AMA | CHANGEMEDED

Precision Education

The Future of Lifelong Learning

IAMSE Winter 2025 Series
January 16th

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Chief Academic Officer, AMA
Professor of Medicine, Johns Hopkins

#CHANGEMEDED

Disclosures *Opinions are my own*

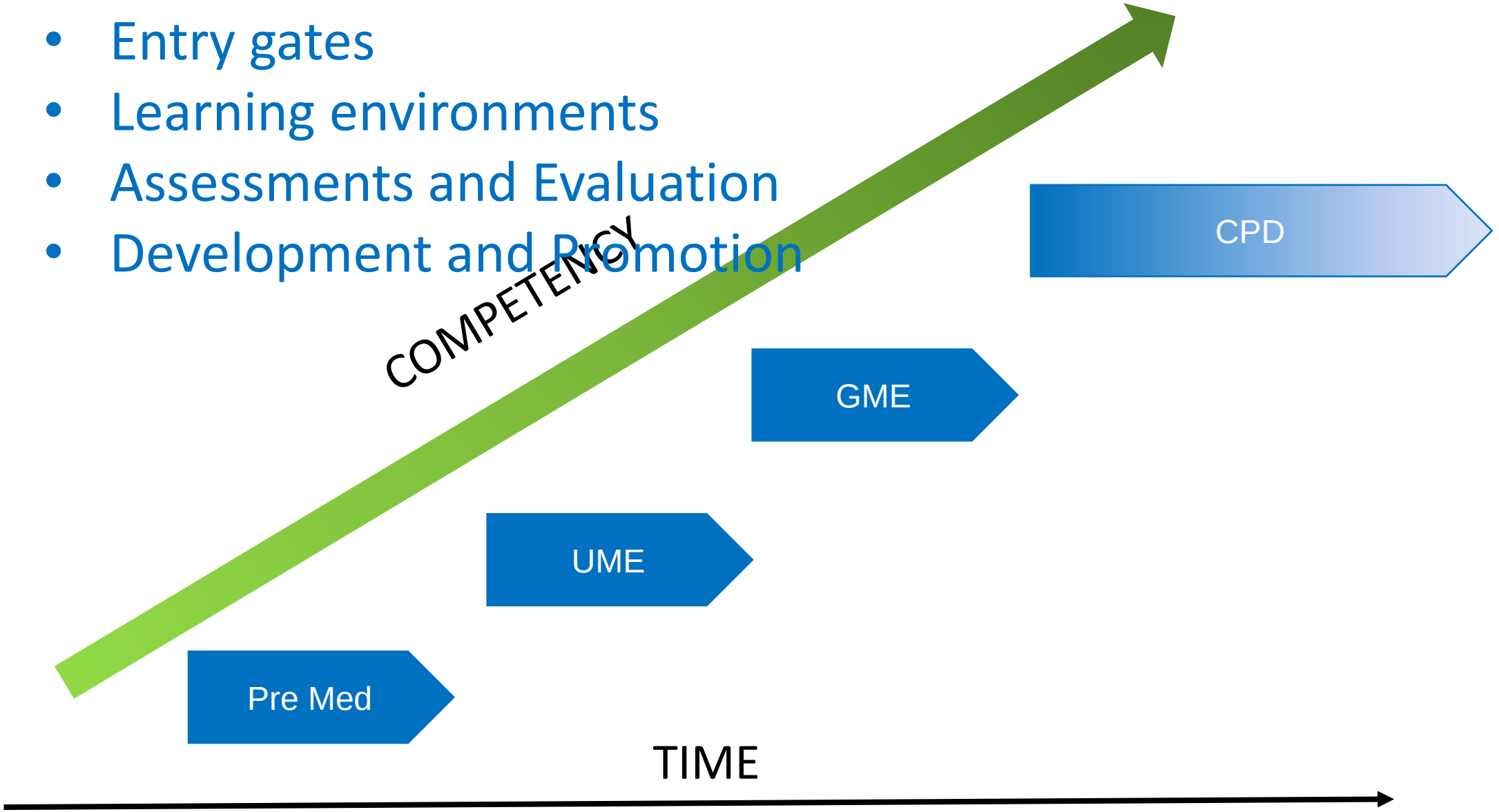
Acknowledgements *Many*

Objectives

By the conclusion of this talk, you will be able to:

- Identify barriers to lifelong learning in medical education
- Discuss a conceptual model of precision education
- Describe current innovations in precision education specifically relevant to UME, GME, and CPD

- Entry gates
- Learning environments
- Assessments and Evaluation
- Development and Promotion

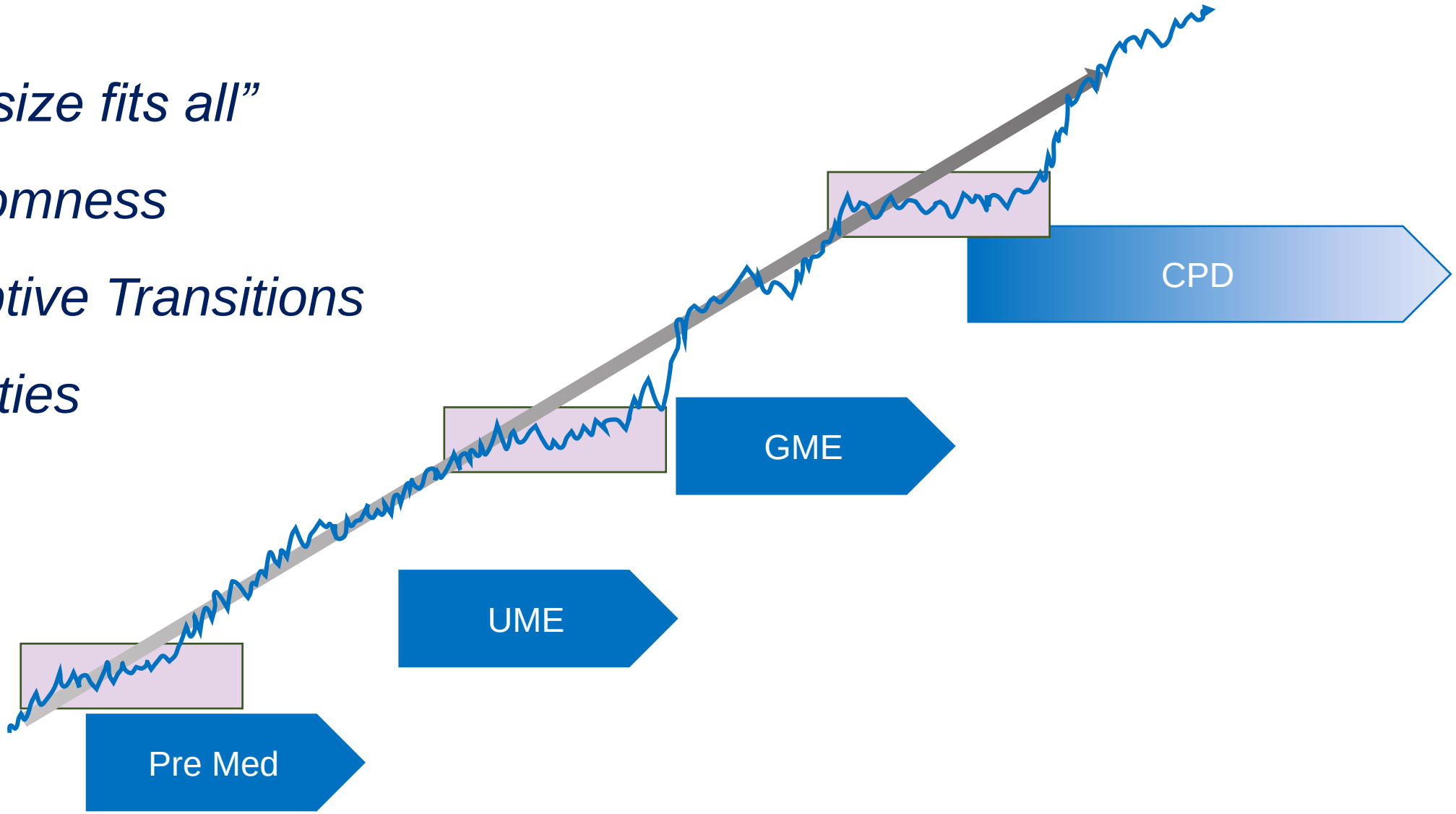


“One-size fits all”

