NHS RightCare

# Resource Allocation Optimization

# Team Roles

## Samuel Chadick

- **Facilitator**
  - Team Leader
  - PowerPoint Visualization

## Magloire Diala

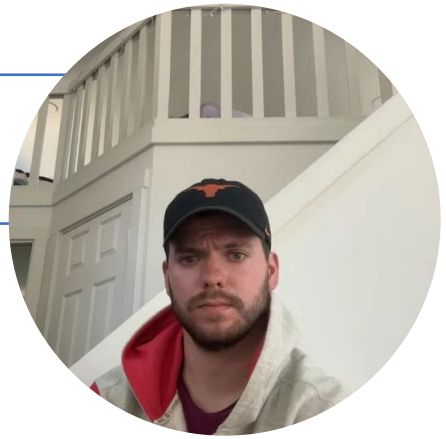
- **Timekeeper**

## Julia Tenny

- **Scribe**

## Sachi Wijeratne

- **Champion**



Samuel Chadick

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# Define Phase

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# Founding Vision

- Traces back to a report conceived during World War II.
- Crafted by economist William Beveridge, architect of the report for Britain's Welfare State foundation.
- Groundbreaking mission: Address and eradicate societal "great evils" - want, disease, ignorance, squalor, and idleness.


Reference taken from: Day, C. (2017, December 7). *The Beveridge Report and the foundations of the Welfare State*. The National Archives blog. https://blog.nationalarchives.gov.uk/beveridge-report-foundations-welfare-state/

# Pre-NHS Healthcare

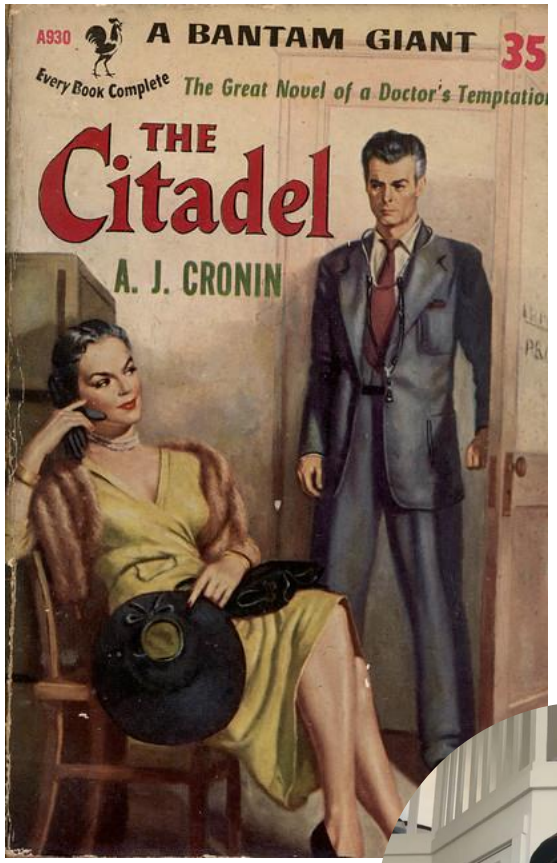
## Regional Healthcare Transformation

- Pre-NHS healthcare was a varied patchwork, with "voluntary" and municipal hospitals across regions.

## Public Demand for Change

- Influential works like "The Citadel" by A.J. Cronin (1937) fueled a growing public demand for healthcare reform.

Reference taken from: *The Birth of the NHS*. Historic UK. (n.d.). https://www.historic-uk.com/HistoryUK/HistoryofBritain/Birth-of-the-NHS/

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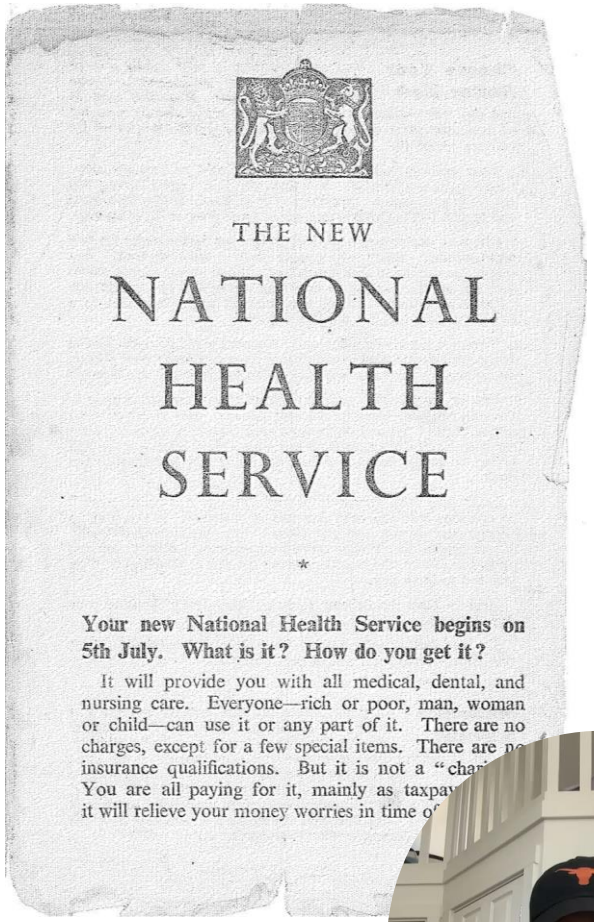
# Birth of the NHS

- On July 5, 1948, the NHS became the world's first universal health system financed through taxation.
- The NHS revolutionized healthcare, providing comprehensive, free medical care, leaving a lasting impact.
- The NHS holds a special place in the hearts of the British, more popular than the royal family, the armed forces, or the BBC.

Reference taken from: *The Birth of Britain's National Health Service*. Wellcome Collection. (n.d.). https://wellcomecollection.org/articles/WyjHUicAACvGnmJI



THE NEW

NATIONAL HEALTH SERVICE

*

**Your new National Health Service begins on 5th July. What is it? How do you get it?**

It will provide you with all medical, dental, and nursing care. Everyone—rich or poor, man, woman or child—can use it or any part of it. There are no charges, except for a few special items. There are no insurance qualifications. But it is not a "char... You are all paying for it, mainly as taxpay... it will relieve your money worries in time of...

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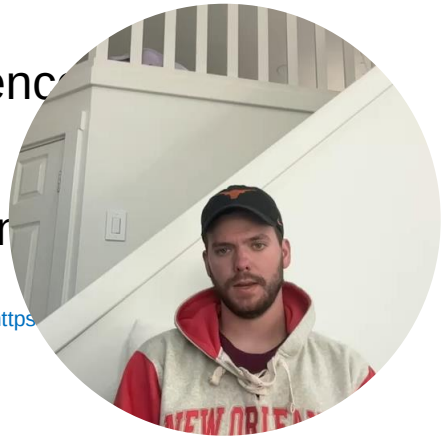
# Core Functions

**Key Roles:**

- Workforce Excellence
- Digital Transformation
- Information Management
- Population Health Focus

**Long-Term Aims:**

- Health Equity
- Quality and Safety
- Access and Experienc
- Value for Money
- Societal and Enviror



Reference taken from: NHS. (n.d.). NHS choices. https
we-do/

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# Project Background

**Healthcare's Vital Role**

- Health is integral to our lives, as well as the well-being of our loved ones and communities
- Healthcare improvements ensure access to essential services, enhancing the well-being of individuals and communities.

**Critical Healthcare Issues**

- Conducted an in-depth analysis of a UK National Health Service dataset, identifying critical issues affecting patient care.
- We observed a notable issue: insufficient availability of beds, which directly impacts the quality of patient care.

# Problem Statement

“Throughout a 10-year time span, the Intensive Care Unit (ICU) of the UK National Health Service (NHS) has experienced an average of 300 urgent operation cancellations even though the current bed capacity at the ICU stands at 3,423 in average. Our objective is to decrease the urgent operation cancellations by 5% from their current levels.”

Sachi Wijeratne

# Negative Consequences

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| Health & Wellbeing | Care & Quality | Funding & Efficiency |
|---|---|---|
| • Psychological strain<br>• Physical effects<br>• Social Disruptions | • Increased wait times<br>• Inconvenience across surgeries<br>• Disengagement<br>• Lack of trust | • Resource pressures<br>• Lack of revenue |

Suboptimal Results

Sub-par experience

Poor resource alloca

References taken from: Dell'Atti L. The Cancelling of Elective Surgical Operations Causes Emotional Trauma and a Lack of Confidence: Study from a
Urologia Journal. 2014;81(4):242-245. doi:10.5301/urologia.5000050

Wong, D. operations: a 7-day cohort study of planned adult inpatient surgery in 245 UK National Health Service hospitals. *British journal of anaesthesia*,

**Samuel Chadick**

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# Measure Phase

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# Project Objectives

- Decrease the cancellation of urgent operations.
- Explore potential improvements.
- Aim to enhance efficiency and patient satisfaction.

Sachi Wijeratne

# DMAIC Project Outline

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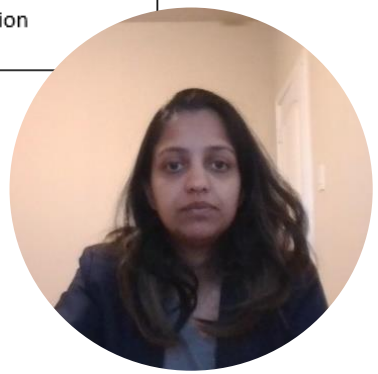
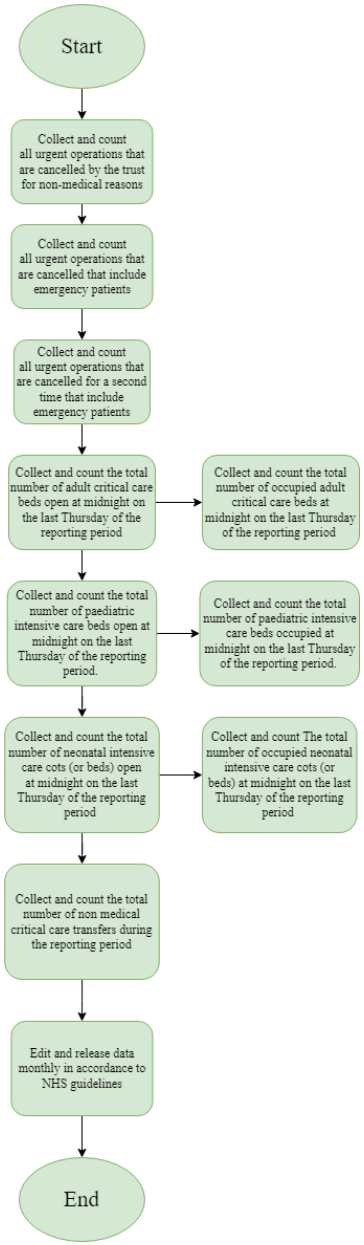
| Define | Measure | Analyze | Improve | Control |
|---|---|---|---|---|
| **DESCRIPTION** | | | | |
| - Problem Statement<br>- Outline the scope of the project<br>- Create a process map<br>- Estimate project impact & completion | - Data collection method<br>- Understand the data and analyze data quality<br>- Identify the independent variables<br>- Data preparation<br>- Understand the current status of the process<br>- Mini literature review | - Root cause analysis<br>* Fishbone diagram<br>- Exploratory data analysis<br>- Data Visualization | - Outline and evaluate the solutions<br>- Revise process maps (if required)<br>- Outline a test solution and plan<br>- Kaizen blitz (if required)<br>- Make implementation plan | - Identify & document the new work standard<br>- Confirm and sustain the reduction of the problem<br>* Quality control plan<br>- Determine additional improvements<br>- Documentation & present to target audience |
| **TOOLS** | | | | |
| | Customer, QFD, FMEA | Benchmarking process, Graphical analysis | DOE Screening, Simulation | Continuous Gage R&R, Attribute R&R, Control Charts, FMEA |
| **DELIVERABLES** | | | | |
| -Project Proposal PPT<br>-Project Proposal Report | -Dataset<br>-Process Plan PPT/Report | -Process capability analysis | -Identify the significant Attributes<br>-Proposed solution | -Sustained solution<br>-Documentation |



Sachi Wijeratne

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# Process Map

Julia Tenny

# Deciphering the Data

**Type of Data**

- Qualitative data relating to UK National Health Service data on the occupancy rates of critical care beds and its effect on the cancelation of urgent operations.

