



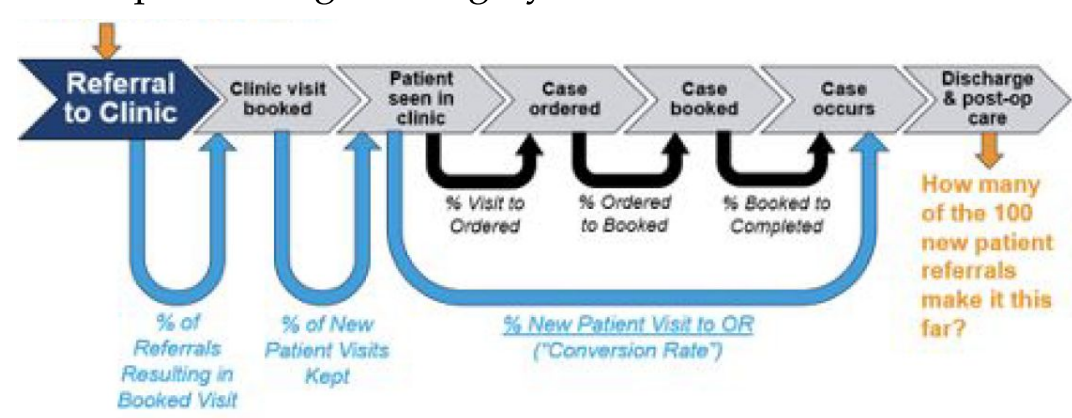
## Introduction

### Beth Israel Deaconess Medical Center

- Location: Boston, USA
- Large academic medical center. Consistently ranked as one of the top hospitals in Massachusetts
- 600 beds, 70 ICU beds, 500,000 outpatient visits/year
- The department of surgery oversees operations across 15 divisions and discharges 41,000 in-patients/year

### The Challenge

- The department of surgery faces complex operational and logistical challenges, partly due to the large number of procedures performed
- Patients who require surgical intervention typically begin their journey by visiting a surgeon in the out-patient clinic
- After examination and if warranted, the surgeon would advise a surgical intervention and place an order if there is mutual agreement
- Following this, the patient would then be worked up and operated upon.
- The series of steps from referral to clinic to performing the surgery are detailed below:



- Currently, there is no visibility through these steps and it is not possible to track a patient or measure conversion rates, drop-offs and patients lost to follow up throughout the process.
- Patients who have been prescribed a surgery and who consent to the same but don't have the procedure eventually performed represent a potential system inefficiency.
- Our goal is to analyze the entire process to look for bottle-necks while also demonstrating a monitoring mechanism that seeks to maximize the process completion rate.

## Background & Approach

### Developing the Approach

1. Interviewing three types of stakeholders: administrative Directors, administrative managers, and operational staff about surgical volume issues, ownership/processes around the volume and conversion rates.

Administrative leads from three divisions:

- Ophthalmology
- General Surgery
- Cardiac Surgery

2. Conducting a Healthcare Literature Review and Market Research

- Factors that contribute to whether a particular patient arriving in the clinic will convert to surgery.
- Examined patient demographic data, service provider, diagnosis, and diagnosis codes to predict whether a particular patient will have surgery within 90 days.
- Barriers to increasing elective surgery throughput to baseline.
- Recommended action to take to increase surgical throughput.

3. Conducting a Synthesis of industry analysis

- COVID-19 pandemic in the United States 35% decrease in elective surgeries.
- The financial impact of \$200 billion of losses between March and June 2020
- Deferral of elective surgeries caused an important backlog of future patient demand
- Factors influencing volume shortages: Specialty mix, Regional differences, facility size, and system postures.