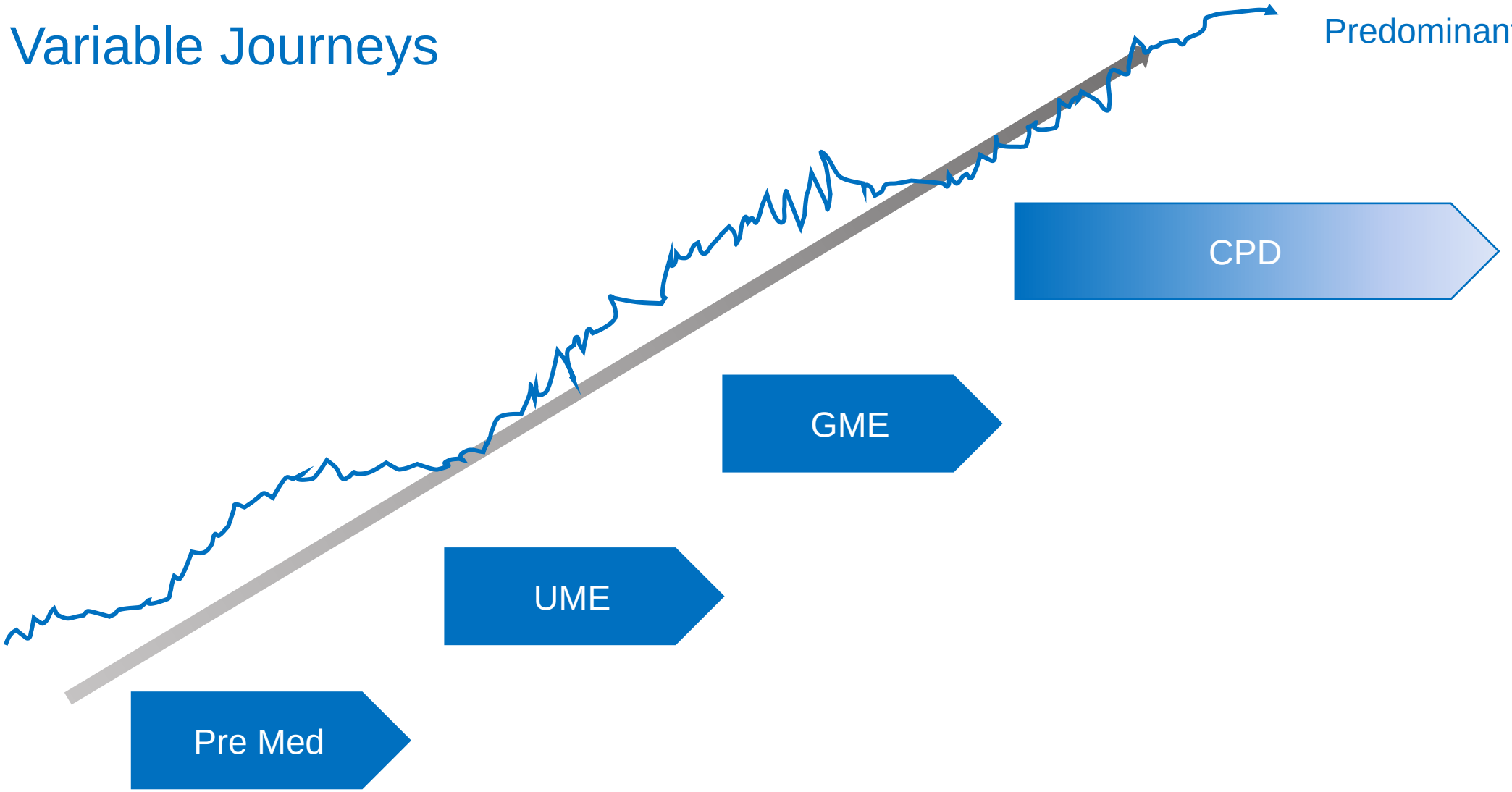
Randomness

Disruptive Transitions

Inequities



Variable Journeys



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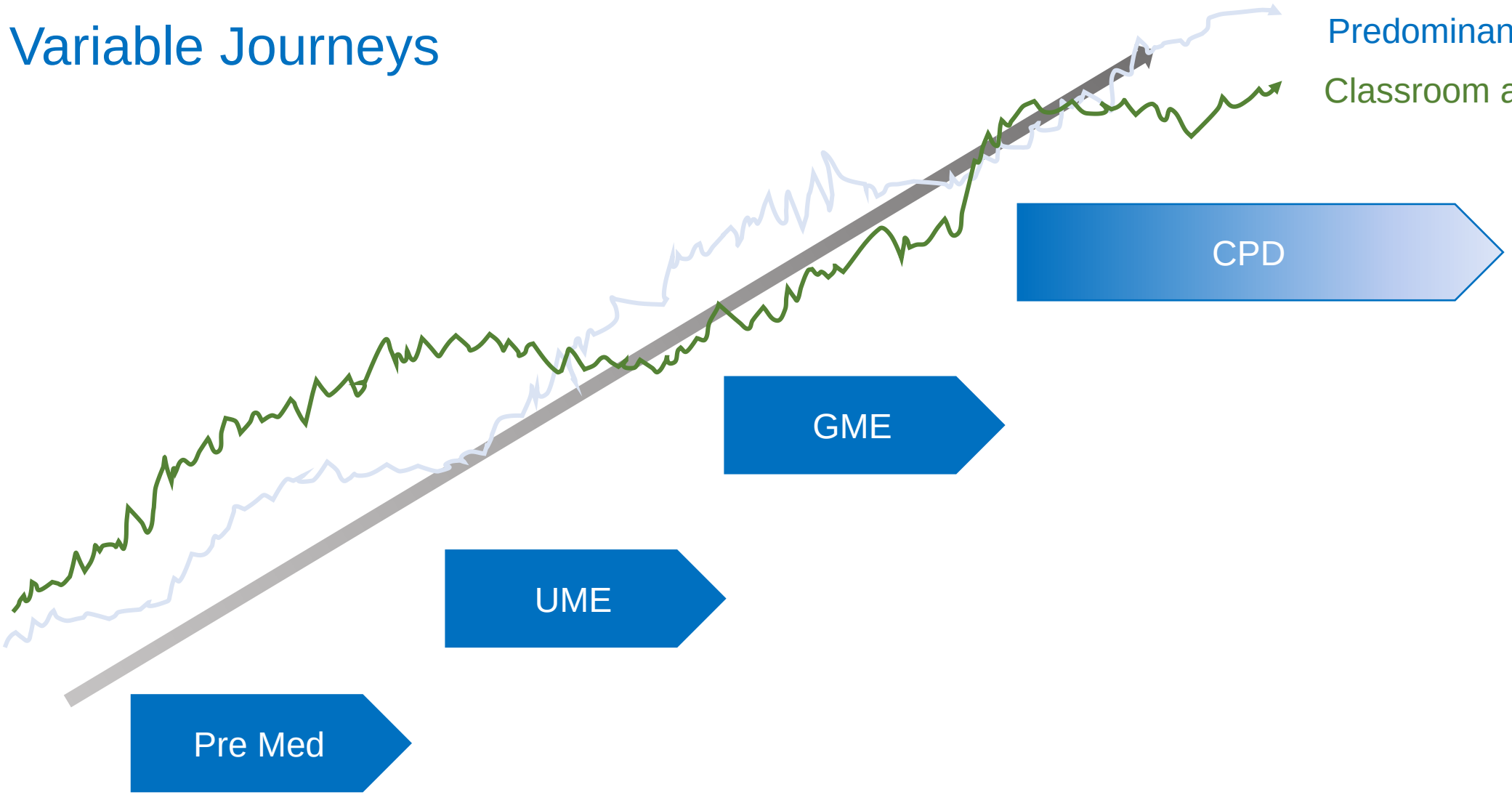

