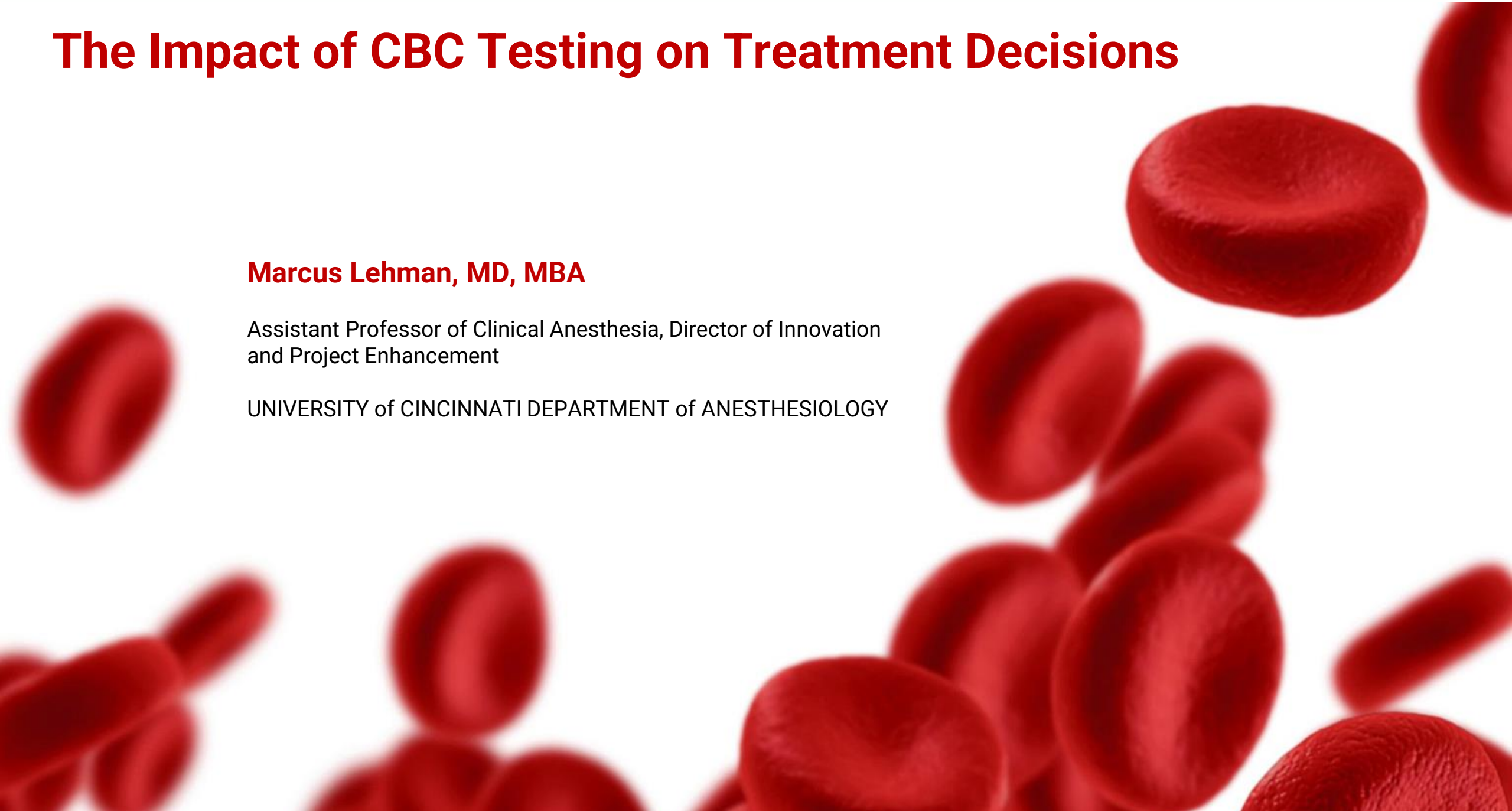
The Impact of CBC Testing on Treatment Decisions



Marcus Lehman, MD, MBA

Assistant Professor of Clinical Anesthesia, Director of Innovation and Project Enhancement

UNIVERSITY of CINCINNATI DEPARTMENT of ANESTHESIOLOGY

Disclosure

I have a strategic consulting relationship with PixCell Medical, Inc.

Dates of Consulting: October 2022 - Present
Type of Consulting Services Provided: Strategic planning, market research, and business development
Potential Conflicts of Interest: While I strive to provide unbiased insights and recommendations, my consulting relationship with PixCell Medical, Inc. may impact my perspective on topics related to the medical device industry.

Note: PixCell Medical, Inc. is a medical device company focused on developing innovative diagnostic solutions to improve patient care.

Disclosure

I am an Anesthesiologist at the University of Cincinnati.

Employment: Anesthesiologist
Dates of Employment: August 2012 - Present
Type of Employment: Clinical and Academic
Potential Conflicts of Interest: While I strive to provide unbiased insights and recommendations, my employment at the University of Cincinnati may impact my perspective on topics related to healthcare and medical education.

Note: The University of Cincinnati is a public research university with a comprehensive healthcare system, including the UC Health network of hospitals and clinics.

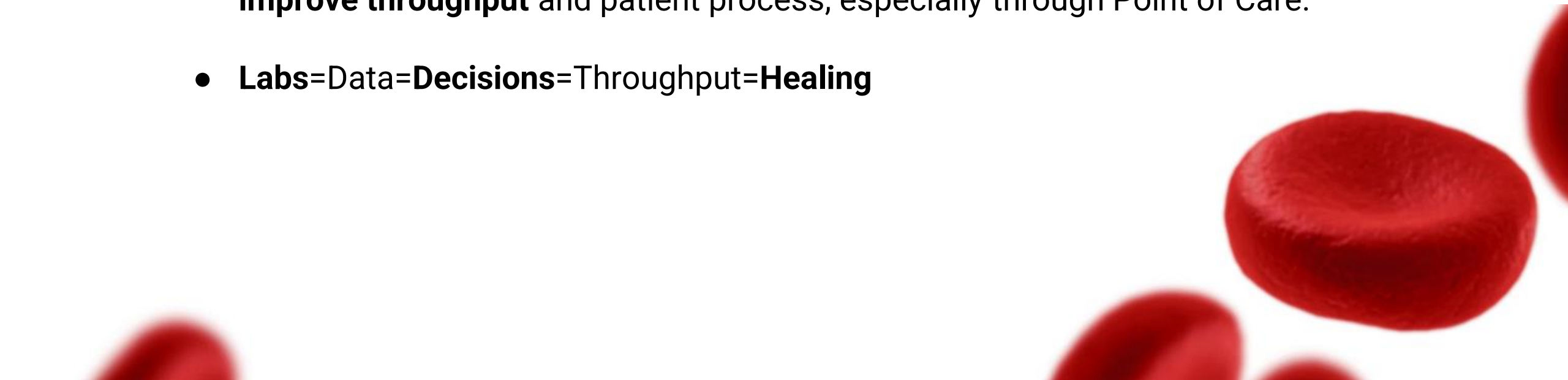
Objectives

- Evolve our **understanding of healthcare process**, *and* reveal how Lab Diagnostics plays an “outsized” role in said process, setting up Laboratorians and Directors to be leaders in process improvement and system efficiency.

- Reconsider **Point of Care as a critical tool for streamlining** a patient’s path through their care and system efficiency.

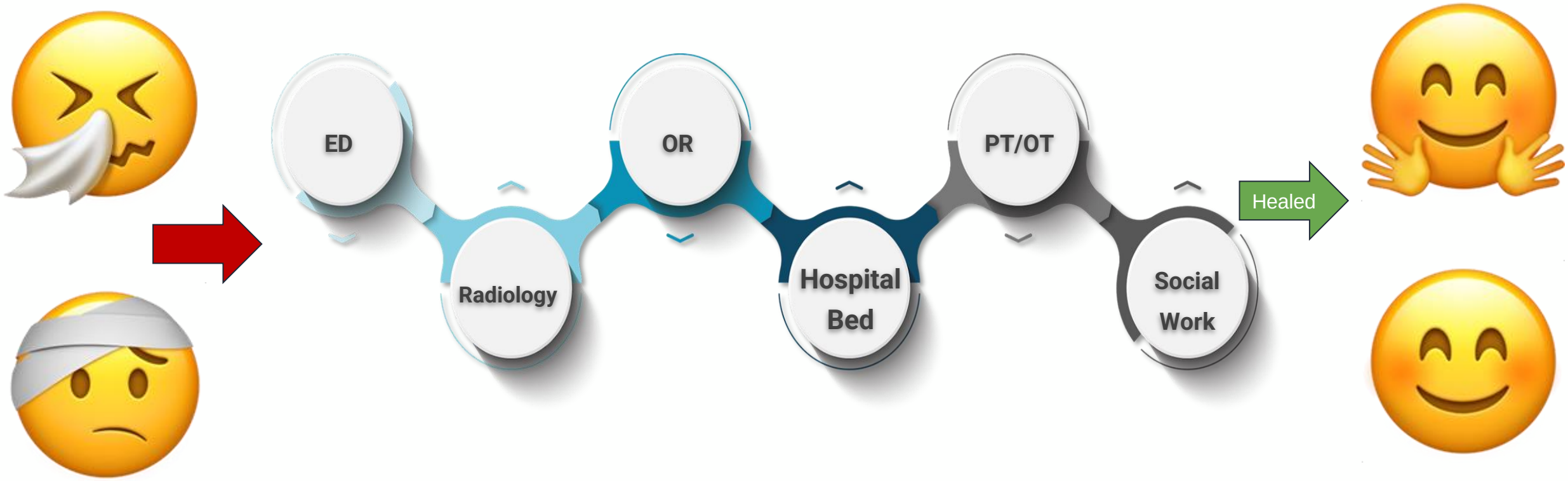
- Discuss **real world examples where Lab Diagnostics can dramatically improve throughput** and patient process, especially through Point of Care.

- **Labs**=Data=**Decisions**=Throughput=**Healing**

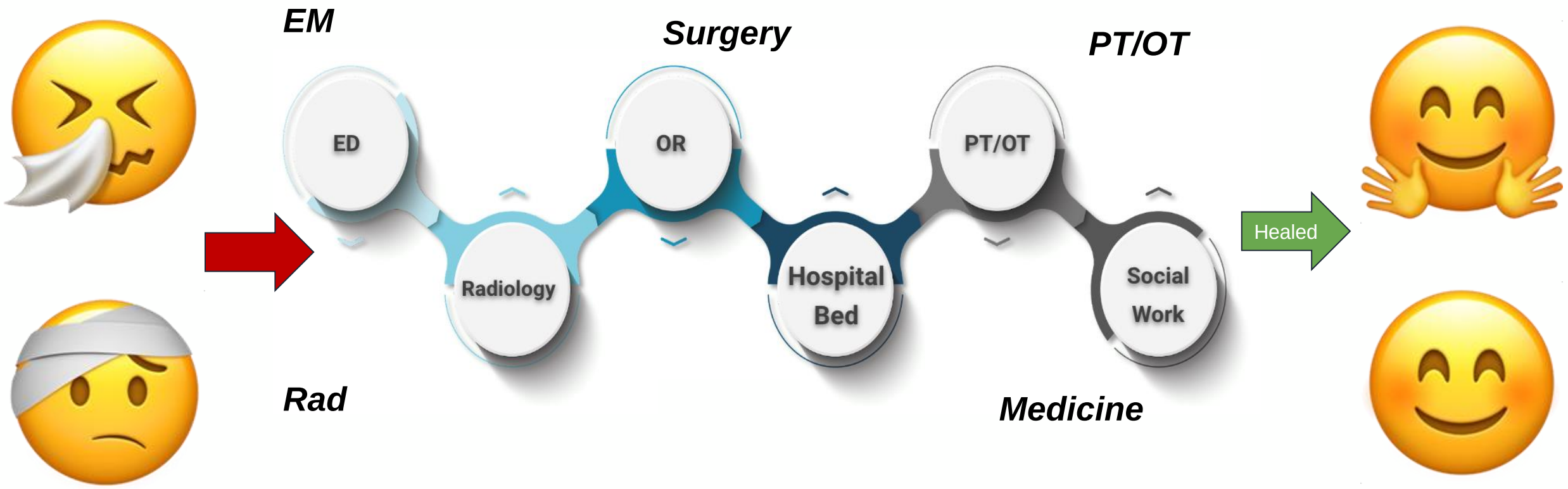


The Point of Care: Healing People

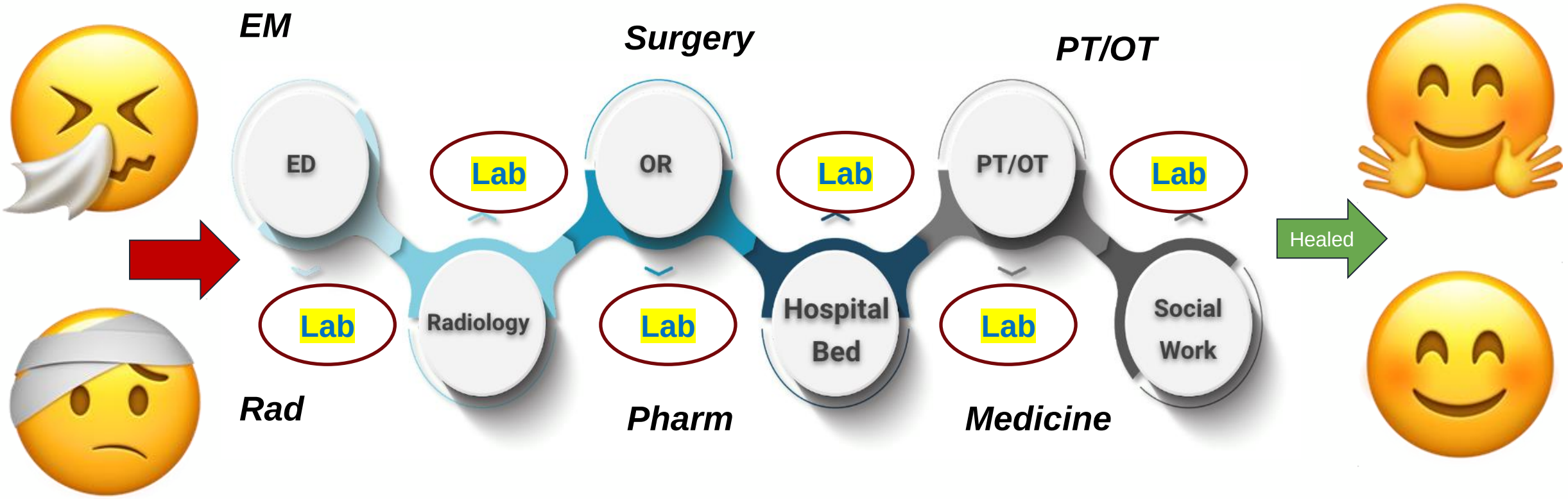
Healthcare Process



Healthcare Process



Healthcare Process



Hospital Management:

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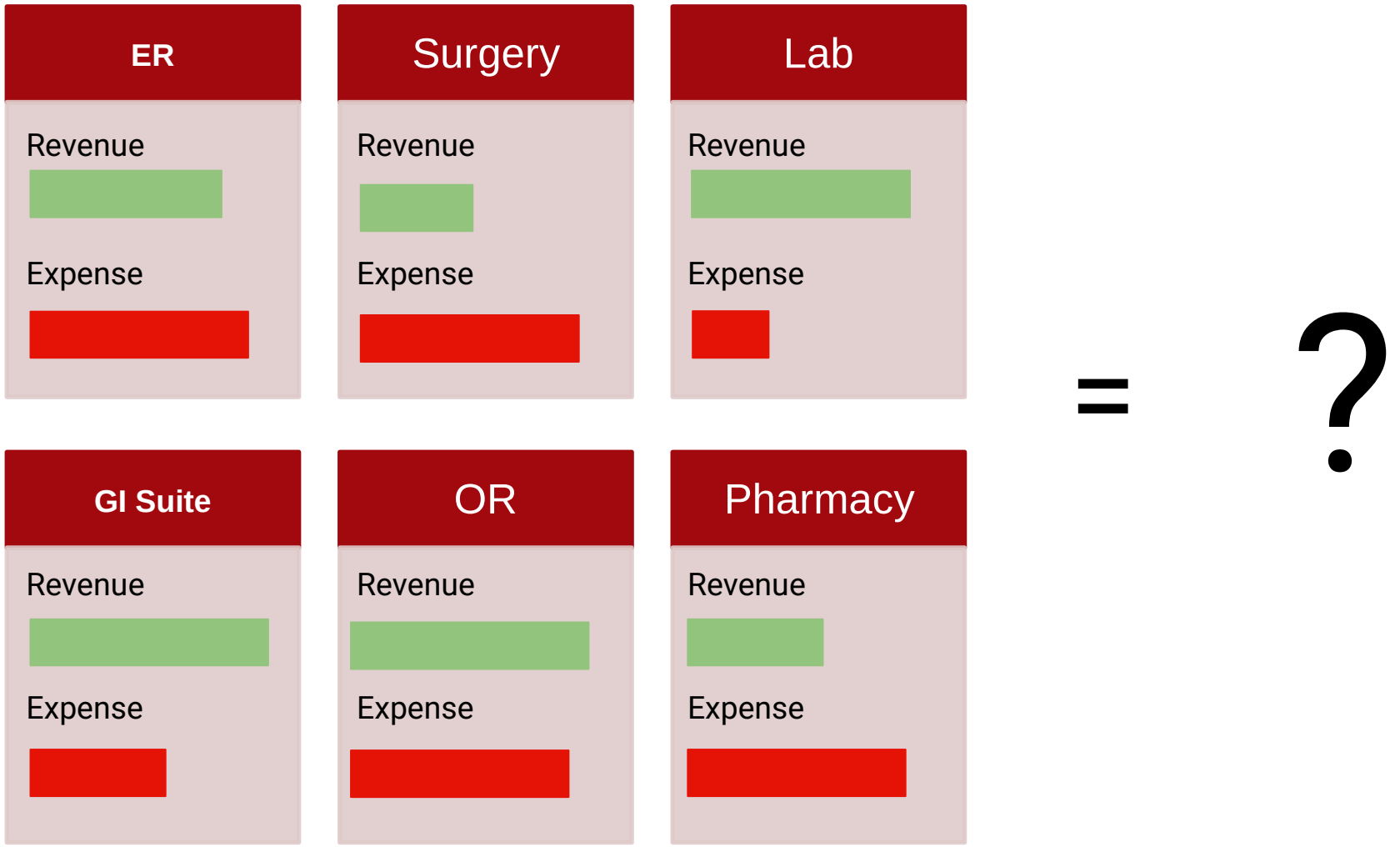
Locations	Staff/Teams	Contributors
• ER • Radiology • OR • Hosp Floor	• EM • Rad • Surgery • Anesthesia • PT / OT	• Lab • Pharmacy

Hospital Management:



Hospital Management:

ER	Surgery	Lab
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Expense	Expense	Expense

GI Suite	OR	Pharmacy
Revenue	Revenue	Revenue
Expense	Expense	Expense

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Hospital Management:

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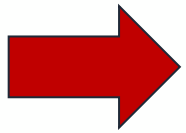
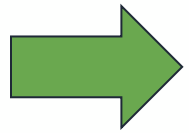
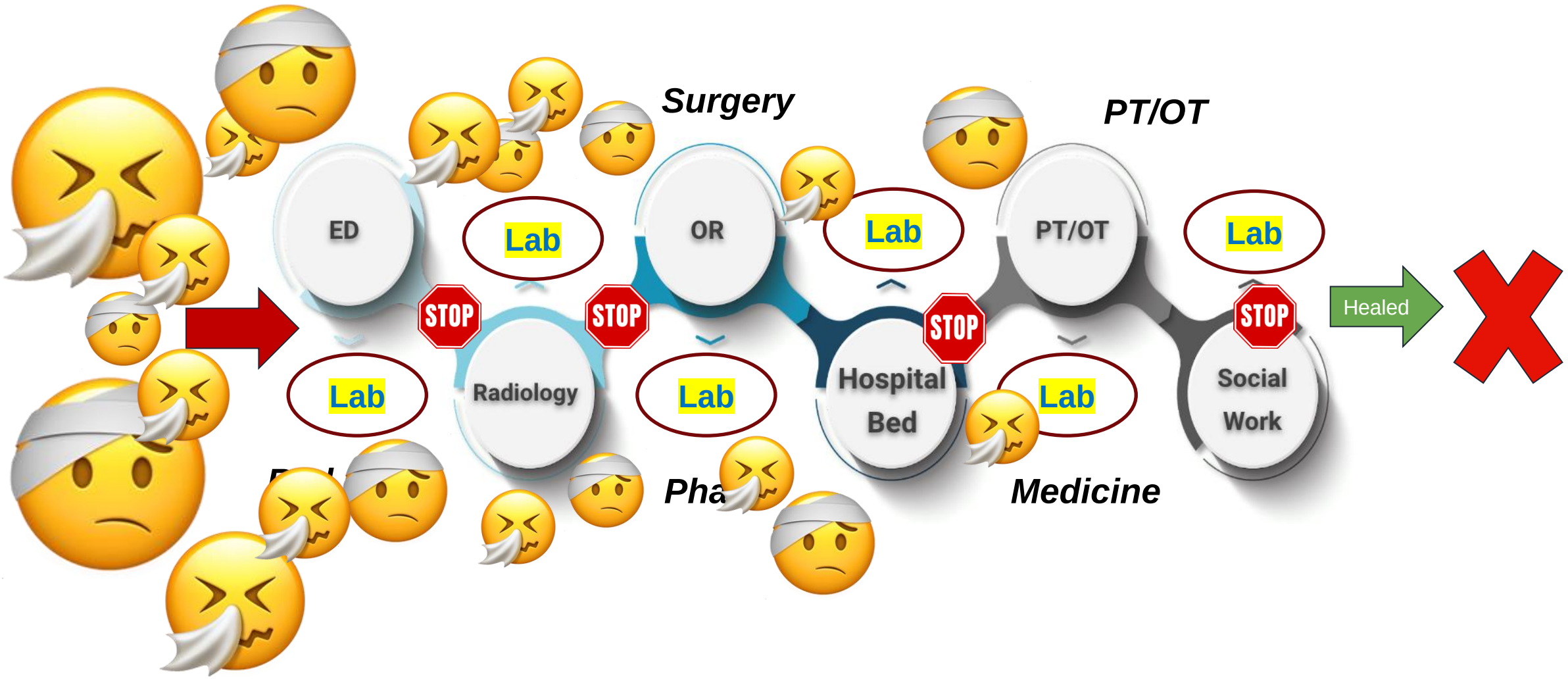
Hospital Management





Hospital Management



Safety net hospitals in Georgia are at risk. Atlanta Medical Center is just the latest example

Safety net hospitals in Georgia are at risk. Atlanta Medical C

Staff Shortages Choking U.S. Health Care System

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Staff Shortages Choking U.S. Health Care System

Harris Health's $45 million deficit finds American Rescue Act stopgap after last fall's budget battle

The federal funding will help protect services, expansion projects and keep Harris

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Doctors' strike threatens tackling backlog, warn NHS bosses

