



## Objectives

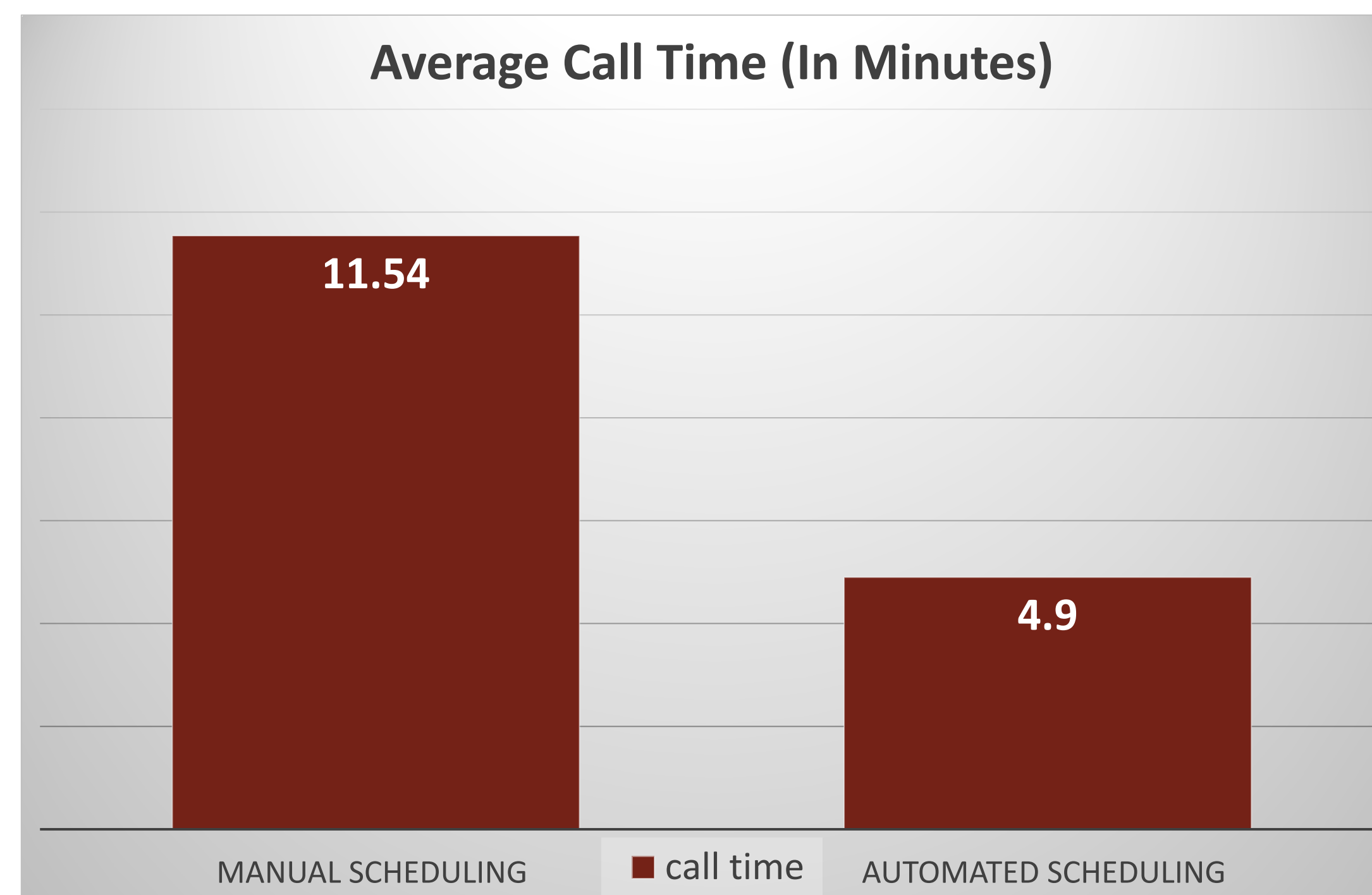
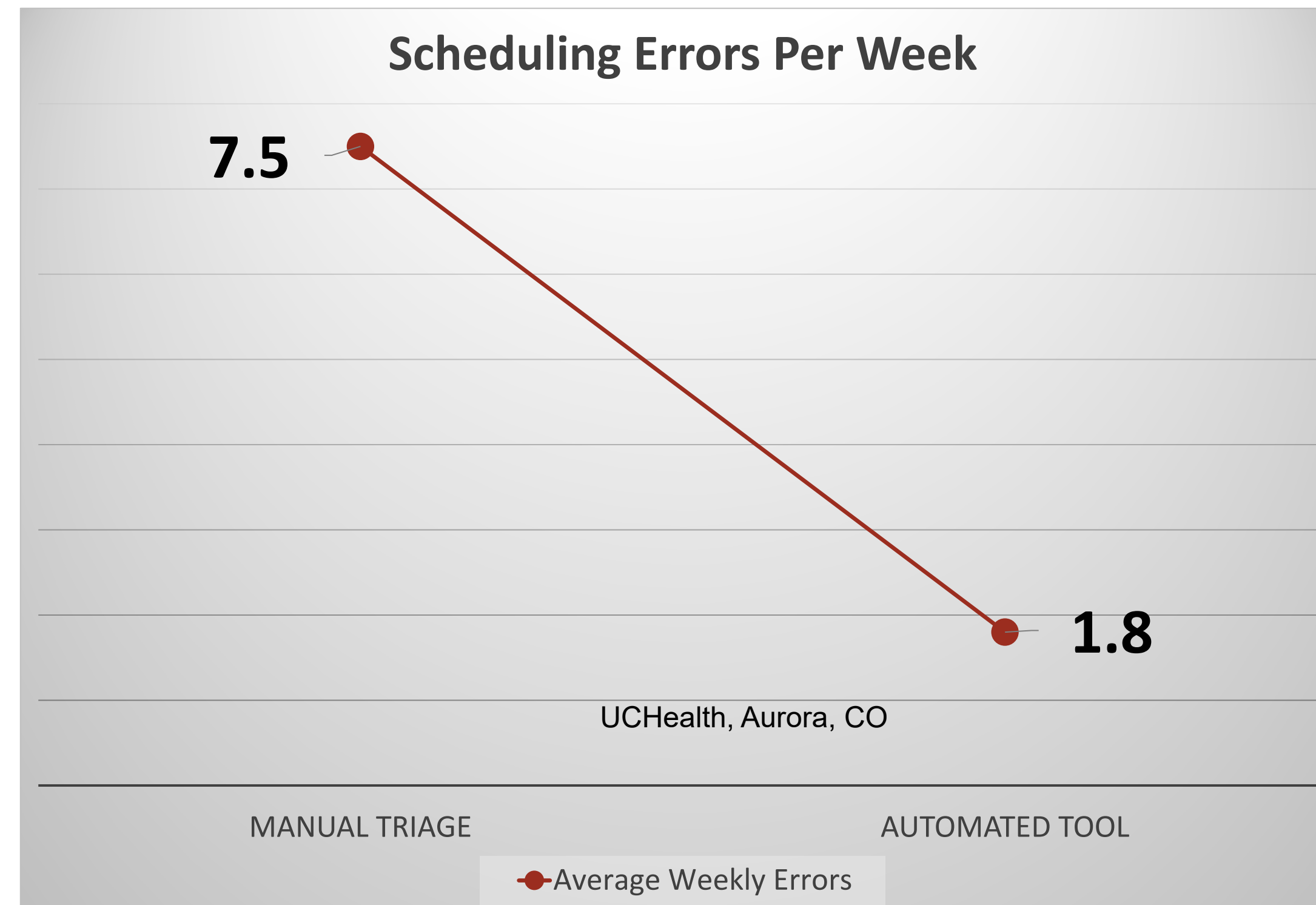
- Illustrate the potential cost savings and benefits of an automated scheduling tool for procedural scheduling.
- Discuss the methods employed in establishing an automated procedural scheduling process.