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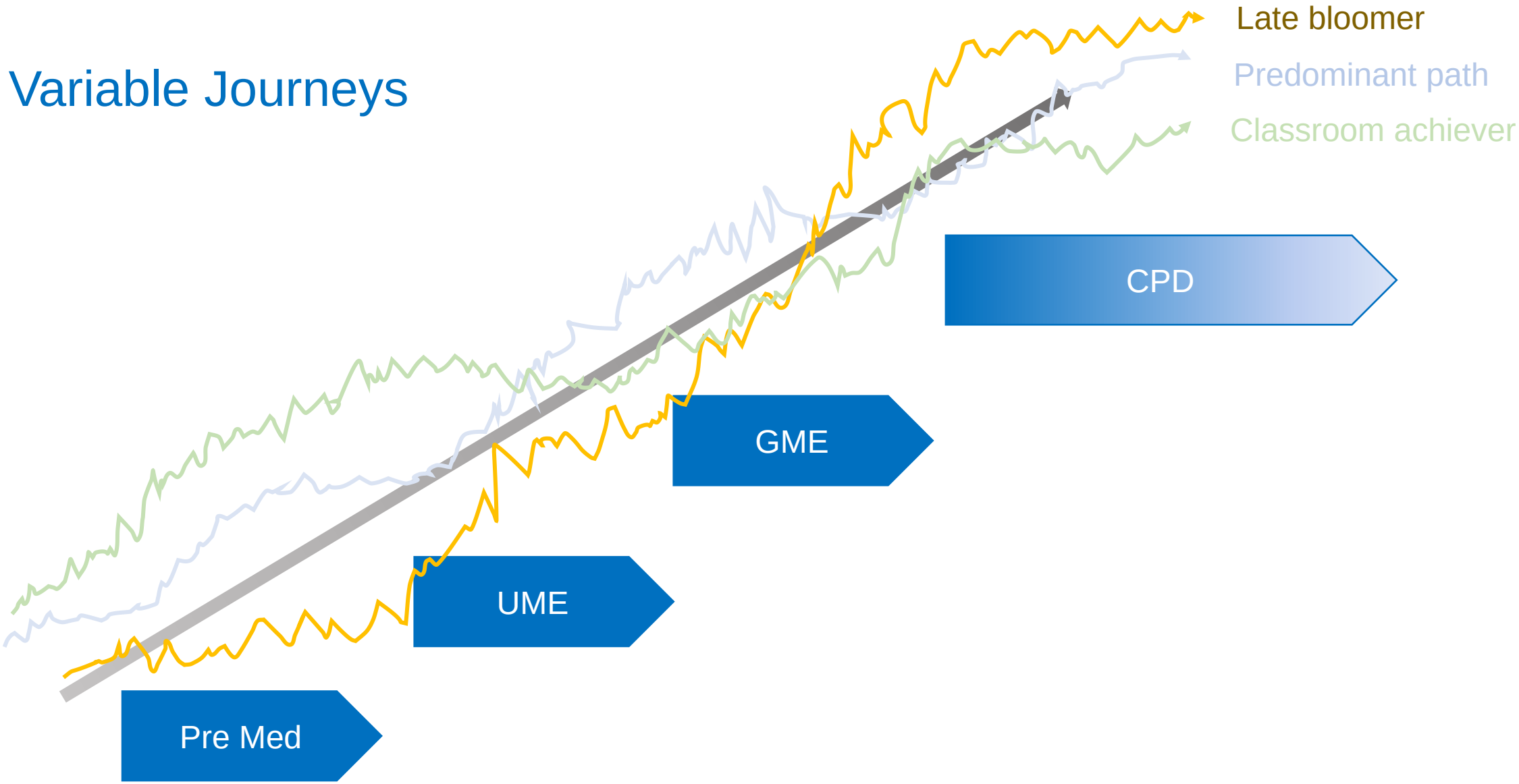
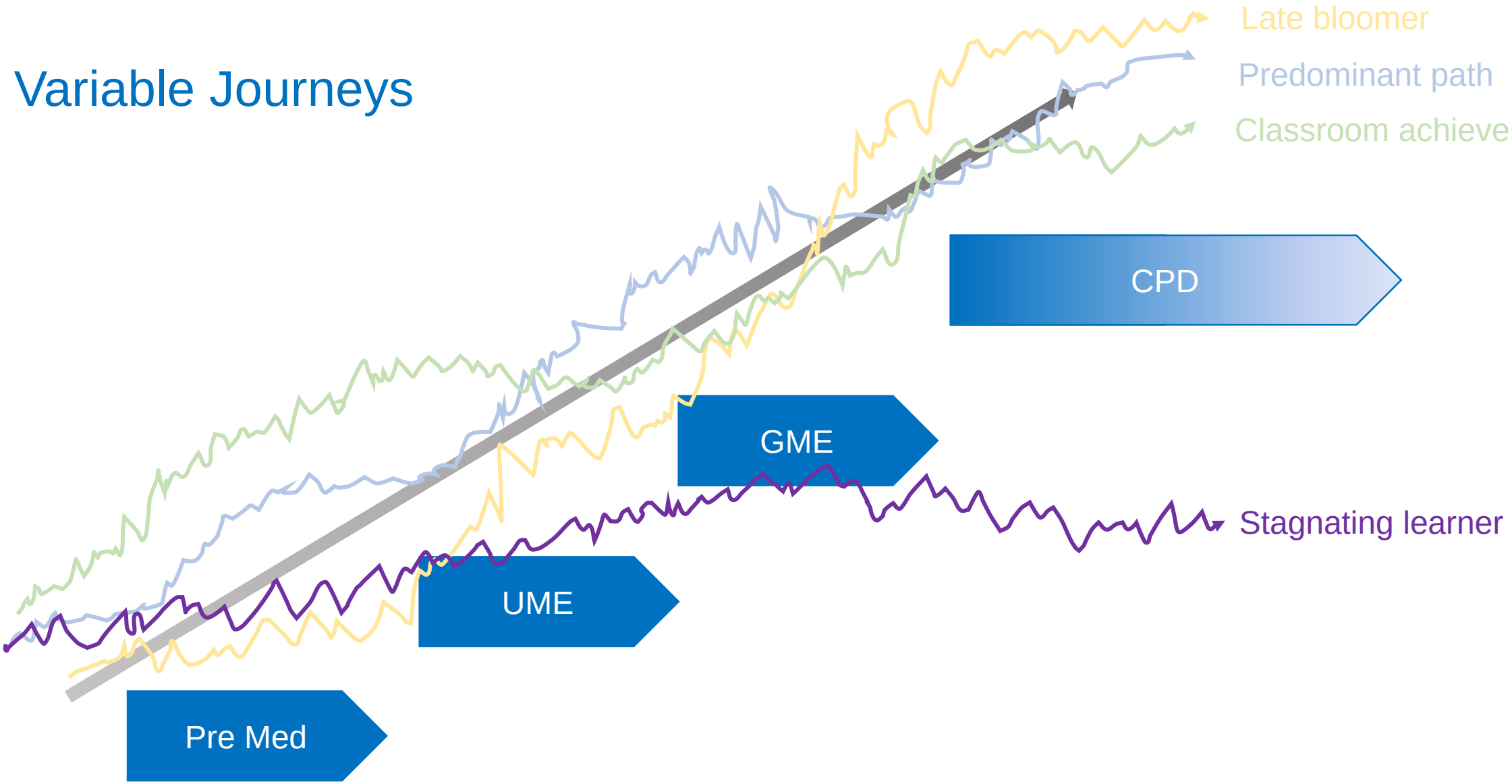