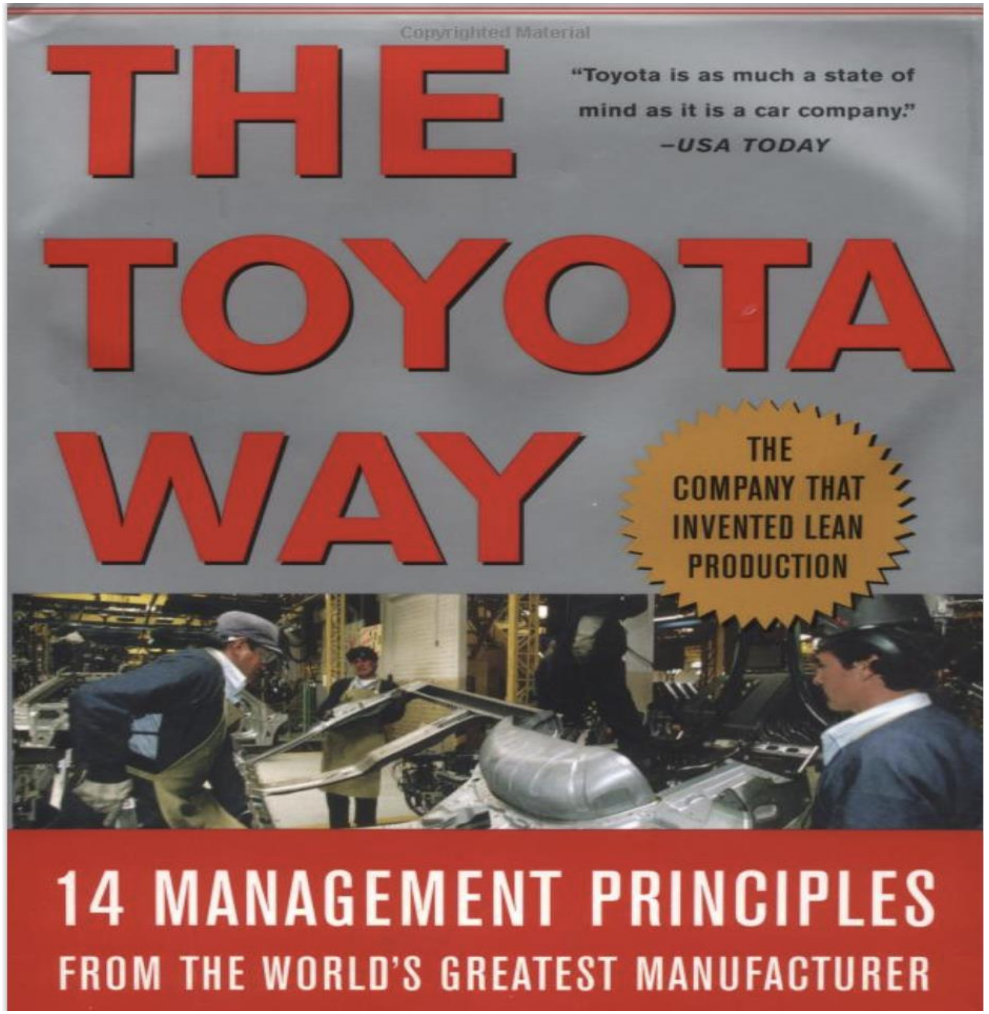
THE TOYOTA WAY

"Toyota is as much a state of mind as it is a car company."
–*USA TODAY*

THE COMPANY THAT INVENTED LEAN PRODUCTION

14 MANAGEMENT PRINCIPLES

FROM THE WORLD'S GREATEST MANUFACTURER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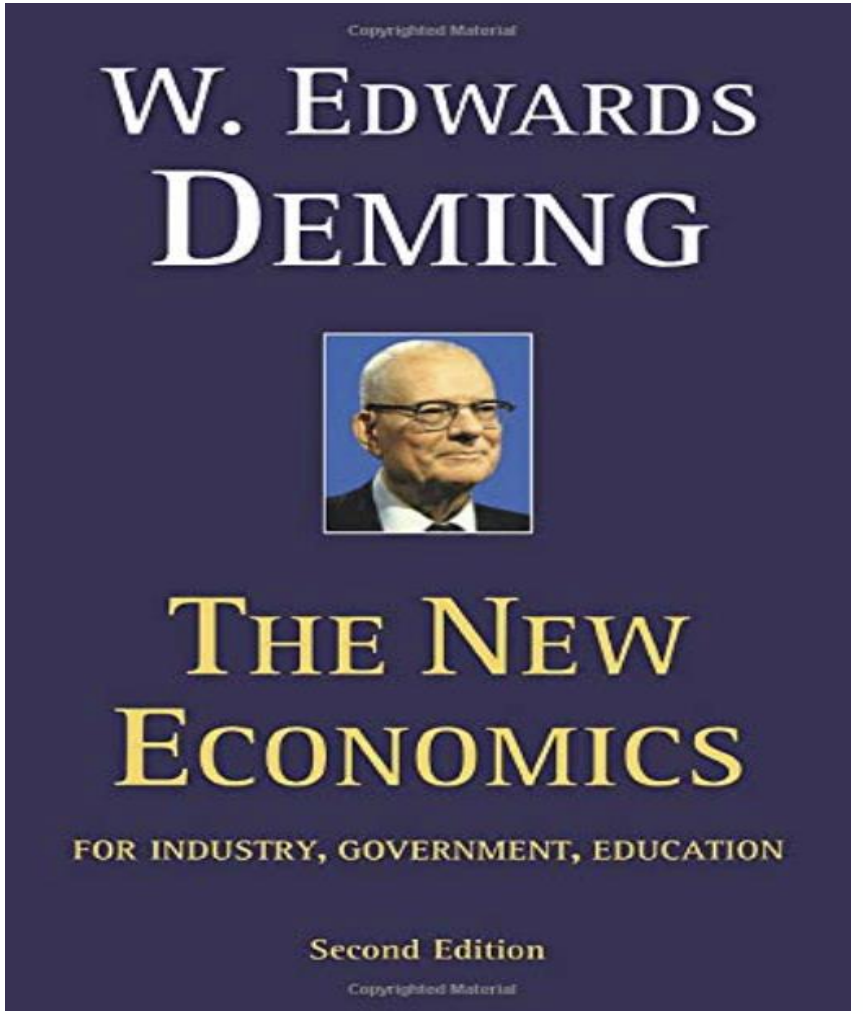
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The Point of Care: Hospital **Process** Management

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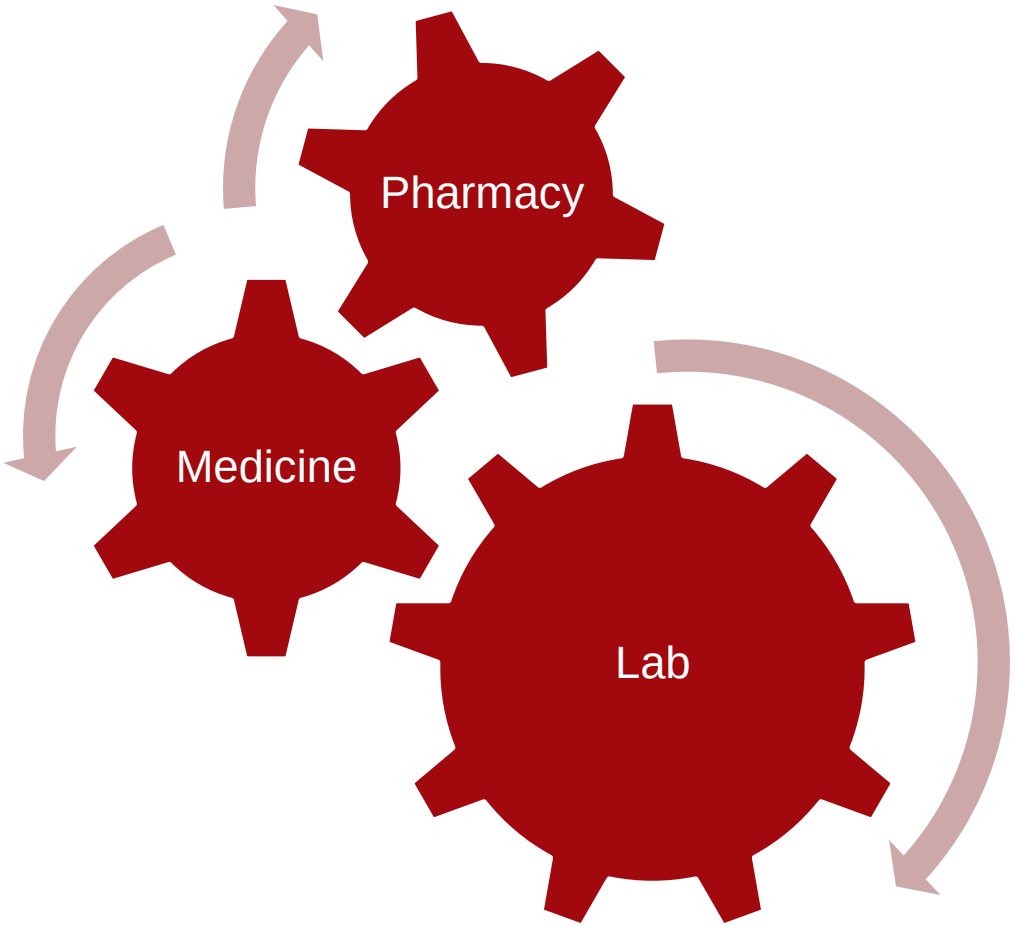
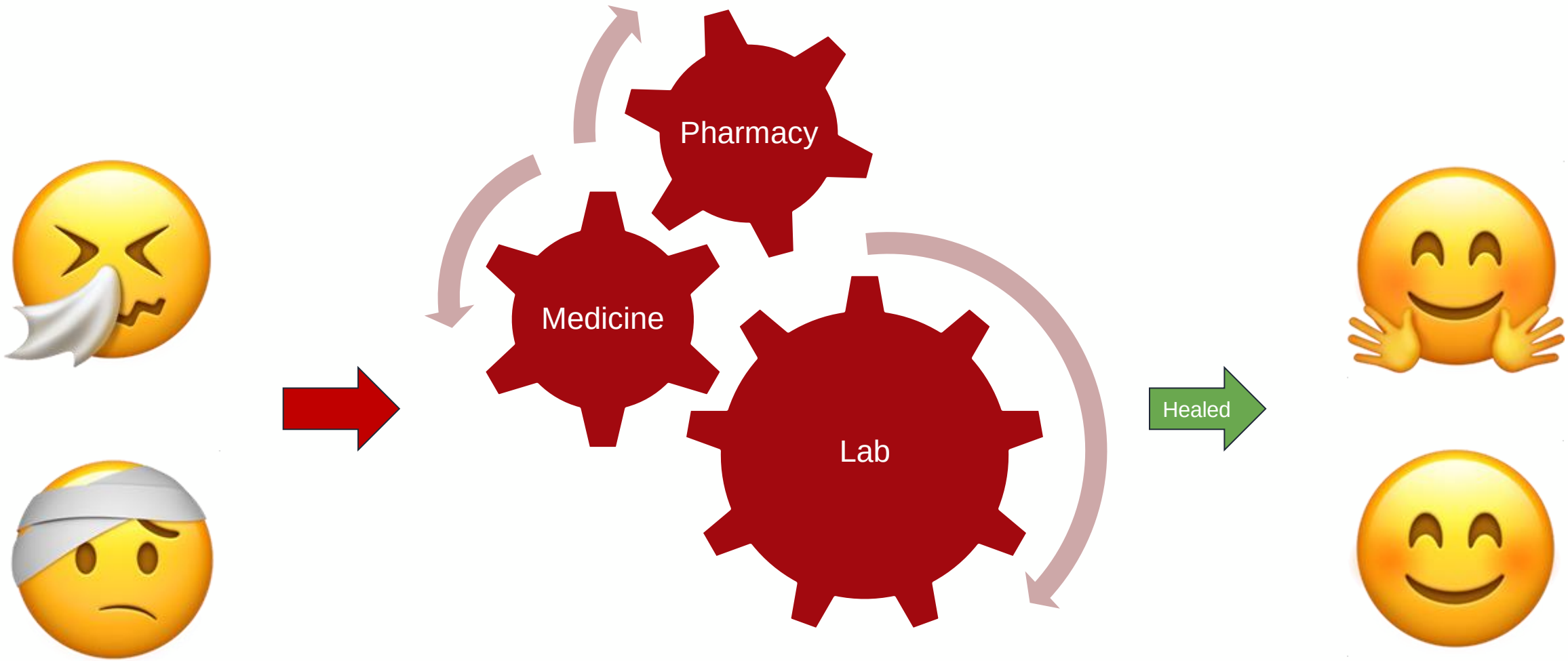
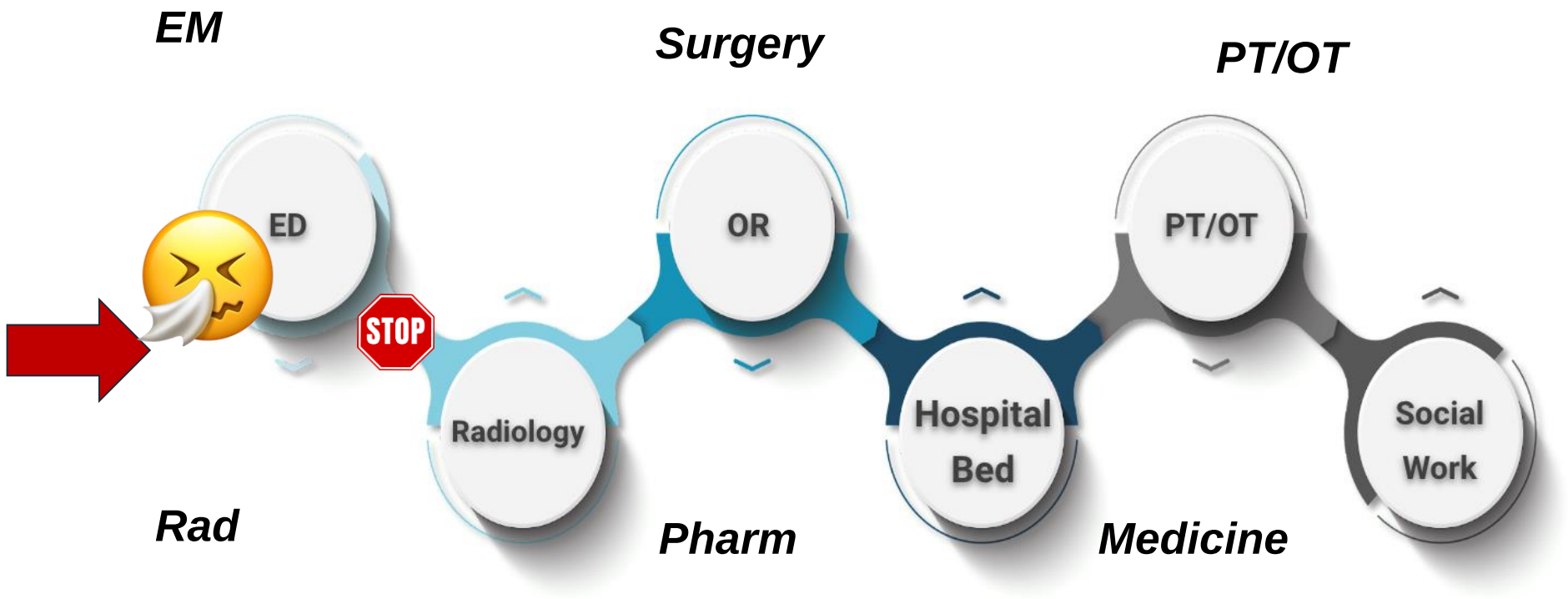