**Number of Records**

- 114 records, based on monthly data from 8/11/2010 to 2/20/2019.

**Measurements**

- It is measured in a count and percentage format. Collected mont
  last Thursday of the month at midnight.

Julia Tenny

# Variables

- Year
- Period
- Number of Adult critical care beds
- Number of Pediatric intensive care beds
- Number of Neonatal critical care cots (or beds)
- % of Open Beds Occupied Adult critical care beds
- % of Open Beds Occupied Pediatric intensive care beds
- % of Open Beds Occupied Neonatal critical care cots (or beds)
- Number of Non-medical Critical care transfers in the month
- Urgent Operations Canceled
- Urgent Operations Canceled for the 2nd or more time

Julia Tenny

# Key Performance Indicators (KPIs)

- % of Open Beds Occupied Adult critical care beds
- % of Open Beds Occupied Pediatric intensive care beds
- % of Open Beds Occupied Neonatal critical care cots (or beds)
- Urgent Operations Canceled
- Urgent Operations Canceled for the 2nd or more time

Julia Tenny

# Measurements

**Dataset Measurements**

- Critical Care capacity of beds in 3 categories (monthly)
- Cancellations of urgent operations (monthly)

**Calculated Measurements**

- Average measurements of capacity and urgent operation cancellations

Julia Tenny

# NHS Data Collection

- Data collected by the National Health Service (NHS)
- Government-funded healthcare system in the United Kingdom
- Collected to monitor critical care bed availability
- Collected to manage critical care bed occupancy
- Goal: Reduce availability shortages

Julia Tenny

# Data Collection Plan

| Metric | Reason for Collection | Operational Definition | Data Source | Sampling Method | Sample Size | Who Will Collect | How Validated | Form Used |
|---|---|---|---|---|---|---|---|---|
| Number of Adult Critical Care Beds | To determine the base amount of beds available to adult patients in need of critical care. | Number of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| Number of Paediatric Intensive Care Beds | To determine the base amount of beds available to paediatric patients in need of critical care. | Number of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| Number of Neonatal Critical Care Beds | To determine the base amount of beds available to neonatal patients in need of critical care. | Number of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| % of Adult Critical Care Beds Occupied | To determine if an acceptable amount of adult critical care beds are occupied. | Percentage of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| % of Paediatric Intensive Care Beds | To determine if an acceptable amount of paediatric critical care beds are occupied. | Percentage of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| % of Neonatal Critical Care Cots Occupied | To determine if an acceptable amount of neonatal critical care beds are occupied. | Percentage of Available and Occupied Critical Care Beds | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Service | No |
| Urgent Operations Cancelled | To measure urgently needed operations canceled due to lack of available critical care beds. | Total number of Urgent Operations Cancelled within the period. | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National Health Se | |
| Urgent Operations Cancelled for the 2nd or more time | To measure urgently needed operations canceled twice due to lack of available critical care beds. | Total number of Urgent Operations Cancelled within the period. | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National H | |
| Number of Non-medical Critical Care Transfers | To measure amount of critical care transfers due to non-medical reasons. | Total number of Non-Medical Critical Care Transfers Monthly | SDCS / Unify2 Data Collection | Online Resource | 114 | Team Members | UK National H | |

Julia Tenny

# Why Is This Data Relevant:

- *Quantifying NHS Challenges:* Understanding the magnitude of challenges faced by the National Health Service in delivering critical care.
- *Financial Impact:* Highlighting the consequences of inadequate funding on critical care services.
- *Operational Ramifications:* Exploring how insufficient resources result in the cancellation of urgent operations.
- *Patient Outcomes at Stake:* Examining the correlation between resource shortages and diminished patient outcomes.

Julia Tenny

# Data Driven Project Definition

- **High Cancellation Rates:** Hospitals in the UK frequently cancel operations due to insufficient bed capacity.
- **ICU Focus:** Our project focuses on the Intensive Care Unit (ICU) of the NHS, where specialized beds are crucial.
- **Bed Capabilities Impact:** The ICU's pace relies on specific bed capabilities.
- **Data Parameters:** Our dataset includes monthly bed occupancy rates and availability rates for three bed types.
- **Strategic Data Selection:** The dataset is specifically chosen to serve our project's objectives.

Julia Tenny

# Fish Bone Diagram

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**People**

- Staffing shortages in ICU (nurses, physicians, support staff)
- Lack of training for staff in managing high-stress situations
- Fatigue and burnout among healthcare professionals

**Equipment**

- Shortage of critical care equipment
- Equipment maintenance issues
- Supply chain disruptions affecting equipment available

**High Urgent Operation Cancellations**

**Process**

- Inefficient bed allocation and utilization
- Poorly coordinated patient scheduling
- Delays in transferring patients to ICU

**Communication**

- Poor communication between surgical team and ICU staff
- Ineffective communication with patient and their families
- Coordination issues in rescheduling operations

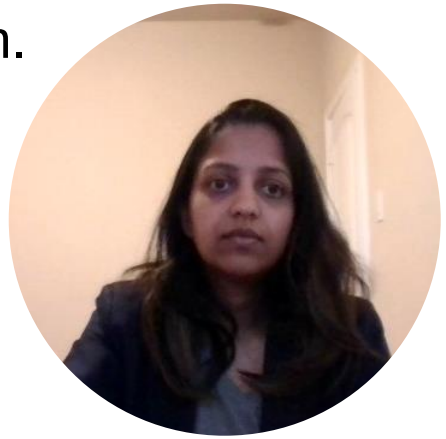
Magloire Diala

# Project Deficiencies

Unable to request more information about the dataset.

Uncertainty in the costs involved in increasing bed capacity.

Inability to measure the success/ROI in real terms at the completion.



Sachi Wijeratne

# Target Audience & Project Goal

**Target Audience**

- NHS, hospital staff and management
- Government Health Agency
- Patient and Their Families

**Project Goal**

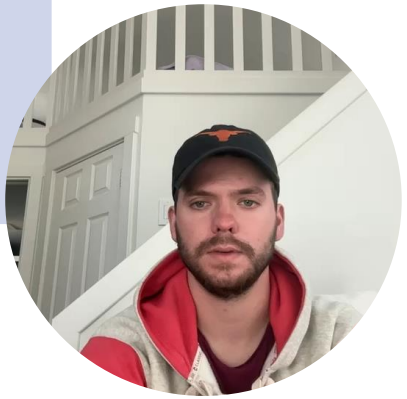
- To decrease the cancellation of operations within the NHS ICU by identifying factors that affect critical, bed availability, with the goal of reducing the frequency of canceled operations

# Tools Used for Analysis

**Excel:** Employed for data cleaning, calculation of new columns, and pivot table creation to enhance data visualization.

**Statistical Analysis:** Used various statistical formulas and mathematical equations to derive meaningful insights about the data – patterns, trends, relationships, etc.

**Google:** Enabled mapping and visualization for location-based GIS methods for a comprehensive analysis.



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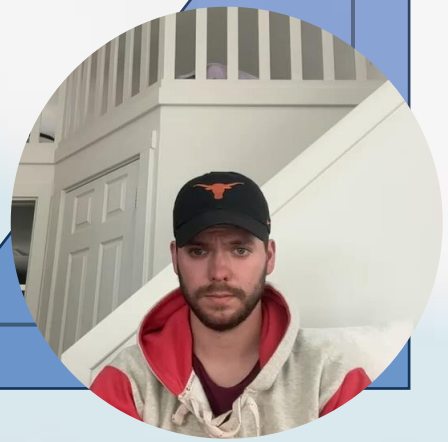
# Analyze Phase



