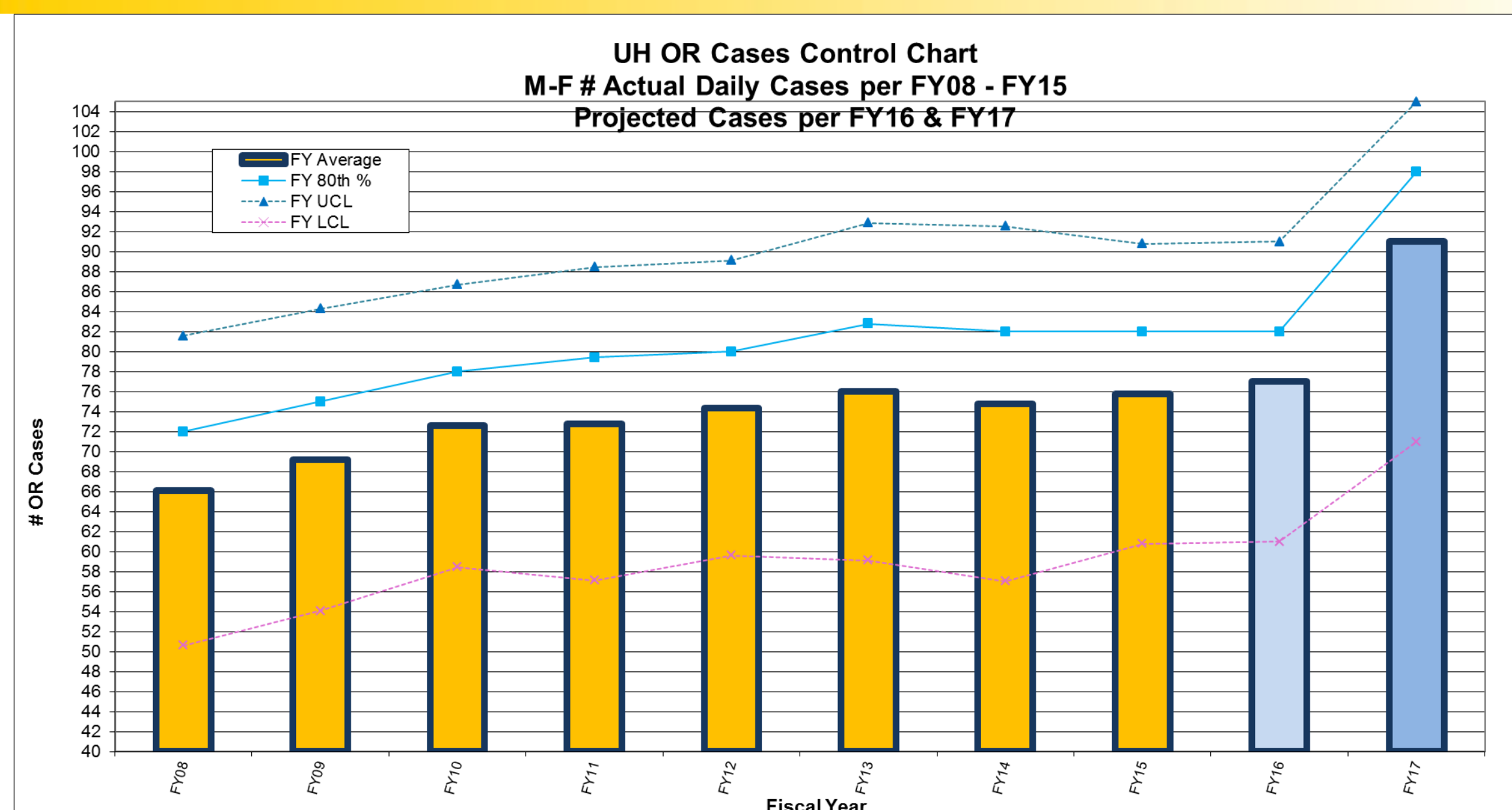


## Optimizing UMHS Block Scheduled OR's & Inpatient Beds with 4 New Adult UH OR's

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### Problem Statement

#### Why Adding Rooms



UH ORs are highly constrained

- Average 75 cases per day with 10% variability
- Average 10 hour room usage = 87%