The Point of Care: Hospital Management

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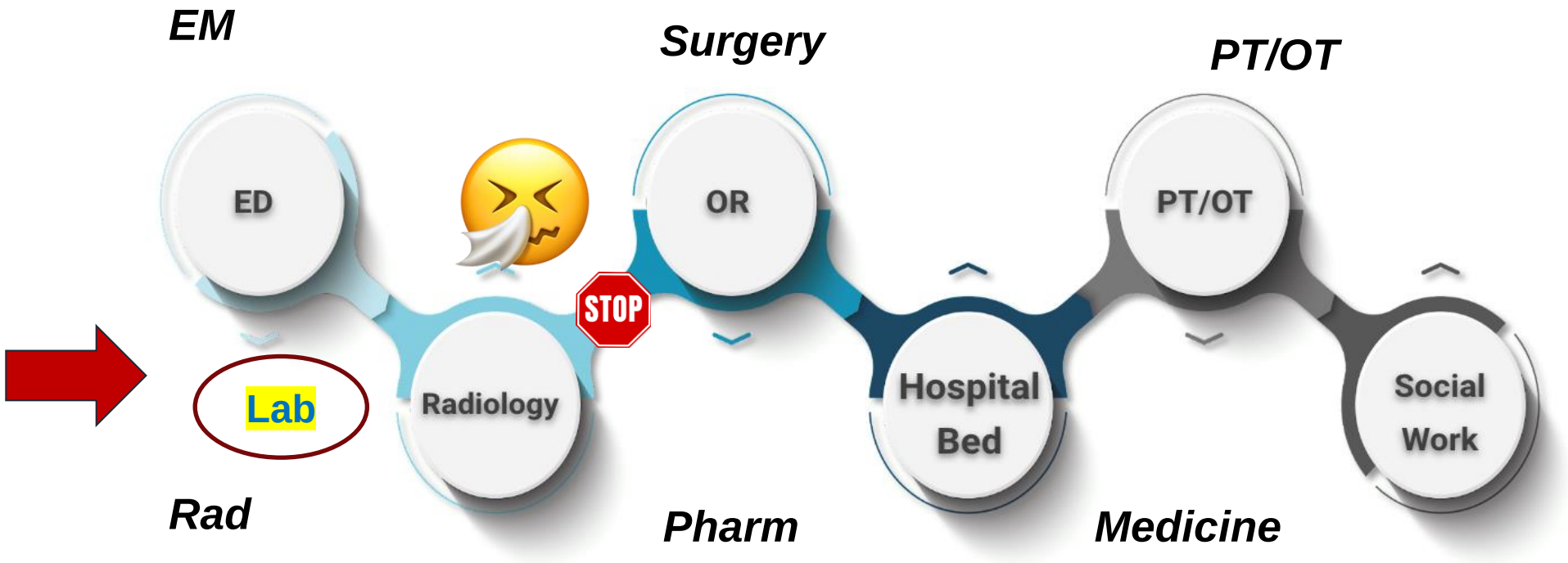
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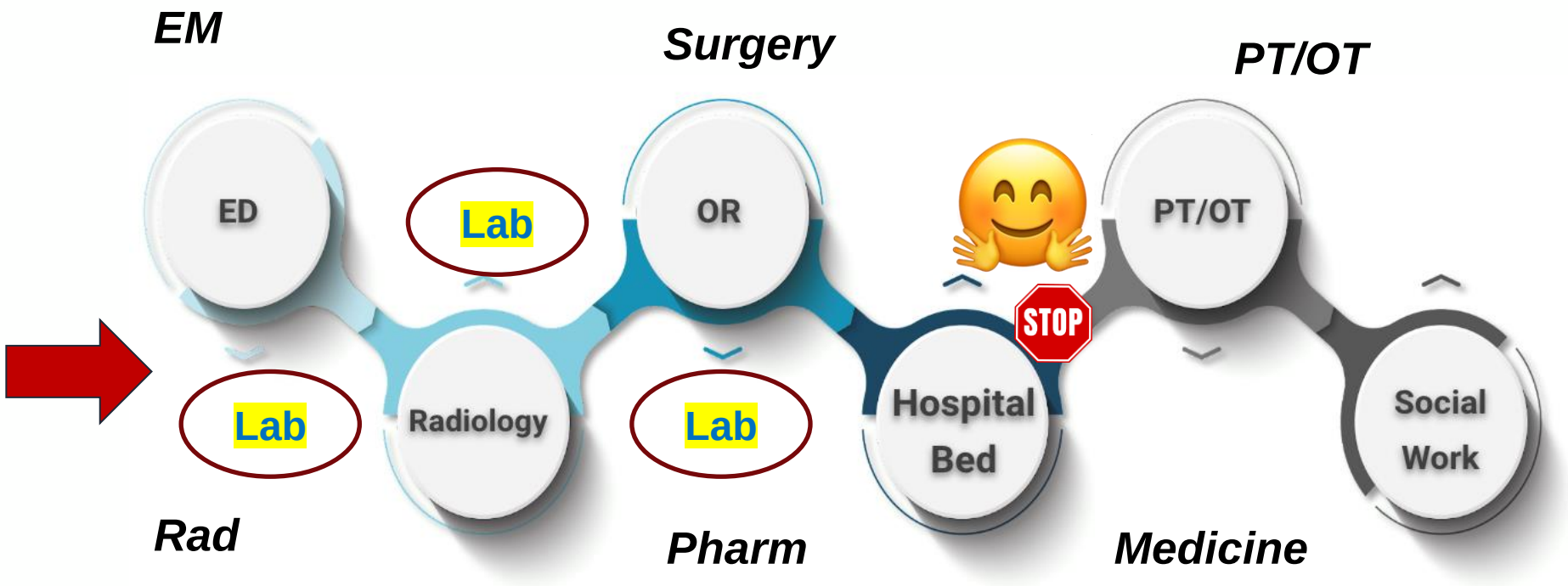
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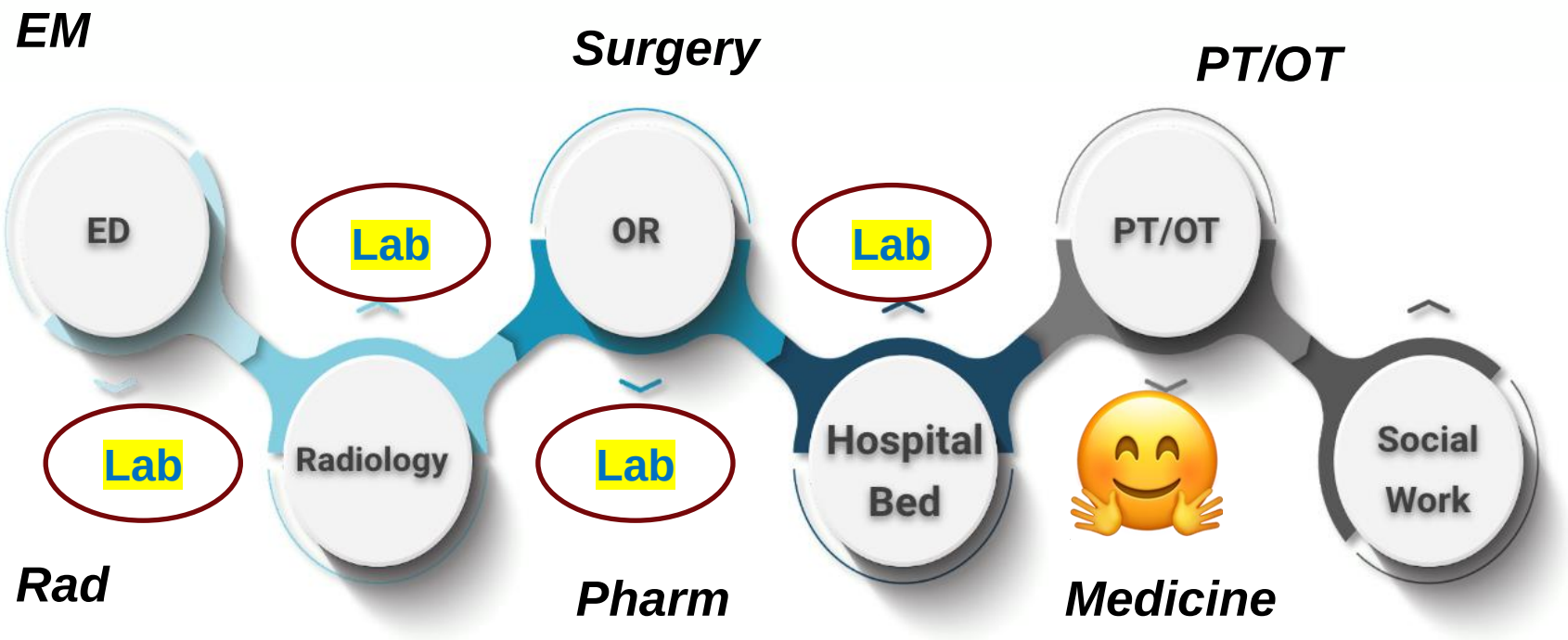
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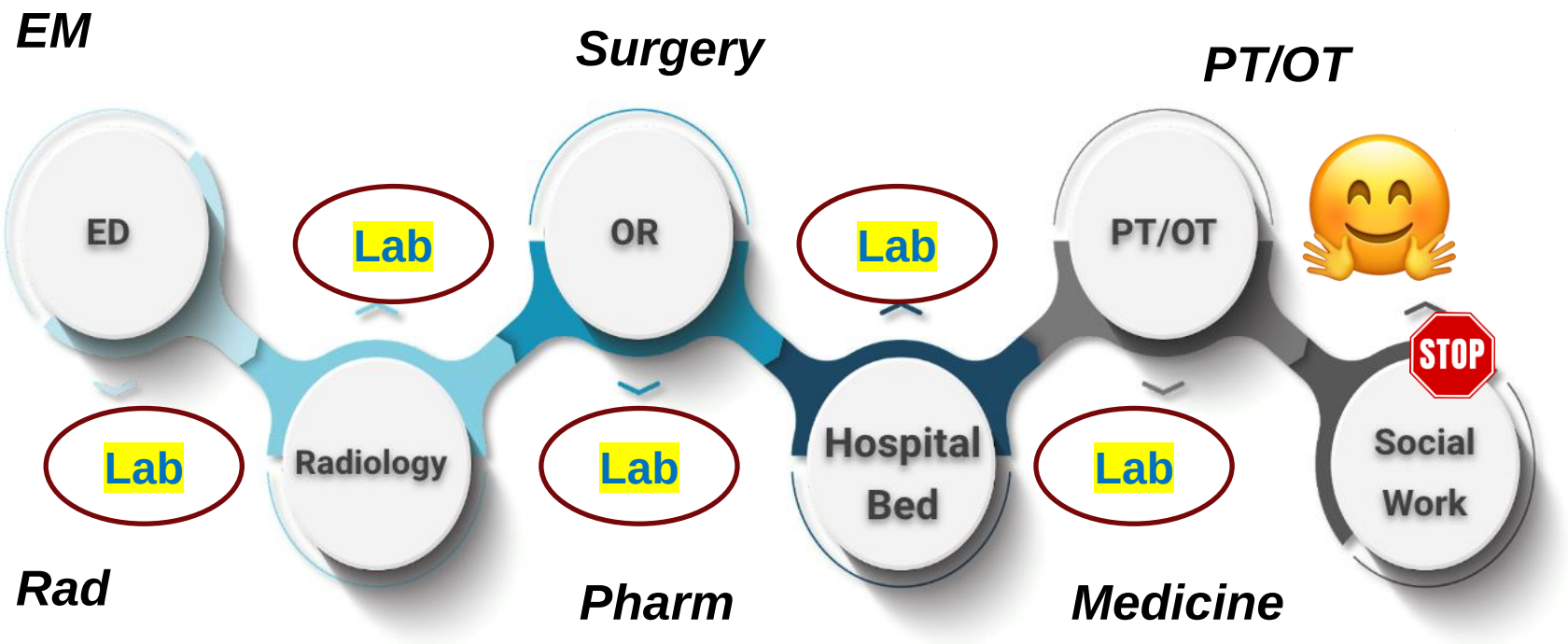
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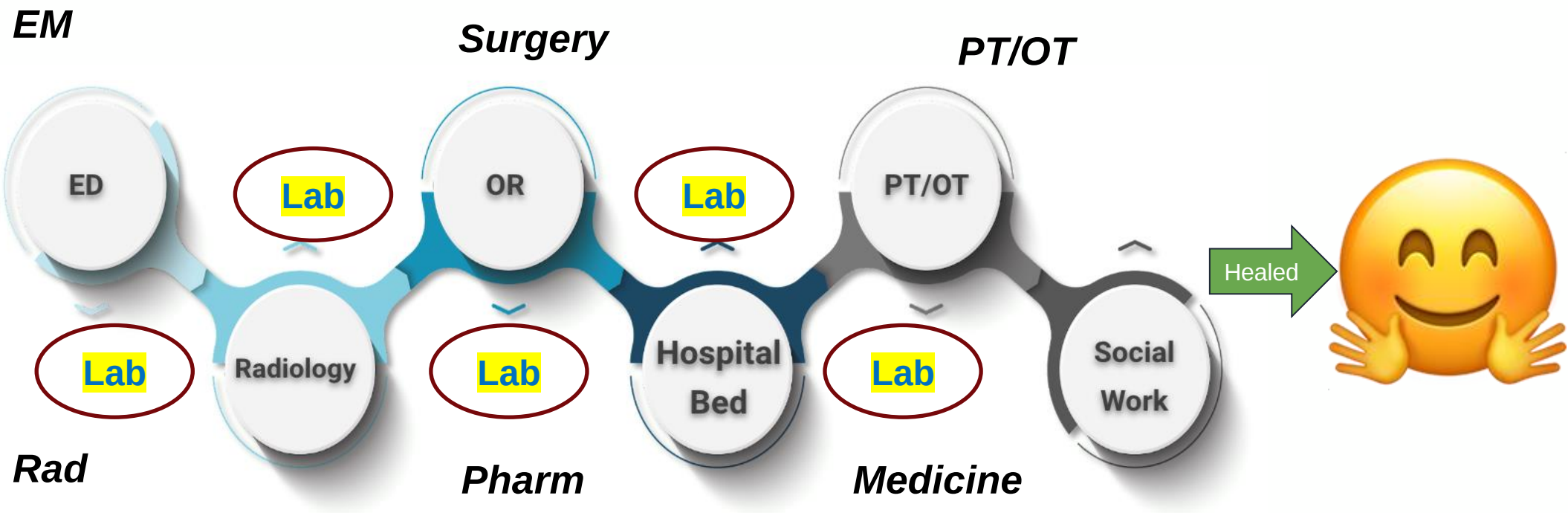
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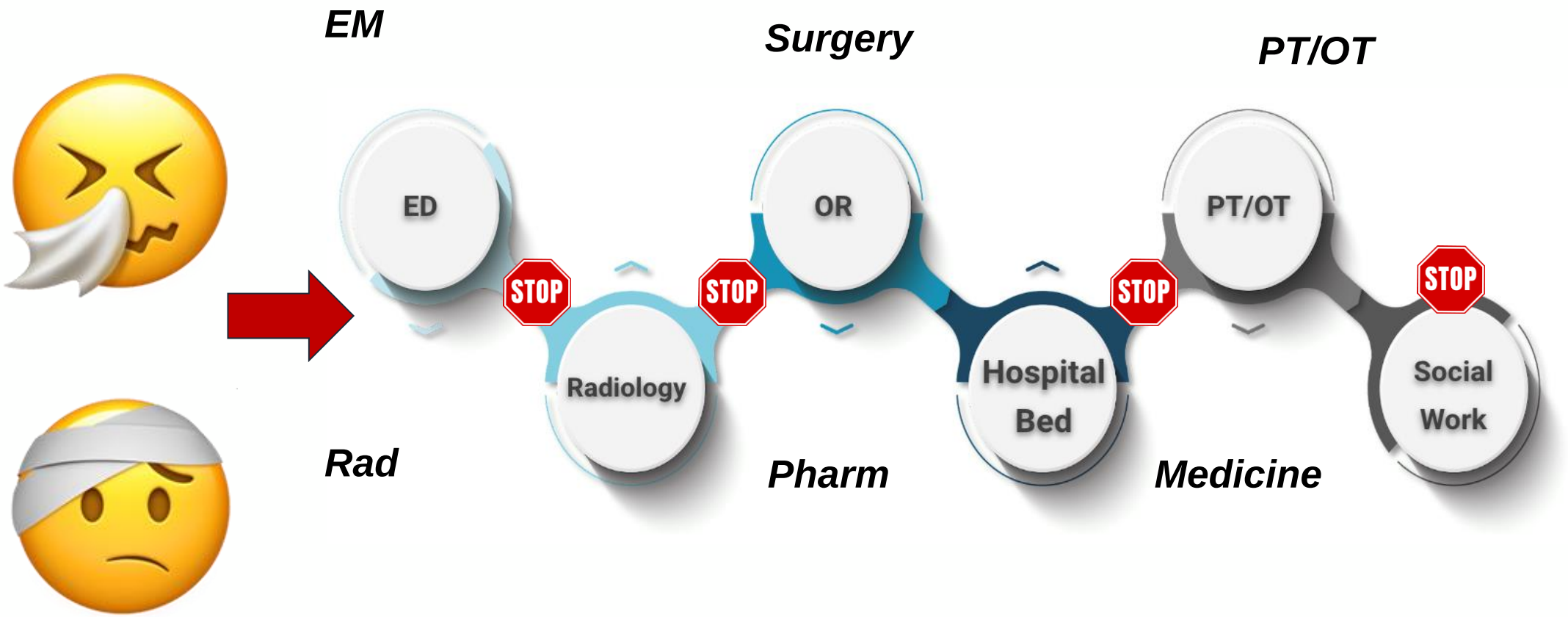
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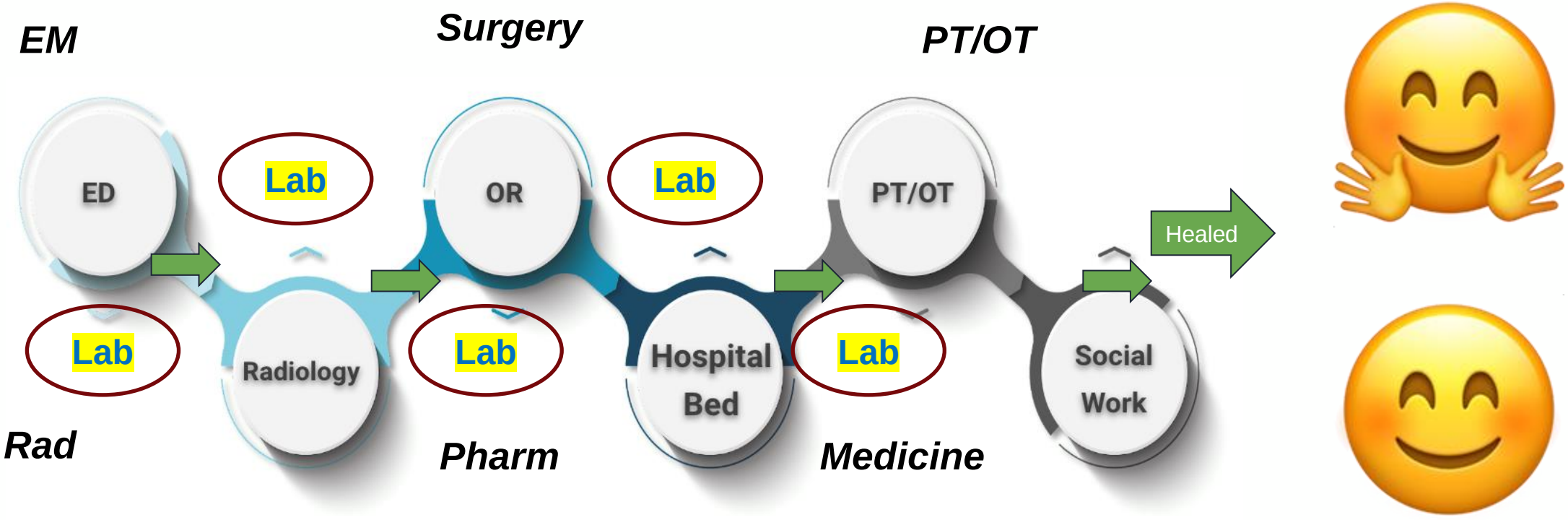
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The Point of Care: Objectives

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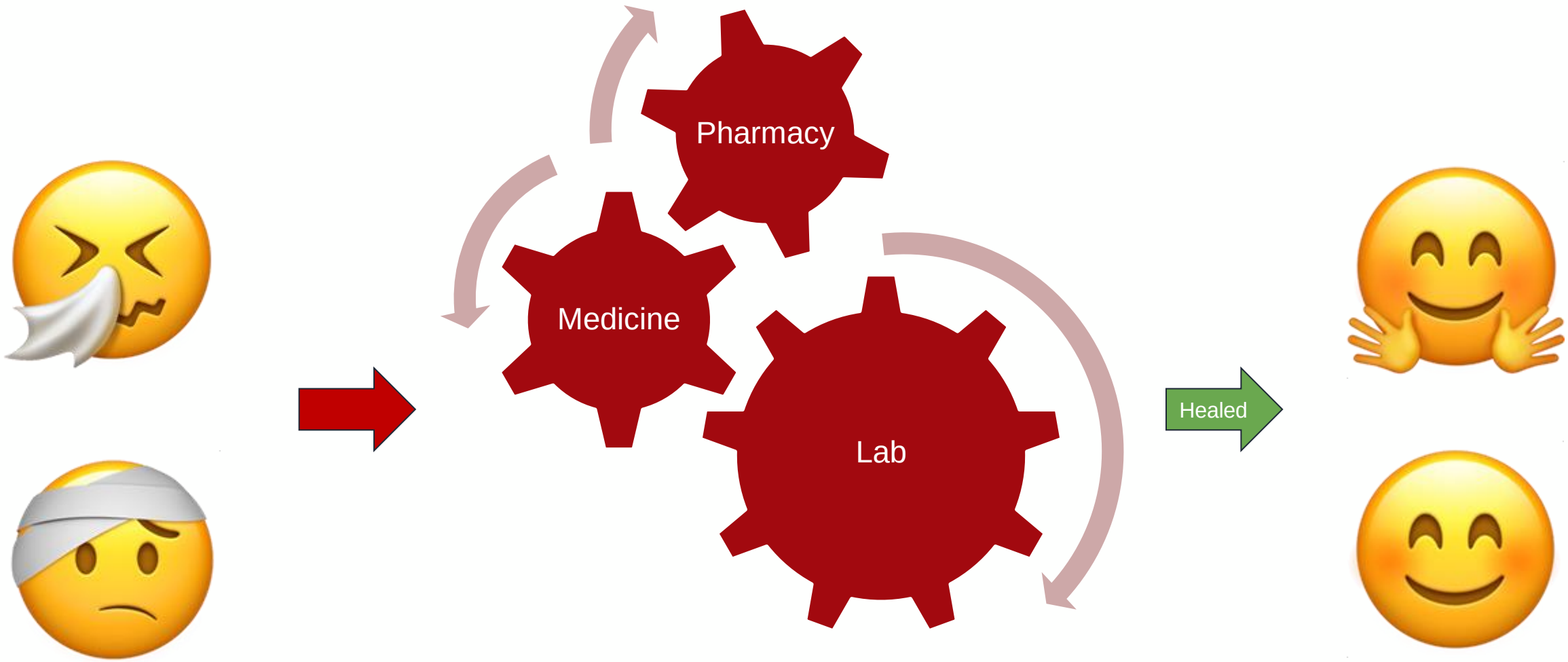
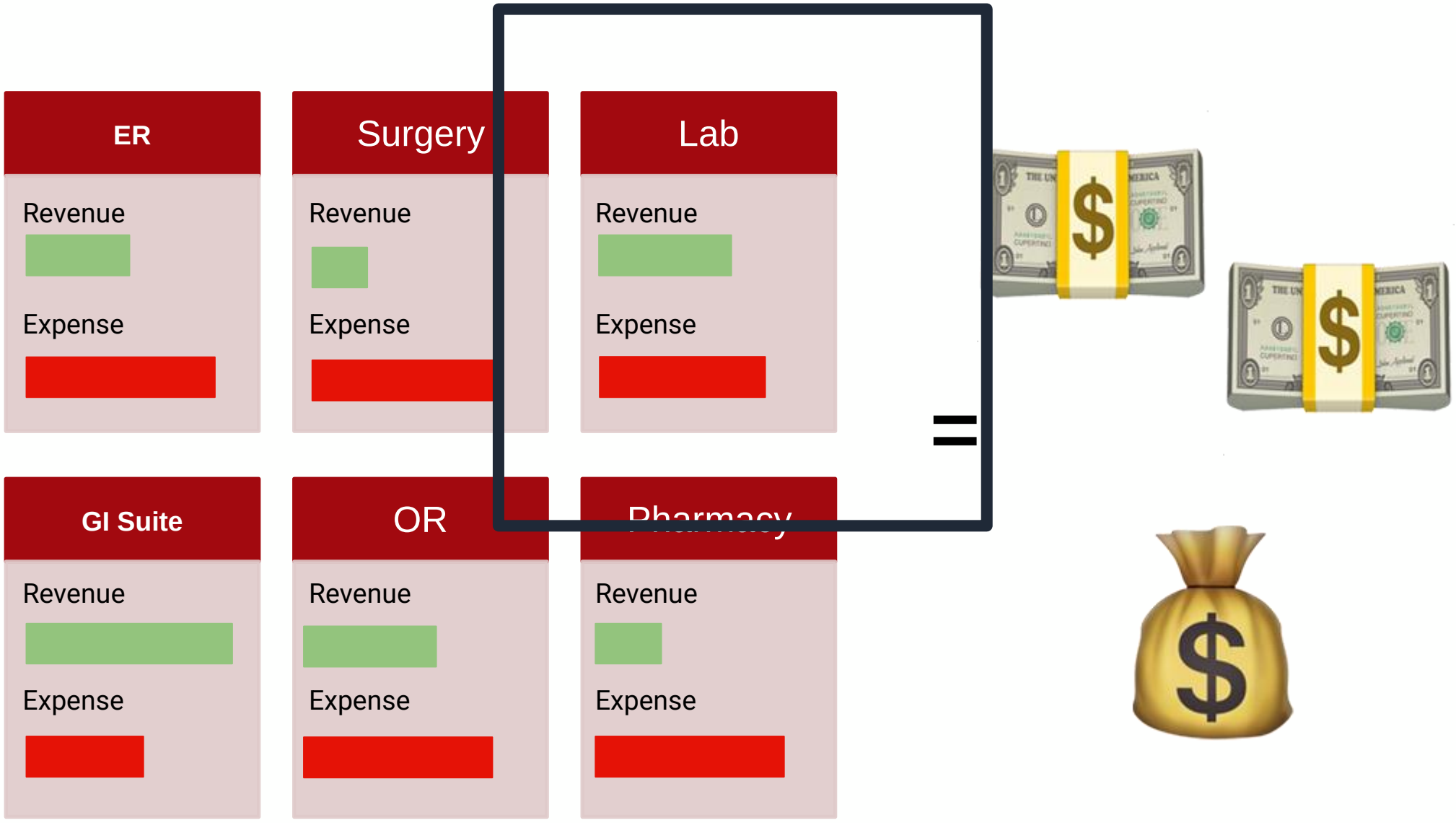
- **Reconsider Point of Care as a critical tool for streamlining a patient’s path through their care and system efficiency.**

Point of Care: Throughput Accelerator



Labs = Decisions = Throughput

Point of Care: Throughput Accelerator



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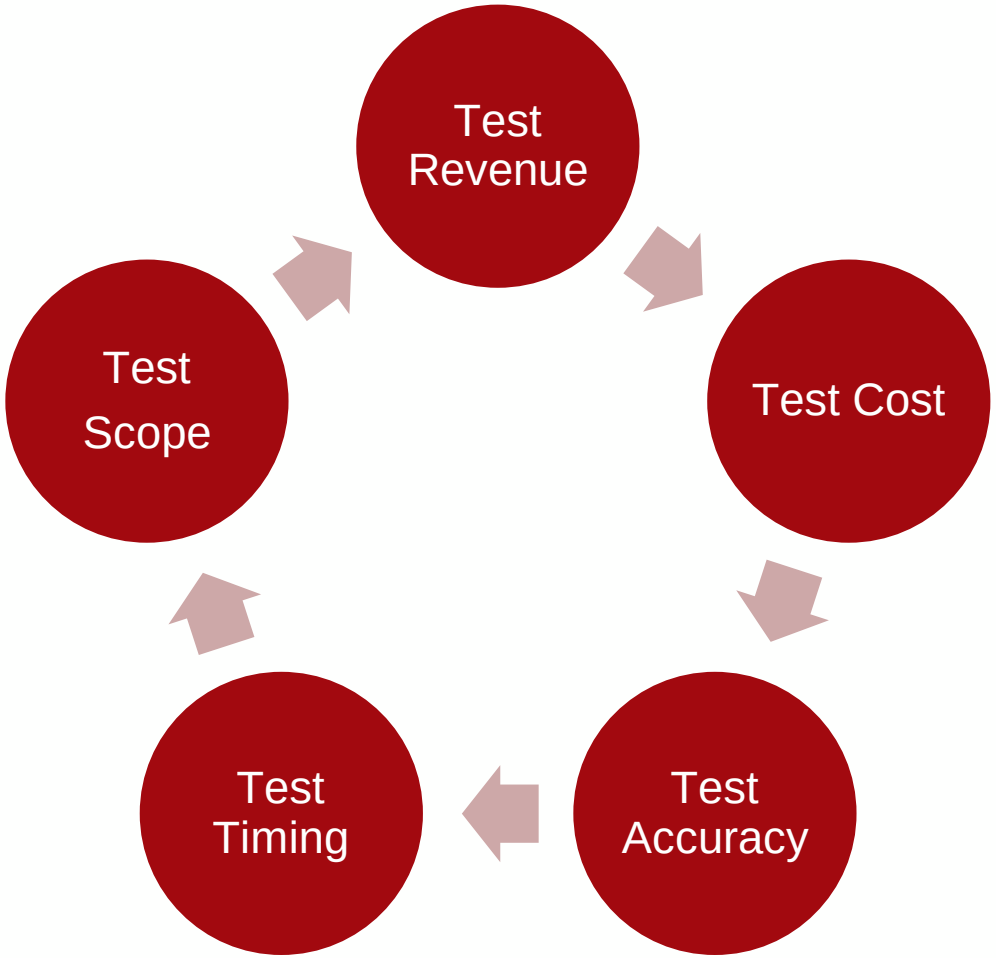

