Figure S1: VCAT Indicator Suite

Figure S23: VCAT Viewer – timeline view of service utilization
Figure S34: VCAT Viewer – timeline view of clinician utilization

Figure S45: VCAT Viewer – timeline view of clinical discipline utilization
Figure S5a6: VCAT condition histogram

Figure S5b7B: VCAT Co-Morbidity Matrix (MHSU focused)
**Hepatitis C Cascade of Care**

Chronic Hepatitis C virus infection (HCV) affects more than 251,990 individuals in Canada and approximately 60,000 British Columbians (2). HCV is a major health problem in Vancouver’s DTES, since 80% of its residents self-identify as illicit drug users (2). Due to the complex biopsychosocial challenges facing DTES residents and difficulties related to accessing fragmented health and social care services, HCV patients are often disengaged from care and do not receive longitudinal and coordinated primary care services (1,2,14).

In 2013, VCH’s primary care teams developed a framework for providing comprehensive client-centered care throughout the chronic Hepatitis C virus infection (HCV) journey (also known as the Hepatitis Cascade of care) including pre-treatment, on-treatment, post-treatment, and end-of-life support for people diagnosed with HCV and associated liver disease, as well as harm reduction strategies for those at risk of reinfection (15). The VCAT HCV Cascade of Care was developed through an iterative process by working with a group of clinicians and specialists in Hepatitis C over a period of about 6 months ([Figure S69](#)).
Similar to the HIV cascade of care, VCAT can export information at client level into excel for each of the cascade’s columns, information that includes important elements of the VPR, so that clinicians can easily detect important actionable items for their QI work.

For this particular cascade another useful indicator was developed showing at a glance the proportion of clients at risk for HCV who are being tested for HCV vs those who are not tested as well as the clients being tested but who do not necessarily need to be tested (Figure S749). This can be a very useful tool in making sure that resources are allocated in the right way and at the right time for patients in need.
**Chronic Obstructive Pulmonary Disease (COPD) Cascade of Care**

COPD, an important Ambulatory Care Sensitive Condition (ACSC), is recognized as being manageable within community primary care, where the aim is to reduce acute exacerbations and complications, which are the main causes why people with COPD end up in the Emergency Department (ED) and are often admitted for inpatient care (16,17).

The CHC’s COPD population is often older, poorer and present with multiple comorbidities including depression and anxiety; therefore, these highly complex patients are high users of the healthcare system (18). It is important to assess disease progression (via spirometry), but also patient complexity to ensure appropriate intensity of response. The VCAT’s COPD Cascade of Care provides a useful heuristic that operationalizes COPD evidence-based guidelines, to ensure that patients are provided effective longitudinal team-based primary care (Figure S844).
Complimentary to the COPD cascade of care is the VCAT COPD treatment viewer, designed to offer a comprehensive but simple view of the client journey through the VCH services from a COPD perspective (Figure S912). The LABA/LAMA prescriptions are shown on a timeline as well as the spirometry tests, encounters with different clinical disciplines in community as well as the acute care system. The patient’s complexity score in time is also shown which helps to assist in identifying patients needing more extensive/proactive services (e.g. fragile, poor, alone, etc.)
Opioid Use Disorder (OUD) Cascade of Care

Since 2016, there have been over 3000 opioid-related overdose deaths in BC, with 600 occurring in Vancouver (12,19). Drawing from recent efforts to scale up access to antiretroviral therapy to curb the HIV epidemic, the Cascade of Care framework has been recently proposed as a potential tool to monitor care for Substance Use Disorders (12,20). The evidence-based Opioid Use Disorder (OUD) Cascade of Care aligns with and enables operationalization of the Best Practices in Oral Opioid Agonist Therapy (BOOST) Collaborative - a joint initiative of the BC Centre for Excellence in HIV/AIDS and VCH that aims to improve care for people with OUD in Vancouver (Figure S1013).
Similar to the other chronic diseases, the timeline view has found particular utility in the addictions continuum of care by revealing services accessed over time and whether there are any gaps or duplication of services. It has also enabled team QI work to improve in the system of care. The OAT treatment viewer is a useful complimentary indicator to the cascade of care, enabling clinicians to detect gaps in treatment (i.e. whether the patient is adherent to treatment, and identifying patients needing more extensive and/or proactive interventions) (Figure S1144).
Figure S114: VCAT COPD Treatment Viewer

Figure S1249: Integrated Care Team Chronic Disease Prevalence Profile Viewer
Optimizing shared care and task reallocation

A team-based care pilot project was initiated at Raven Song CHC Primary Care program in 2017/2018 where more nursing involvement in care was trialed for a few months. The delivery of primary care to date had been physician centric, which was recognized to be an inefficient use of resources and expertise.

Figure S1321 shows that prior to the pilot there was indeed very little nursing involvement in care (first graph), then during the pilot where nurses were embedded and contributed a lot more to sharing care (middle graph) and after the pilot when nursing participation in shared care is considerably higher than before the pilot (third graph).

Figure S1321: Team-based provider matrix (MD to Nursing ratio changes over time)
This kind of analysis enables evaluation of initiatives focused on optimizing team-based care, and can be enhanced through the addition of other clinical disciplines to the mix. The VCAT currently provides an analysis of primary care encounters by professional discipline type over time for each CHC (Figure S1422).

Figure S1422: Primary care encounters by professional discipline over time