Citations:

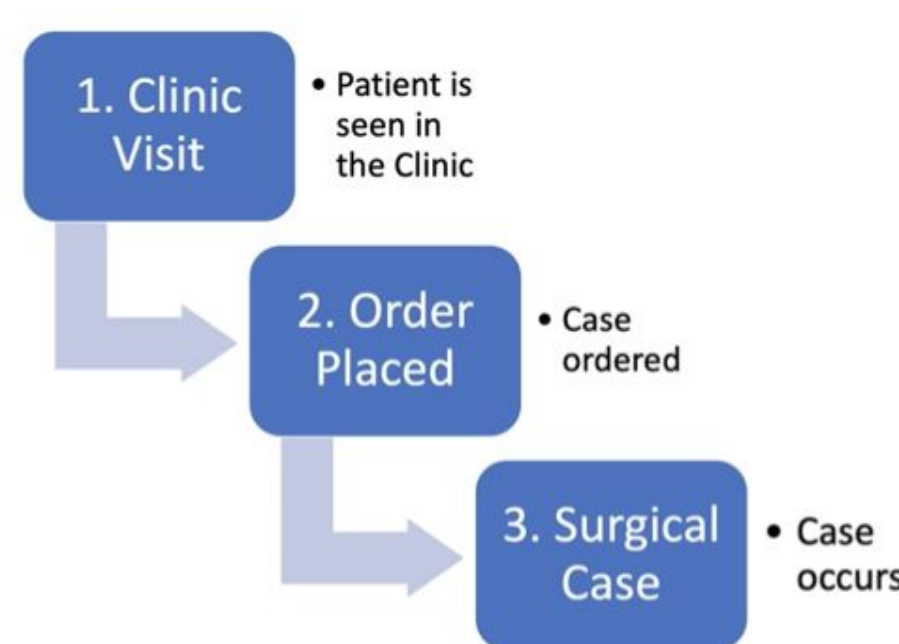
1. Hospitals and health systems continue to face unprecedented financial challenges due to COVID-19. American Hospital Association, June 2020, [aha.org](https://www.aha.org).
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## Methods

### Surgical Patient Pathway Overview

In a typical workflow, a patient would start with a clinic visit with the specialist to determine the right treatment plan. During this visit, it may be decided by the physician that the patient requires surgery to treat their ailment. In this scenario, the physician would place an order for the patient to receive surgery, which is either entered by the physician or a nurse. Upon leaving the clinic visit, the patient could then work with the surgery scheduling office to schedule a case within the available blocks for the designated surgeon. They are summarized into the three steps to the left. To measure conversion rates between the three steps, we have created three metrics which measure the dropoffs of patients throughout this journey.