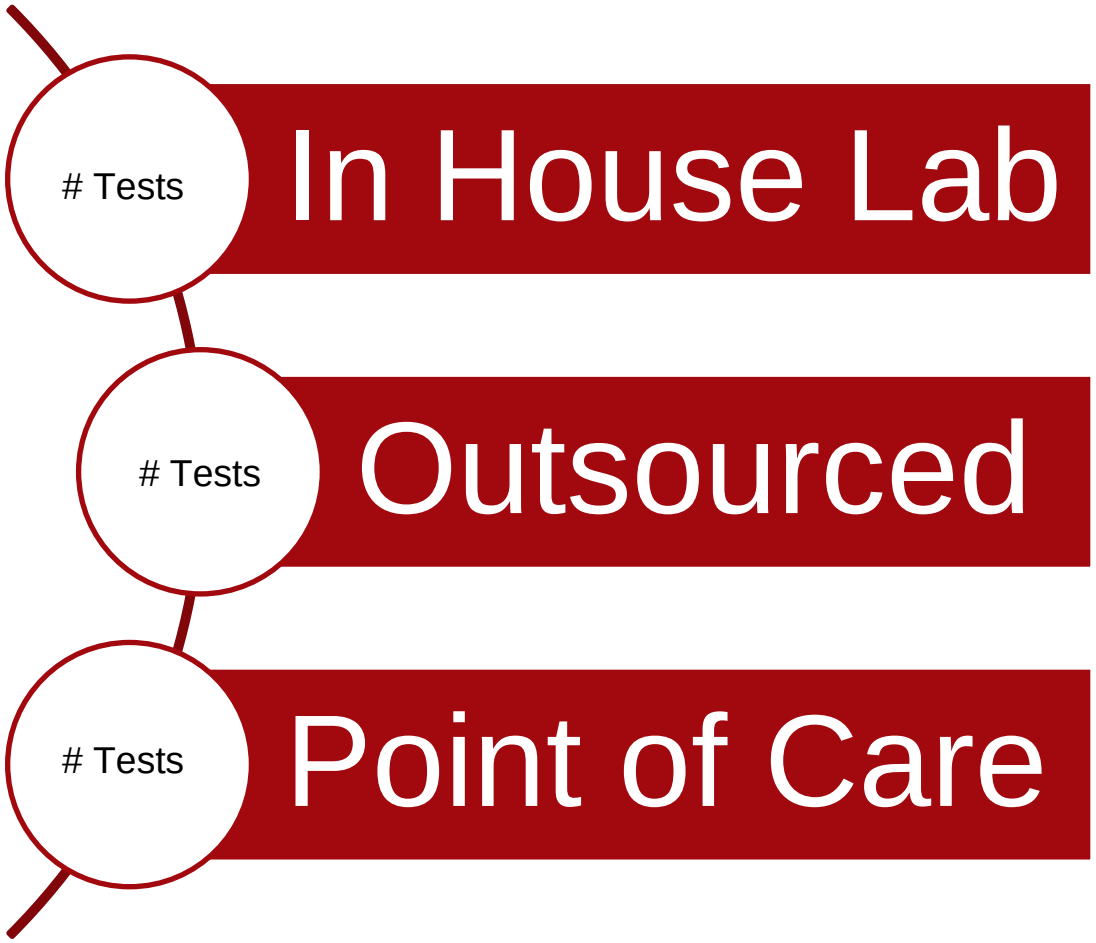

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Point of Care: Throughput Accelerator

	Test Revenue	Test Cost	Test Accuracy	Test Timing	Test Scope
In House Lab	MEDIUM	LOW	HIGHEST	MEDIUM	MEDIUM
Outsourced	HIGH	HIGH	HIGH	SLOW	HIGH
Point of Care	LOW	HIGH	DEPENDS	FASTEST	LOW

Point of Care: Throughput Accelerator

	Test Revenue	Test Cost	Test Accuracy	Test Timing	Test Scope
In House Lab	MEDIUM	LOW	HIGHEST	MEDIUM	MEDIUM
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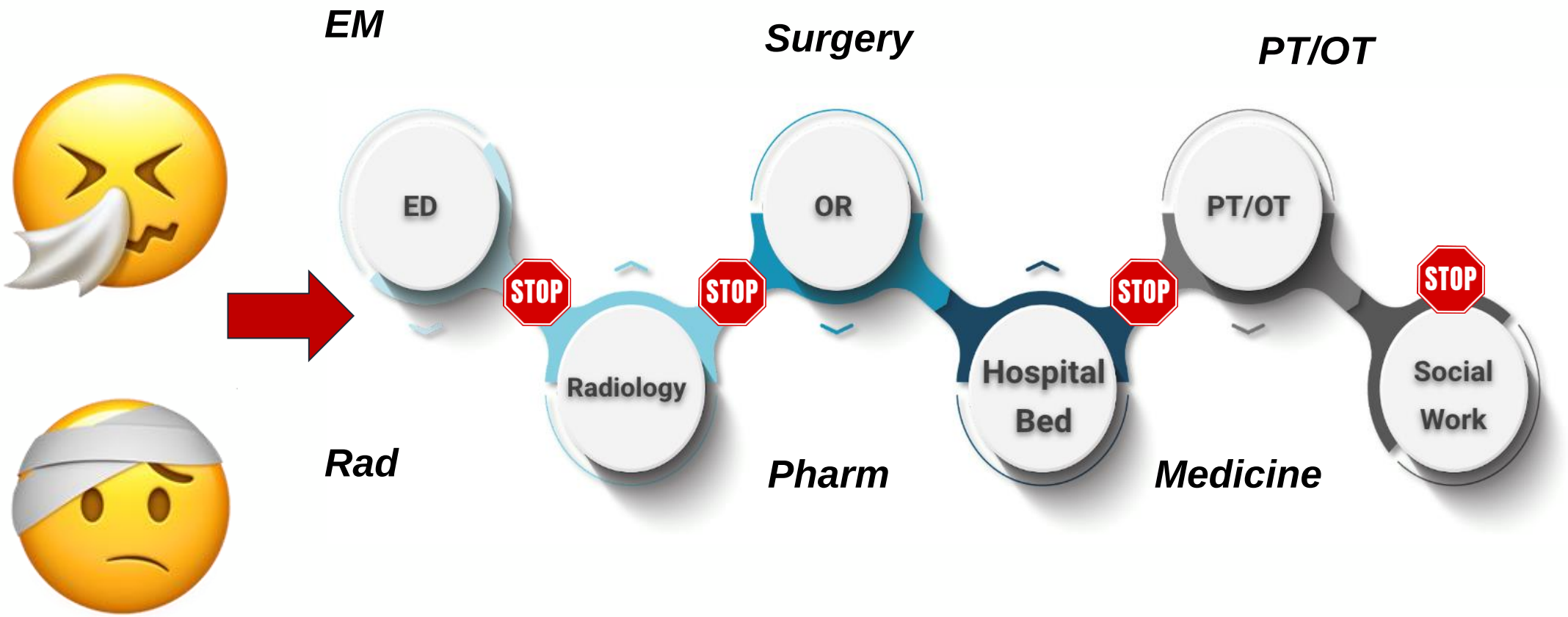
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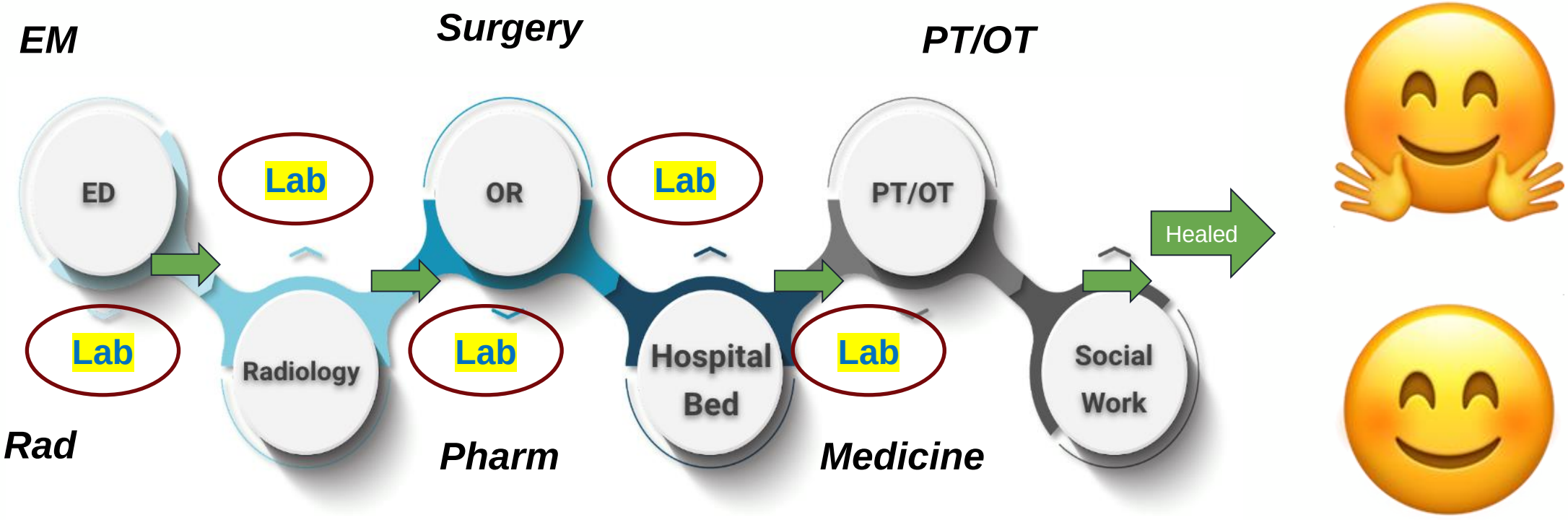
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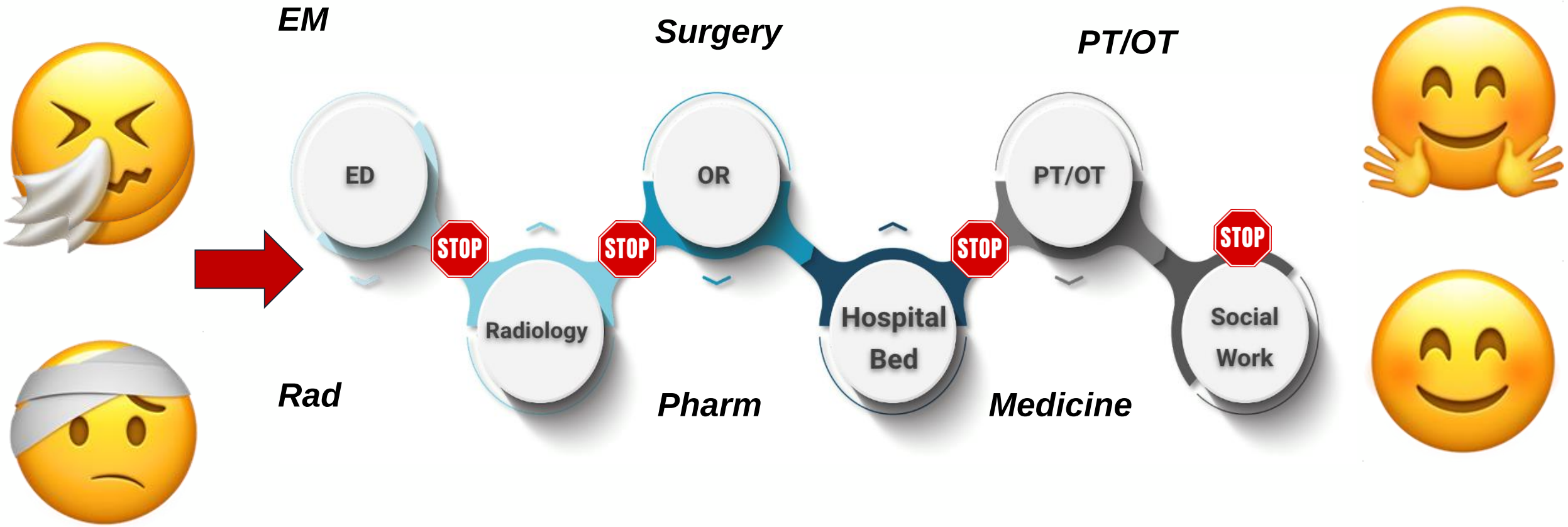
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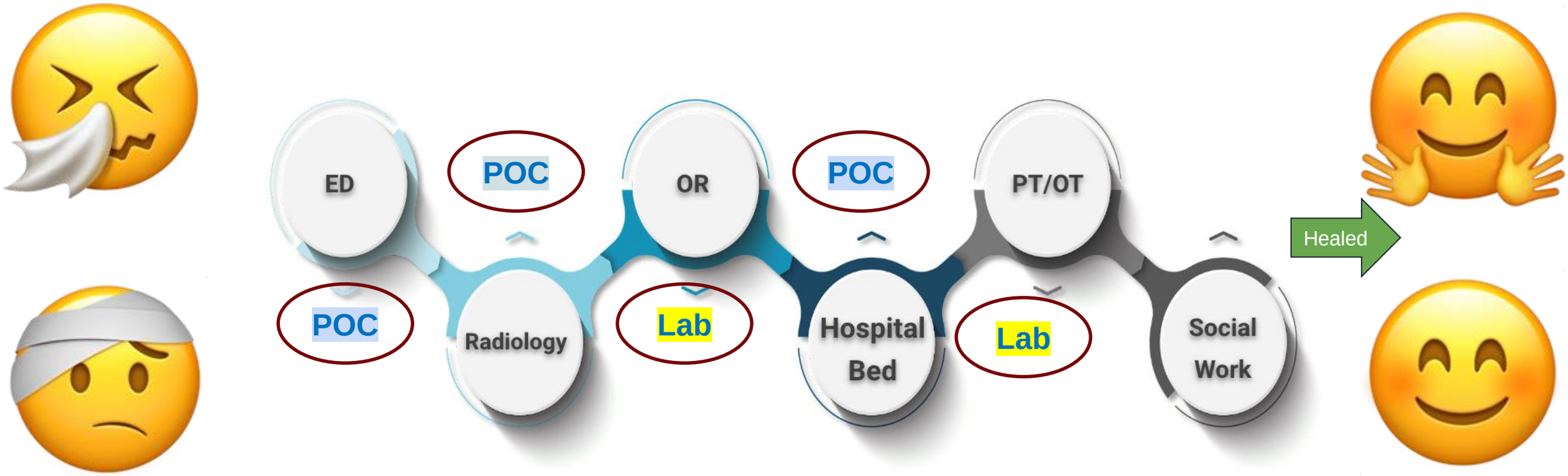
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Labs = Decisions = Throughput = Healing

In House Lab

“STAT” Labs:

- 35 Minute Average Time
  - Sample Time + Results + Information to provider
- 90th Percentile = 87min

Labs = Decisions = Throughput = Healing

In House Lab

“STAT” Labs:

- 35 Minute Average Time
  - Sample Time + Results + Information to provider
- 90th Percentile = 87min
- System 1: Under 2 hours

Labs = Decisions = Throughput = Healing

In House Lab

“STAT” Labs:

- 35 Minute Average Time
  - Sample Time + Results + Information to provider
- 90th Percentile = 87min
- System 1: Under 2 hours
- System 2: Under 45 min

Labs = Decisions = Throughput = Healing

In House Lab

“STAT” Labs:

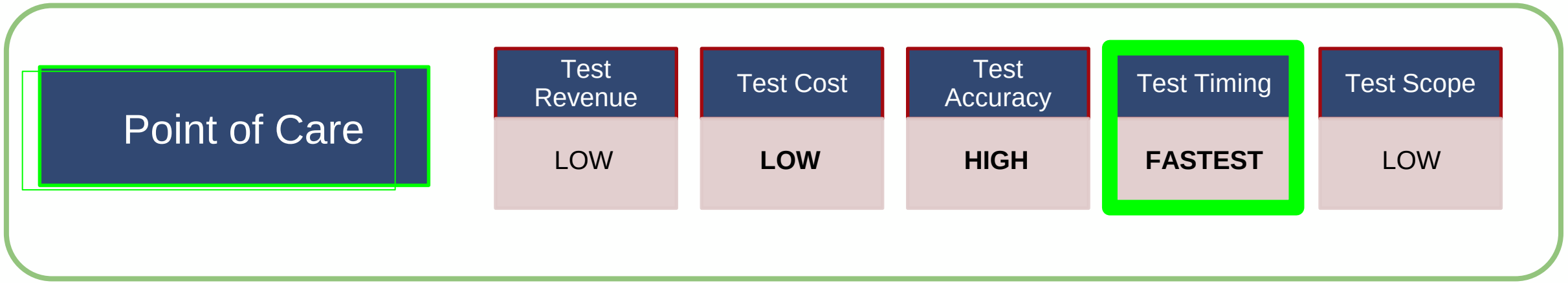
- 35 Minute Average Time
  - Sample Time + Results + Information to provider
- 90th Percentile = 87min
- System 1: Under 2 hours
- System 2: Under 45 min

Point of Care

Systems

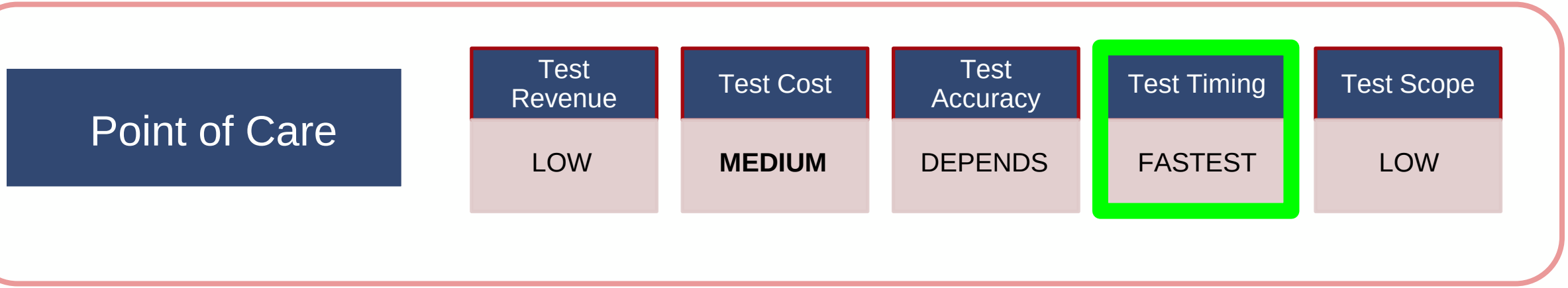
- 3-5 minute run time
- Sample Time + Results + Information to provider
- 90th Percentile ~ 10 minutes

Point of Care = Throughput Accelerator



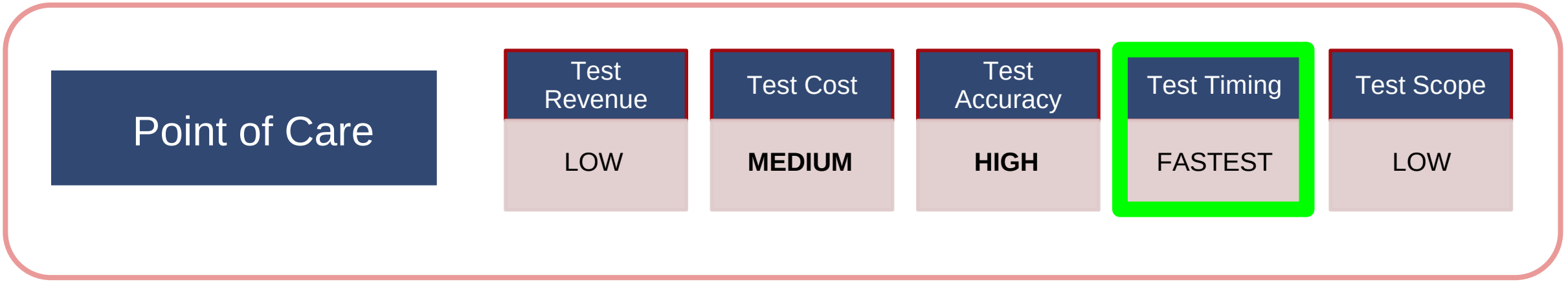
Point of Care = Throughput Accelerator

- Less Quality Control needs



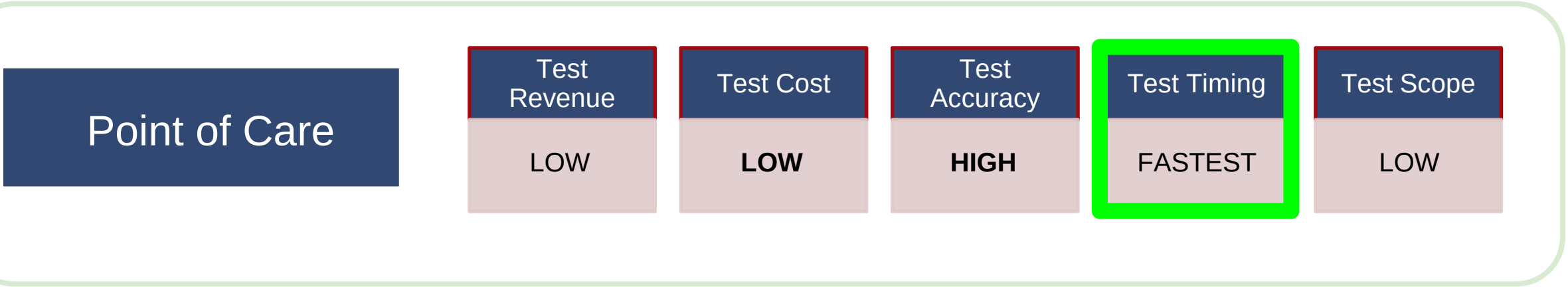
Point of Care = Throughput Accelerator

- Less Quality Control needs
- Higher accuracy



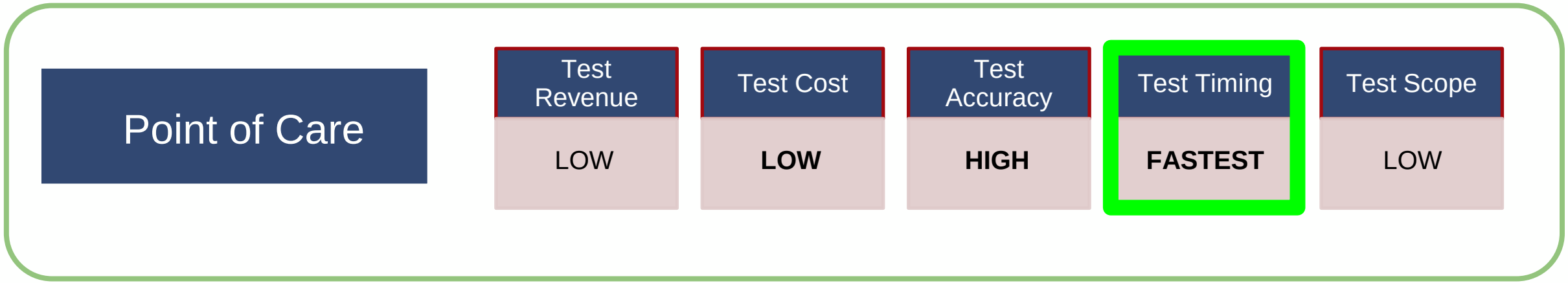
Point of Care = Throughput Accelerator

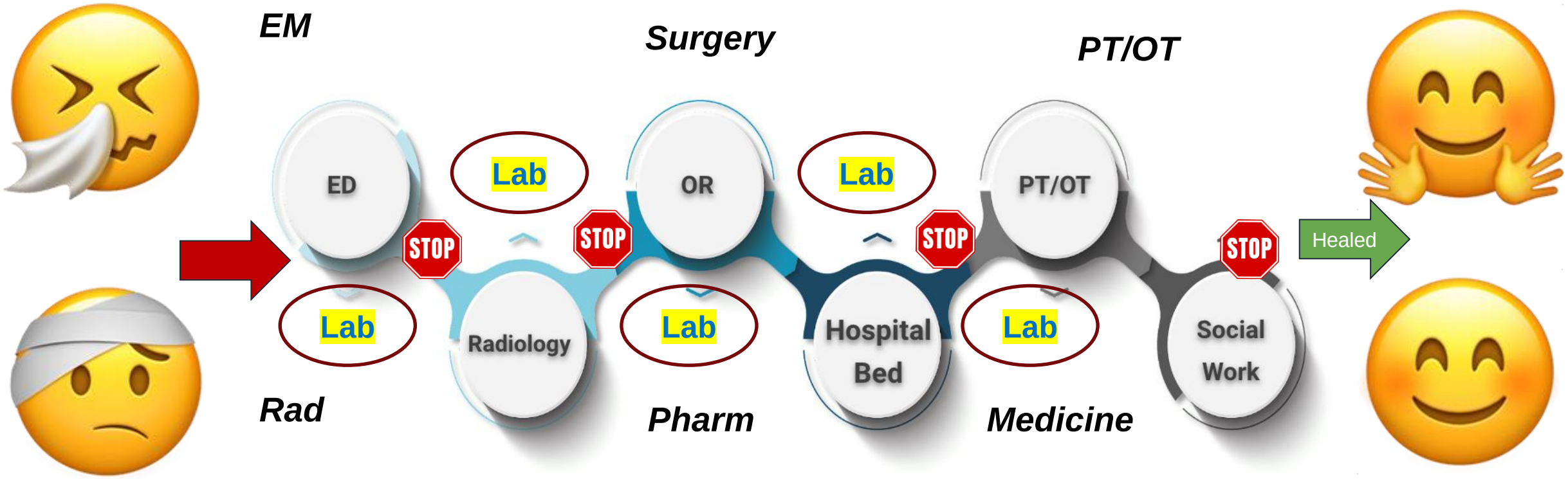
- Less QC
- Higher accuracy
- Simplified User Interface



