Process Assessment:

- Admissions Profile:
  - 56% were males and 52% were older than 60 years
  - Number of admissions over the year ranged from 3 to 11 with a maximum cumulative Length of Stay (cLOS) of 219. 53% of high-users had a cLOS between 30-90 days and those with 4-6 admissions made up the total cumulative LOS. Of the high-user admissions, 31% were to General Internal Medicine (GIM) wards, 26% to surgical specialties, 16% to Gastroenterology, 15% to Hematology, and 8% to Family Medicine (Graph 1).
  - 59% of the 2015-16 high-users were admitted to hospital in 2015 and 41% in 2014 indicating that there is a longitudinal pattern of high use in about half the patients.

- Chart review of HCUs delved into clinical services involved either as an admitting or consulting service (Graph 2). For 85% of HCUs, 1 to 4 services were involved during their last admission, the remaining 15% had 5-10 services involved. Further analysis is required to understand why after several re-admissions, fewer consultations were required; though we postulate it may be because a diagnosis has been established by that point.

Social Profile and Community Supports:

- Did not find an increased pattern of Charlson Comorbidities in these HCUs. 95% of HCUs had 0-3 Charlson Comorbidities and 5% had 4-6 Charlson Comorbidities.
- 97% listed a physician as their Primary Care contact; 89% reported a GP while others reported GIM, Pulmonary/CF, Psychiatry, Palliative or other specialists.
- 90% of patients had a discharge summary dictated on Netezza for their last admission prior to Sep 2016.

Medical Profile:

- Gastrointestinal, Cardiovascular, Infectious Diseases, and Pulmonary were the most common categories of comorbidities seen in High-Cost Users.
- Most common comorbidities: CHF, A/Fla/Aftrtn, HTN, diabetes without end organ damage, hypothyroid, GERD, thrombosis, GI infection, UTI/pelvicinfections, AKI, CKD, dyslipidemia, anxiety, depression, substance abuse, COPD and pneumonia.
- Medications: 77% of HCUs had ≥7 discharge medications; the majority (59%) were prescribed 7 to 14 medications at the time of last admission (Graph 3). As hypothesised, HCUs have long medication lists which may be a targetable, predictive factor.
- Did not find an increased pattern of Charlson Comorbidities in these HCUs. 95% of HCUs had 0-3 Charlson Comorbidities and 96% had a Charlson Comorbidity score of 0 to 4. Thus, a greater Charlson Comorbidity Score is not necessarily predictive in this HCUs population (Graph 4).

- On the other hand, 82% of HCUs had a LACE score ≥ 11 indicating that higher LACE scores may be predictive of HCUs (Graph 5).

Aiming Improvement Opportunity/Selection:

1. Develop algorithm/scoring system for the prediction of High-Cost Users
2. QI project on in-patient ward surrounding intensive medication reconciliation for HCUs
3. Intensive disposition and community resource integration for HCUs
4. Consider trial of “Virtual Ward Model” for transition of HCUs to the community
5. Project to close the gap on family physician attachment and admission updates
6. QI project on appropriateness of admitting/consulting services for HCUs
7. QI project to connect HCUs to Mental Health resources in the community
8. “Virtual wards” are transitions in the community where outpatients receive care coordination by an inter-professional team and direct care via telephone calls, home or clinic visits. Identifying appropriate patients for this type of intervention is essential for success.

Reinforce Ownership, Measurement, & Continuous Improvement:

Next step: Survey of Family Physicians of High-Cost Users

Characterization of high-cost users has revealed that in addition to high number of admissions and greater cLOS, high number of ED visits and non-UAH admissions might also be a predictive factor. Thus, a future direction would be to identify high-users based on recurrent ED visits in addition to re-admissions.

Collaboration & Communication Strategies:

- Development of an inter-professional team including physicians, residents, medical students, operational leaders, quality consultants and a data analyst
- Complete data analysis and share the findings with salient medical and operational stakeholders to prioritize the opportunity areas and determine next steps
- Review the literature on similar undertakings at other institutions and learn from their observations

Lessons Learned:

- Although extensive chart audits are time consuming, the information gained is vital to understanding and improving the health journey
- Inter-professional collaboration is integral to the design & implementation of such projects
- Every high-user patient has a unique story. A distinct interplay of patient and system factors influences re-admissions in these high-users