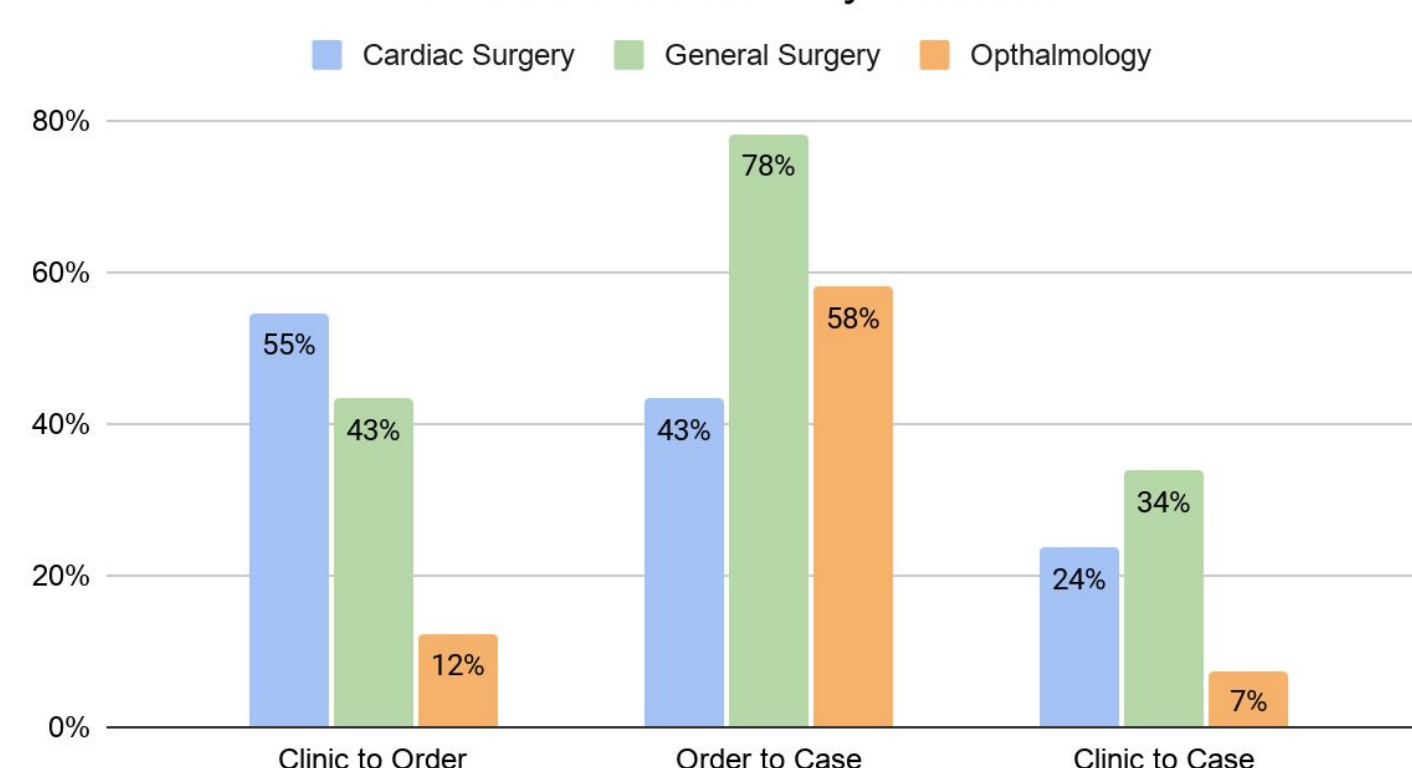
We are investigating only the cardiac surgery, general surgery, and ophthalmology specialties as they are wholly operated within BIDMC and have a high volume of elective, outpatient surgeries.