Point of Care = Throughput Accelerator

- Less QC
- Higher accuracy
- Simplified User Interface
- Reduced user error and training needs

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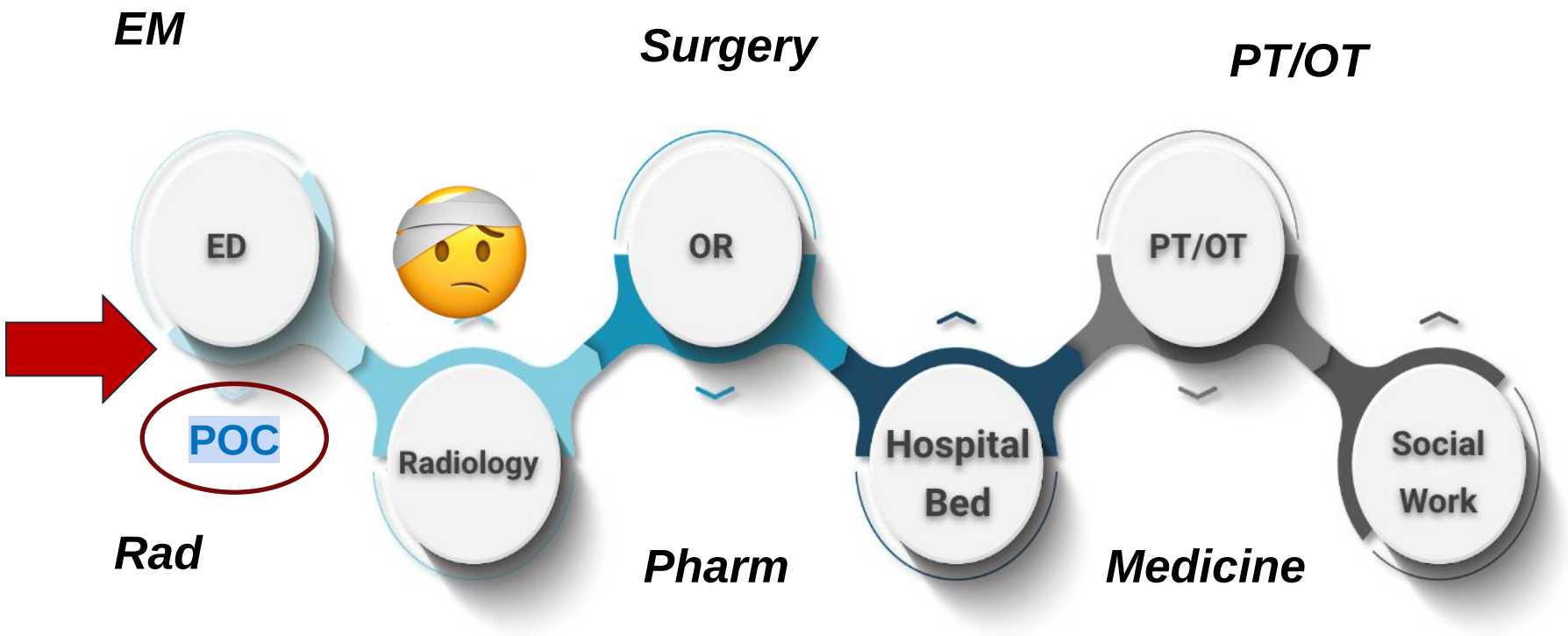
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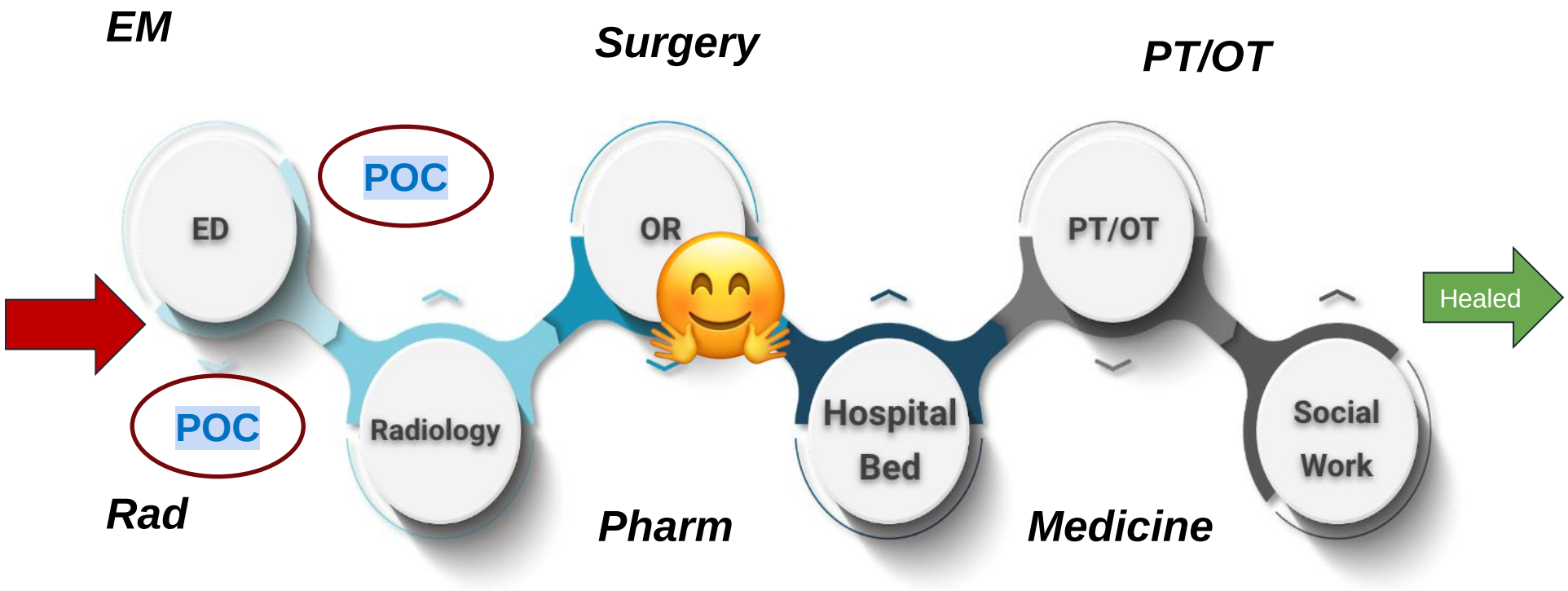
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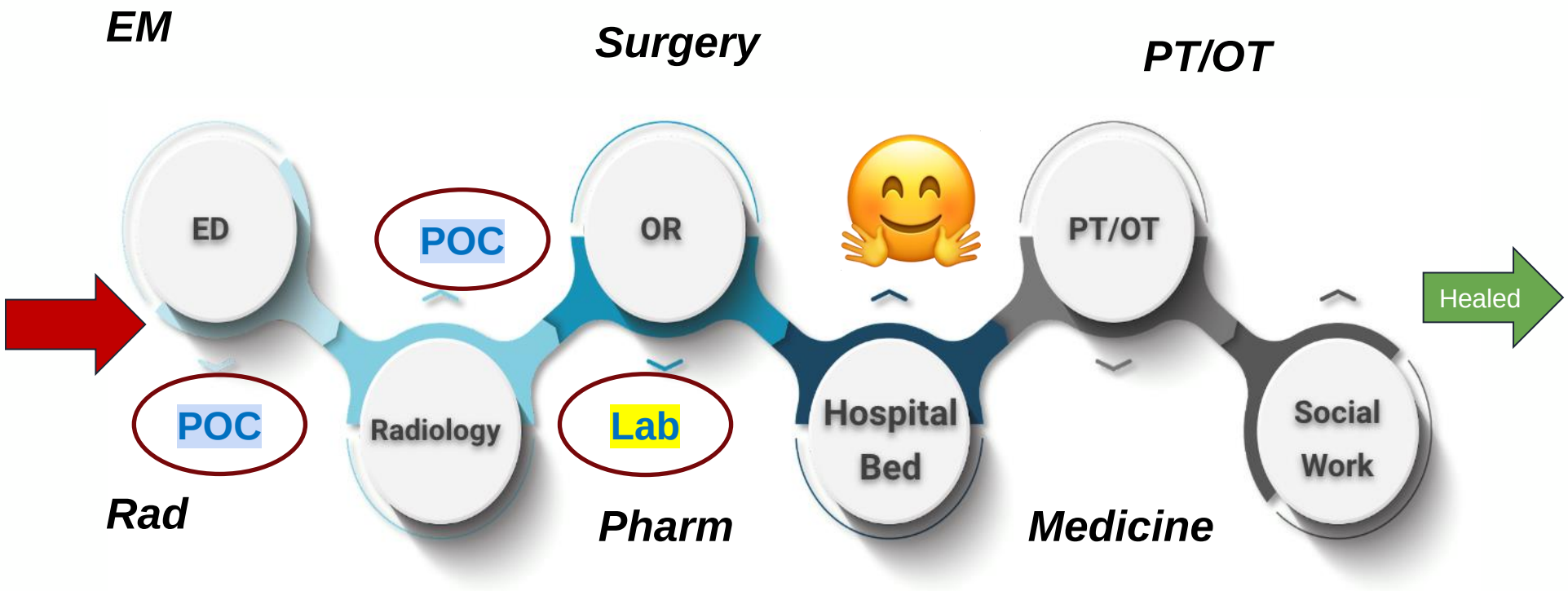
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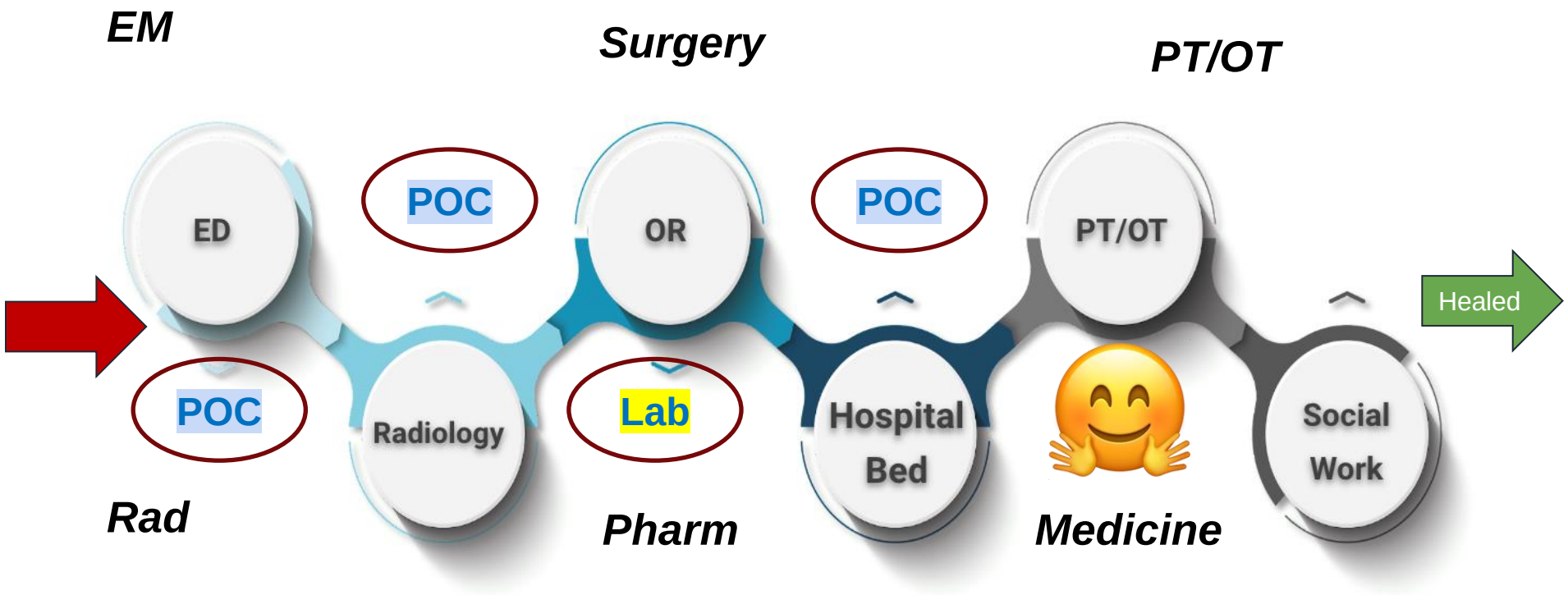
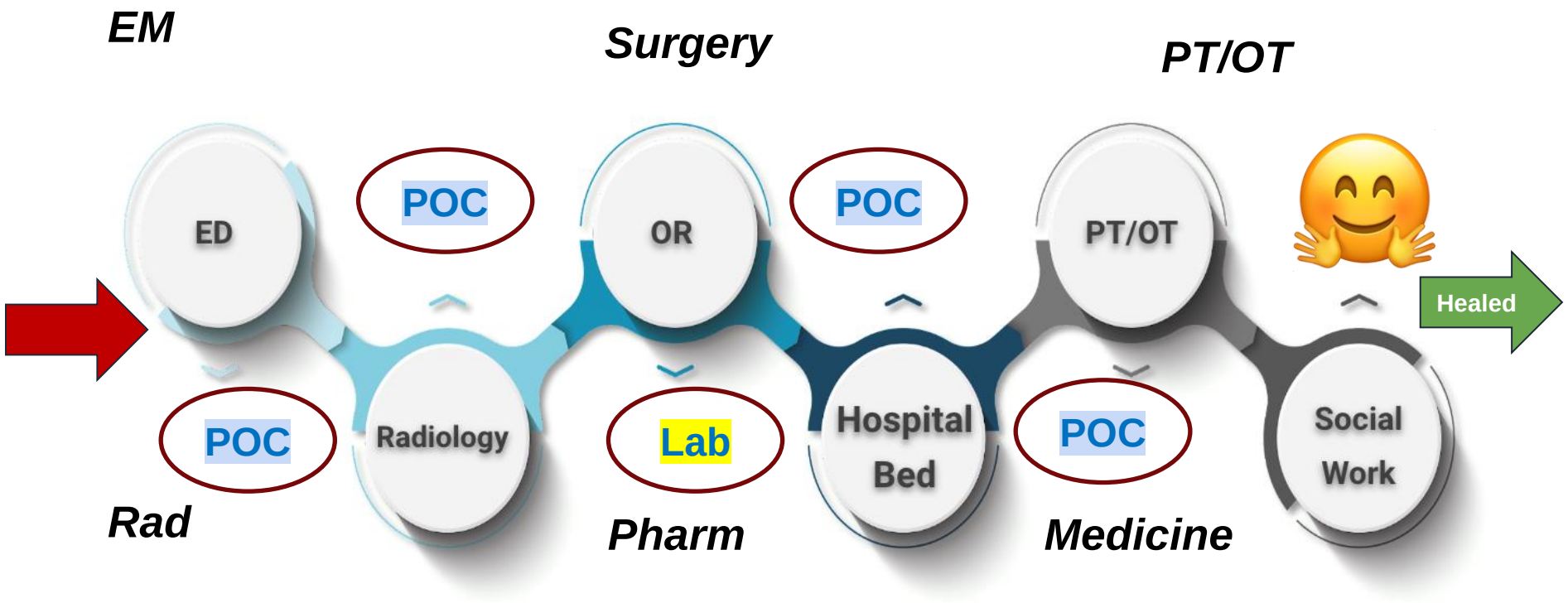
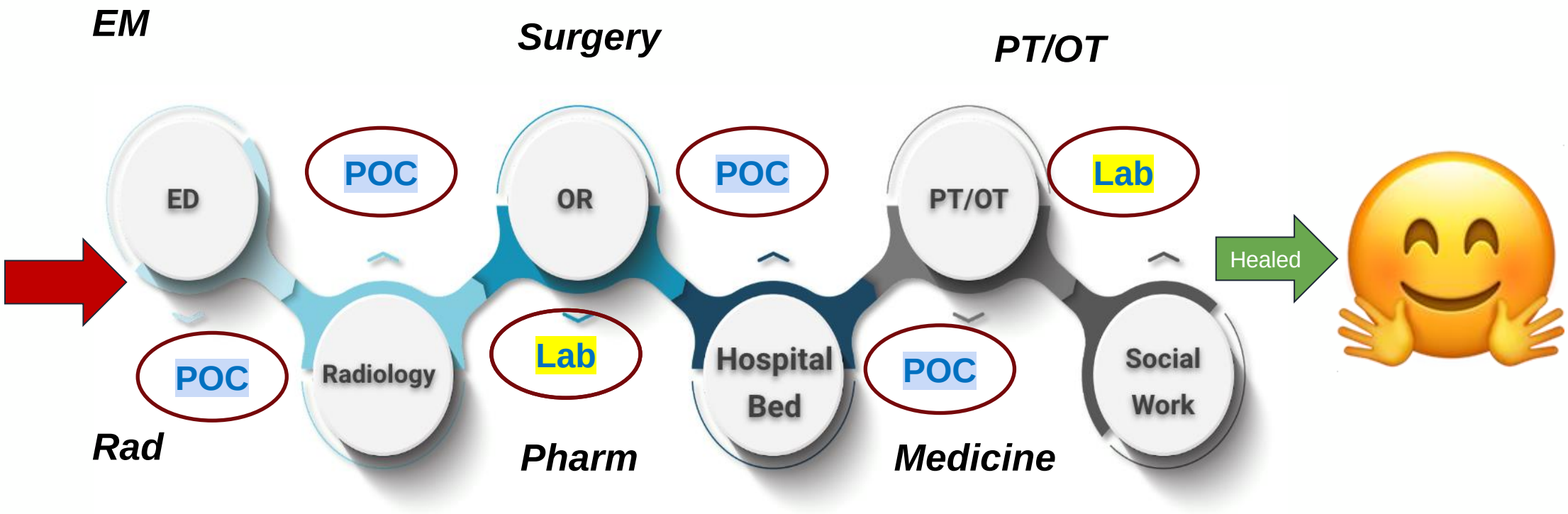
Labs