Variable Journeys



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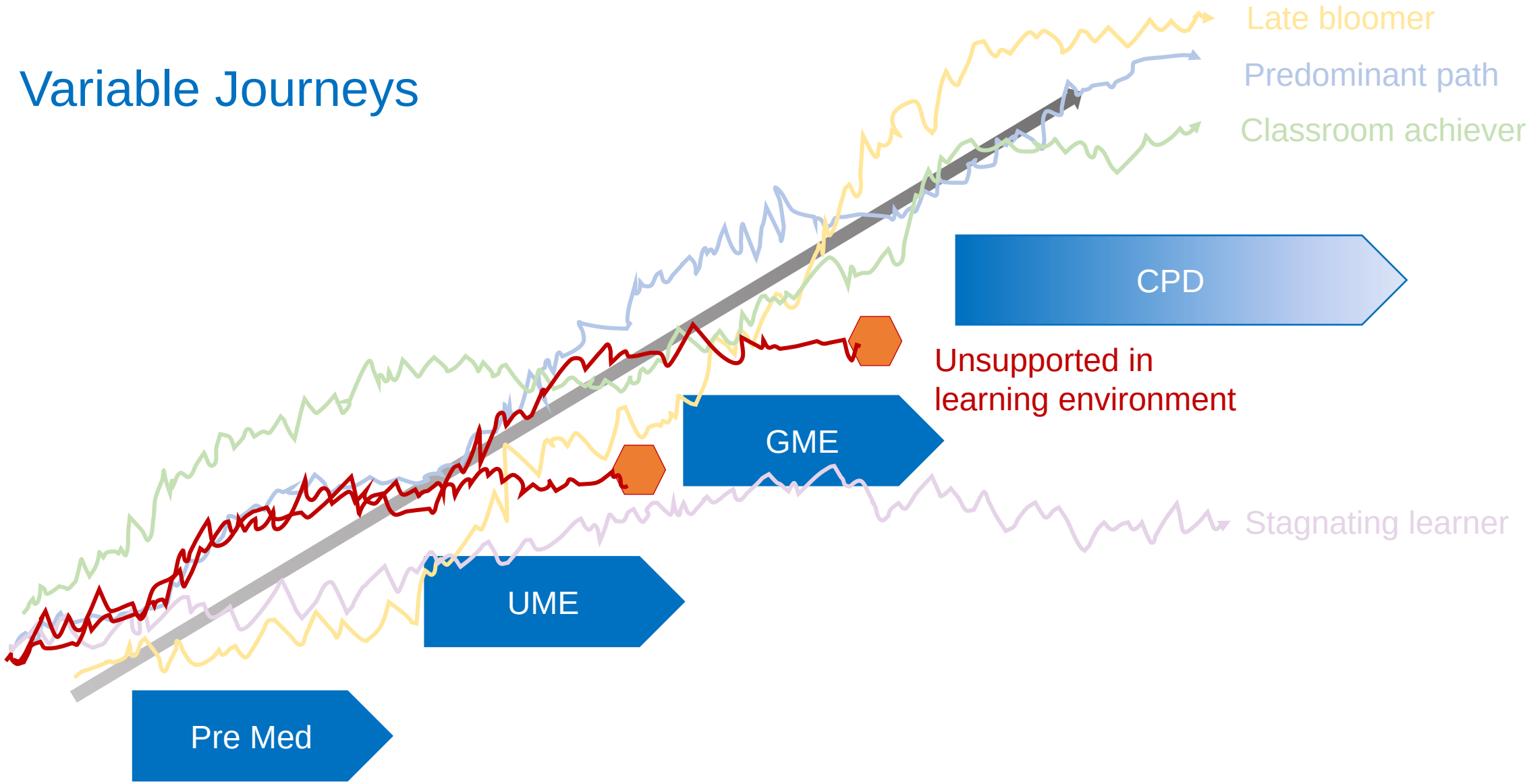
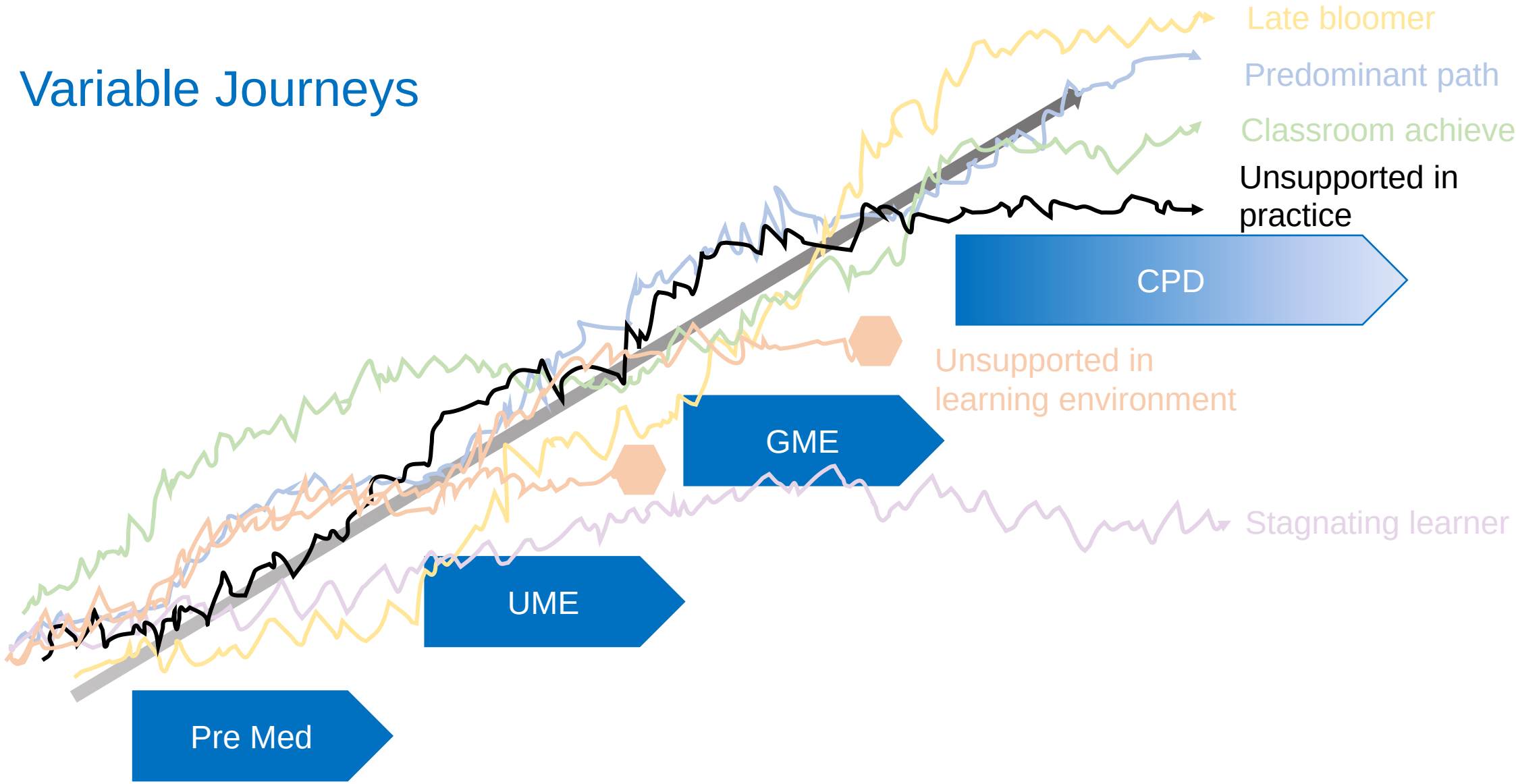
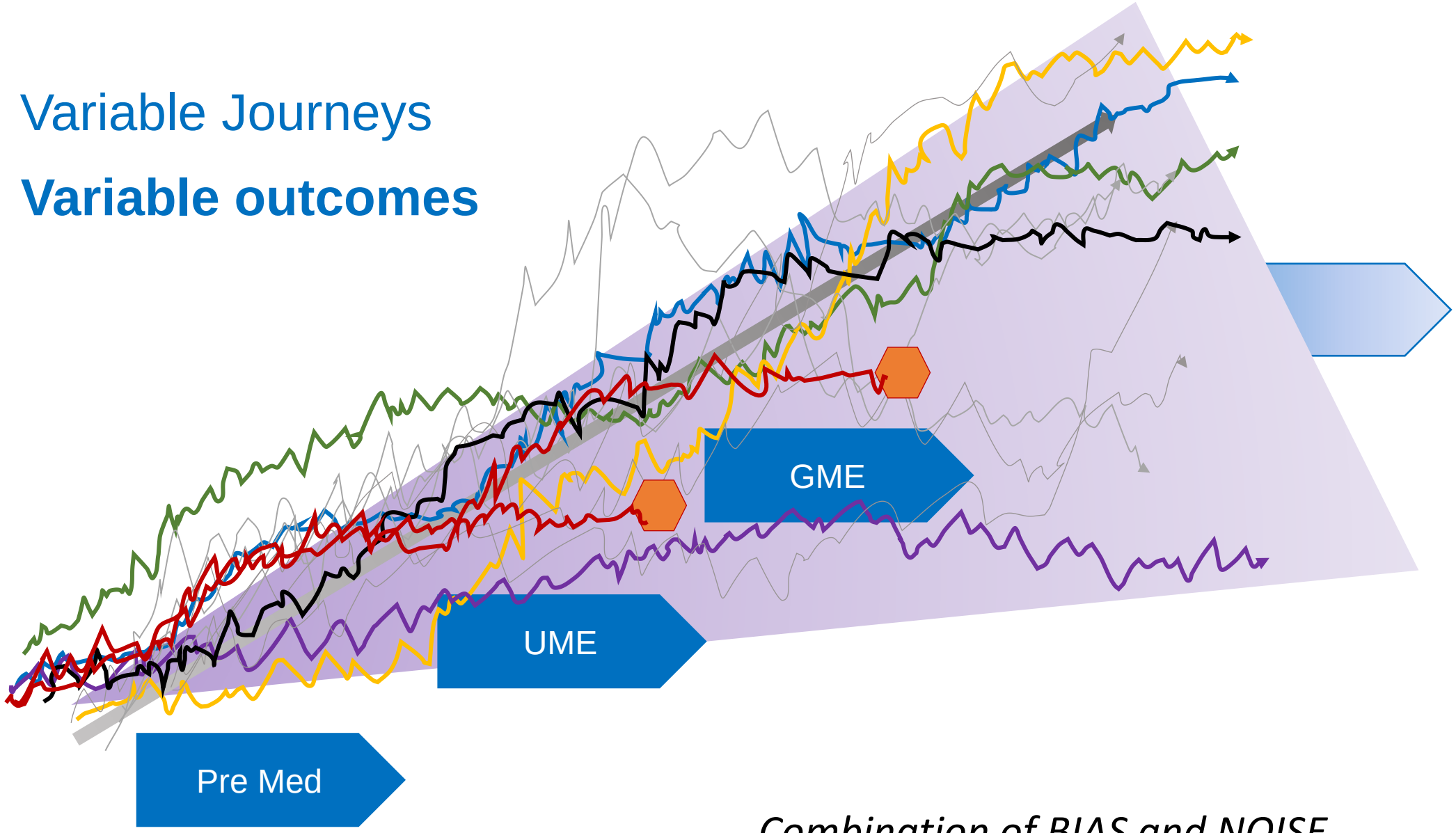