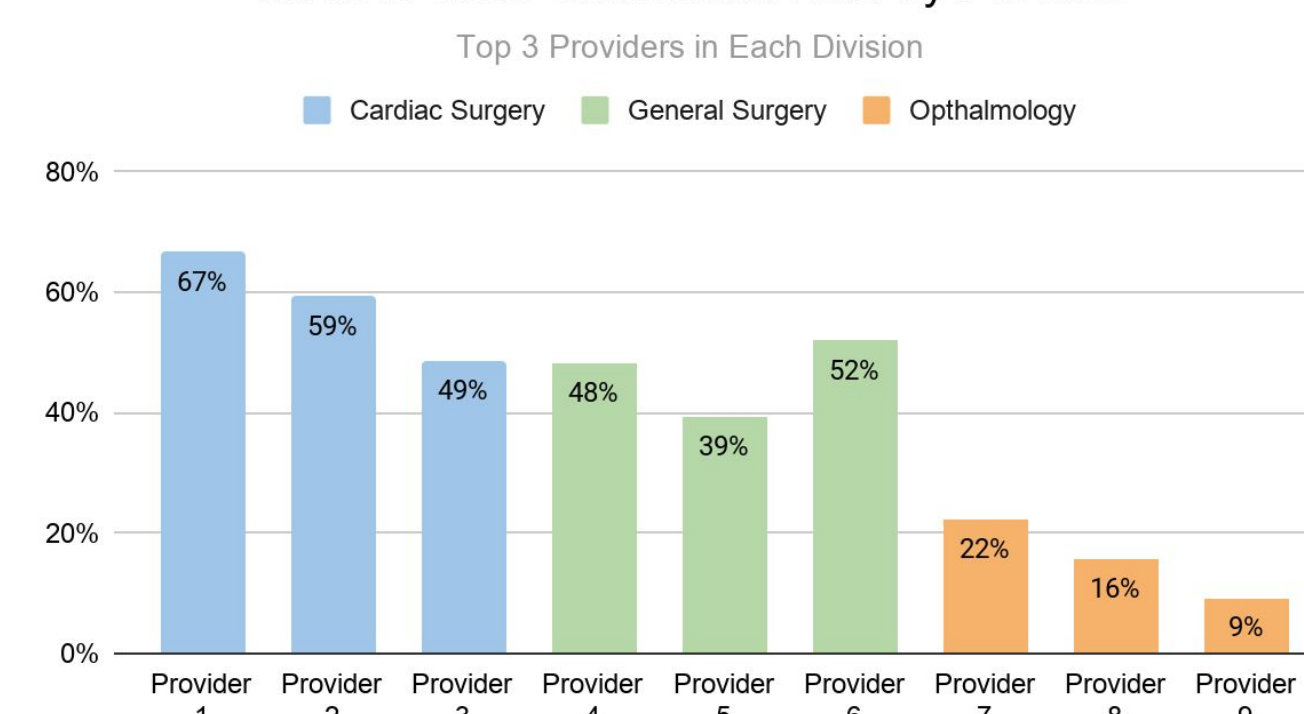
Metric Name	Numerator	Denominator	Description
Clinic to Order Conversion Rate	Order Placed	Clinic Visits	This metric keeps track of the proportion of patients for whom surgery has been deemed necessary by their clinic visit provider, and subsequently have a surgery order placed. Drop-offs here typically represent patients who do not need surgery.
Order to Case Conversion Rate	Surgical Case	Order Placed	This metric determines the proportion of patients who actually have a surgery case performed out of those who have placed a surgery order. Drop-offs here represents instances where a patient cancels or does not show up to surgery after it is scheduled.
Clinic to Case Conversion Rate	Surgical Case	Clinic Visits	Measures the total conversions from when a patient visits the clinic to when they possibly have surgery performed. This metrics provides the most comprehensive overview of the conversion process, but may not provide enough details about where drop-offs happen in the process.