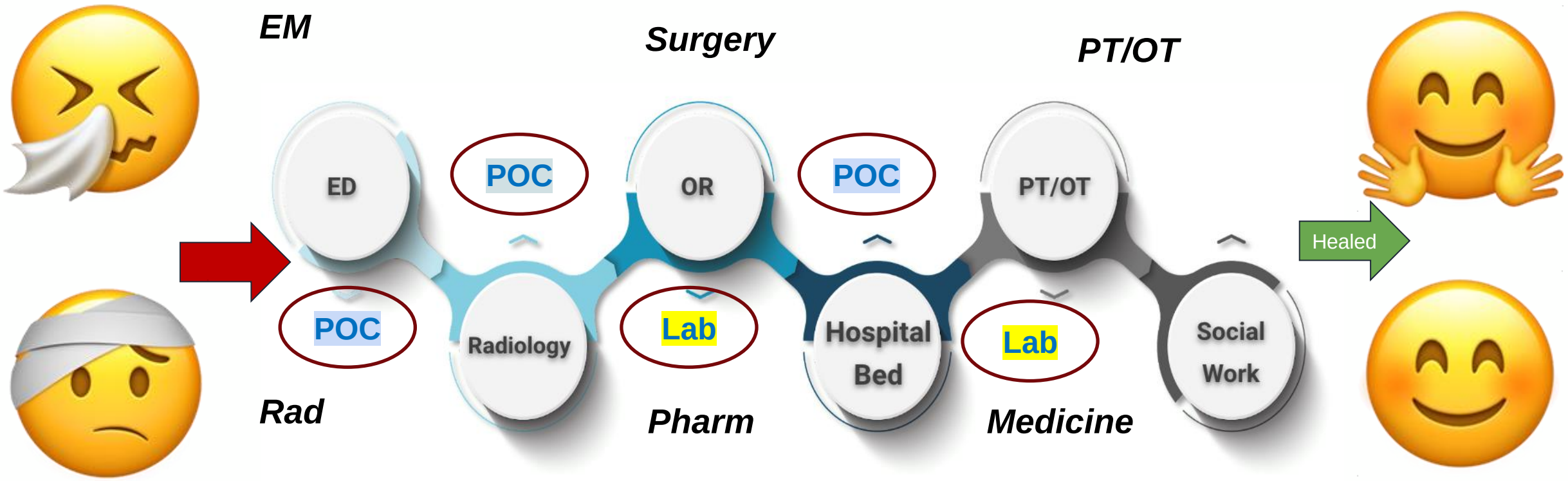
Labs = Decisions



Labs = Decisions = Throughput



Labs = Decisions = Throughput = Healing



Labs = Decisions = Throughput = Healing

Objectives

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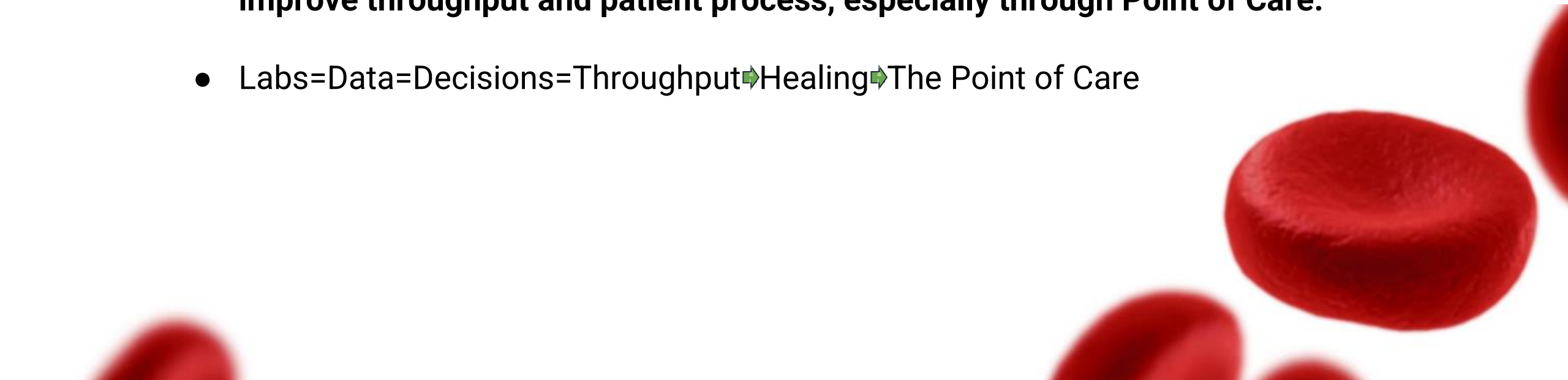
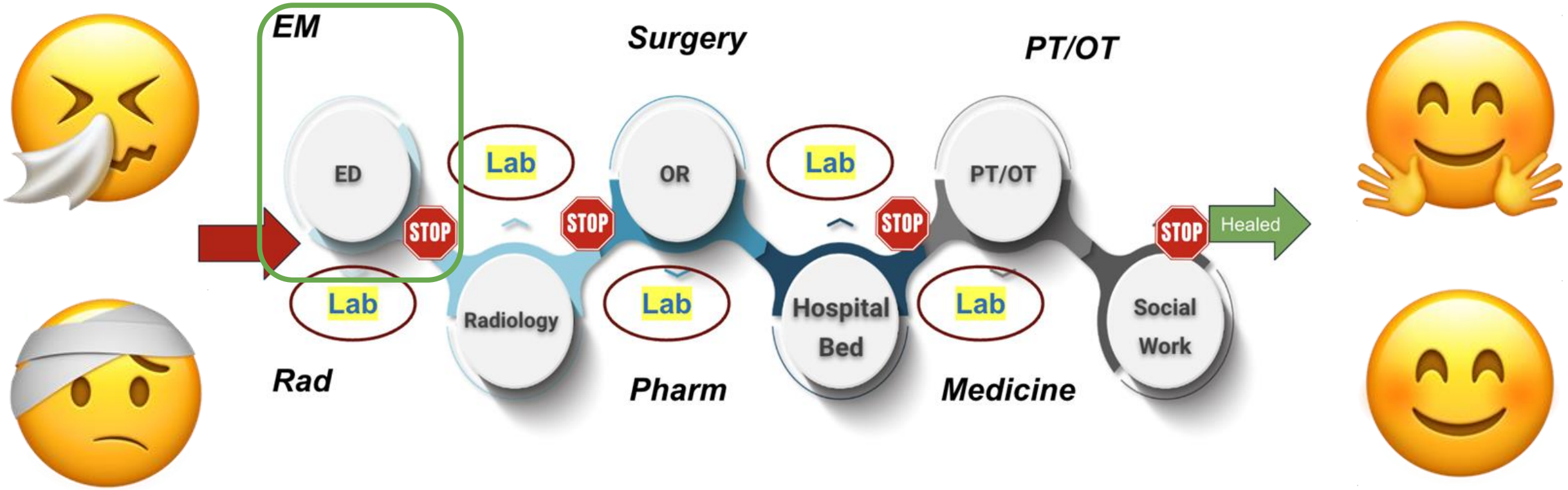
- Labs=Data=Decisions=Throughput➡Healing➡The Point of Care

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Radiology
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Hospital Bed
Lab
Social Work
Rad
Pharm
Medicine

Patient #1

56yo M, Hx of alcohol abuse, Hep C. Patient comes in because he “fell out.” Has been throwing up dark vomitus, looks like coffee.

- Esophageal tear
- **Cirrhosis - Varices**
- **Peptic ulcer Disease**
- Others

Patient #2

75yo F, Hx of GERD, HTN, Hyperlipidemia, stroke last year. Started throwing up blood this morning. 3 episodes since, bright red.

- Esophageal tear
- Cirrhosis
- Peptic ulcer Disease
- **Other: Anticoagulation**

GI Bleed

- GI Bleeding:
  - 149.8 cases per 100,000 persons per year
  - >80yo: 524.6 cases per 100,000

GI Bleed

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  - 1.5% to 2.7% have GI Bleeds

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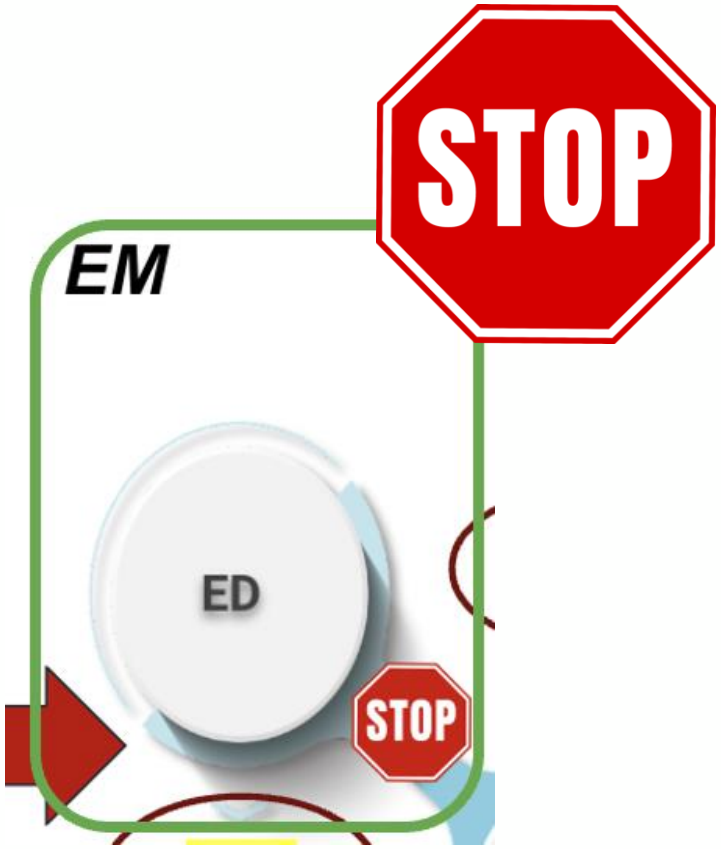
Next Step: Urgent/Emergent Endoscopy

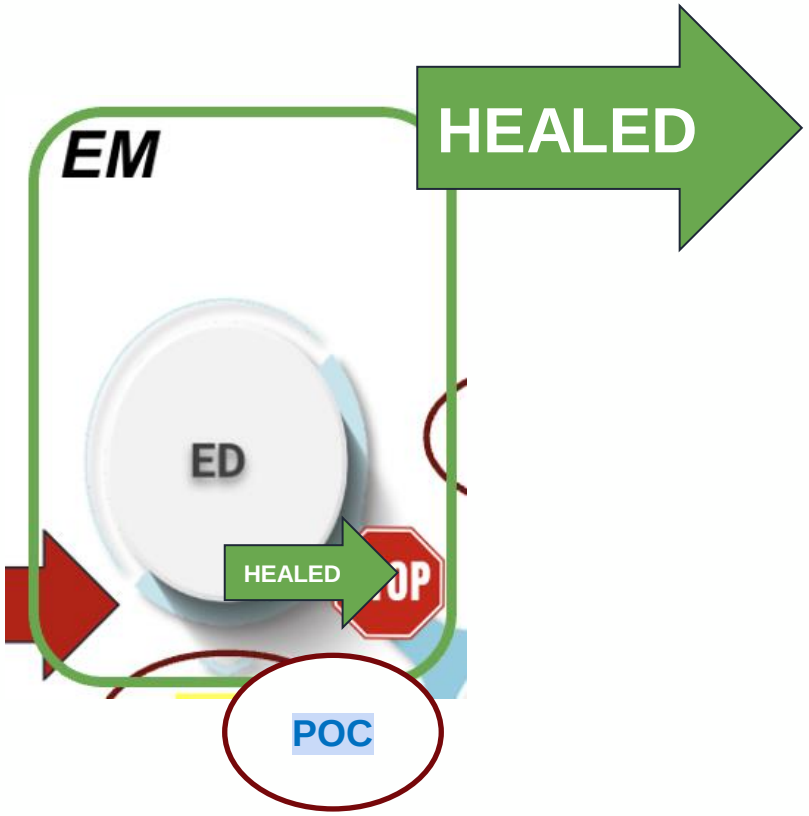
Urgent/Emergent Endoscopy = Diagnosis and Treatment in One



Can the patient tolerate the procedure?

- **Will pt need transfusion before or can we proceed?**
- **Will we need platelets be able to stop the bleeding?**
- Is it okay to proceed with General vs. MAC sedation

Urgent/Emergent Endoscopy

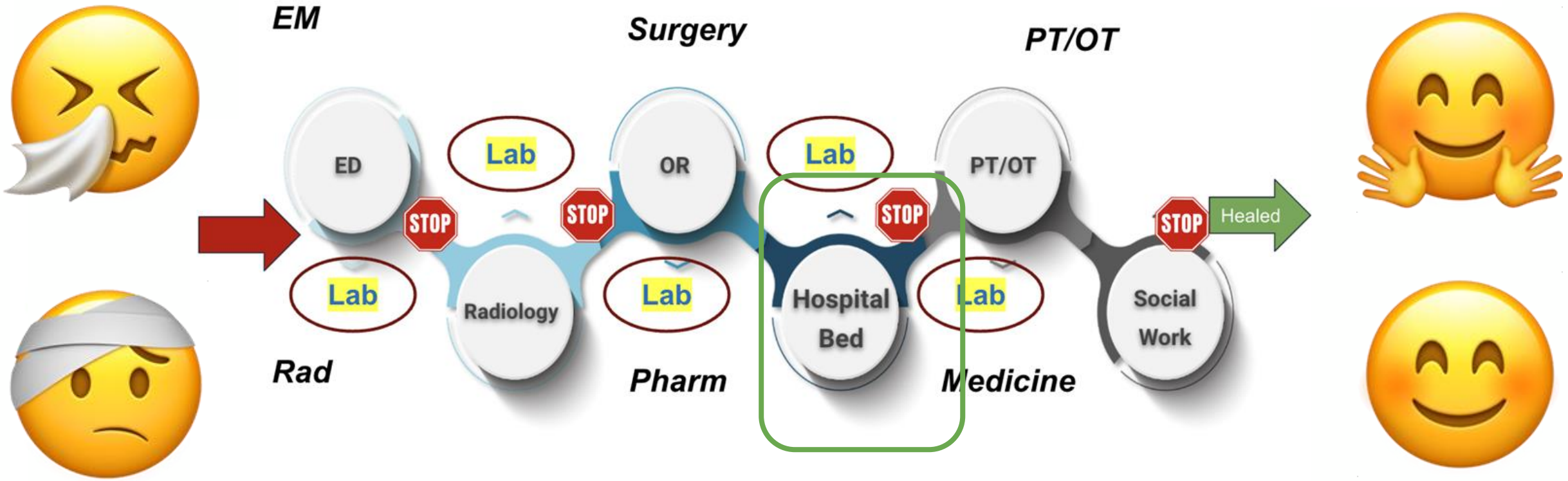


POC

Can the patient tolerate the procedure?

In 10 minutes:

- **HgB= 8.2**
- **Platelets=200**
- Proceed with GA for aspiration risk
- No platelets
- Type and Cross RBC but proceed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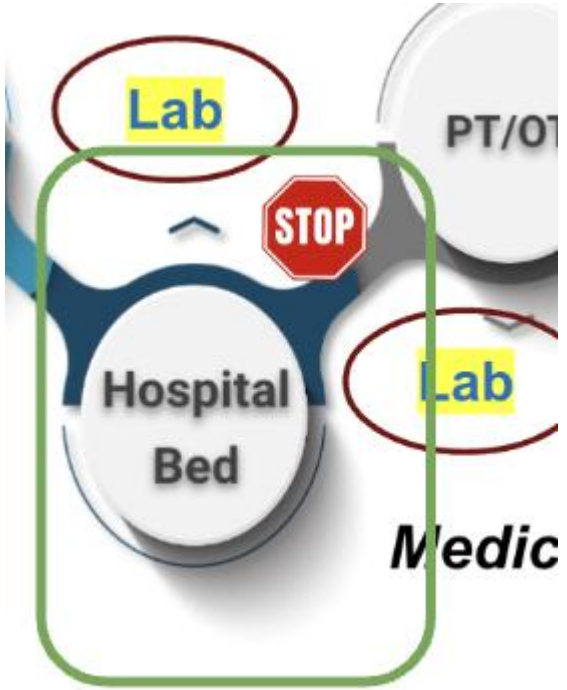
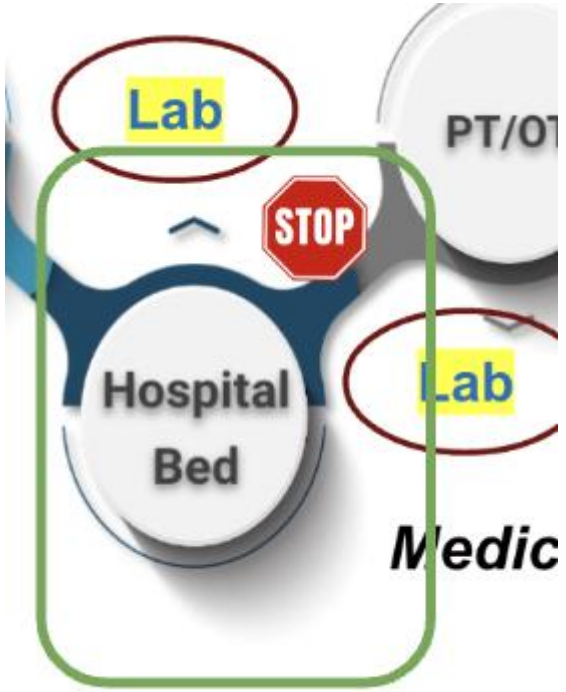
Labor and Delivery - Epidurals and Complications



- 9 million epidurals in OB (L&D) per year
- 10% to 20% High Risk
- Risk: Epidural Hematoma increases with Platelets <70
- 67% of C-Sections under epidural (1.2 million)
- Each year, about 14 million women experience postpartum hemorrhage resulting in about 70,000 maternal deaths globally

Labor and Delivery - Epidurals and Complications



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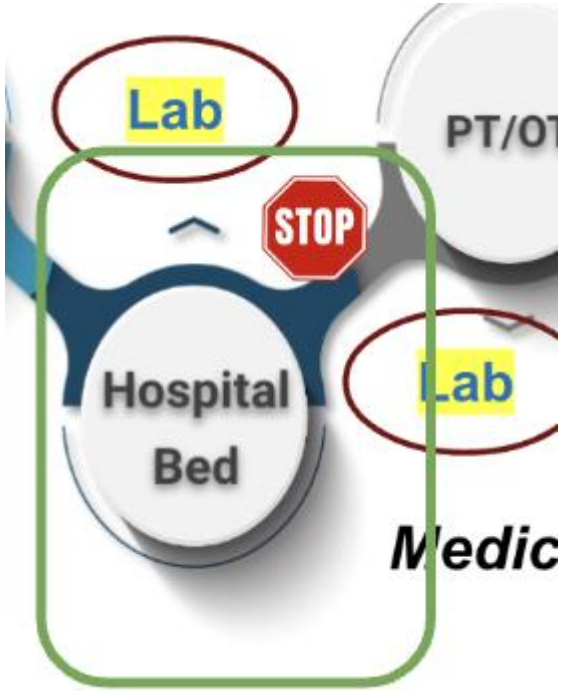
HEALTH

U.S. Maternal Mortality Hits Highest Level Since 1965

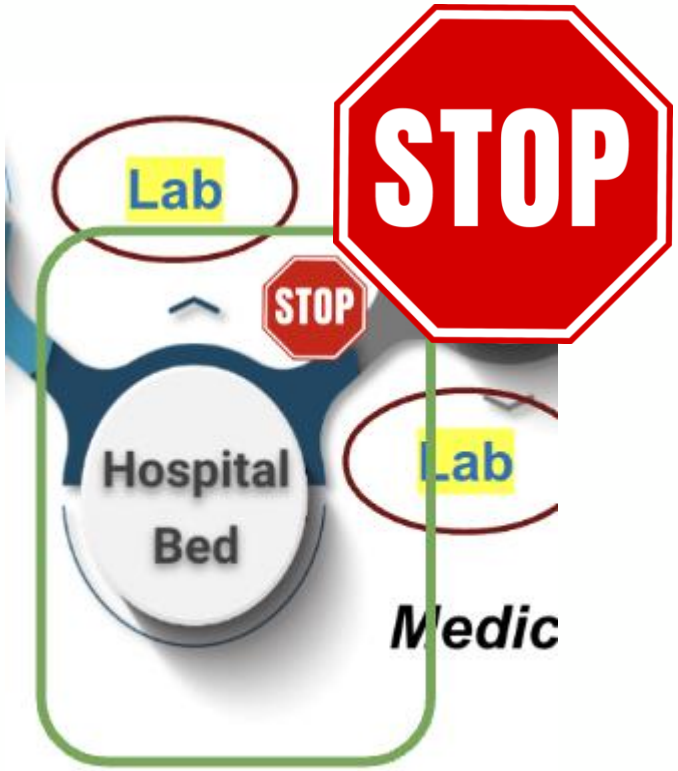
Black mothers are the most affected, 2021 data show

Patient Scenario #3

26yo F, G2P1. Hx of pre-eclampsia, previous C-section. Wants (Vaginal Birth After Cesarean (VBAC) Arrives at 5cm dilation. Requesting epidural.



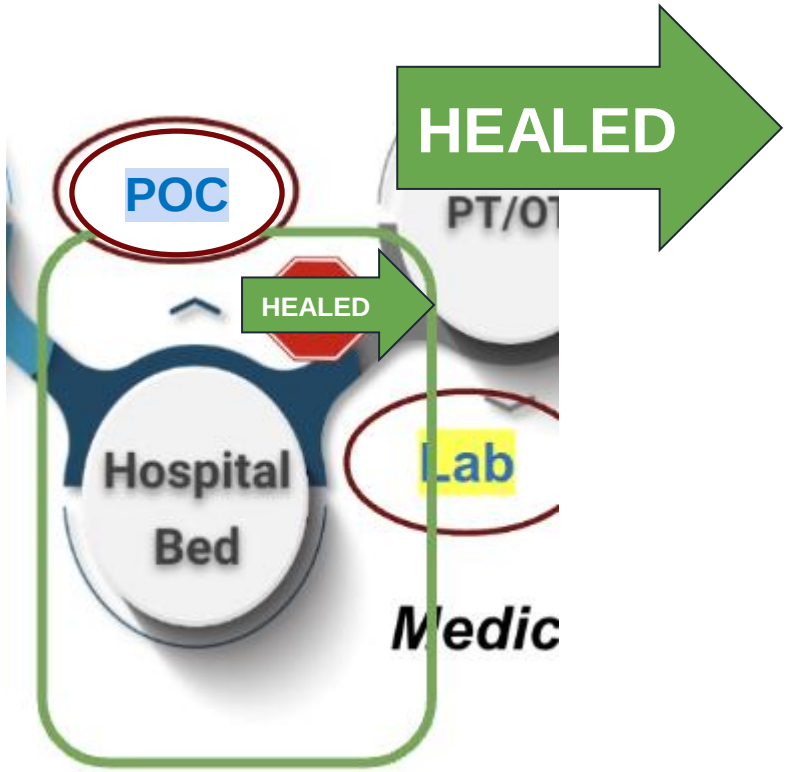
Neuraxial Anesthetic Placement for Labor & Delivery or Cesarean - Epidural and Spinal



What does the patient need now and before the procedure?

- **Is the Platelet count >70?**

Neuraxial Anesthetic Placement for Labor & Delivery or Cesarean - Epidural and Spinal



POC

Can the epidural be placed so patient is ready for Labor and complications?

- **10 min**
- **Platelet Count=120**

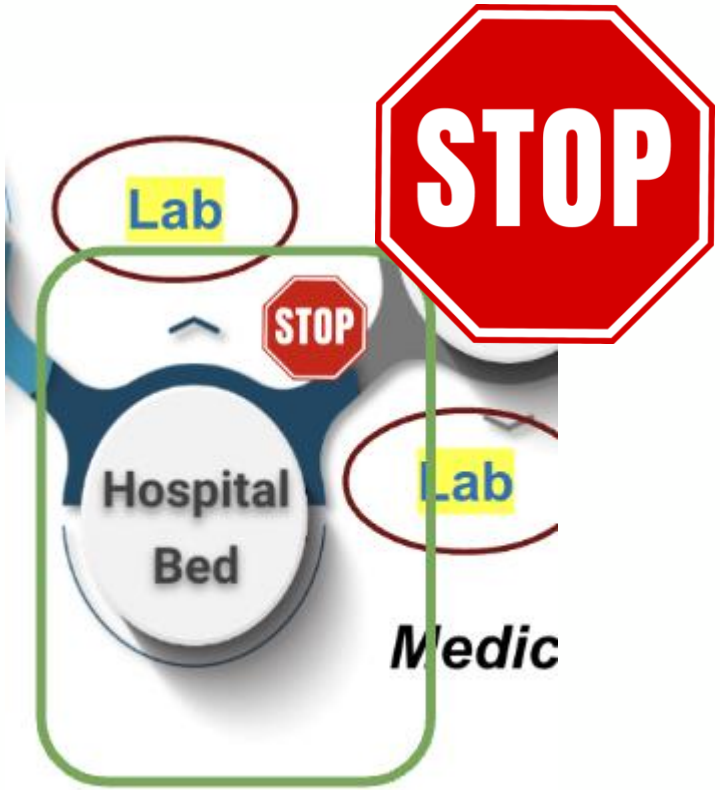
Patient Scenario #3 Part 2

Same patient, successfully delivered vaginally. 30 minutes later, called to room because of profuse vaginal bleeding.

Emergent Need:

- **NEW CBC:** Do we need to transfuse?
- **NEW Platelets:** will we be able to stop the bleeding?