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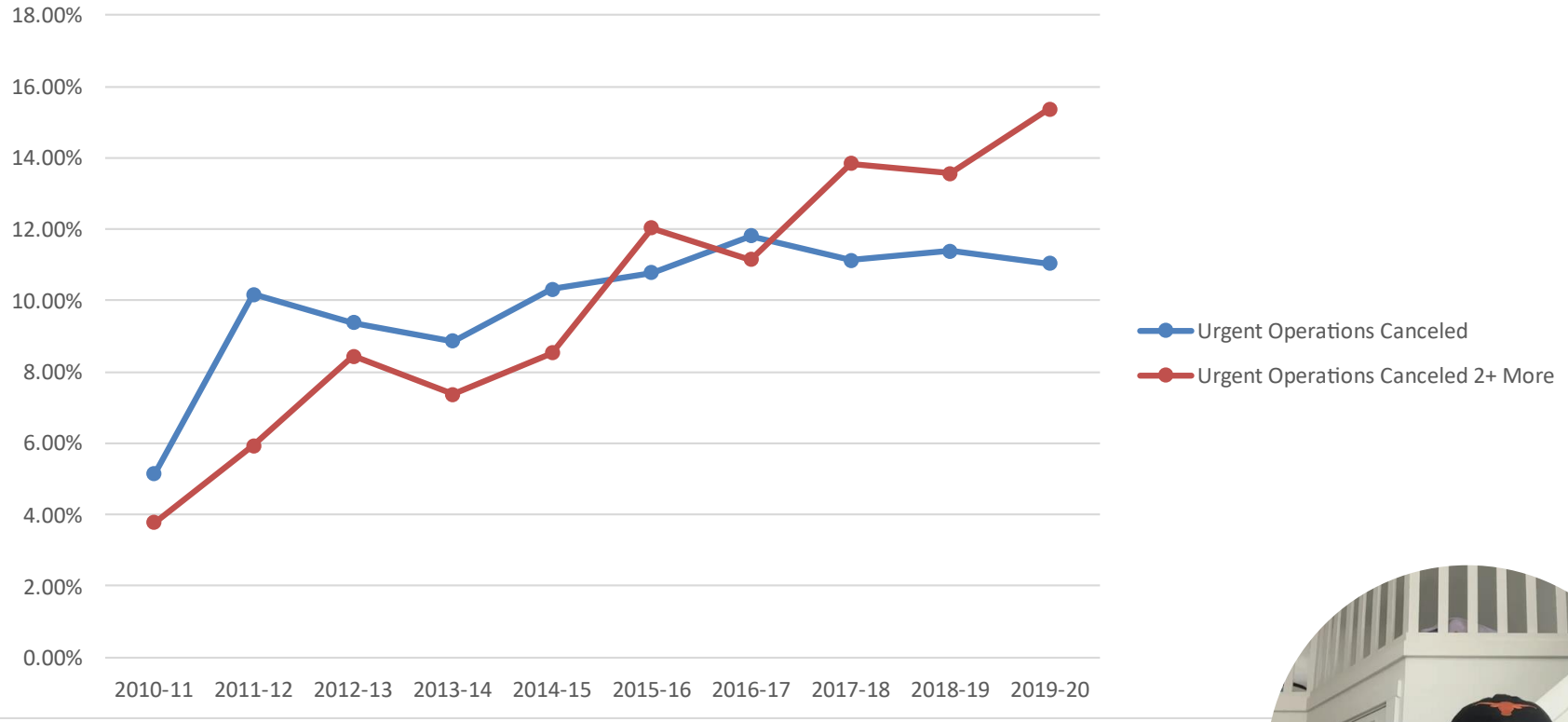
# Yearly Comparison: Urgent Operations Canceled

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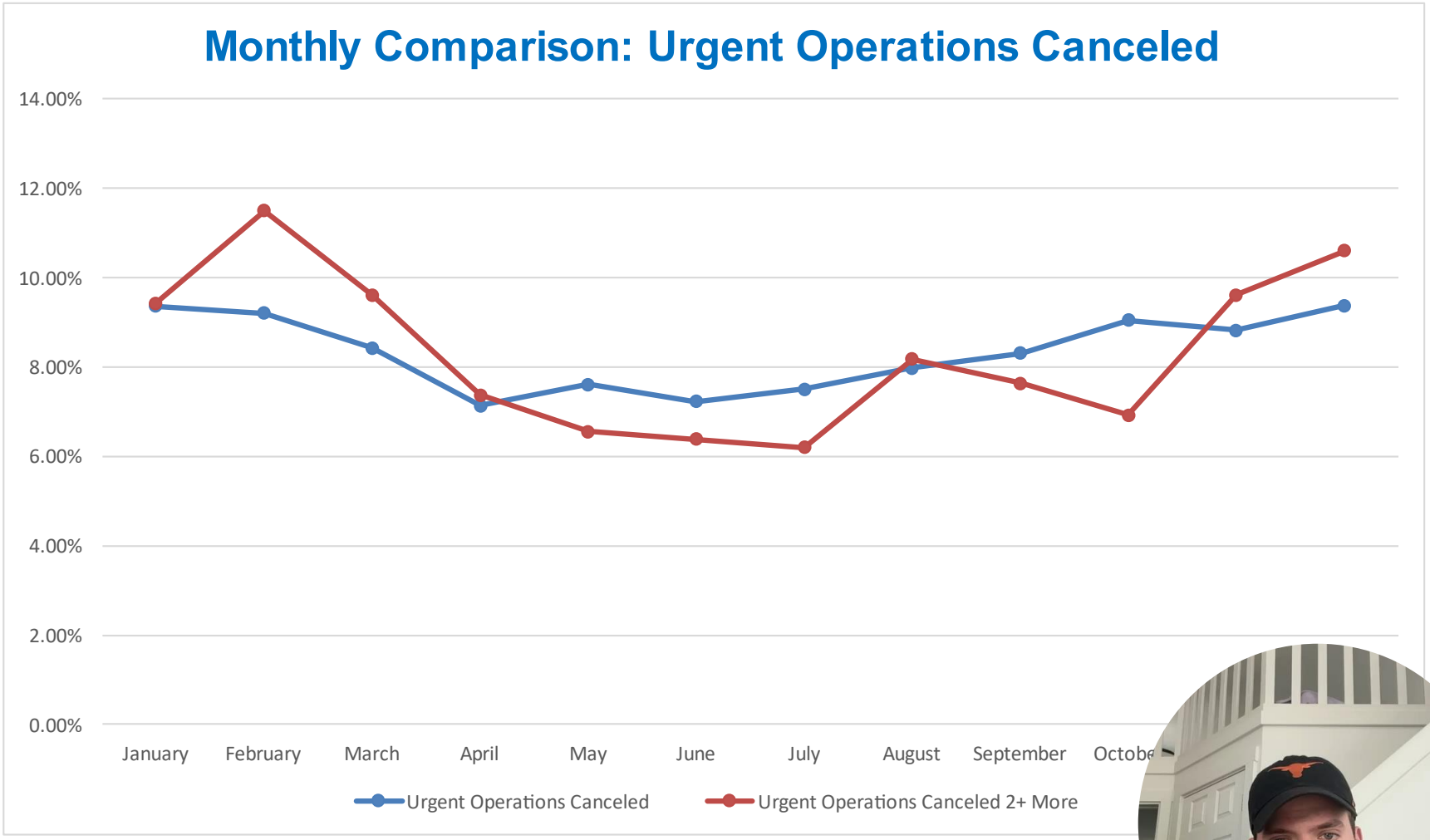
# Monthly Comparison: Urgent Operations Canceled

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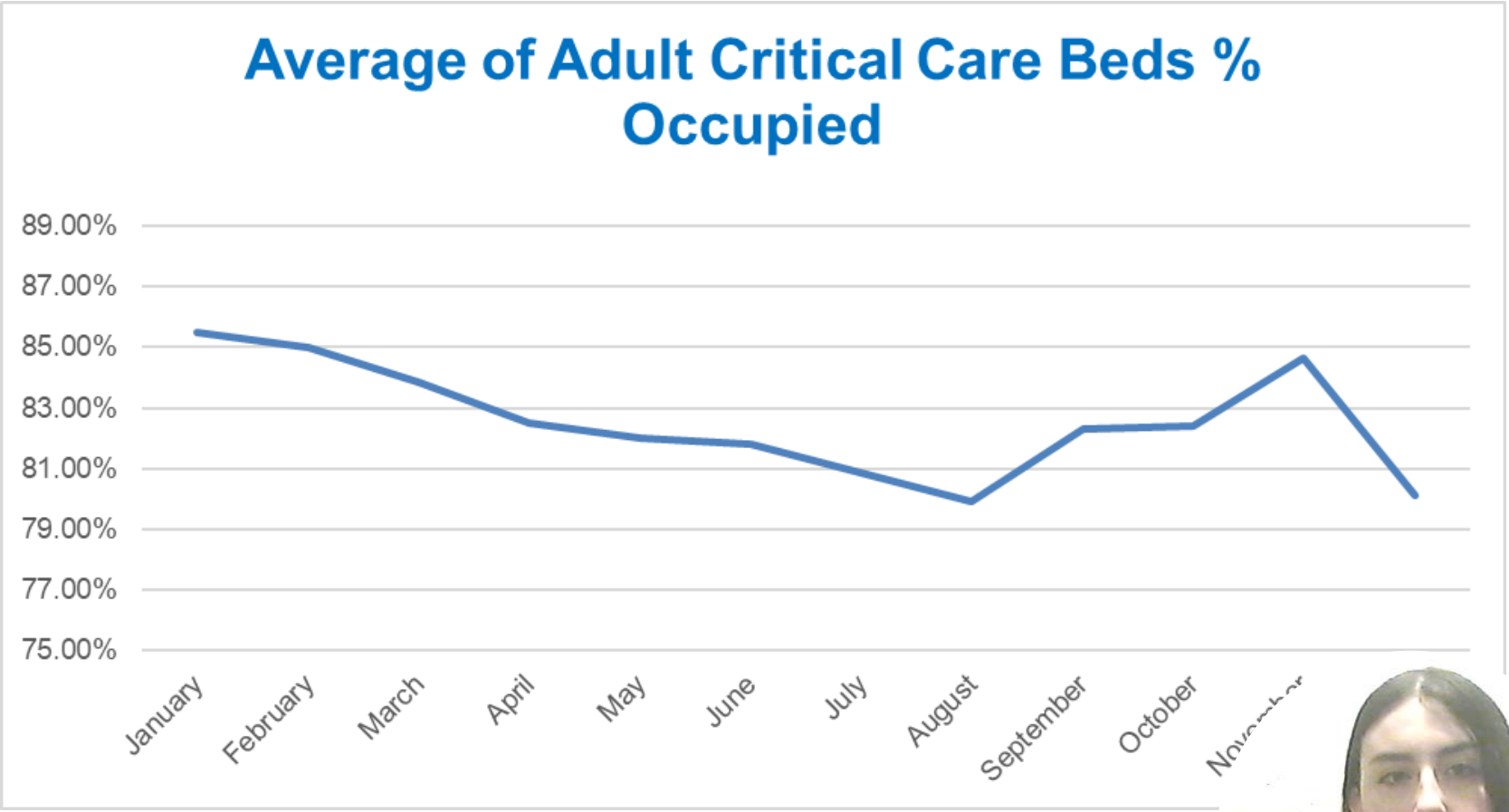
# Average of Adult Critical Care Beds % Occupied