## Background

- Existing logistical challenges with patient scheduling exacerbated during transition from conscious sedation to propofol sedation provided by anesthesia in July 2021 for ambulatory gastroenterology procedures at UCHealth University of Colorado Hospital
- Underwent iterative process of developing screening tools to ensure patients appropriately triaged according to sedation risk
- Triage initially performed by clinical nursing staff who communicated recommendation to non-clinical schedulers; was a highly subjective and time-consuming process
- Questionnaire and decision tree developed to allow non-clinical scheduling staff to manually perform focused screening of patients to determine appropriate level of sedation
- Length of questionnaire and inaccuracy of patient responses indicated the need for an automated and less subjective process
- Partnered with Electronic Health Record (EHR) analysts to create report that extracted information from patient's chart to answer survey questions. Used binary system (0 or 1) to score each question and generate patient specific score that represents sedation risk level

## Purpose

- Improve efficiency in scheduling process
- Leverage existing information in patient EHR to increase accuracy in risk assessment and room triage
- Decrease staffing requirements by eliminating the need for manual triaging for the majority of patients
- Reduction of costs associated with patient triage and procedure scheduling



## Methods

- Tool reviews >90 separate components of patient's EHR, assessing for cardiac and pulmonary disease history, kidney and liver function, medications, and Body Mass Index
- Tool generates score for hundreds of patients instantaneously
- Patients with lower scores are assumed to have fewer comorbidities, posing less risk for anesthesia complications. Patients lacking recent documentation require manual triage
- Scores 0-10: fast tracked to scheduling hub where non-clinical personnel schedule them without requiring clinical review; 65% meet this criteria
- Scores >10: sent to a nurse navigator, who utilizes itemized report to quickly identify items responsible for higher score and determine if patient is appropriate for propofol sedation

## Outcomes

- Tool has allowed scheduling team to screen high volume of patients, reducing overall scheduling time by 75%
- 98% scheduling accuracy rate
- Non-clinical staff utilizing tool to accurately, safely, efficiently schedule patients for multiple disciplines across UCHealth system
- Significant reduction in sedation related adverse events
- Estimated \$910,000 additional annual revenue due to reduction in cancellations and increased block utilization
- Elimination of manual nurse triage results in projected annual cost savings of >\$90,000.

## Discussion

- Tool continues to evolve through collaboration with anesthesia department members and analysis of quality of care events
- Success of project has led to implementation of automated triage tool in other procedural areas throughout UCHealth system
- How could the process be improved?
  - Earlier identification of dedicated anesthesia team
  - Increased collaboration in development of tool criteria
  - Enhanced preprocedural documentation of patient comorbidities
  - Collection of robust pre-procedure data to better understand impact of change

## Speaker Contact Information



# Scoring Tool Reference Spreadsheet

Cardiac			
Inquiry	Response	Action	Room Type
Chest pains, heart palpitations or shortness of breath?	No	Schedule Anywhere	Okay for MAC
	Yes	Call RN, Schedule Pre Procedure Visit	na
Chest pains, heart palpitations or shortness of breath?	Treatment Needed	Refer to PCP	na
	Urgent Issue	Triage to ED	na
	Patient is Stable	Chart Review	MAC
Defibrillator	No	Schedule Anywhere	MAC
	Yes	Chart Review (interrogation report)/Exclude from ASC	na
EF < 30	No	Chart Review	MAC
	Yes	Pre Procedure Consult	General
Pacemaker	No	Schedule Anywhere	MAC
	Yes	Chart Review	
> 40% beats Pacemaker	No	Schedule Anywhere	MAC

Social/Demographic/Sleep			
Inquiry	Response	Action	Room Type
Height and Weight	BMI < 45	Schedule Anywhere	MAC
	BMI > 45	Chart Review/Exclude from ASC	General
Pregnant	No	Schedule Anywhere	MAC
	Yes	Chart Review/Exclude from ASC	General
DNR Directive	No	Schedule Anywhere	MAC
	Yes	Exclude from ASC	
Family Member or Power of Attorney Consent	No	Schedule Anywhere	MAC
	Yes	Chart Review	
Wheelchair Transfer Assistance	No	Schedule Anywhere	MAC
	Yes	Chart Review/Exclude from ASC	General