To address the OR congestion, 4 new ORs set to open in July 2016

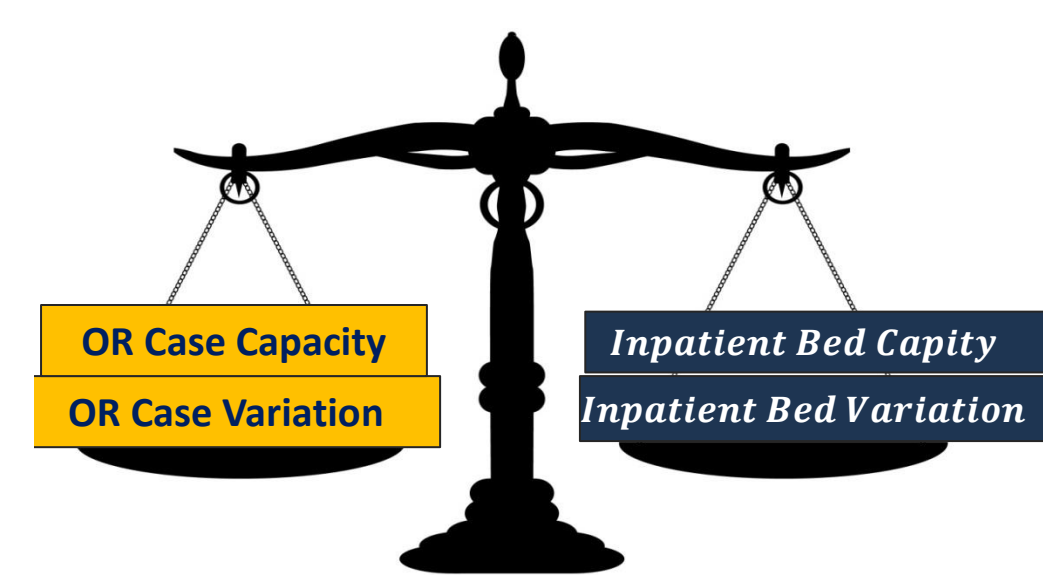
- Surgical services receiving additional OR time were identified based on each service's OR utilization

#### Effects of Block Schedule

#### Increased OR Inpatient Cases with 4 new OR's

OR Activation Project  
 Block Optimization

Goal: Identify an OR block arrangement that best levels inpatient census across the week without sacrificing "smooth-ness" in the OR or PACU



Traditional Smoothing Metrics

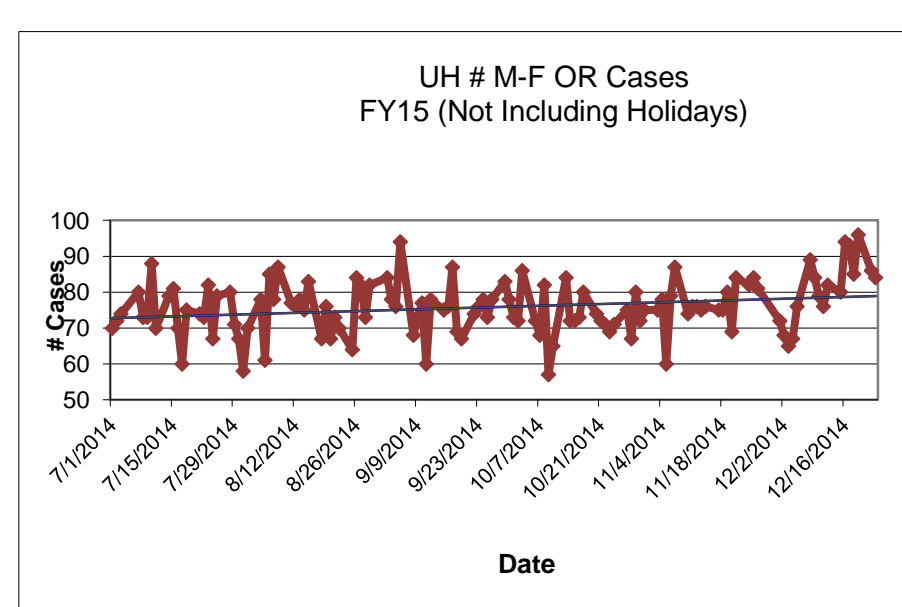
Decreasing variation in following metrics across days of the week