## Results

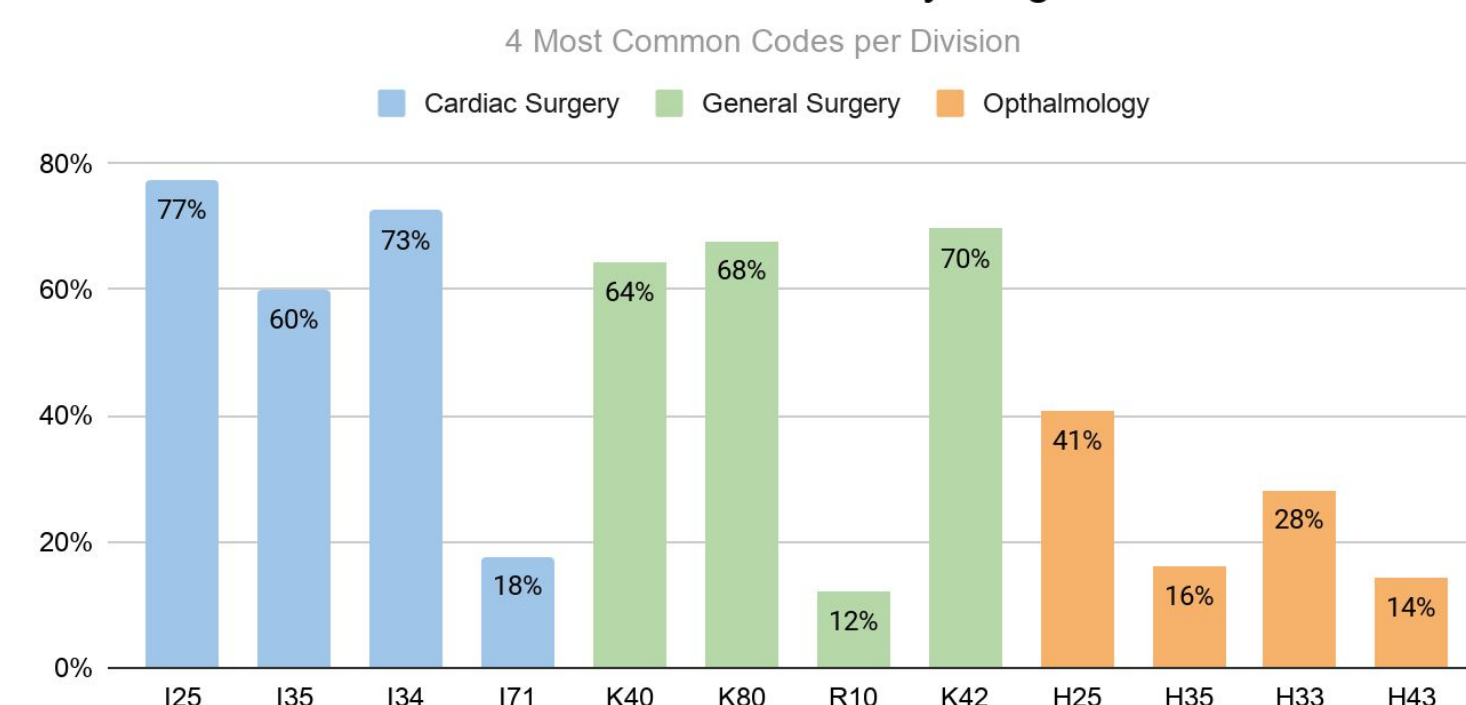
### Conversion Rates by Division



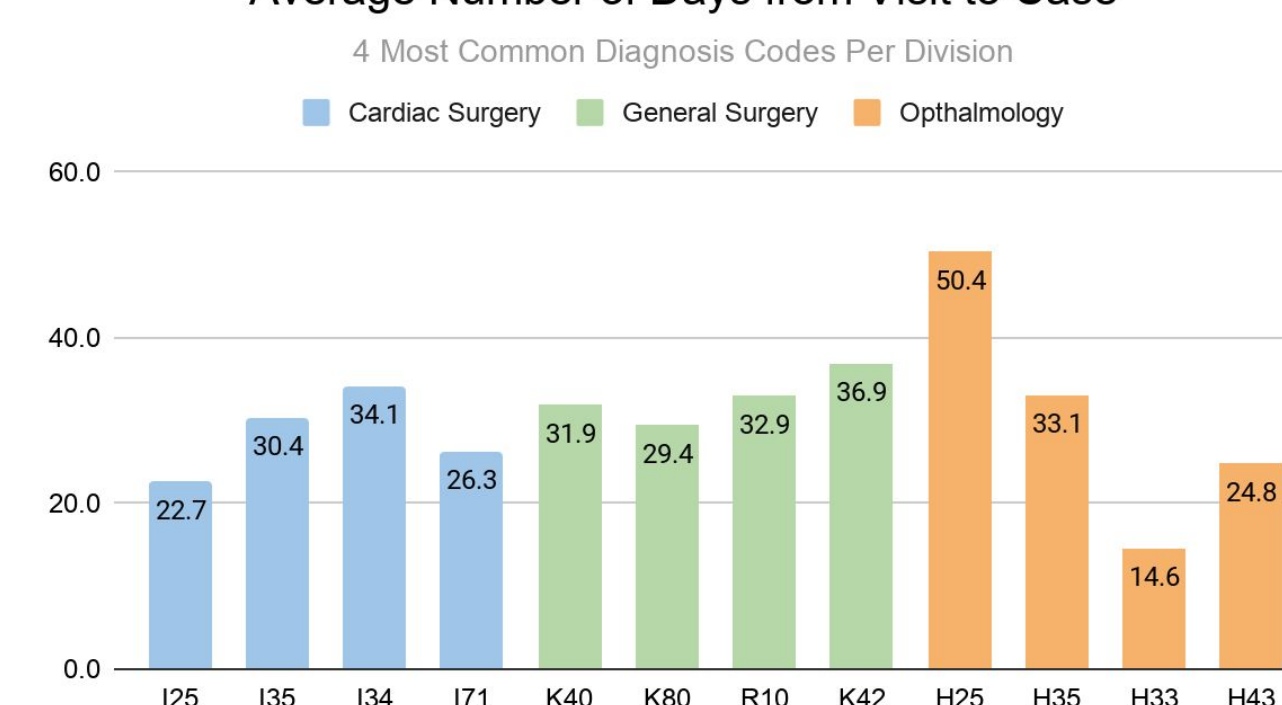
### Clinic to Case Conversion Rate by Provider