Renal/Endocrine/Hematologic			
Inquiry	Response	Action	Room Type
Dialysis	No	Schedule Anywhere	MAC
	Yes	Chart Review, Exclude from ASC	?
Diabetes	No	Schedule Anywhere	MAC
	Yes	Chart Review	?
Diabetes, Insulin Dependent	No	Schedule Anywhere	MAC
	Yes	Chart Review	na
Diabetes, Insulin Dependent, HgA1c level > 9	No	Schedule Anywhere	MAC
	Yes	Exclude from ASC, preferably before 10AM	General Room
Anemia or Low Platelet Count	No	Schedule Anywhere	MAC
	Yes	Chart Review	na
Anemia or Low Platelet Count, Platelets < 50	No	Schedule Anywhere	MAC
	Yes	Receive Treatment prior to Procedure, Exclude from ASC	?
Anemia or Low Platelet Count, Hgb < 8	No	Schedule Anywhere	MAC
	Yes	Receive Treatment prior to Procedure, Exclude from ASC	?
Blood Clot, Legs or Lungs	No	Schedule Anywhere	MAC
	Yes	Chart Review	na
Blood Clot, Legs or Lungs, Last Event	> 12 months	Schedule Anywhere	MAC
	< 12 months but > 3 months	Exclude from ASC	?
	< 3 months	Only schedule if urgent, Exclude from ASC	General Room
Bleeding Disorder	No	Schedule Anywhere	MAC
	Yes	Chart Review/Pre Procedure Visit	?
Blood Thinners	No	Schedule Anywhere	MAC
	Yes	Chart Review/Pre Procedure Visit	?

Cardiac			
Inquiry	Response	Action	Room Type
Abnormal Heart Rhythm	Congenital Heart Disease/Decompensated	No	Schedule Anywhere
		Yes	Exclude from ASC, Pre An
AFIB rate > 100	Heart attack or Stent Placed	No	Schedule Anywhere
		Yes < 12 months	Delay scheduling procedu
		Yes > 12 months	Chart Review/Exclude from
Congenital Heart Disease	Valve heart disease diagnosis	No	Schedule Anywhere
		Yes	Chart Review (ECHO Report)
Valve heart disease diagnosis/ ECHO Report	Mild	Schedule Anywhere	MAC
	Moderate > 4 Mets	Schedule Anywhere	MAC
	Moderate < 4 Mets or unknown	Exclude from ASC/PPS Review	na
	Severe	Exclude from ASC/PPS review	na
Treated for Hypertension/ED visit to treat High Blood Pressure	No	Schedule Anywhere	MAC
	Last 12 months, no	Schedule Anywhere	MAC
	Last 12 months, yes	Exclude from ASC/Refer to PCP	?
Pulmonary Hypertension	No	Schedule Anywhere	MAC
	No symptoms with Exercise	Chart Review	?
	Symptoms with Exercise	Schedule Anywhere?	?

Hepatologic/Neurologic/Pulmonary			
Inquiry	Response	Action	Room Type
Cirrhosis of the Liver	No	Schedule Anywhere	
	Yes	Chart Review	
Cirrhosis of the Liver, Decompensated	No	Schedule Anywhere	
	Yes	Exclude from ASC, Cha	steps
Neuromuscular Disease	No	Schedule Anywhere	
	Yes	Chart Review/Exclude	
History of Seizures	No	Schedule Anywhere	
	Yes	Chart Review	
History of Seizures: Last Seizure	> 1 year ago	Schedule Anywhere	
	< 1 year ago	Exclude from ASC	
	< 1 month ago	Exclude from ASC, Pre	
Stroke or Transient Ischemic Attack (TIA)	No	Schedule Anywhere	
	Yes	Chart Review	
Recent Stroke or Transient Ischemic Attack (TIA)	> 9 months ago	Schedule Anywhere	MAC
	< 9 months ago	Suggest postponement for elective, Exclude from ASC, urgent only	?
Difficult Airway	No	Schedule Anywhere	MAC
	Yes	Exclude from ASC	?
Supplemental Oxygen during the Day	No	Schedule Anywhere	MAC
	Yes	Chart Review	na
Supplemental Oxygen during the Day, Flow Rate	< 2 Liters	Schedule Anywhere	MAC
	> 2 Liters	Exclude from ASC	?

