existing planned follow-up with any of these departments, and not assigned to any department in steps (A) and (B)

The last attending doctor from the primary coordinating department would then be the assigned PCD, unless advised otherwise by the clinical HOD.

	INITIAL	NEW
Patients Selection & PCD Assignment Methodology	No. of TCU Departments (≥5 depts) + Manual Case Reviews	Multivariate Regression Mode + PCD Assignment Algorithm
Process Duration (Leading to PCD tagging)	Approx. 3 months[1]	Approx. 1 month

[1] Based on initial batch of clinical case reviews in Jun 2016 of extracted patients with 5 or more TCU departments

Figure 4: Comparison of Patients Selection & PCD Assignment Methodologies

Congruence testing using past case-review records as validation standards also shows that the new method is able to correctly identify 82% of case-reviewed-certified complex care cases and assigning them to the right primary coordinating department.

PROGRESS & INSIGHTS

Using the newly established method, the workgroup has began a routine 6-monthly extraction and tagging of complex care patients to their PCDs with effect from Apr 2019. To-date, a total of 1,496 complex care patients were tagged to their assigned PCDs in the electronic medical system since start of this program.

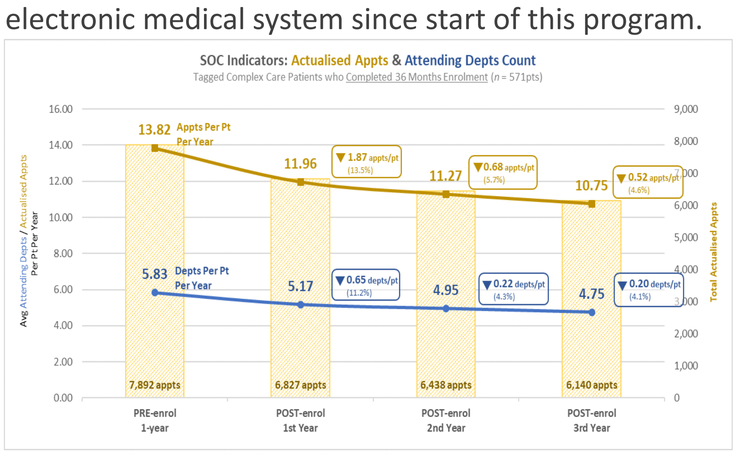


Figure 5: No. of SOC Actualised Appts & Attending Depts Count (Pre- vs Post-; Year-on-Year)

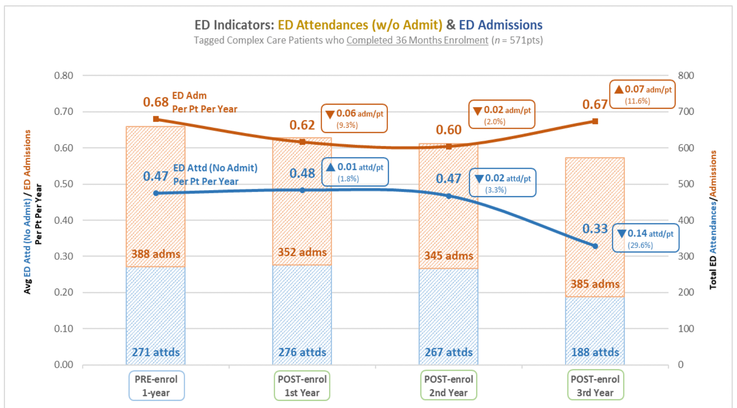


Figure 6: No. of ED Attendances (w/o Admit) & ED Admissions (Pre- vs Post-; Year-on-Year)

Outcome indicators are monitored and the following observations were made for patients with at least 3-year enrolment (571 complex care patients):

- ⬇ **Reduction in total SOC appt visits & no. of depts that each patient is seeing**
- ⬇ **Reduction in total ED attendances** (despite slight rebound of admission rate at post-enrolment Y3)

Anecdotally, these reductions might be attributed to care coordination initiatives which invoke the PCDs' & care providers' awareness to actively review and consolidate patient appointments.

With care better managed and coordinated at the outpatient setting, the reduction in overall ED attendances would have ensued, resulting in the dip as observed above.

NEXT STEPS

Moving forward, the workgroup will anchor on these established foundations to continue driving coordinated care initiatives across the hospital:

- Leveraging on interconnectivity on NGEMR in facilitating care coordination
- Continual engagement of clinical departments to generate more awareness and sustain the care coordination efforts post-NGEMR rollout
- Venturing pilot care collaboration with non-medical care providers to augment the care coordination efforts currently anchored by PCD (e.g. collaboration with Pharmacy on medication reconciliation for complex care patients with polypharmacy)
- Potentially synergising with other whole-of-hospital programs (e.g. other Outpatient-to-Community [O2C] initiatives) for providing a seamless care continuum for patients so that they are well managed at various care settings, where required and applicable
- Continual review of the current workflows/processes and outcome indicators for process improvement and devising potential outcome-driven intervention(s) for delivery of value-based care

Together, we can deliver Better Care to our patients!