- Case Hours per Day
- Count of Cases by Hour of Day
- Unit Census/Demand

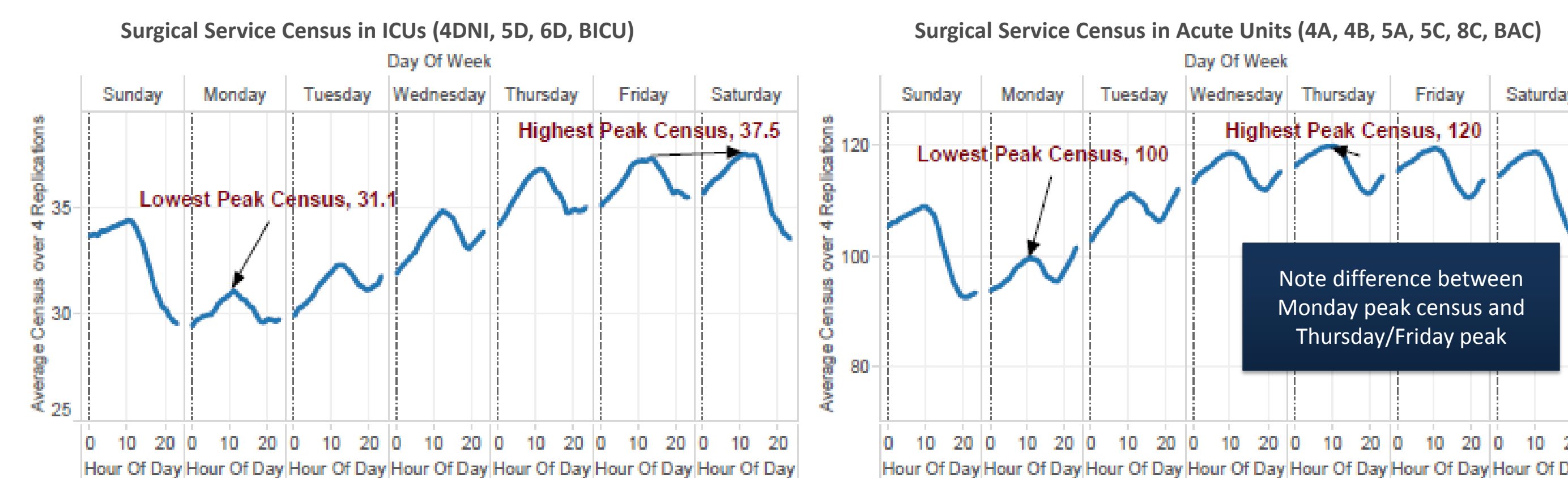
#### Key Issues

Increased surgical patient volume requires planning to address

1. High Variability in Bed & OR Needs
  - Day-to-day (inpatient occupancy ranges from 75% to 95% based on DOW and month variation)
  - Among units & services (surgical patients are placed on specialized units, these units will experience occupancy increases to a greater degree than the hospital as a whole)
2. High Capacity in Bed (85%) & OR (87%) Needs



### Solution Approach



Variation in surgical census is high. Because "planning for the peak" is required, census variation across days of week should be minimized.

#### How are Beds & ORs Organized?

	Mon	Tue	Wed	Thu	Fri
<b>Core A</b>					
1	Ortho	Ortho	Ortho	Ortho	Ortho
2	Ortho	Ortho	Ortho	Ortho	Ortho
3	Ortho	Ortho	Ortho	Ortho	Ortho
4	Ortho	Ortho	Ortho	Ortho	Ortho
5	Ortho	Ortho	Ortho	Ortho	Ortho
6	Ortho	Ortho	Ortho	Ortho	Ortho
7	Ortho	Ortho	Ortho	Ortho	Ortho
8	Ortho	Ortho	Ortho	Ortho	Ortho
<b>Core B</b>					
9	GSA	Oral	Oral	Oral	Oral
10	Ortho	Ortho	Ortho	Ortho	Ortho
11	Ortho	Ortho	Ortho	Ortho	Ortho
12	Ortho	Ortho	Ortho	Ortho	Ortho
13	Ortho	Ortho	Ortho	Ortho	Ortho
14	Ortho	Ortho	Ortho	Ortho	Ortho
15	Ortho	Ortho	Ortho	Ortho	Ortho
16	Ortho	Ortho	Ortho	Ortho	Ortho
17	GSA	STX	STX	STX	GSA