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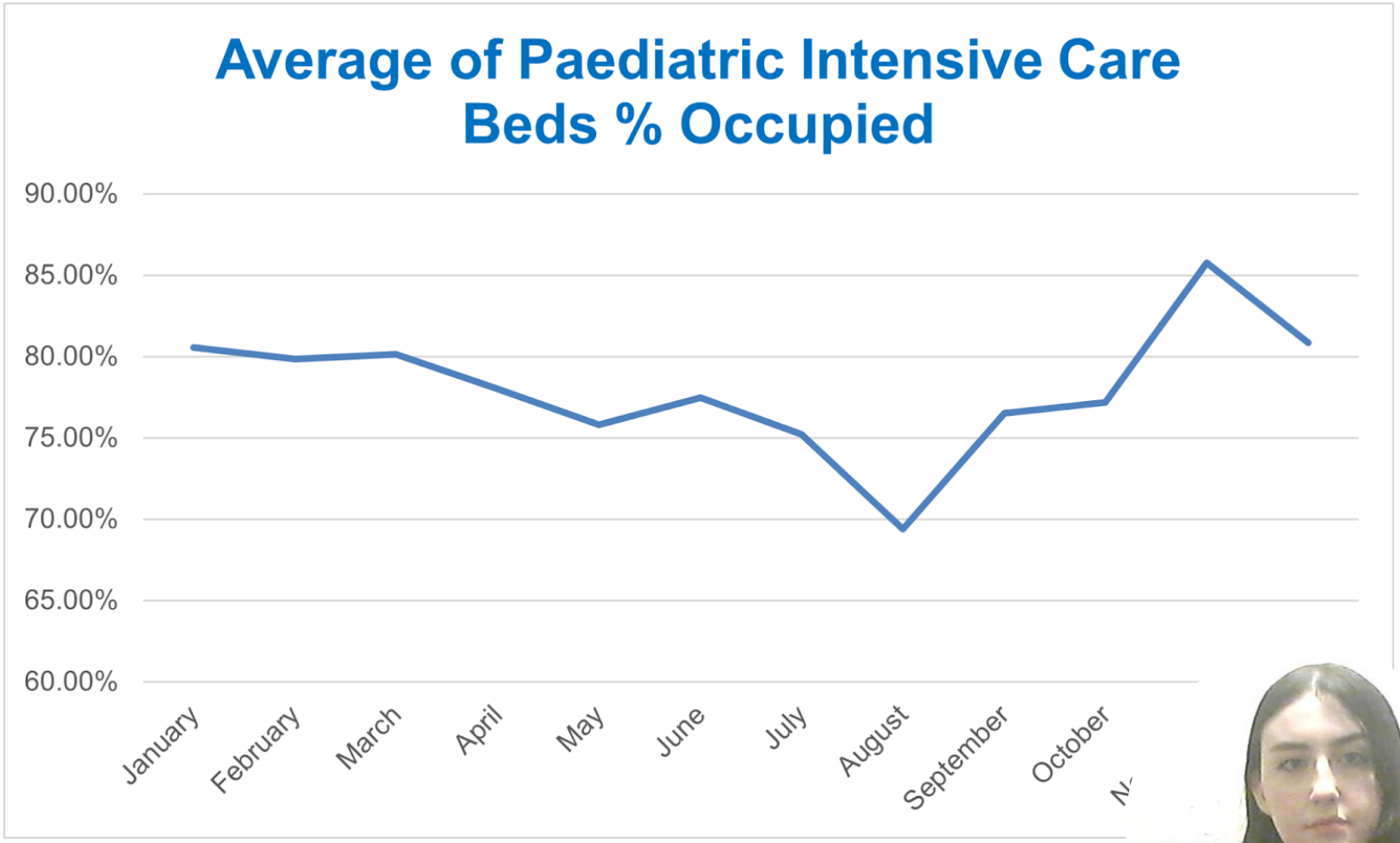
# Average of Paediatric Intensive Care Beds % Occupied

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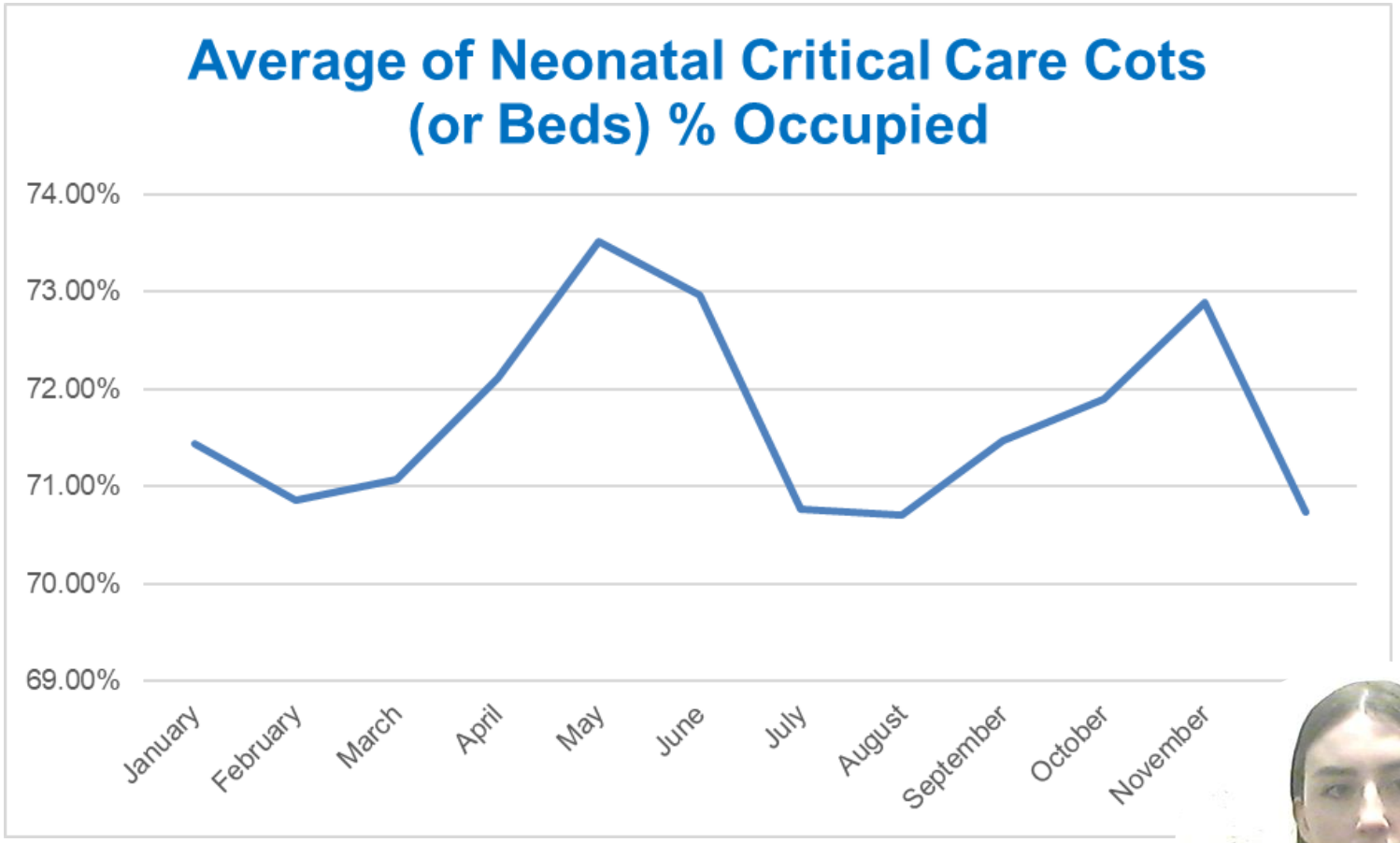


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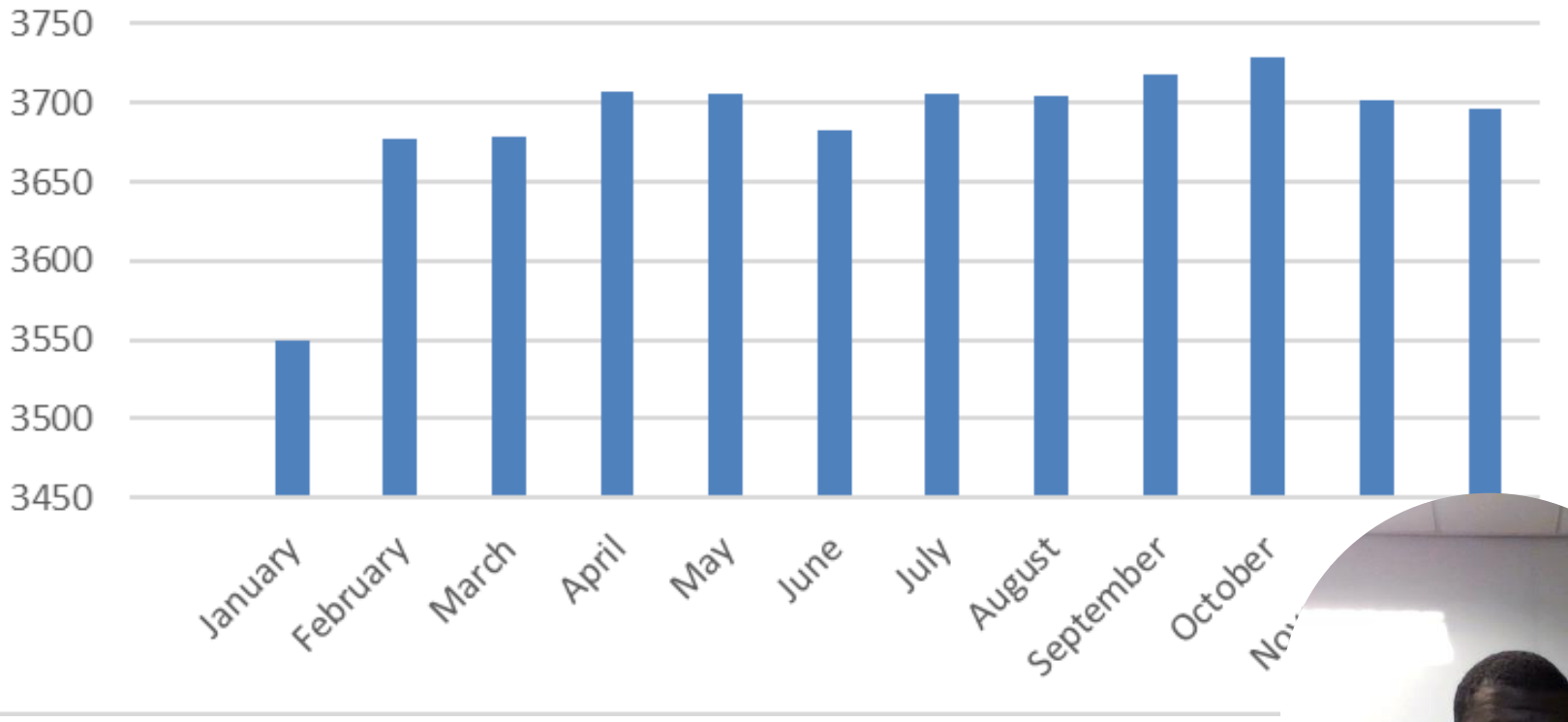
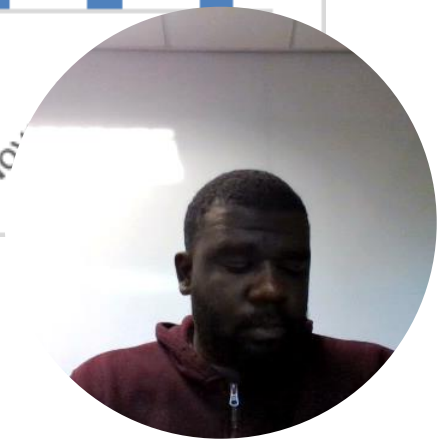
# Average of Adult Critical Care Beds % Available