Variable Journeys



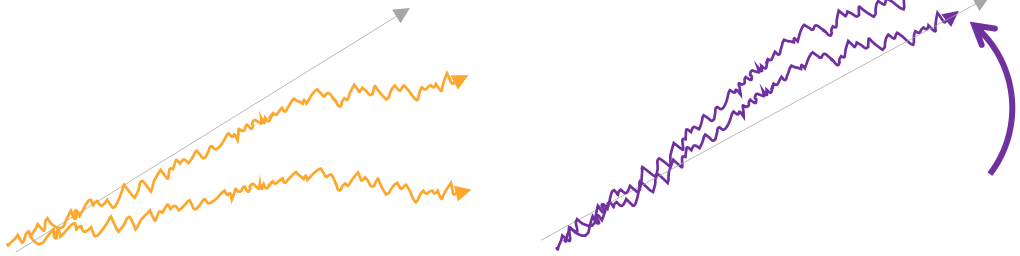
Variable Journeys

Variable outcomes



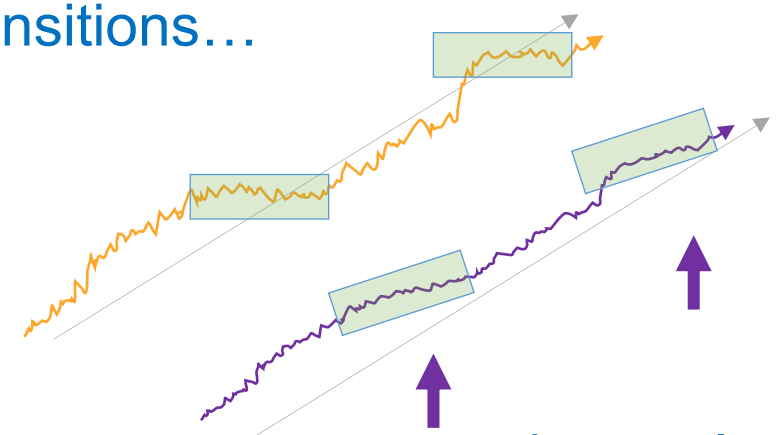
Combination of BIAS and NOISE

Expanding CBME…



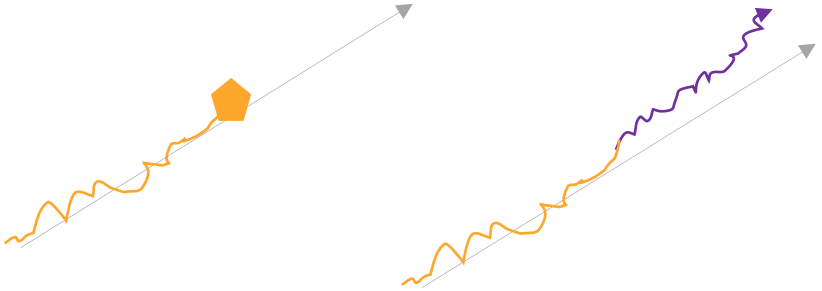
… elevates slope, reduces variability

Improving flexibility and transitions…



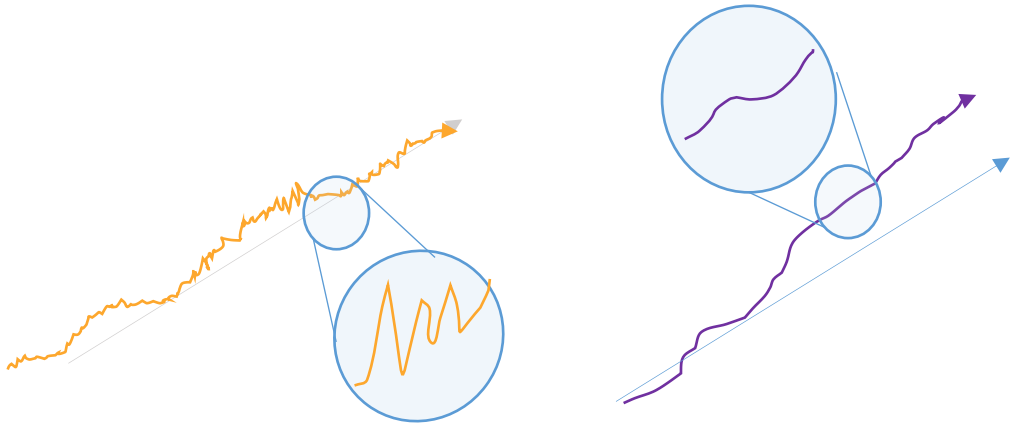
… reduces plateaus

Embedding equity in learning environments…



… fixes the pipes

Increase personalization…

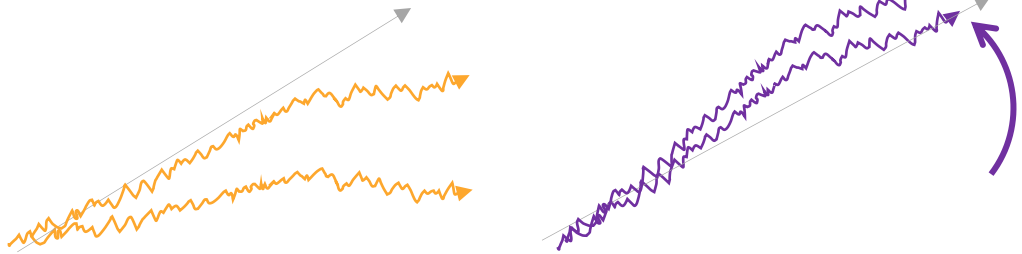


… elevates slope, smooths the path

Precision Education

WHY?

Expanding CBME…



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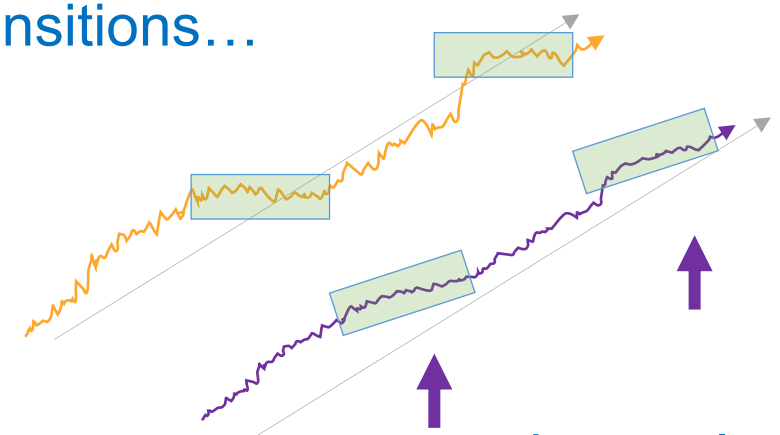

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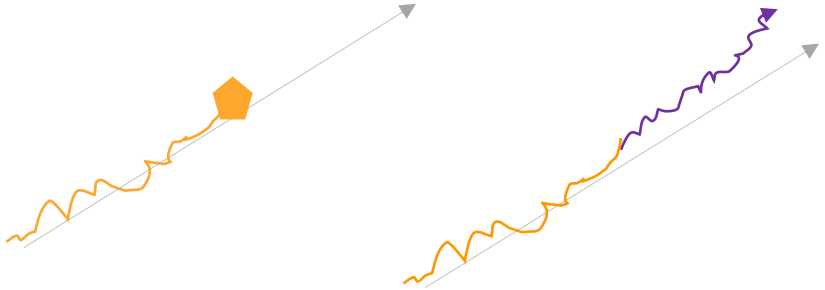