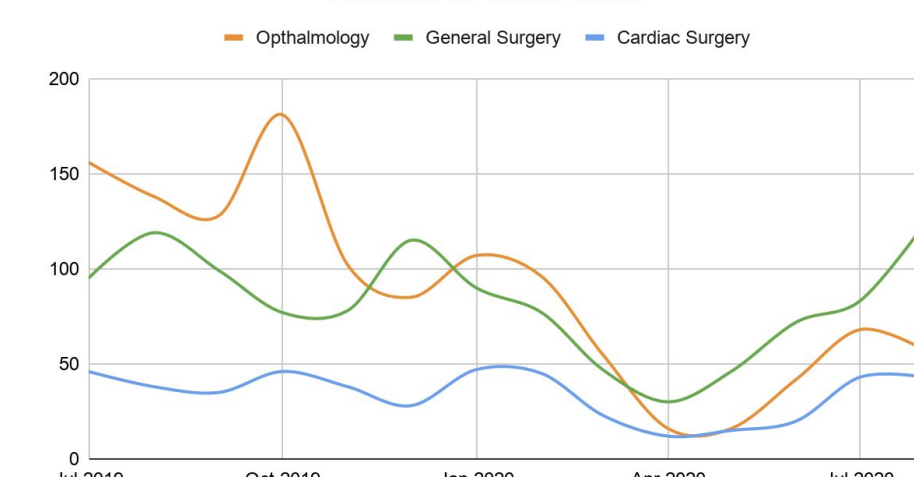
### Clinic to Case Conversion Rate by Diagnosis Code



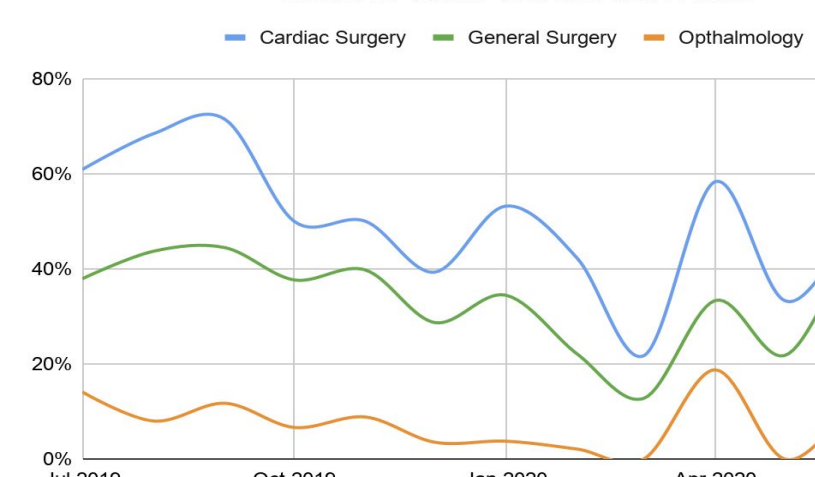
### Average Number of Days from Visit to Case