Magloire Diala

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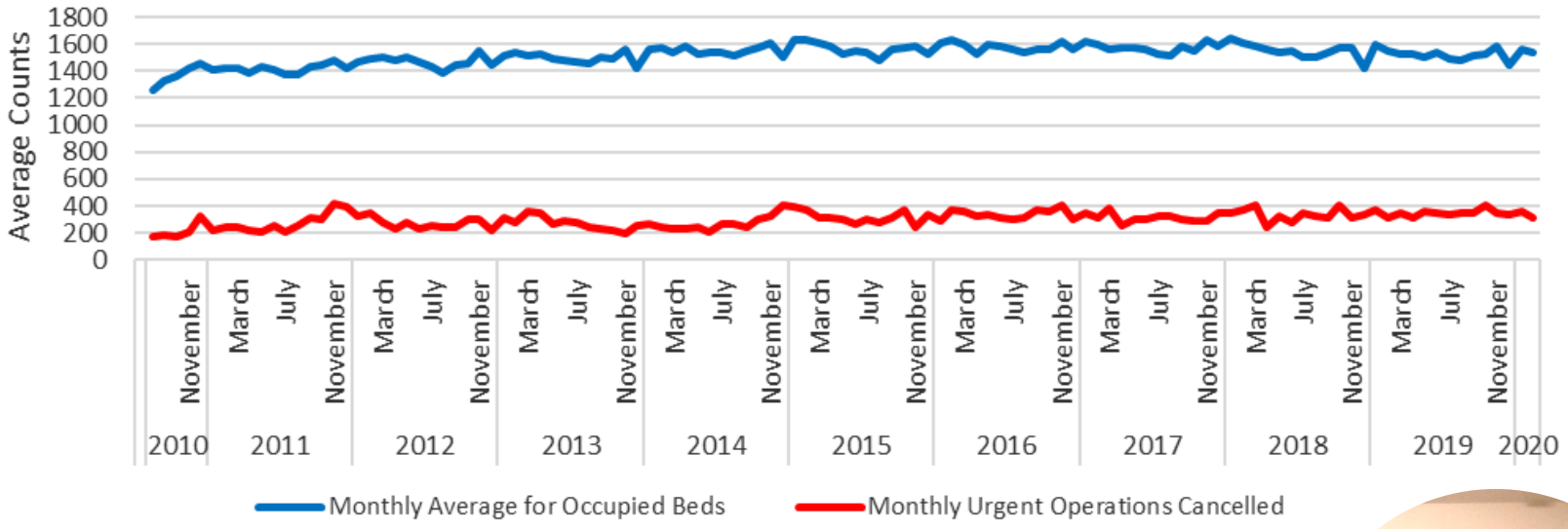
# Average Occupied Beds versus Cancellation of Operations

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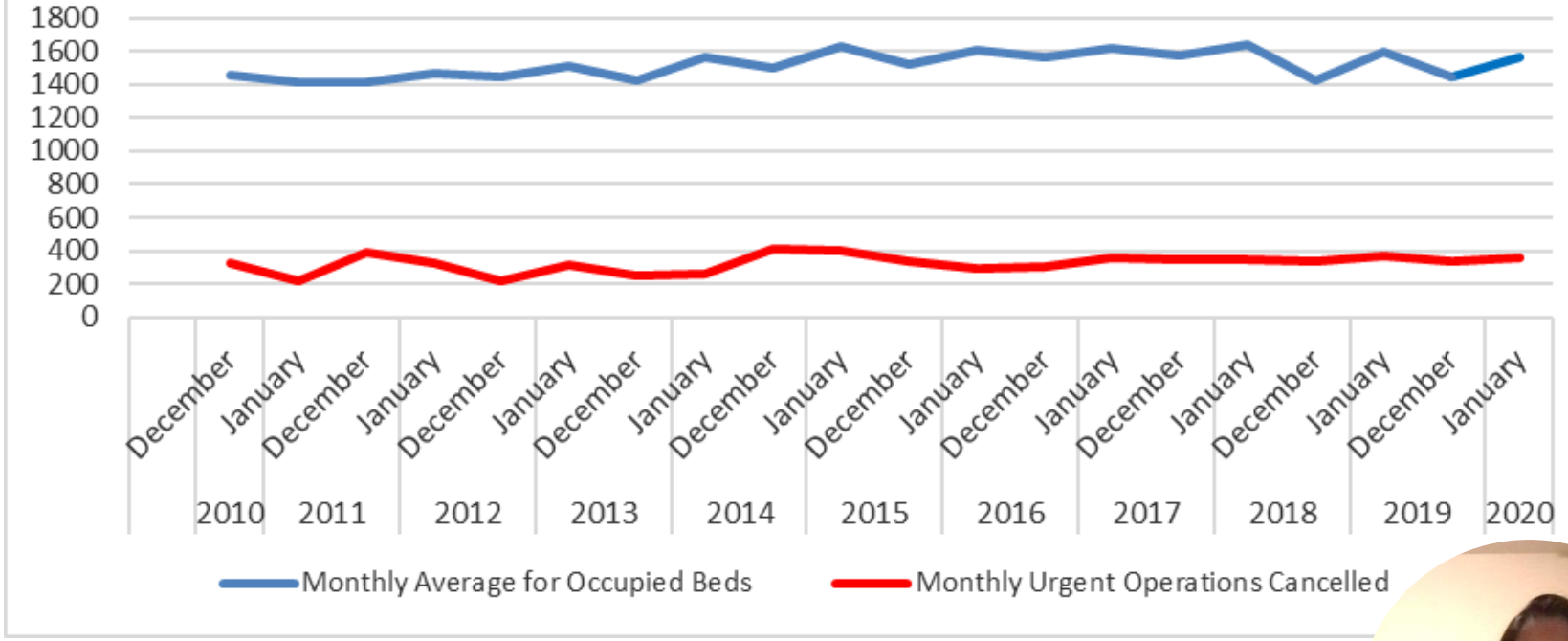
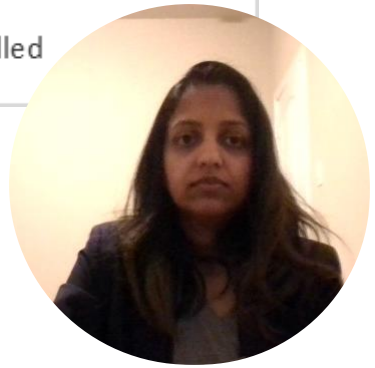
# Occupancy versus Operation Cancellations for Peak Months



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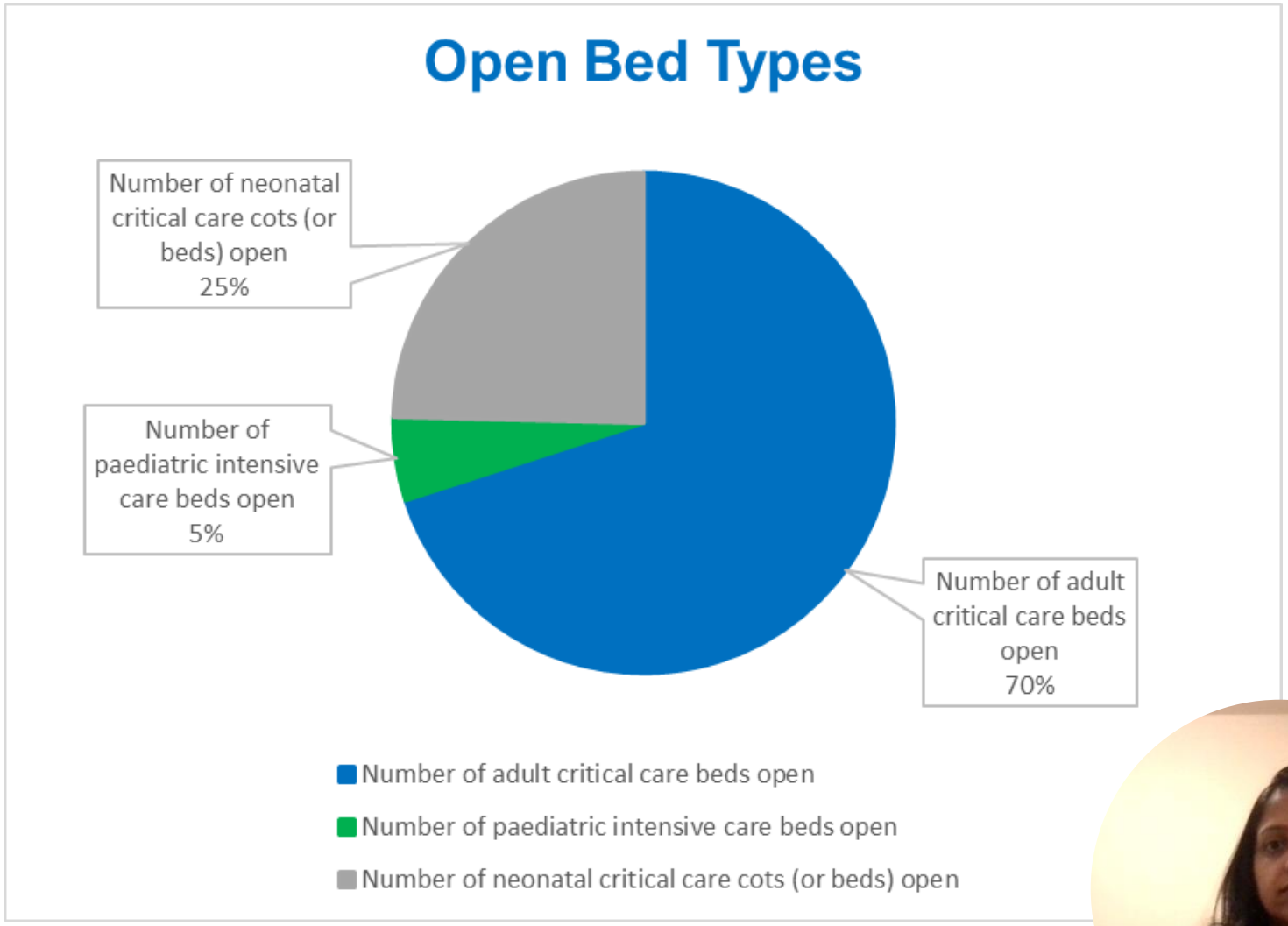