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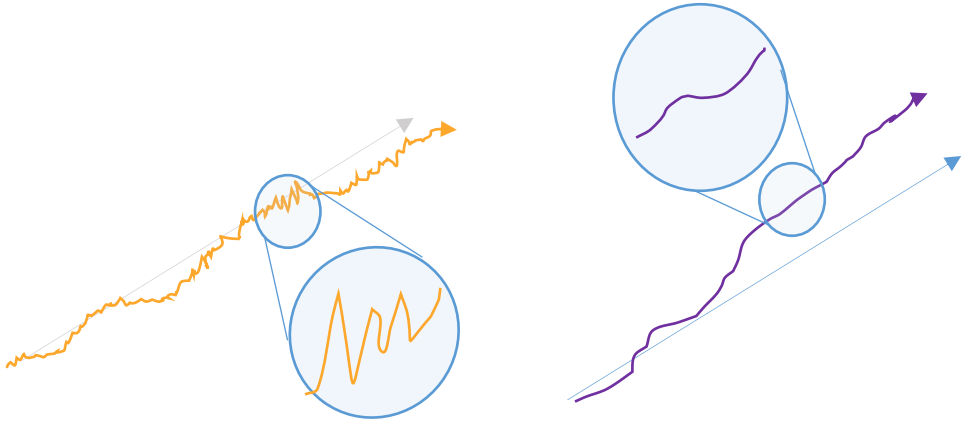
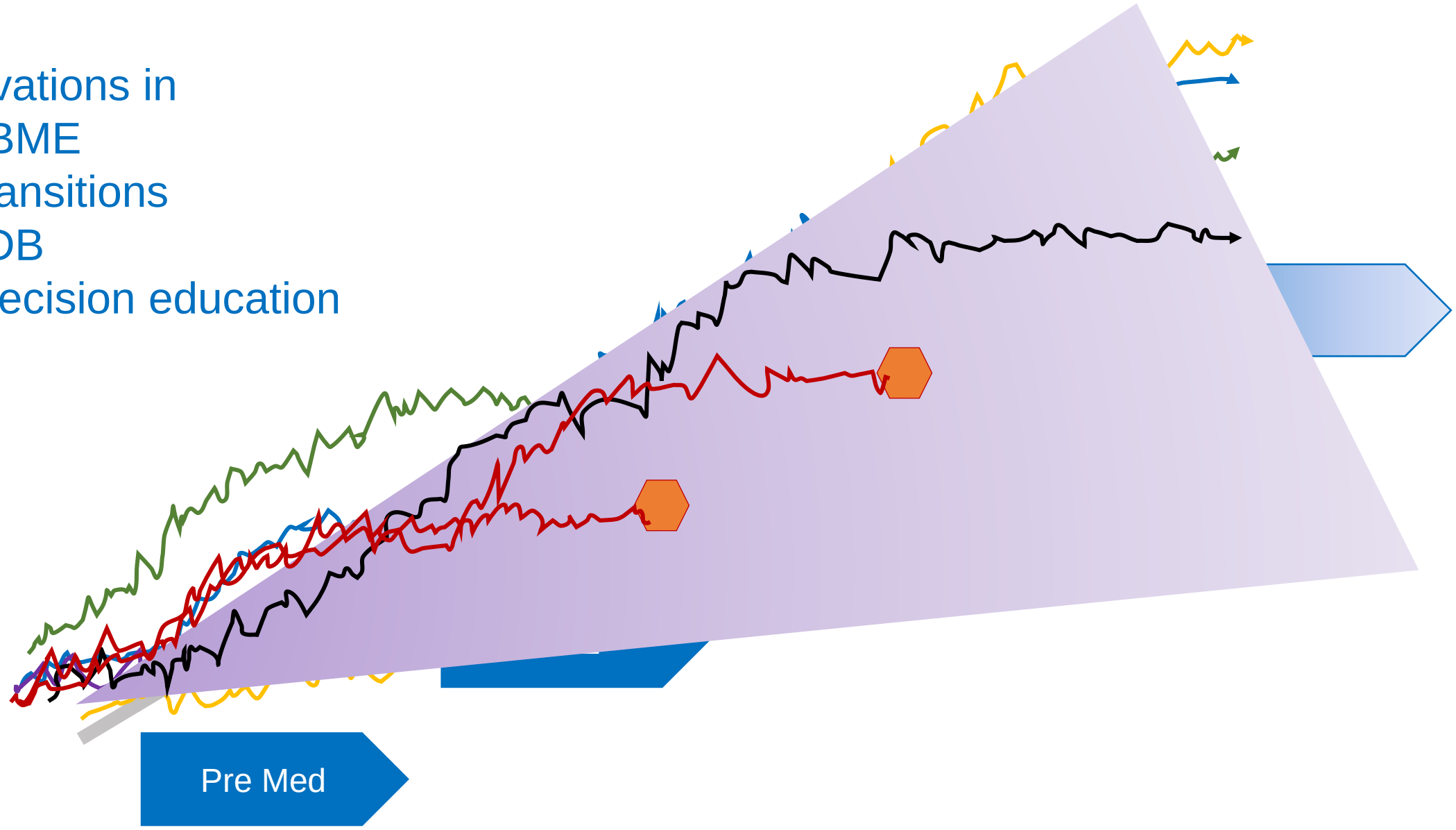
Increase personalization…



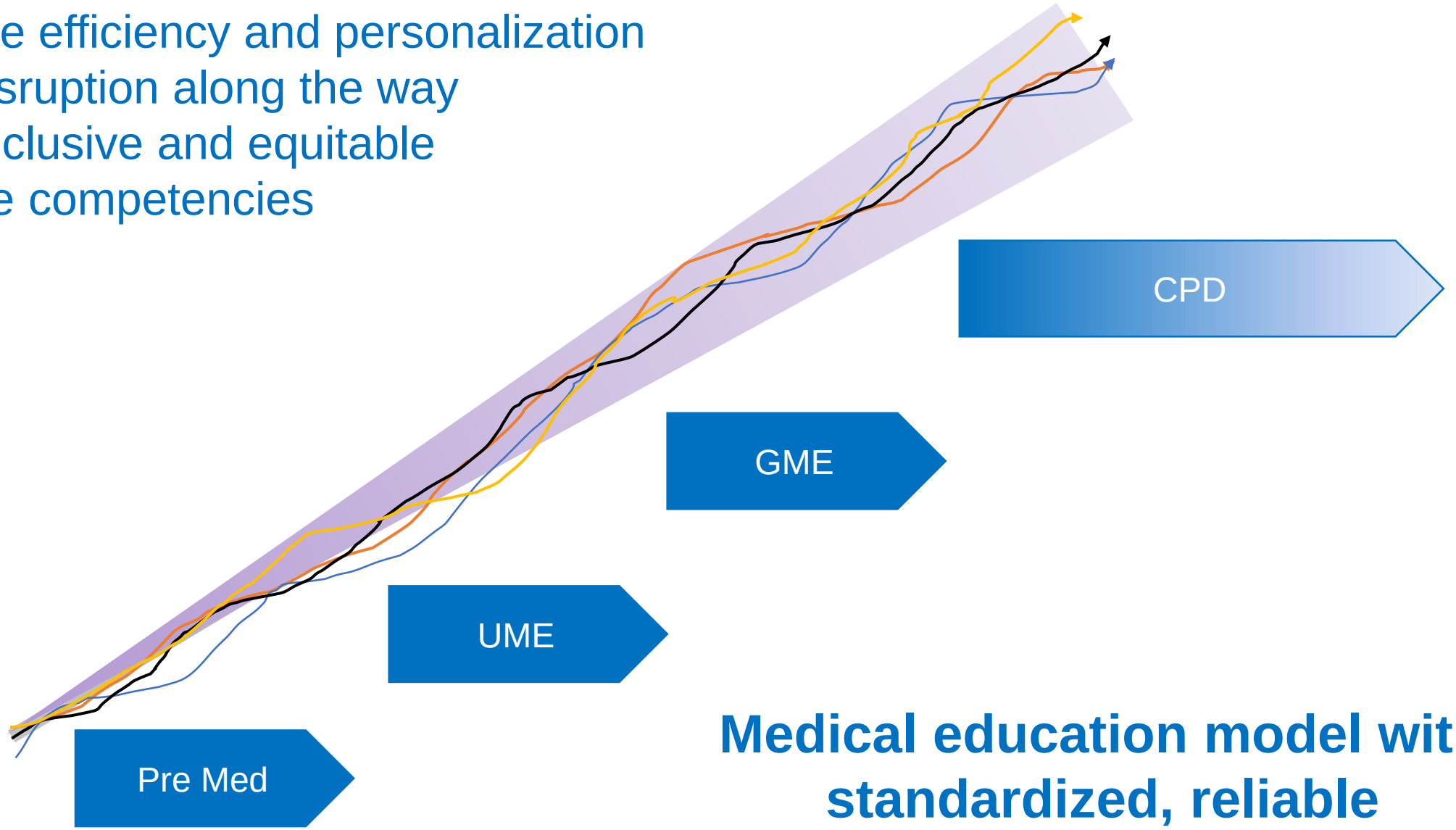
… elevates slope, smooths the path

Innovations in

- CBME
- Transitions
- EDB
- Precision education



- Increase efficiency and personalization
- Less disruption along the way
- More inclusive and equitable
- Reliable competencies



Medical education model with standardized, reliable competency outcomes enabling better patient care

Precision Education

WHAT?

Summit
June 2022

Design Sprint
June 2023

Research
July 2022
Sep 2023

Visionary Interviews
Dec 2023

National Experts
Jan - present

Universities
Health Systems
Associations
Coursera
Google
Microsoft
OpenAI
Khan Academy

Sal Khan, Khan Academy

Precision education systems in medicine use data and technology to transform lifelong learning by improving personalization, efficiency, and agency at the individual, program, and organizational levels.

Ultimately, these systems make learning more effective and improve patient outcomes.