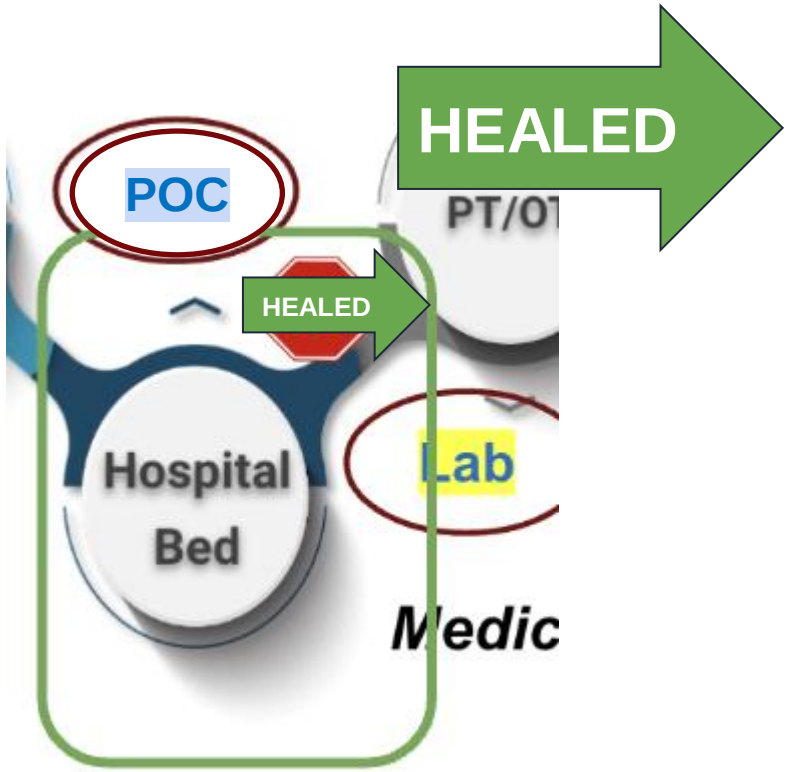
Maternal Hemorrhage



What does the patient need now and before the procedure?

- **NEW CBC**
- **NEW Platelet Count**

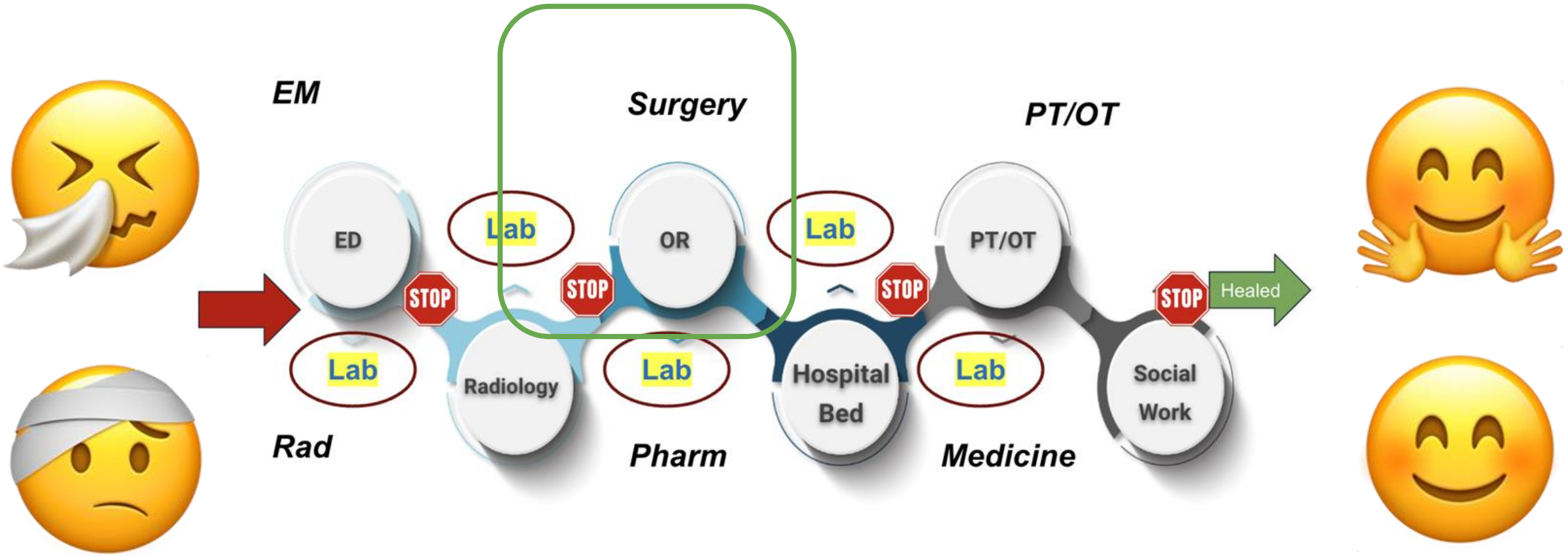
Maternal Hemorrhage



POC

What does the patient need now and before the procedure?

- **HgB=7.3**
- **Platelets= 90**
- Get RBCs and Platelets and transfuse immediately
- Prep OR for evaluation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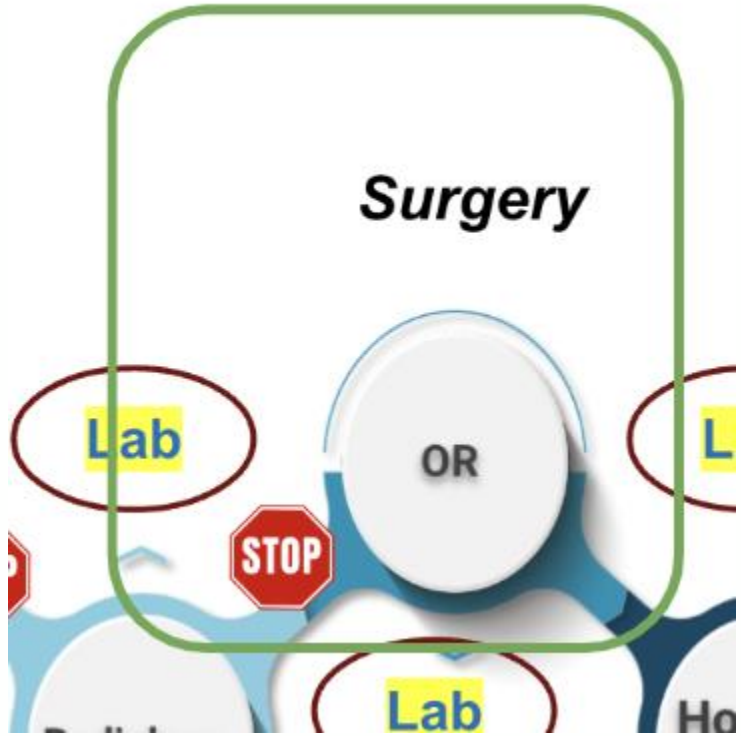
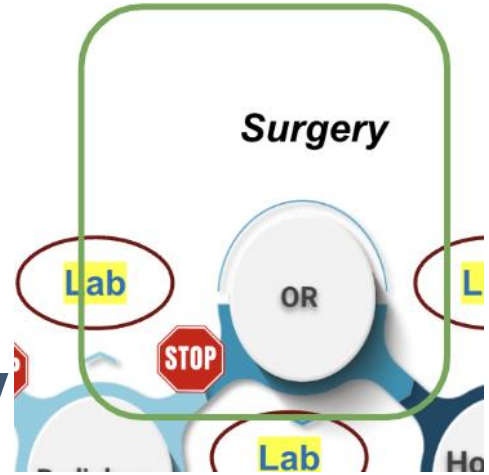
Urgent/Emergent Surgery



Acute Surgical intervention

- 10.6 million surgeries are Emergent/Urgent
- Of the 40-50MM surgeries per year
  - 17% Emergent (within 1 hr)
  - 25% Urgent (within 6 hours)

Urgent/Emergent Surgery



Acute Surgical intervention

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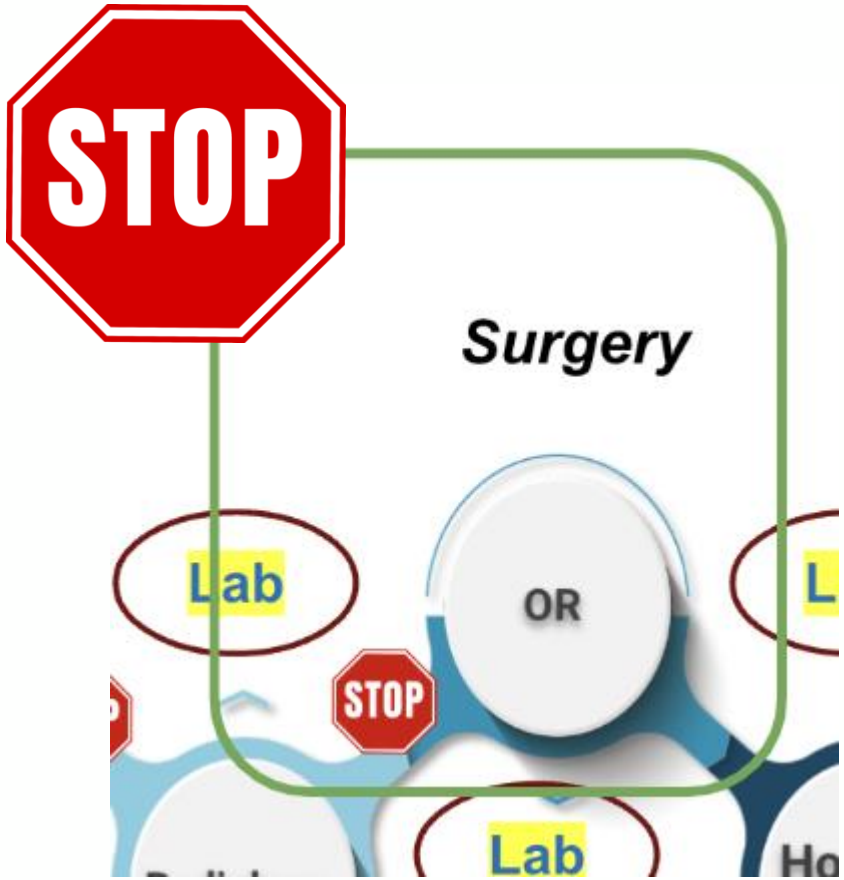
  - 17% Emergent (within 1 hr)
  - 25% Urgent (within 6 hours)

Considerations of Surgery

- Higher likelihood of underlying medical conditions
- Higher risk of bleeding
- Higher risk of infection
- Anesthesia complications
- Need for more intervention pre-surgery
- Lack of preparation for surgery by patient

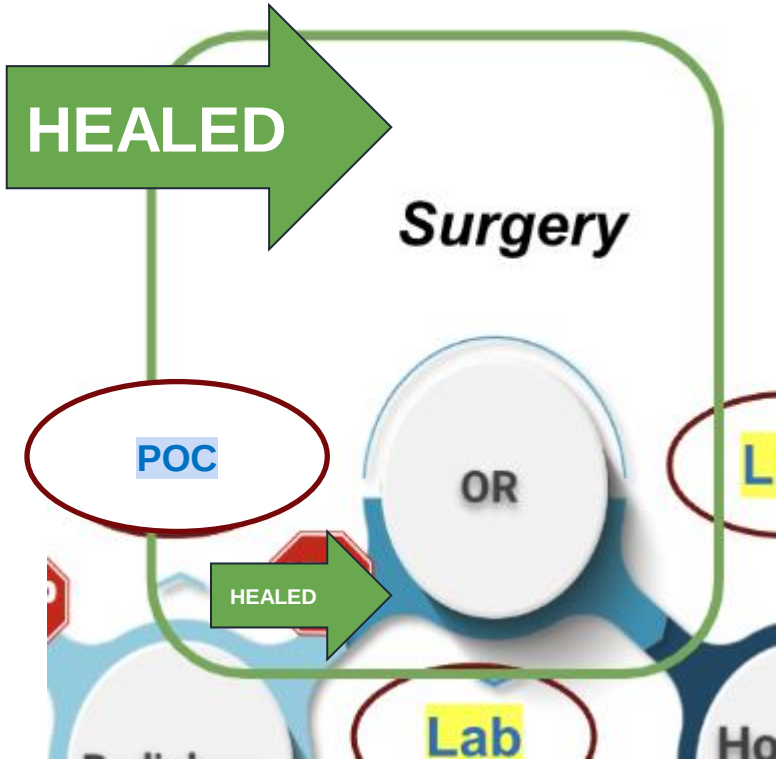
Urgent/Emergent Surgery



Would do we need to get to the OR?

- **Hgb**
- **Platelets**
- **K+**
- Type and Screen
- Electrolytes
- Glucose
- Renal Panel

Urgent/Emergent Surgery

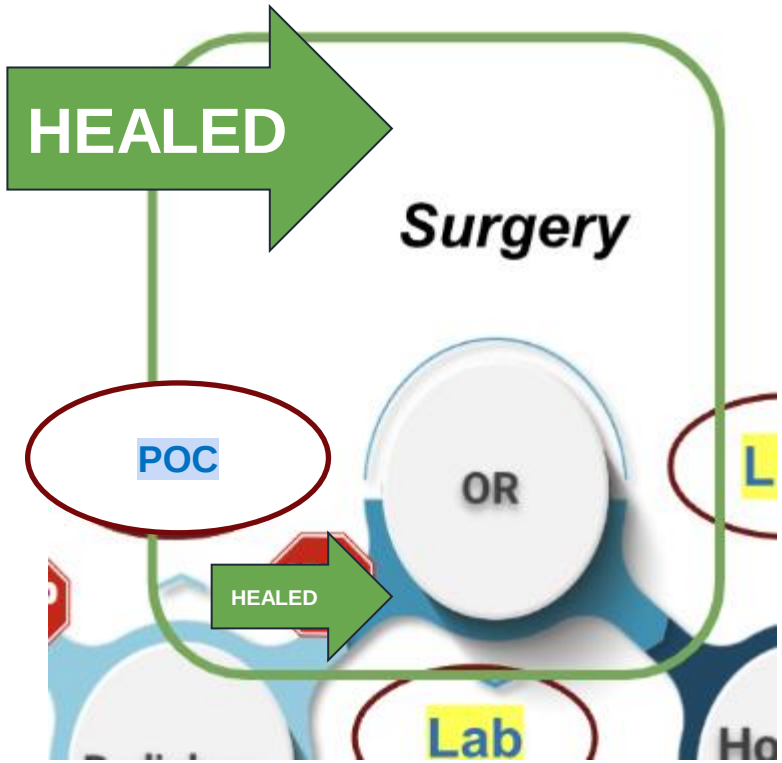


POC

Would do we need for the next step?

- **Hgb**
- **Platelets**
- **K+**
- Type and Screen
- Electrolytes
- Glucose
- Renal Panel

Other Examples



POC

- Ambulatory Surgery Centers - Hgb
- Kidney Transplant - K+, Hgb
- Liver Transplant Take Backs - CBC, Plt
- Post-Transfusion Pre-op - CBC
- Spinals before Rad-Onc procedures - CBC, Plt
- IR - Stroke Stat: CBC, Plt
- SICU - Bleed - CBC, Plt
- Out of OR Procedures - CBC, Plt, K+
- Out of OR intubations - K+
- PACU Bleeding, Hypotension - CBC
- Pain Clinic Neuraxial - Plt
- Regional Anesthesia - Plt
- Cardiac Surgery
- Intraoperative Data - CBC, Plt, Electrolytes
- Discharge Labs: confirming stability - Various

Objectives

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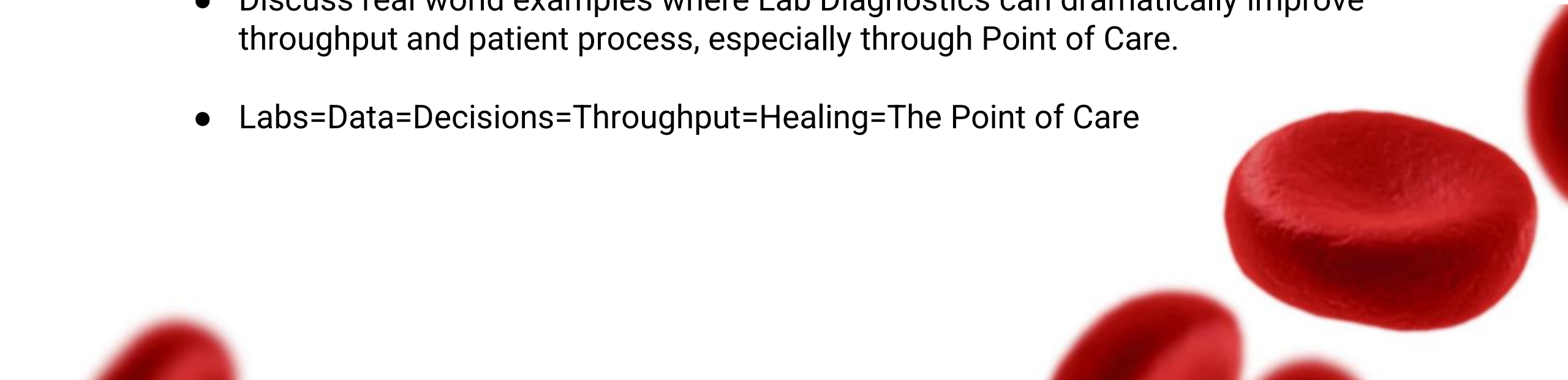

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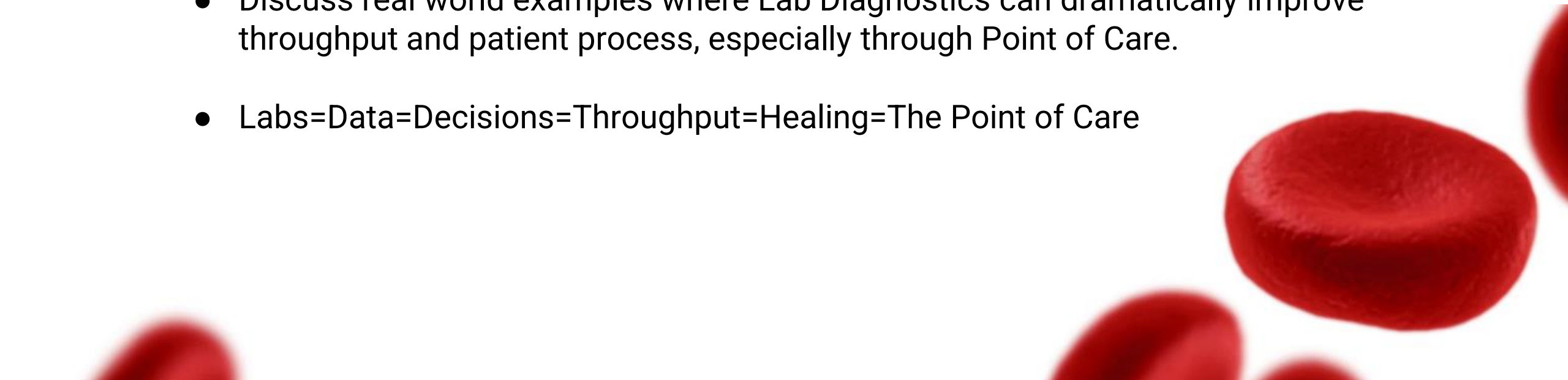

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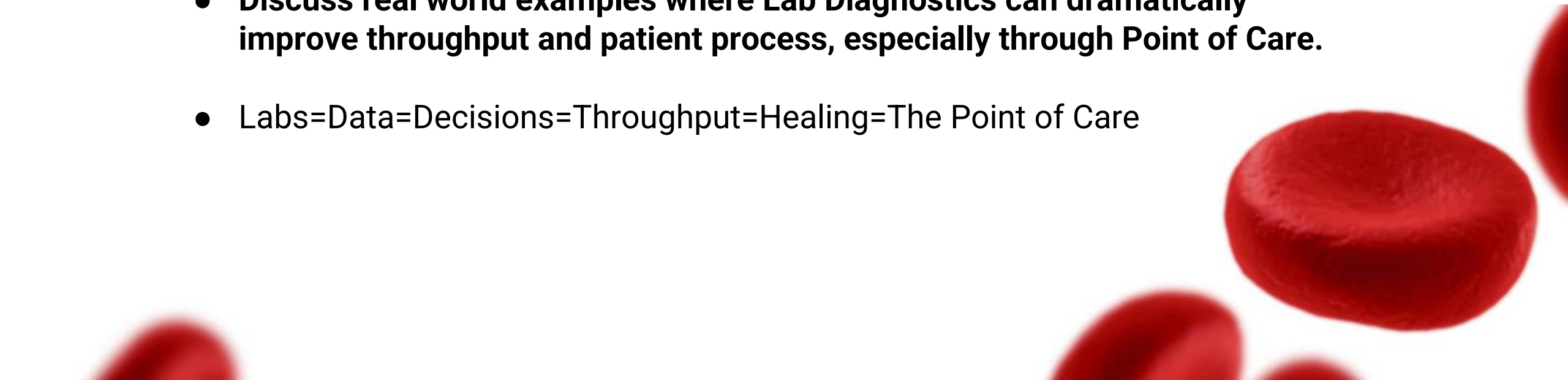

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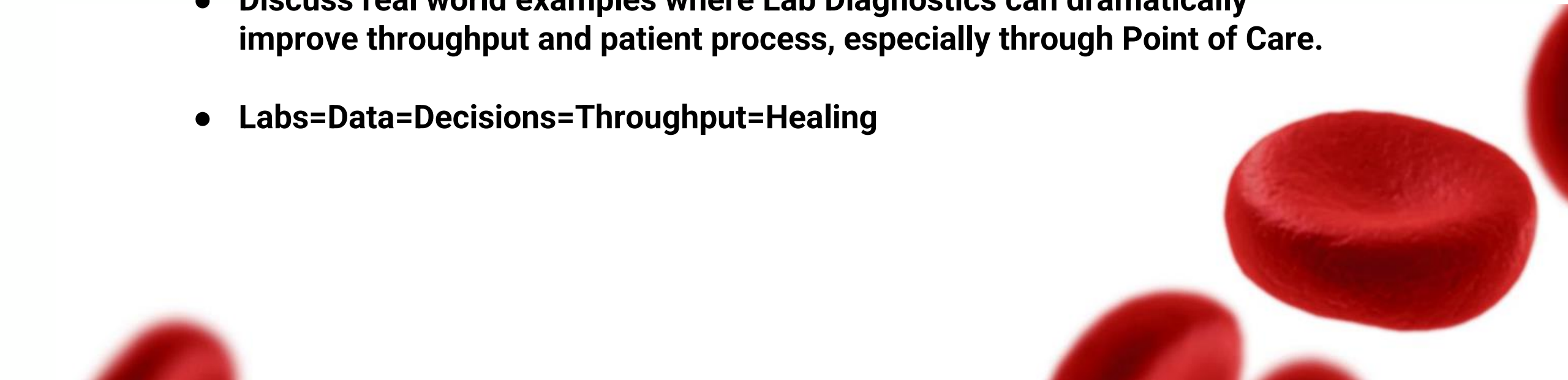
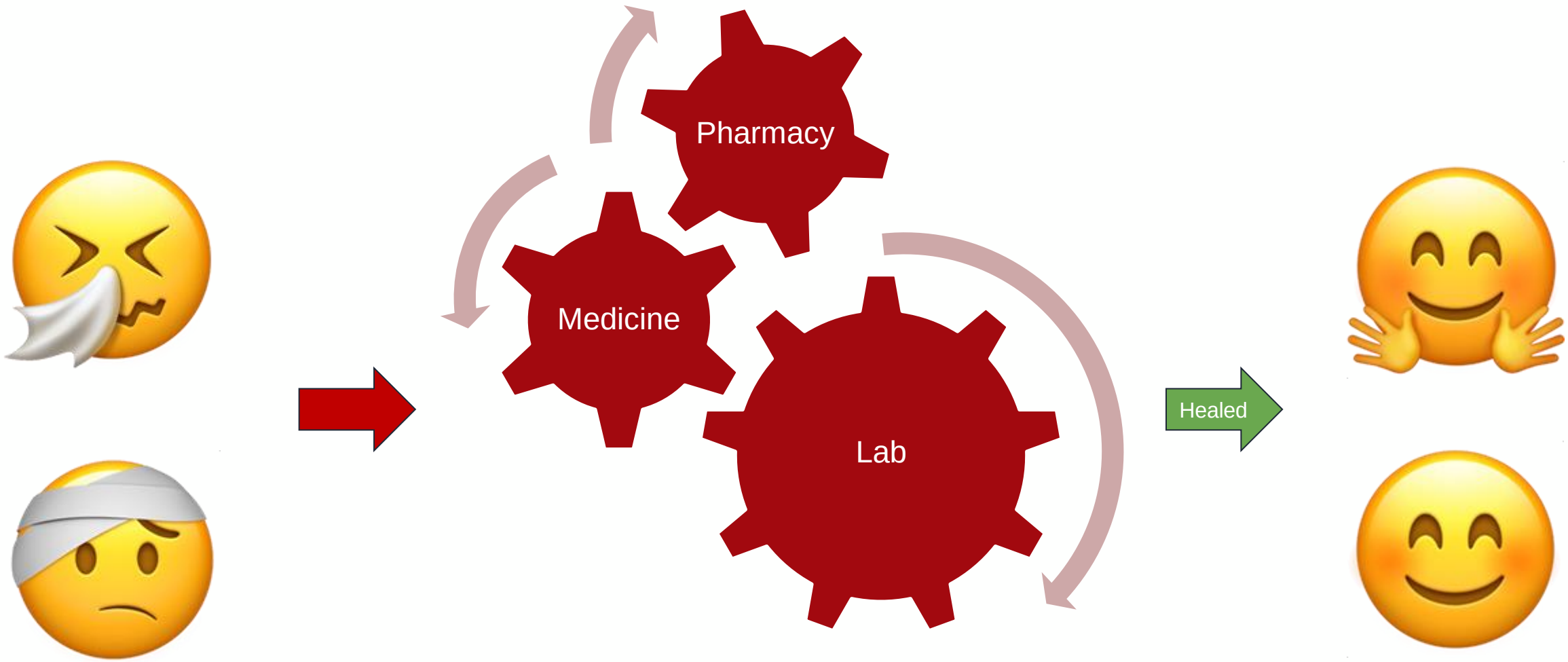