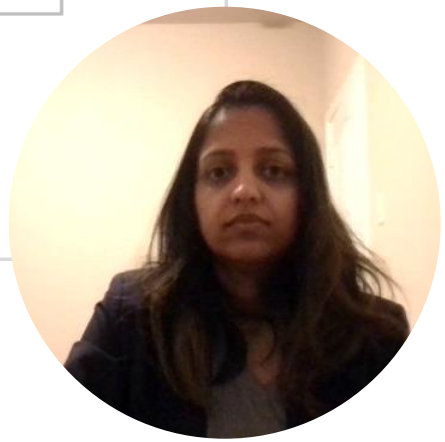

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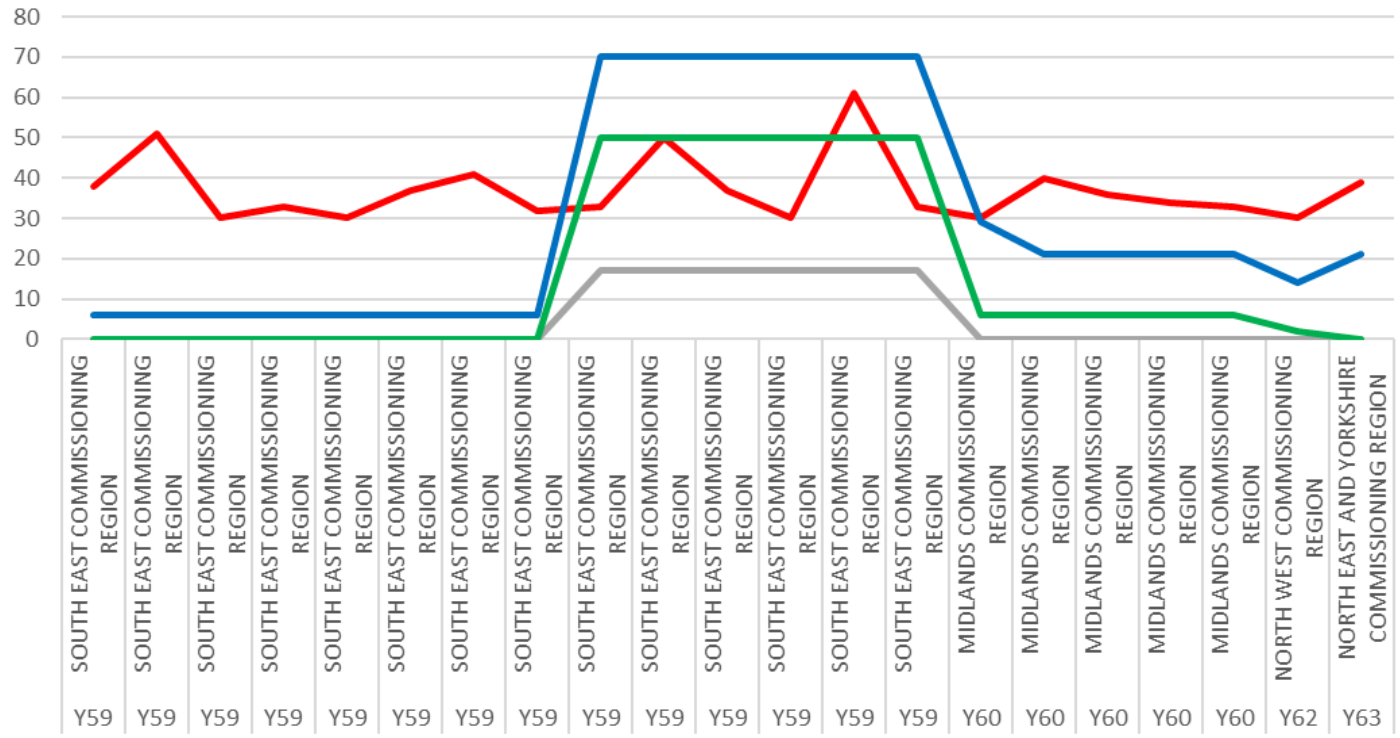
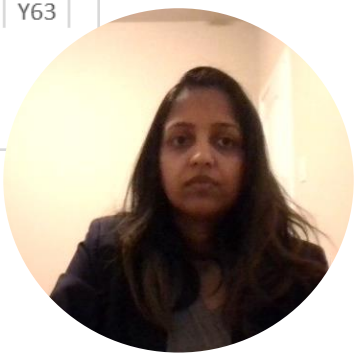
# Monthly Cancellations (30 or more) versus Bed Type



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# Improve Phase

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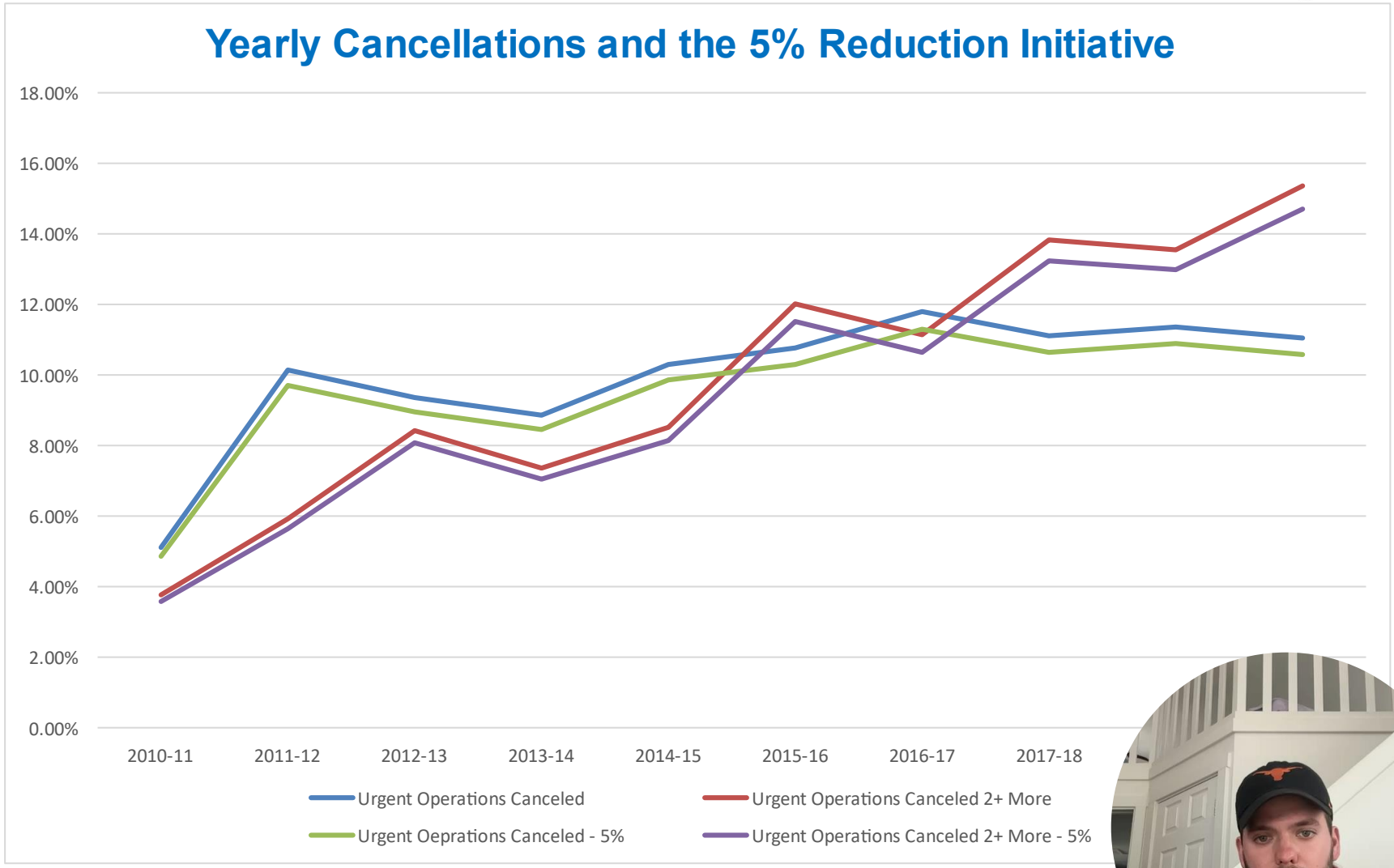
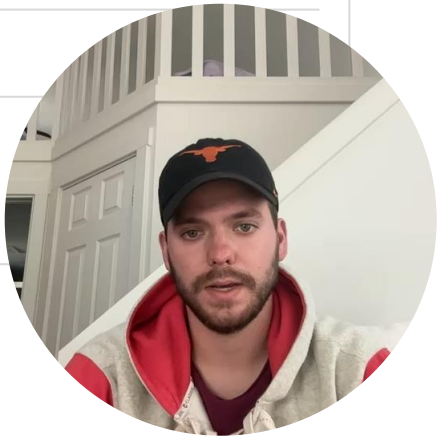
# Yearly Cancellations and the 5% Reduction Initiative