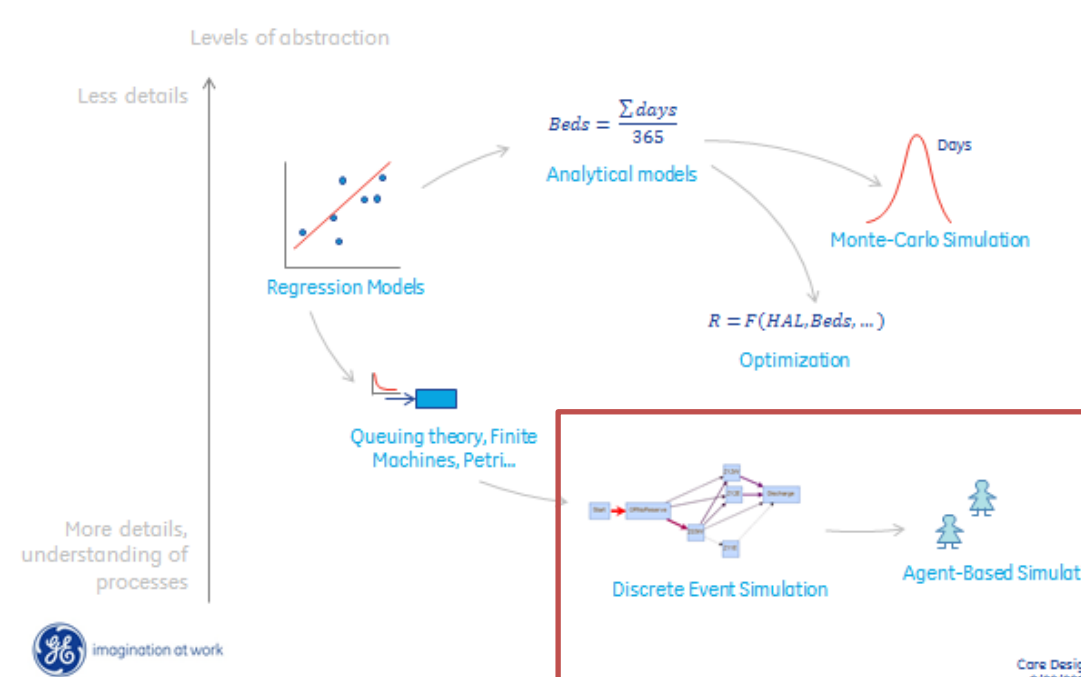
#### Approach

**GE Hospital of the Future simulator:** used to test the impact of changes in block allocations on inpatient occupancy

**OR case volume analysis:** used to identify the impact of changes in block allocations on OR and PACU case variability

**Step 1:** 28 block allocation scenarios were tested in HOF simulator to find the scenarios that minimized impact on peak inpatient census.