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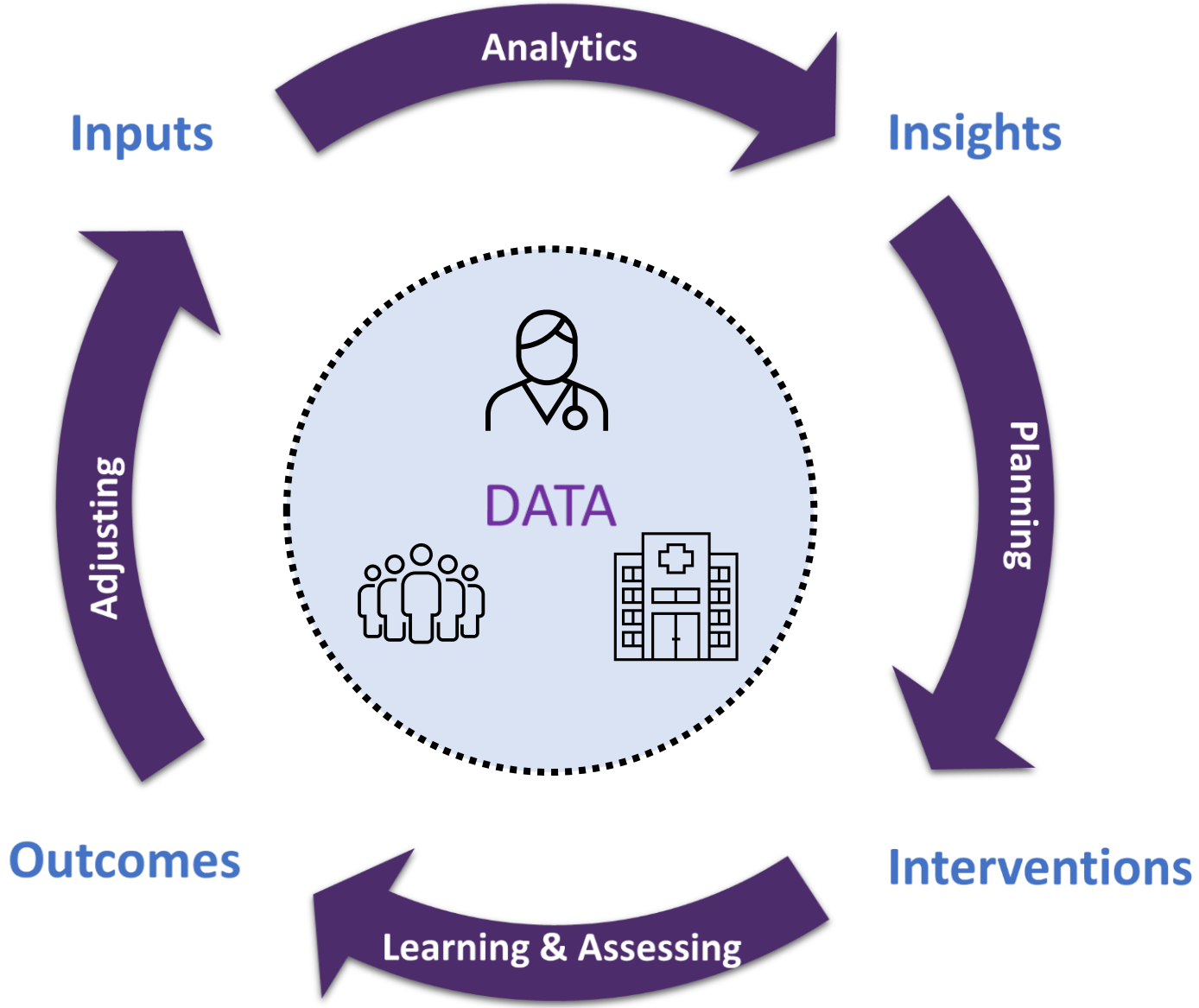
Precision Education Systems



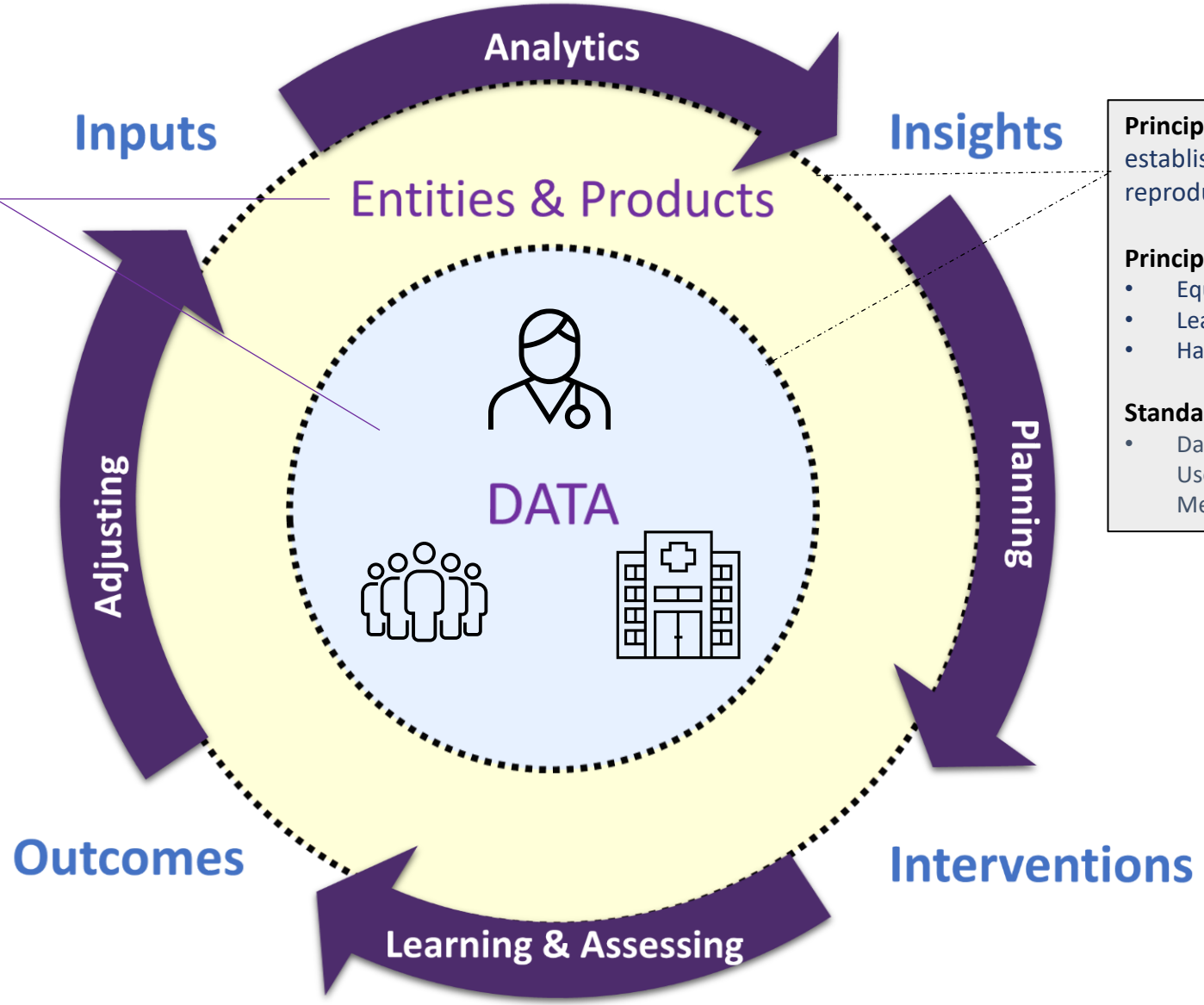
Desai SV, et al. *Academic Medicine*, 2024

Precision Education Systems*

Data are stored in multiple structures across the medical education and health care ecosystem and are utilized via **Entities** and **Products**.

Examples of **Entities**[1]:
AMCs, HCOs, Assoc/Orgs[2], CMS/Payors, Industry, SMS, Specialty Societies

Examples of **Products**[1]:
LMS, EHR, Apps (local and commercial), Toolkits



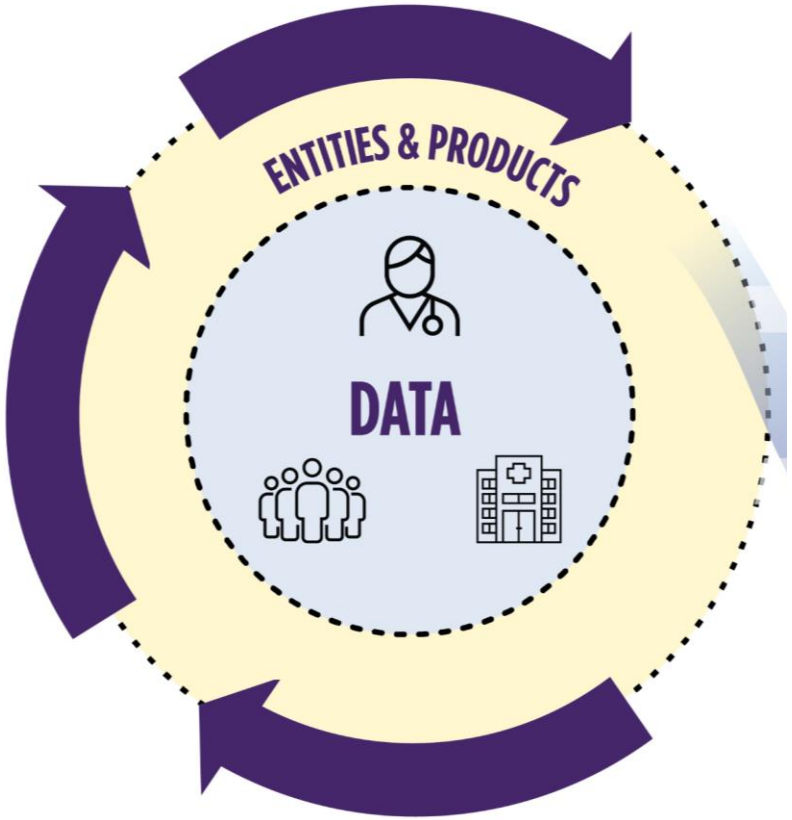
Principles and **Standards** need to be established to ensure effective, equitable, reproducible, scalable, and safe systems:

Principles include:
- Equity
- Learner agency
- Harmonized in workflow

Standards include:
- Data Acquisition, Privacy, Governance, Use/Sharing, Policy, IP, Debiasing, Ethics, Medical legal, Consumption, Tech/apps

[1] AMC, academic medical center; HCO, health care organization, CMS, Centers for Medicare and Medicaid Services; SMS, state medical societies; LMS, learning management system; EHR, electronic health record.
[2] Examples: American Association of Colleges of Osteopathic Medicine, Accreditation Council for Graduate Medical Education, American Board of Medical Specialties, National Board of Medical Examiners, Federation of State Medical Boards

Desai SV, et al. *Academic Medicine*, 2024



UME *GME* *CPD*

Desai SV, et al. *Academic Medicine*, 2024

Precision Education

HOW?