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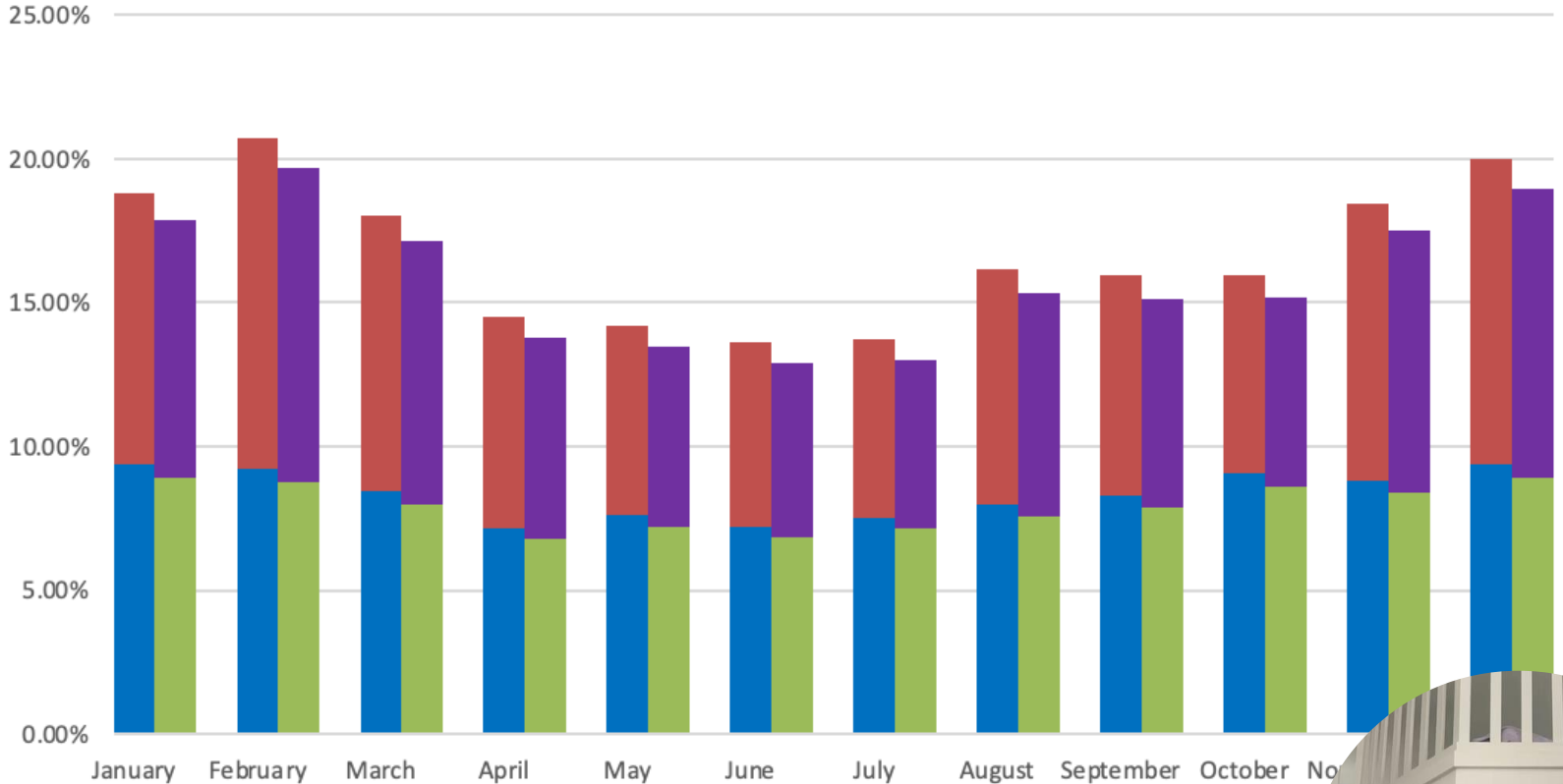
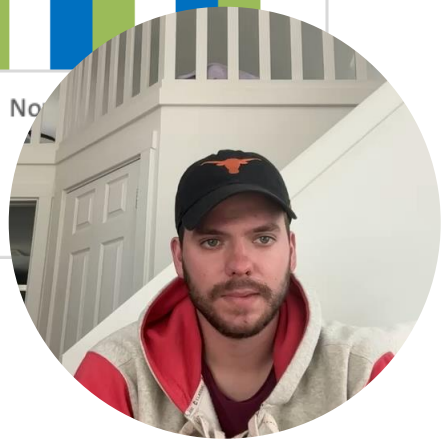
# Monthly Cancelations versus 5% Reduction



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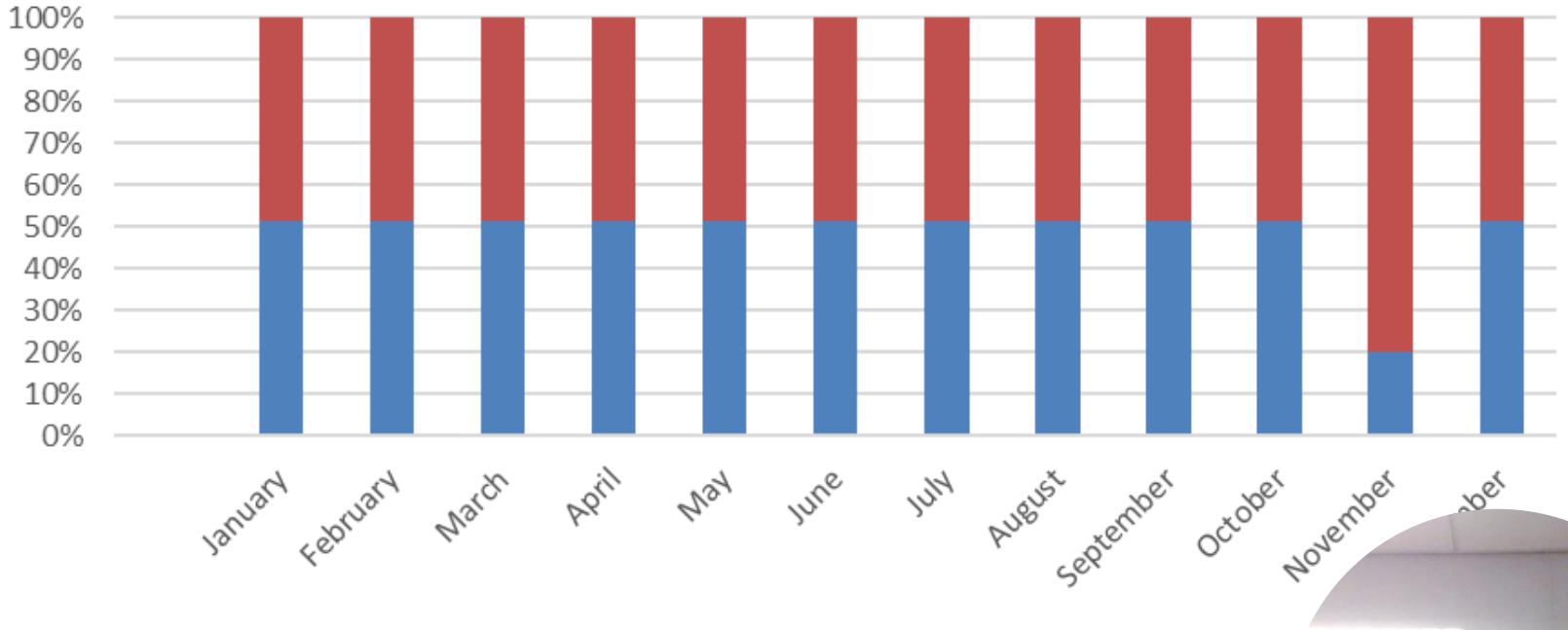
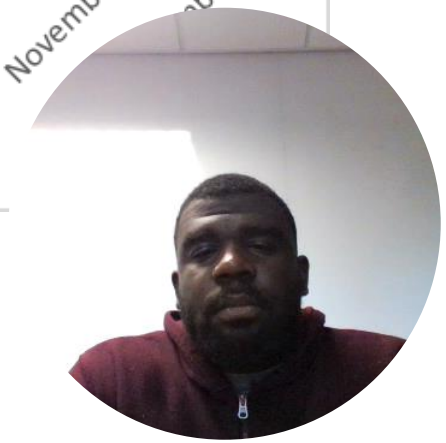
Julia Tenny

NHS RightCare

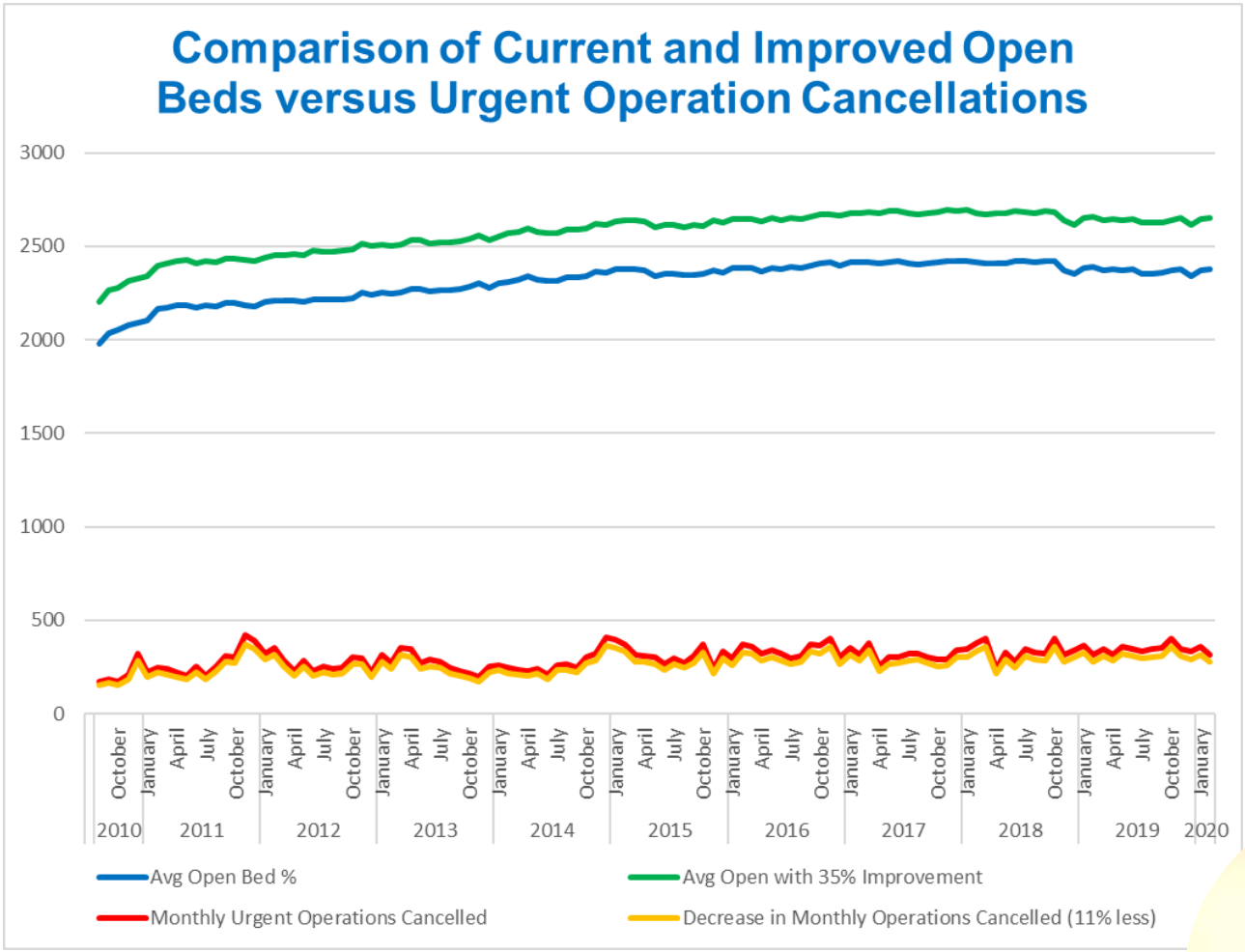
# Average of Adult Critical Care Beds % Available with % 5 Reduction