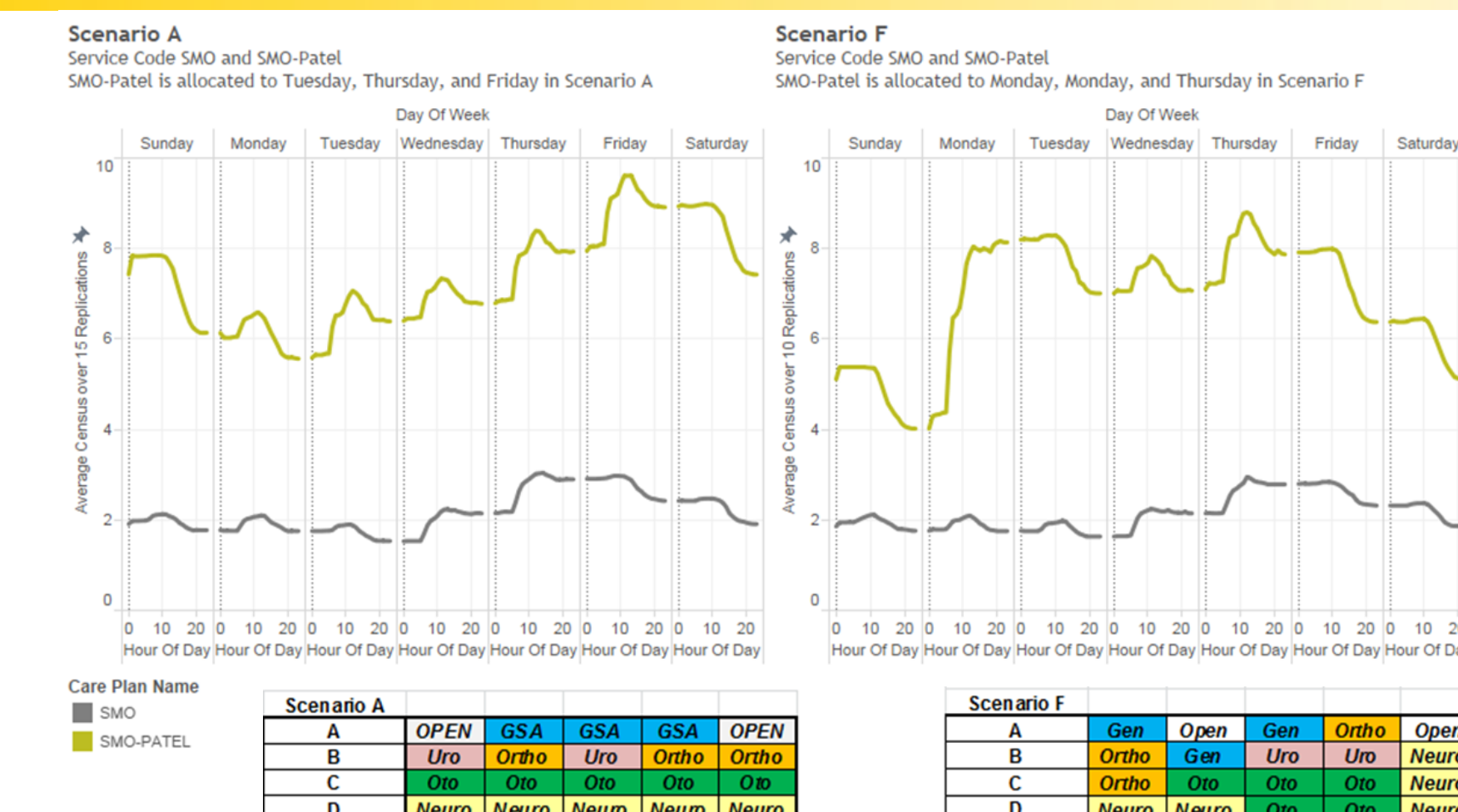
**Step 2:** Of the top performers, the scenario that minimized the increase in case volume and case hour variation across days of the week was identified. This ensures that the OR and PACU will remain "balanced", which is important for staffing and equipment and supplies considerations.



Scenario	A	B	C	D
<b>Scenario A</b>	OPEN	GSA	GSA	OPEN
A	Uro	Ortho	Uro	Ortho
B	Ortho	Ortho	Ortho	Ortho
C	Ortho	Ortho	Ortho	Ortho
D	Neuro	Neuro	Neuro	Neuro
<b>Scenario B</b>	Uro	Uro	Gen	Gen
A	Uro	Uro	Gen	Ortho
B	Open	Open	Ortho	Ortho
C	Ortho	Ortho	Ortho	Neuro
D	Ortho	Neuro	Neuro	Neuro