# EMR Based Scoring Tool Example

601	GI Score (Metro)	701	GI Score (Metro)	203	GI Score (Metro)	602	GI Score (Metro)	304	GI Score (Metro)
06:55	— Score calculated: 2,000								
0	Pregnant	0	Pregnant	0	Pregnant	0	Pregnant	0	Pregnant
0	DNR	0	DNR	0	DNR	0	DNR	0	DNR
0	BMI > 45	0	BMI > 45	0	BMI > 45	0	BMI > 45	0	BMI > 45
0	Gastroparesis	0	Gastroparesis	0	Gastroparesis	0	Gastroparesis	0	Gastroparesis
0	Ejection Fraction < 40%	0	Ejection Fraction < 40%	0	Ejection Fraction < 40%	0	Ejection Fraction < 40%	0	Ejection Fraction < 40%
0	Allergy to Propofol or Succinylcholine	0	Allergy to Propofol or Succinylcholine	0	Allergy to Propofol or Succinylcholine	0	Allergy to Propofol or Succinylcholine	0	Allergy to Propofol or Succinylcholine
0	Takes Select Pulmonary HTN Med	0	Takes Select Pulmonary HTN Med	0	Takes Select Pulmonary HTN Med	0	Takes Select Pulmonary HTN Med	0	Takes Select Pulmonary HTN Med
<b>500</b>	<b>Insulin-Dependent Diabetes (Metro)</b>	<b>500</b>	<b>Insulin-Dependent Diabetes (Metro)</b>	0	Insulin-Dependent Diabetes (Metro)	<b>500</b>	<b>Insulin-Dependent Diabetes (Metro)</b>	0	Insulin-Dependent Diabetes (Metro)
0	Peripheral Neuropathy	0	Peripheral Neuropathy	0	Peripheral Neuropathy	0	Peripheral Neuropathy	0	Peripheral Neuropathy
0	High A1C (greater than 8.5%)	0	High A1C (greater than 8.5%)	0	High A1C (greater than 8.5%)	0	High A1C (greater than 8.5%)	0	High A1C (greater than 8.5%)
0	Tracheostomy	0	Tracheostomy	0	Tracheostomy	0	Tracheostomy	0	Tracheostomy
0	Esophagectomy or Esophageal Cancer	0	Esophagectomy or Esophageal Cancer	0	Esophagectomy or Esophageal Cancer	0	Esophagectomy or Esophageal Cancer	0	Esophagectomy or Esophageal Cancer
0	Cardiac Device	0	Cardiac Device	0	Cardiac Device	0	Cardiac Device	0	Cardiac Device
0	Bleeding Disorder	0	Bleeding Disorder	0	Bleeding Disorder	0	Bleeding Disorder	0	Bleeding Disorder
0	DVT or PE	<b>100</b>	<b>DVT or PE</b>	<b>100</b>	<b>DVT or PE</b>	0	DVT or PE	0	DVT or PE
0	Sleep Apnea & CPAP	<b>100</b>	<b>Sleep Apnea &amp; CPAP</b>	<b>100</b>	<b>Sleep Apnea &amp; CPAP</b>	0	Sleep Apnea & CPAP	<b>100</b>	<b>Sleep Apnea &amp; CPAP</b>
0	Daytime Oxygen Dependence	0	Daytime Oxygen Dependence	0	Daytime Oxygen Dependence	0	Daytime Oxygen Dependence	0	Daytime Oxygen Dependence
0	Pulmonary Hypertension	0	Pulmonary Hypertension	0	Pulmonary Hypertension	0	Pulmonary Hypertension	0	Pulmonary Hypertension
0	Neuromuscular Disease	0	Neuromuscular Disease	0	Neuromuscular Disease	0	Neuromuscular Disease	<b>100</b>	<b>Neuromuscular Disease</b>