Magloire Diala

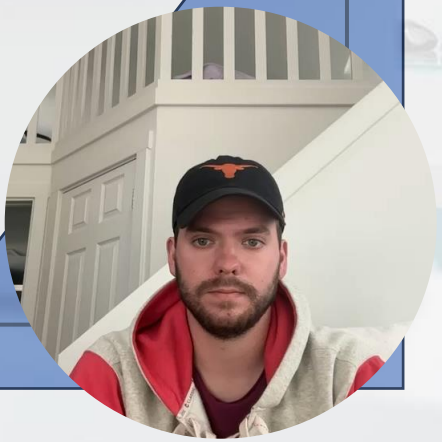
NHS RightCare




Sachi Wijeratne

NHS RightCare

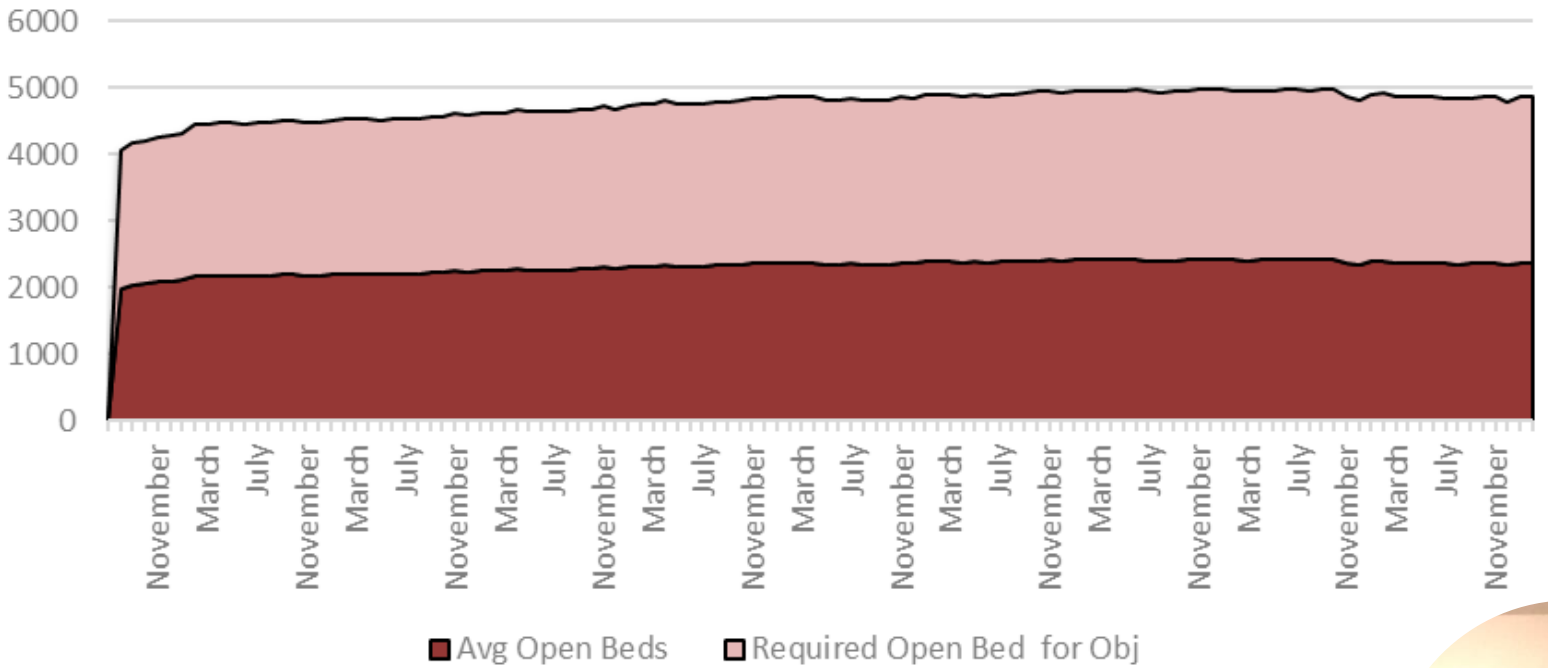
# Control Phase



Samuel Chadick

NHS RightCare

# Control Level for Available Beds on Average for NHS




Sachi Wijeratne

## Challenges in NHS Emergency Dept.

Government Neglect: Criticism for the government's failure to invest in addressing the ongoing bed scarcity issue.

Radical Changes: Proposed solutions include patient copayments and a shift towards the private health sector.

Productivity Concerns: Complaints about the government's assertion of inefficient resource utilization in the NHS.

Private Sector Embrace: Government leans towards relying on the private health sector, raising concerns about exacerbating issues.

Staff Burnout: Over 50 years, staff burnout has increased, leading to a significant work strike on February 6th.

Funding for Staff Welfare: Advocacy for government funding to address staff burnout and retain healthcare professionals within the NHS.

# Strategic Recommendations

## 1. Objective:

- Increase all bed types by 15% across the network to achieve a 5% reduction in urgent operation cancellations.

## 2. Improve:

- Increase all bed types by 35% across the network for a minimally significant decrease (11%) in urgent operation cancellations.
- Increase the number of pediatric intensive care beds, particularly in the Southeast Commissioning Region, for better bed type balance.

## 3. Control:

- Stipulate a minimum bed availability measure for each NHS organization, ensuring monthly maintenance for continued NHS membership qualification.
- Increase welfare funding for NHS-ICU staff to mitigate high turnover rates and promote staff retention.

Reference taken from: The Lancet (2023). The NHS is sick, but it is treatable. *Lancet (London, England)*, *401*(10373), 245. https://doi.org/10.1016/S0140-6736(23)00164-2

**Sachi Wijeratne**

# Objective & Metrics

*Objective*

- Maintain a 5% reduction in urgent operation cancellations across the entire NHS hospital system.

- *Performance Metrics*
  - Monthly hospital wide urgent operation cancellations.
  - Monitoring balance of distribution of bed categories.
  - Percentage change in cancellations compared to the baseline.
  - Patient satisfaction with scheduling across hospitals (New Suggestion).

Samuel Chadick

# Key Elements of Good Standing

1. Proactive Scheduling
2. Emergency Preparedness
3. Staff Training and Adherence
4. Risk Management Protocols
5. Data Collection and Analysis
6. Continuous Improvement Culture

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# Monitoring & Reporting

- ***Compliance Monitoring***
  - Conduct regular audits to ensure adherence.
  - Address non-compliance through corrective actions.
    - Organizations failing to meet bed the minimum bed availability requirements for three consecutive assessments face the revocation of their NHS membership.

- ***Reporting***
  - Generate monthly and weekly report on KPIs.
  - Participate in quarterly performance reviews.

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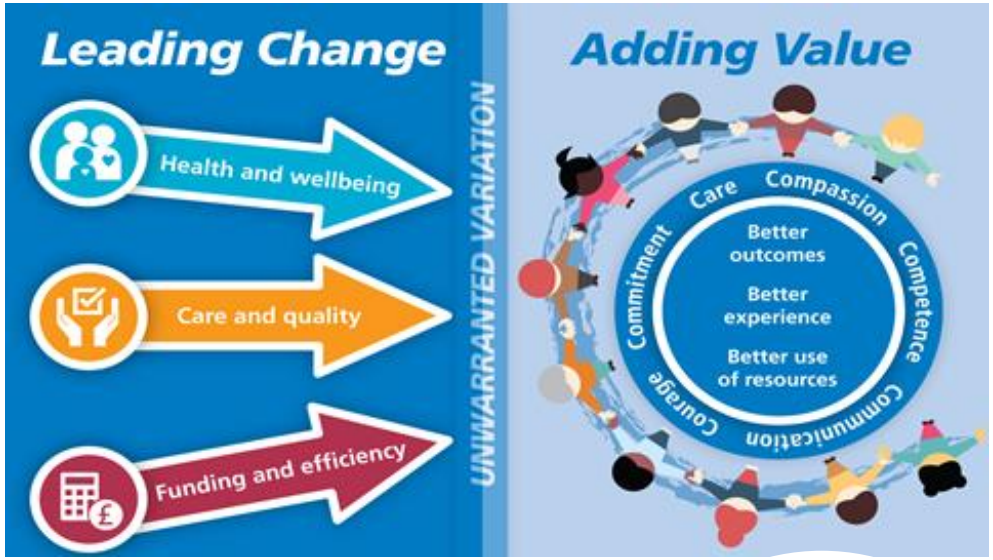
# Communication & Evolution

- *Encourage Communication*
  - Foster open communication among hospitals.
  - Share best practices and implement best practices to collectively reduce urgent operations cancellations.

- *Revision and Approval*
  - Promote lobbying to current government to improve investments and funding.
  - Regularly review and revise the standard as necessary.
  - Promptly communicate any changes to all NHS hospitals within the system.

# Critical Care Enhancements

- Increase Critical Care Bed Capacity: Strategically expand capacity, especially for pediatric patients, in proportion to population growth.
- Augment Staffing Levels: Increase staffing to ensure an adequate staff-to-bed ratio for maintaining high standards of care.
- Enhance Staff Compensation: Explore compensation adjustments to attract and retain skilled professionals.




Reference taken from: Parry-Jones J. (2023). Improving critica
discharges, and systemic pressures. *BMJ (Clinical research ed.)*,
https://doi.org/10.1136/bmj.p1363

**Julia Tenny**

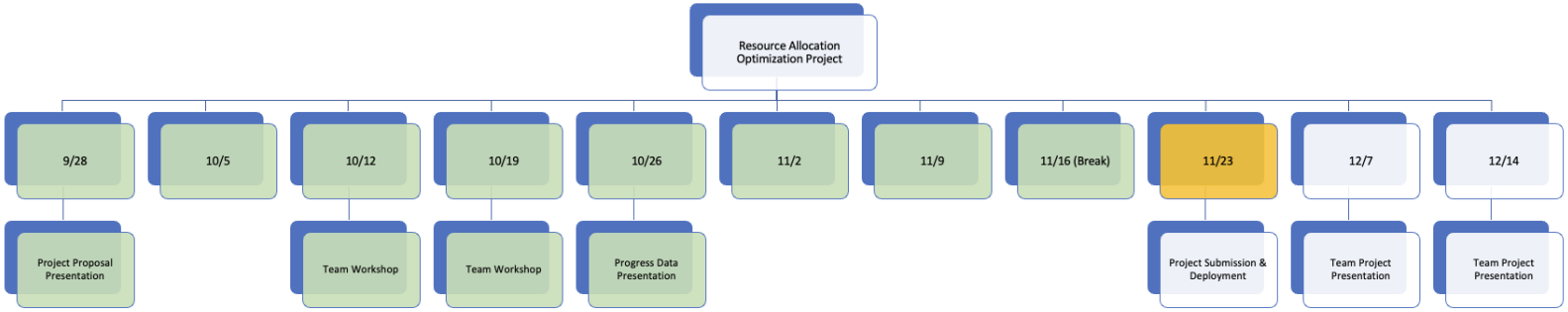
# Leadership for Service Quality Improvement

Drew and Pandit's peer-reviewed journal article on "The BMJ" refers to how excellent leadership and collaborative management can achieve the required improvements in the service quality of medical services. Both authors with a medical background explain how it should be achieved through systematic procedures to positively change the culture within the medical organizations and their staff.

Reference taken from: Drew, J. R., & Pandit, M. (2020). Why healthcare leadership should embrace quality improvement. *BMJ*, m872. https://doi.org/10.1136/bmj.m872

**Julia Tenny**

# Work Breakdown Schedule

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