Point of Care: Throughput Accelerator



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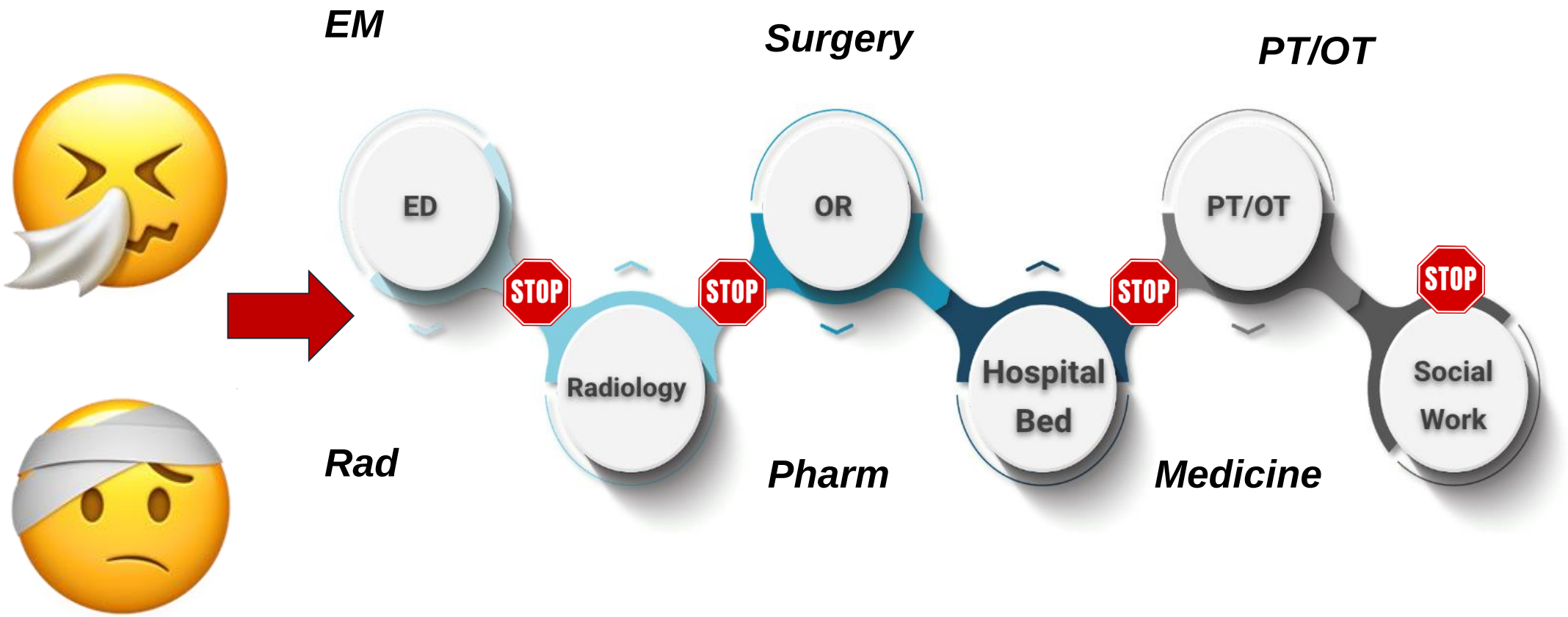
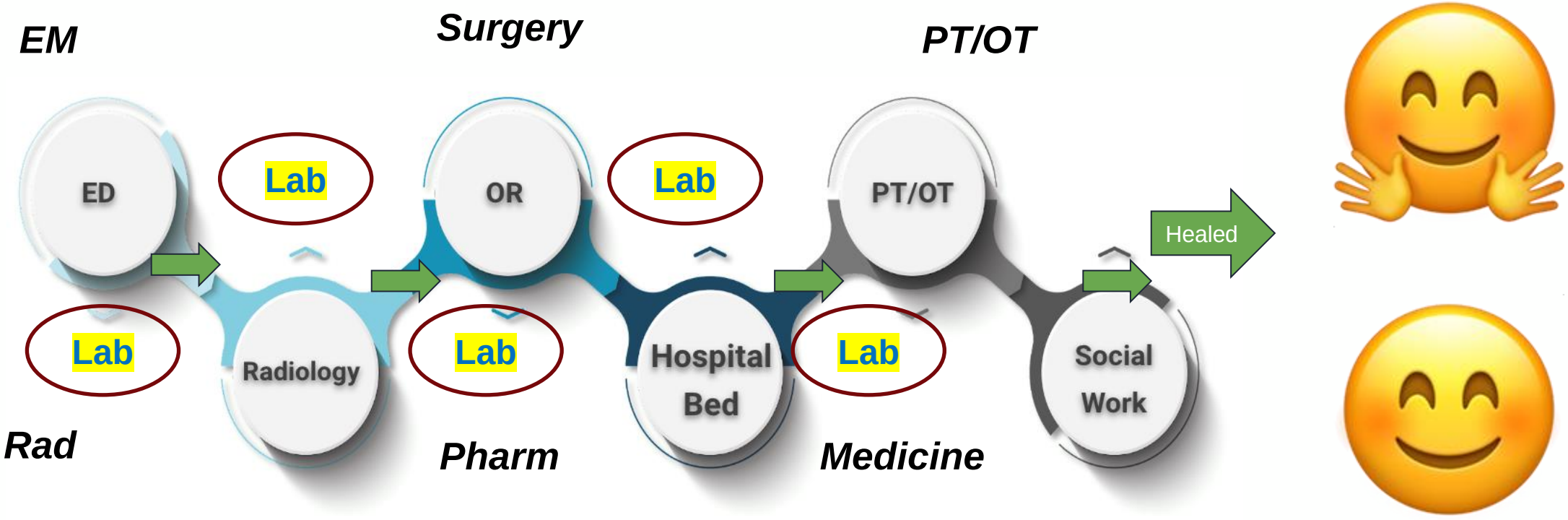
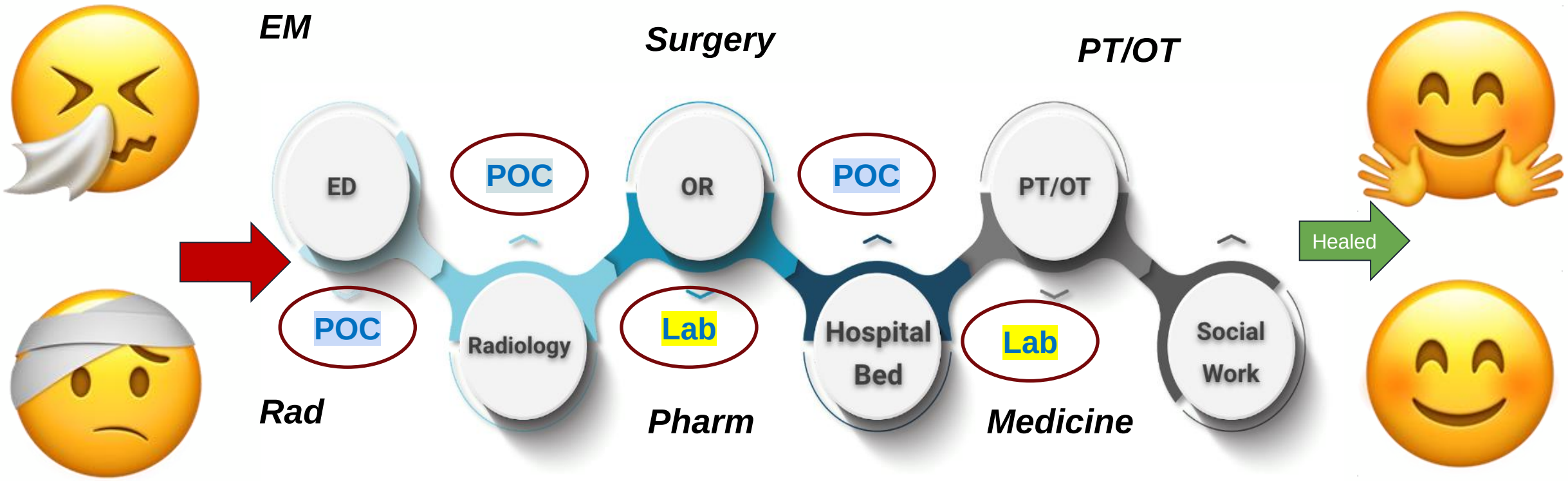


Labs = Decisions



Decisions = Throughput



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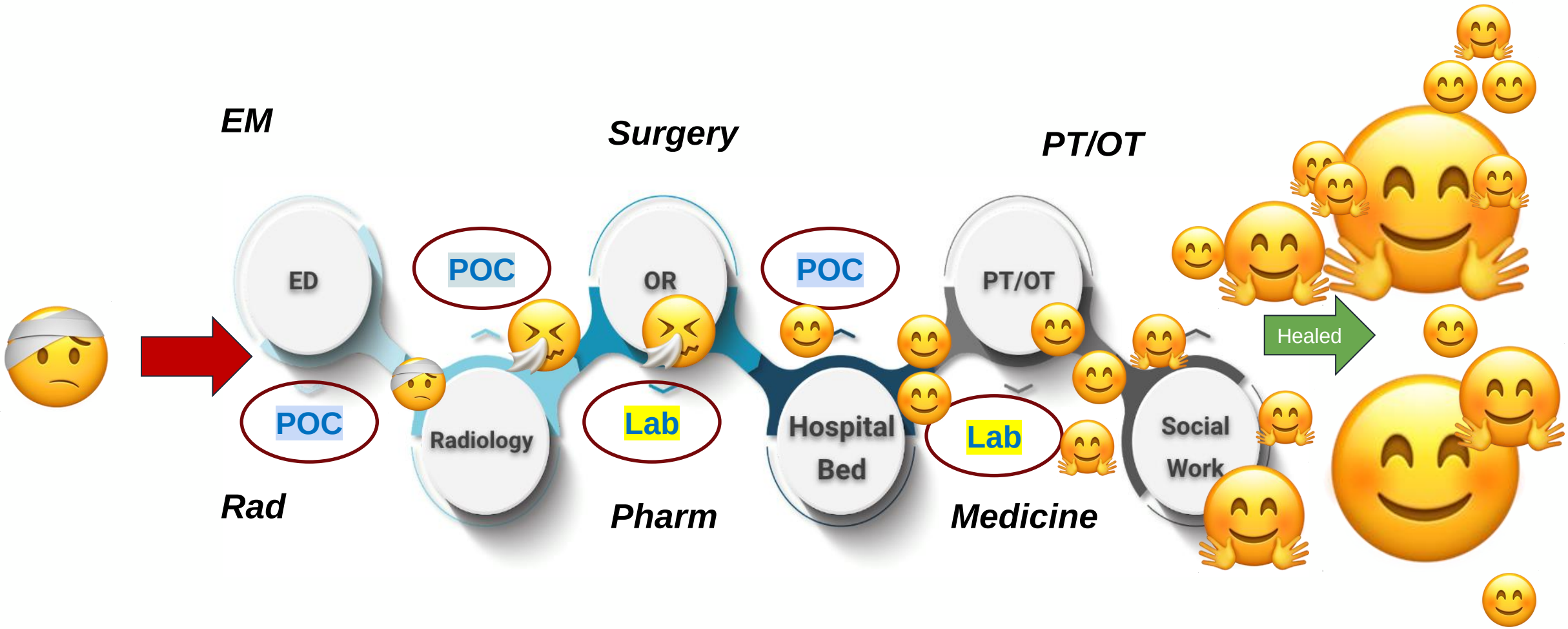

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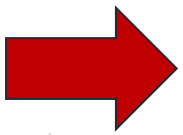
Thank you -



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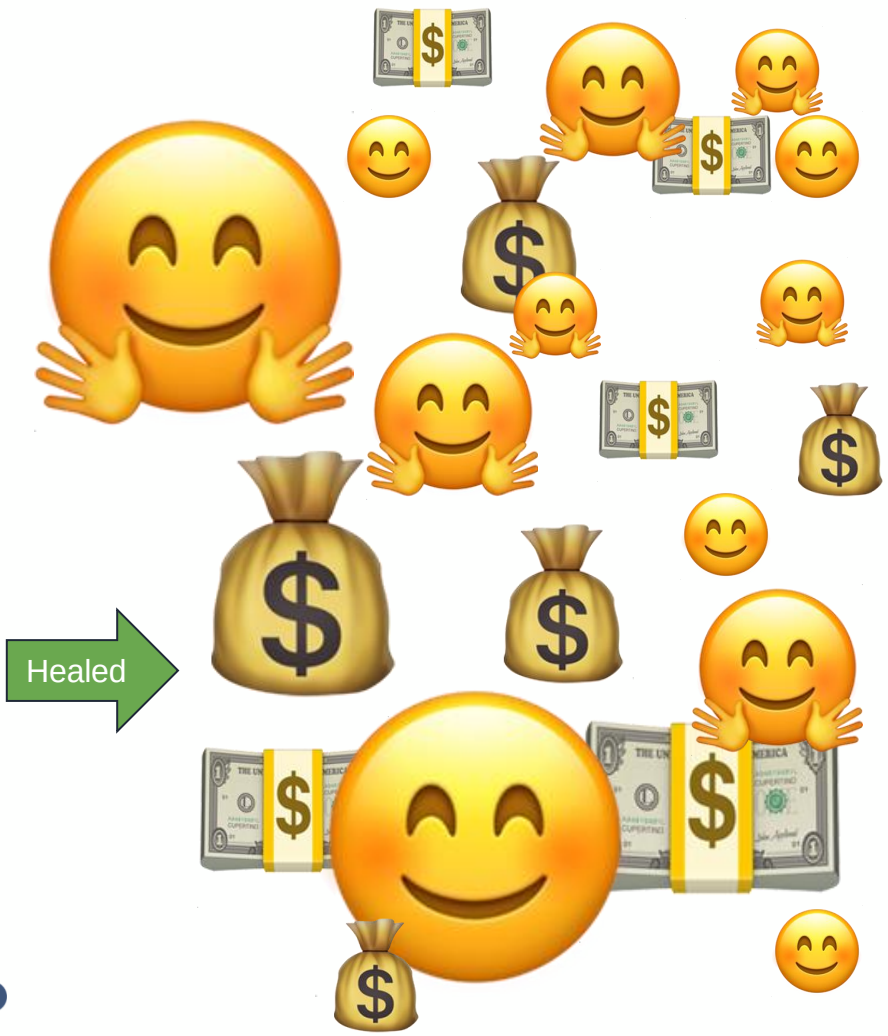
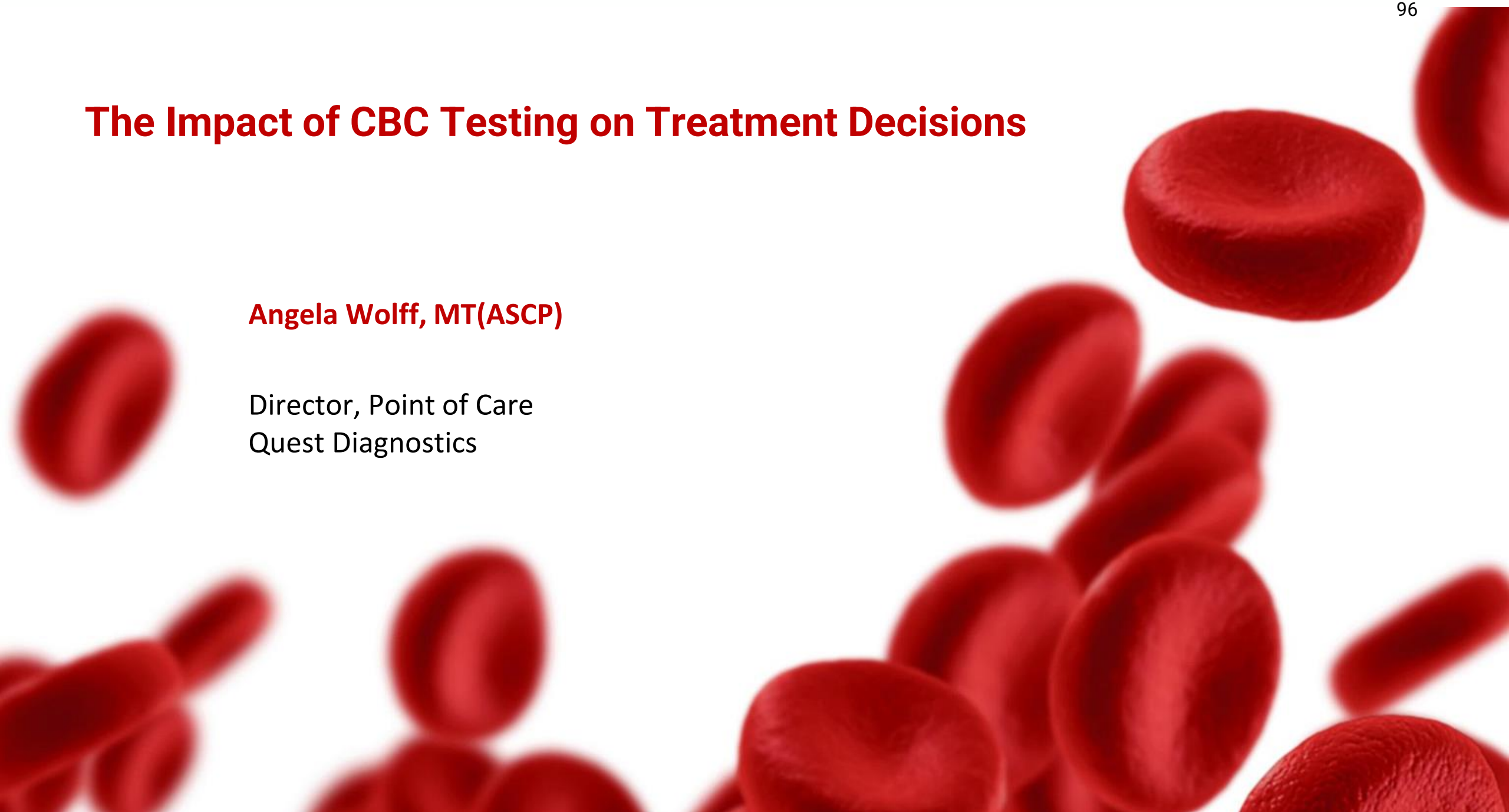


Labs = Decisions = Throughput = Healing 😊

The Impact of CBC Testing on Treatment Decisions

Angela Wolff, MT(ASCP)

Director, Point of Care
Quest Diagnostics



Objectives

- Discuss the challenges of administering traditional hematology instrumentation at the point of care
- Identify the options that improve on the quality of testing at the point of care

Program Background – End to End POC Support from the Lab, from Largest to Smallest

POC Program

CLIA Licensure: 56 total licenses: 31 Moderate / 25 Waived

Complete support of Ascension St. Vincent Hospitals, Community Health Network, and Ortho Hospitals throughout Indiana from Quest Laboratories

POC Specialists: 7 licensed MTs serving as Technical Consultants
POC Support Techs: 7

Testing Personnel: RNs and Medics

Program Background – POC Staff Duties

POC Specialists

- Assist with CMS116, CMS209, Enclosure I submissions/changes
- Assist with the upkeep of Accreditation accounts (CAP or Joint Commission)
- Lead all Accreditation Surveys
- Research/Test/Lead any device changes
- Write/Revise Procedures
- Write/Revise/Annually assess IQCP
- Perform/Evaluate all required studies
- Review Quality Control
- Review Maintenance
- Maintain Inventory
- Upkeep of middleware (Operators/Daily results/Inventory/Report)
- Maintain Proficiency Program (Ordering/Distribution/Submission/Review of results/Failure investigations)
- Troubleshooting
- Monthly QA Reports
- Competency Program (Writing of education/Sign-off/Charting)

Program Background – POC Staff Duties

POC Support Techs

- Monthly QC (New lot/QC baggies)
- Inventory Control (Ordering/Dot system/Delivery)
- Middleware (Operators/ Daily result review)
- Studies for new devices, Annual studies (Linearity/Correlations)
- Troubleshooting
- AUDITS (Device/Reagents)

Program Background – POC CBC Testing

Neighborhood ED Laboratories

Oncology offices

Student health services

Surgical Units

Rural / Critical Access – backup analyzers

Program Background – CBC testing challenges

Testing Personnel are not laboratorians!

Quality Control:

- Correct handling of control material (warming to room temperature, proper mixing)
- Multiple repeat testing on failed controls
- Ability to evaluate H/L flagging for acceptability
- Failure rate: 8 – 20%

Program Background – CBC testing challenges

Maintenance:

- Monthly (~1 hour) and Six-month (~1-2 hours) required
- Performed by POC Specialist
- Drain issues

Calibration:

- Required 2X per year
- Performed by POC Specialist

Reagent Inventory: 20L cubes of diluent / 5L Lyse

- Cubes are heavy
- RNs/Medics do not like to change reagents
- Temperature documentation

Program Background – CBC “wishlist”

- Easy to use
- Ability to have a 5 part differential
- IQCP Eligible
- Fewer reagents
- No maintenance
- Eliminate calibration
- Easy troubleshooting
- Easy training/competency

Thank You

Angela Wolff, MT(ASCP)

Director, Point of Care
Quest Diagnostics