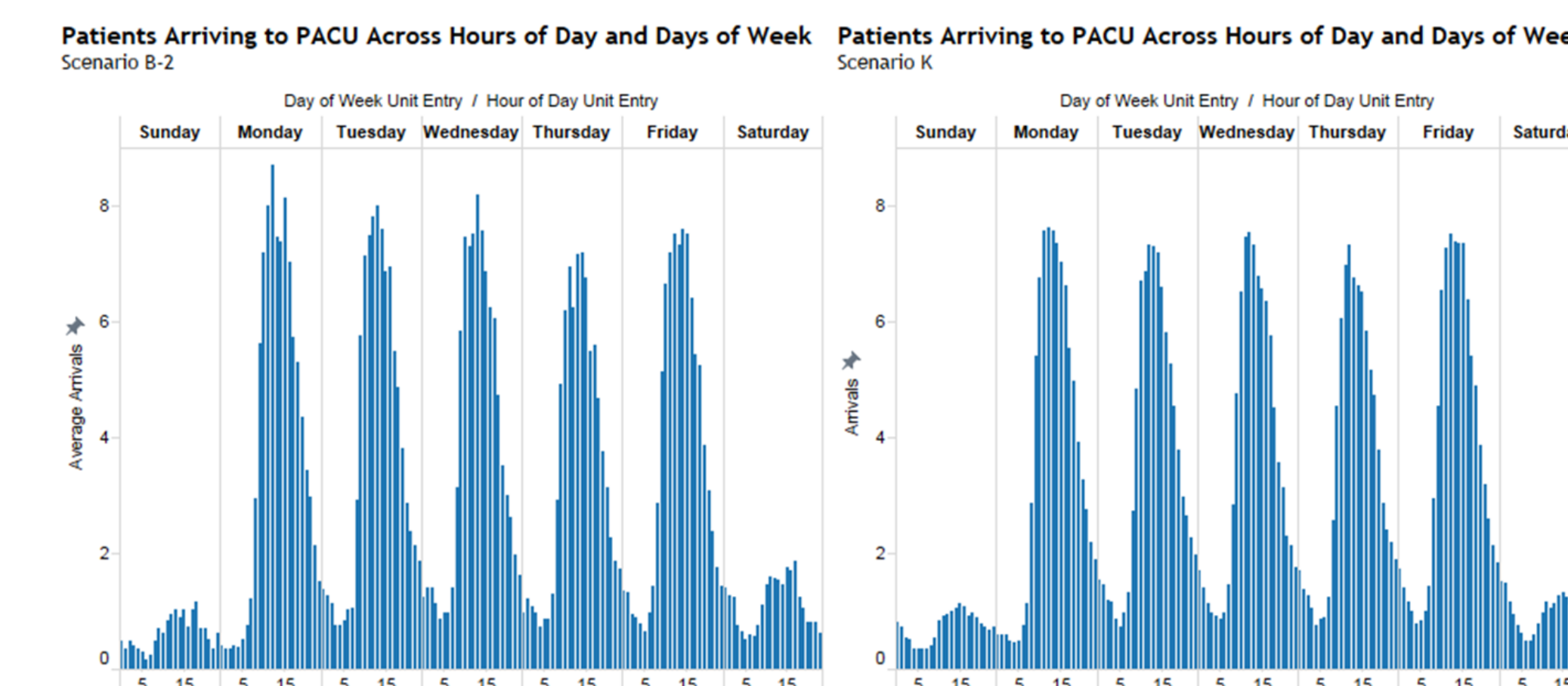
### Impact/Results

#### Model Census Outputs



The distribution of volume across the week is edited according to block scenarios and specific to the surgeon-based patient type. Note in scenario A, Orthopedic census increases Tuesday, Thursday, Friday, and in scenario F, there is a dramatic increase on Monday and a small increase on Thursday

#### Model PACU Outputs



Comparing the impact of the increase in surgical volume on PACU DOW variation between 2 potential scenarios

#### Optimal Model vs Chosen

**Multiple considerations for determining success:**

- ✓ minimizes impact on inpatient census
- ✓ minimal impact on OR case variation across days of week
- ✓ minimal impact on clinic schedules
- ✓ ensure surgeons receive the appropriate room type and size
- ✓ ensure new blocks are in the appropriate core
- ✓ minimal impact on current block schedule

**Stakeholders made difficult prioritization decisions**

Scenario	Metric	Su	M	Tu	W	Th	F	Sa	Variation Across Week
B-2	Peak ICU Census	78	71	74	79	81	82	84	3.2%
	Peak Acute Census	184	166	185	204	212	211	210	
	Cases per day	78	74	79	81	82	83	83	
K	Peak ICU Census	78	74	79	81	82	83	83	2.3%
	Peak Acute Census	181	161	182	200	212	207	207	
	Cases per day	78	74	79	81	82	83	83	

Over 20 potential scenarios were eliminated as infeasible. Chosen scenario shown at right

	Mon	Tue	Wed	Thu	Fri
<b>A</b>	Uro	Open	Uro	Open	Plastics
<b>B</b>	Ortho	GSA	Ortho	Ortho	GSA
<b>C</b>	Neuro	Ortho	Ortho	Ortho	Ortho
<b>D</b>	Neuro	Neuro	Neuro	Ortho	Neuro

#### Conclusions and Future Work

1. Data led to objective discussions on prioritization of OR block scheduling and bed needs.
2. Go Live July 1, 2016
3. Future work includes monitoring data every 3 months to adjust and plan as needed.