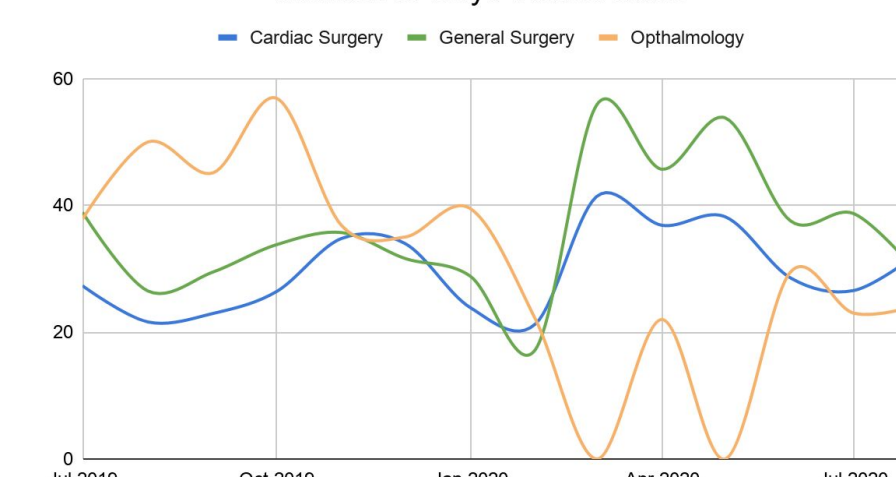
### Number of Clinic Visits



### Clinic to Case Conversion Rate



### Number of Days Visit to Case



## Conclusions & Future Directions

Patient tracking and following up is key to ensuring all BIDMC perioperative patients get the care they need. The wide range and acute nature of care provided by perip makes it much more difficult to track patient statuses, and from our interviews, different departments have taken different approaches to keep track of undecided patients. A unified, electronic workflow for tracking patients from their initial clinic visit will ensure that no patient is left behind. Currently, patients come in for office visits and results in one of three statuses:

1. If the patient decides to have surgery, the order is placed for surgery and their procedure is extremely likely to be performed within the subsequent three months (Exhibit XX)
2. If the patient is undecided, there will not be an order placed and depending on the division, there may or may not be followup with the patient.
3. The patient decides against surgery at BIDMC, and no follow-up is needed.

Patient tracking typically begins once the patient has decided on having surgery (status 1), but the undecided patients in status 2 may fall through the cracks. We propose tracking the patients as soon as they come into the clinic and following up with patients until they are no longer undecided and in either status 1 or status 3.

This type of patient tracking provides two key benefits:

- A. Potential to help more patients receive care. If patients are unsure about surgery or receiving care with BIDMC, proactive outreach can help them feel more comfortable and increase the likelihood that undecided patients will respond.
- B. Develop a thorough understanding of why patients may not receive their care with BIDMC. Patients may reject care due to finding a different provider, insurance, or concerns with the surgery itself. Feedback from those patients will help BIDMC better understand why patients ultimately seek care elsewhere and whether there is lost revenue.

While following up with undecided patients could help increase patients retained at the top of the funnel, it is important to understand that increases along the top of the funnel may not necessarily increase surgical volume. This is driven by the different conversion rates for patients of different urgencies to have surgery. In our study, we saw that as covid decreased clinic volume, the conversion rate actually increased. This is likely due to covid driving off elective surgery patients, so that only the most urgent patients are seen in the clinic. Similarly, the undecided patients we follow up with may be the patients with mostly elective procedures. These patients will likely have a low conversion rate, though even a few extra conversions will be worth the effort to track all the undecided patients.

## References & Acknowledgements

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