0	Seizure Disorder	0	Seizure Disorder	0	Seizure Disorder	0	Seizure Disorder	0	Seizure Disorder
0	Developmental Delay	0	Developmental Delay	0	Developmental Delay	0	Developmental Delay	<b>100</b>	<b>Developmental Delay</b>
0	Dialysis Dependence	0	Dialysis Dependence	0	Dialysis Dependence	0	Dialysis Dependence	0	Dialysis Dependence
0	Anemia and Platelets < 50	0	Anemia and Platelets < 50	0	Anemia and Platelets < 50	0	Anemia and Platelets < 50	0	Anemia and Platelets < 50
<b>100</b>	<b>Anemia and Hemoglobin &lt; 9</b>	0	Anemia and Hemoglobin < 9	0	Anemia and Hemoglobin < 9	<b>100</b>	<b>Anemia and Hemoglobin &lt; 9</b>	0	Anemia and Hemoglobin < 9
0	Cardiac Stent or Heart Attack	0	Cardiac Stent or Heart Attack	0	Cardiac Stent or Heart Attack	0	Cardiac Stent or Heart Attack	0	Cardiac Stent or Heart Attack
0	Cardiac Valve Disease	0	Cardiac Valve Disease	0	Cardiac Valve Disease	0	Cardiac Valve Disease	<b>1</b>	<b>Cardiac Valve Disease</b>
0	Chest Pain or Angina	0	Chest Pain or Angina	0	Chest Pain or Angina	0	Chest Pain or Angina	0	Chest Pain or Angina
0	Congenital Heart Disease	0	Congenital Heart Disease	0	Congenital Heart Disease	0	Congenital Heart Disease	0	Congenital Heart Disease
0	Dysrhythmia	0	Dysrhythmia	0	Dysrhythmia	0	Dysrhythmia	<b>1</b>	<b>Dysrhythmia</b>
0	Treatment for Hypertension or Recent ED Visit for Hypertension	<b>1</b>	<b>Treatment for Hypertension or Recent ED Visit for Hypertension</b>	<b>1</b>	<b>Treatment for Hypertension or Recent ED Visit for Hypertension</b>	0	Treatment for Hypertension or Recent ED Visit for Hypertension	0	Treatment for Hypertension or Recent ED Visit for Hypertension
0	Hypertension	0	Hypertension	0	Hypertension	0	Hypertension	0	Hypertension
0	Difficult Airway	0	Difficult Airway	0	Difficult Airway	0	Difficult Airway	0	Difficult Airway
0	Shortness of Breath	0	Shortness of Breath	0	Shortness of Breath	0	Shortness of Breath	<b>1</b>	<b>Shortness of Breath</b>
0	Dementia	0	Dementia	0	Dementia	0	Dementia	0	Dementia
0	Stroke or TIA	0	Stroke or TIA	0	Stroke or TIA	<b>1</b>	<b>Stroke or TIA</b>	0	Stroke or TIA
0	Cirrhosis	0	Cirrhosis	0	Cirrhosis	0	Cirrhosis	0	Cirrhosis
<b>1</b>	<b>Anticoagulant</b>	0	Anticoagulant	<b>1</b>	<b>Anticoagulant</b>	<b>1</b>	<b>Anticoagulant</b>	<b>1</b>	<b>Anticoagulant</b>
0	Alcohol or Drug Use	0	Alcohol or Drug Use	<b>1</b>	<b>Alcohol or Drug Use</b>	0	Alcohol or Drug Use	0	Alcohol or Drug Use
0	Wheelchair Bound	0	Wheelchair Bound	<b>1</b>	<b>Alcohol or Drug Use</b>	0	Wheelchair Bound	0	Wheelchair Bound
0	40 < BMI < 45	0	40 < BMI < 45	0	40 < BMI < 45	0	40 < BMI < 45	0	40 < BMI < 45