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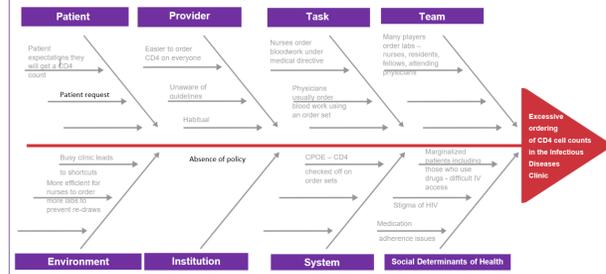
## AIM Statement: By May 2022, reduce the number of flow cytometry orders per patient visit in the HIV clinic by 20%.

### PROBLEM DEFINITION

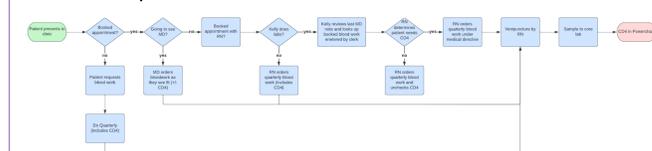
Frequent monitoring of CD4 cell counts in most HIV patients represents low value care. Our clinic continues to monitor CD4 counts every 3-6 months in many patients who have virologic suppression on antiretroviral therapy which is not evidence based. Unnecessary CD4 count measurement adds to health care costs. Each flow cytology test ordered in our HIV clinic costs approximately \$46 for raw materials and reagents (this excludes tech time and interpretation). A chart audit in our clinic revealed that 40/60 (66.67%) of orders were considered unnecessary.

### ROOT CAUSE ANALYSIS

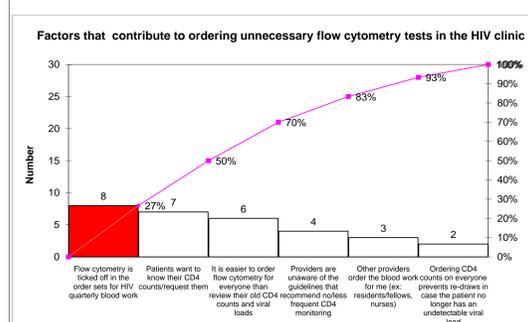
Cause and Effect Diagram:



Process map:



Pareto Chart:



All 3 charts were designed with input from key stakeholders including clinic nurses and physicians. Stakeholder analysis revealed that inclusion of flow cytometry in standard order sets, as well as concerns around patients requesting CD4 counts, were identified by ordering clinicians as key factors in the excessive orders of CD4 counts.

Excessive ordering of an expensive laboratory investigation not needed for routine care of most HIV patients can be curtailed by a “smart” pop up in the electronic medical record.



### IMPLEMENTATION

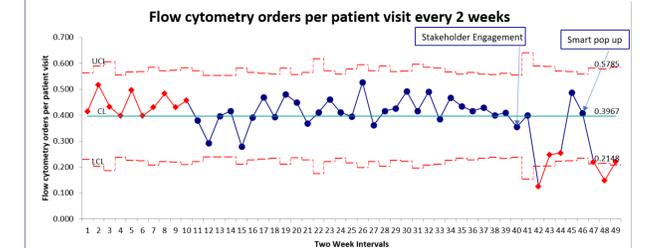
PDSA Cycle 1: We determined if excessive CD4 counts were being ordered in the HIV clinic and presented findings of our spot audit to HIV clinic staff to see if they thought the excess ordering of CD4 counts was a problem and to educate them on the Choosing Wisely guidelines regarding the recommended frequency of CD4 count monitoring.

PDSA Cycle 2: With the help of laboratory medicine and IT, we designed a “smart” pop up in Electronic Medical Record. The pop up is triggered when a CD4 count for the patient has already been done in the last 11 months. The pop up lists the patient’s last CD4 count and describes the Choosing Wisely recommendations and prompts the ordering clinician to click to remove the test from the orders.

The implementation challenges including designing multiple iterations of the pop up and seeking feedback from key users each time. A key step was identifying the unit lead in our clinic as the “lynch pin” of the process as she was ordering 80% of the flow cytometry orders in our clinic and involving her in the design and roll out of the pop up as a key member of the project team.

### MEASUREMENT & RESULTS

Statistical Process Control Chart:



Process measures: Proportion of patients who got a CD4 count done using the new orderable

Balancing measures: Patients who inadvertently did not get a CD4 count but needed one

Discussion: We saw a brief trend towards improvement after the launch of the education PDSA cycle, but then we quickly returned to baseline performance. After the launch of the “smart” pop up in the Electronic Medical Record, we saw an improvement which we hope to sustain and document special cause variation.

### SUSTAINABILITY

Process owner: the division head of the hematology laboratory has agreed to take over monitoring going forward.

Documentation of new standards: a new process map has been created.

Monitoring & response plan: hematology will use Decision Support to create a scorecard to track this and other Choosing Wisely measures – if flow cytometry increases above a threshold of 50 orders per month, the HIV clinic team will be notified and this will trigger a review of the order sets being used.