Integrating Learning & Work

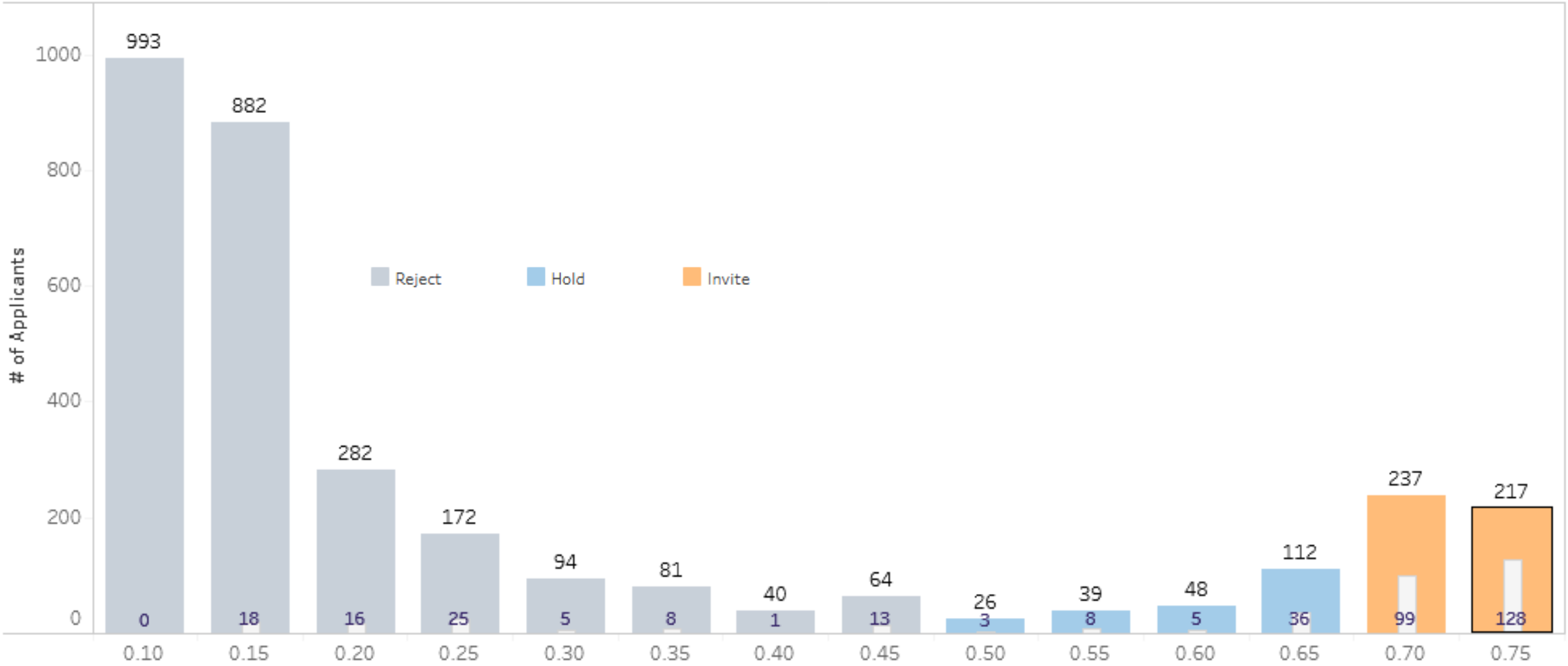
- Longitudinally integrated, meaningful, high-density data
- Assessments based on behaviors and outcomes
- Flexible pathways and anticipatory learning for competency-based progression
- Educators, coaches empowered by predictive analytics and AI
- Systems, technology to power analytics and handle complexity
- Individual-level precision in how we teach, coach, nudge, assess and credential

Problem *(1 of 7)*:
How can thousands of applications for residency be fairly screened?

NYU School of Medicine

Jesse Burke-Rafel

Opportunity:
AI Augmented Recruitment



Reject Predicted

Invite Predicted

Predicted Applicant Distribution 2020

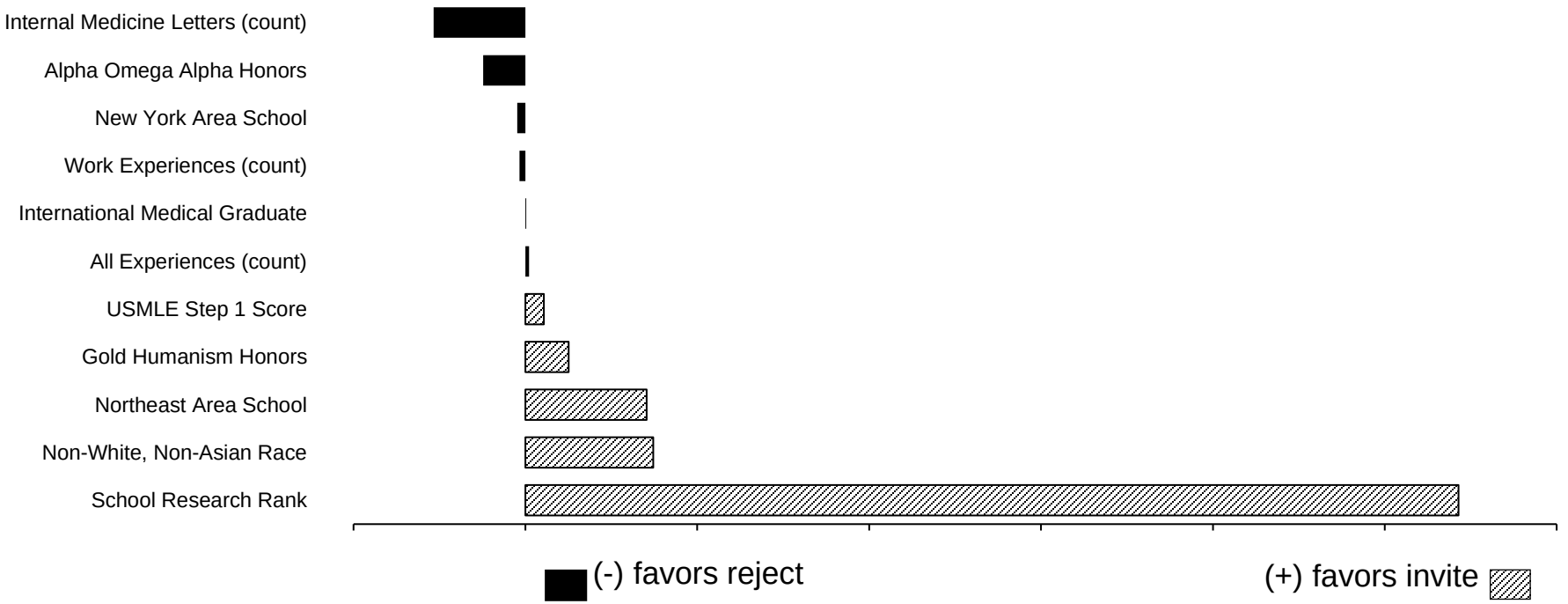
Hover over the decision to view more information

Aamc Id	Applicant Name	Rank	Screening Score	Admissions Team's Decision
[redacted]			0.799	Categorical Invite
			0.799	Not Invited
			0.799	Not Invited
			0.799	Categorical Invite
			0.799	Categorical Invite
			0.799	

Click link below for:

Algorithm Explanation

ERAS Application



Problem *(2 of 7)*:
How do promote
patient-relevant learning?

NYU School of Medicine

Marc Triola
Jesse Burke-Rafel

Opportunity:
NLP supported 'nudges'
and notes assessments

Interventions: “Nudges” as Digital Tools

Admission Monday 6pm; nudge sent Tuesday 7am to trainee & attending

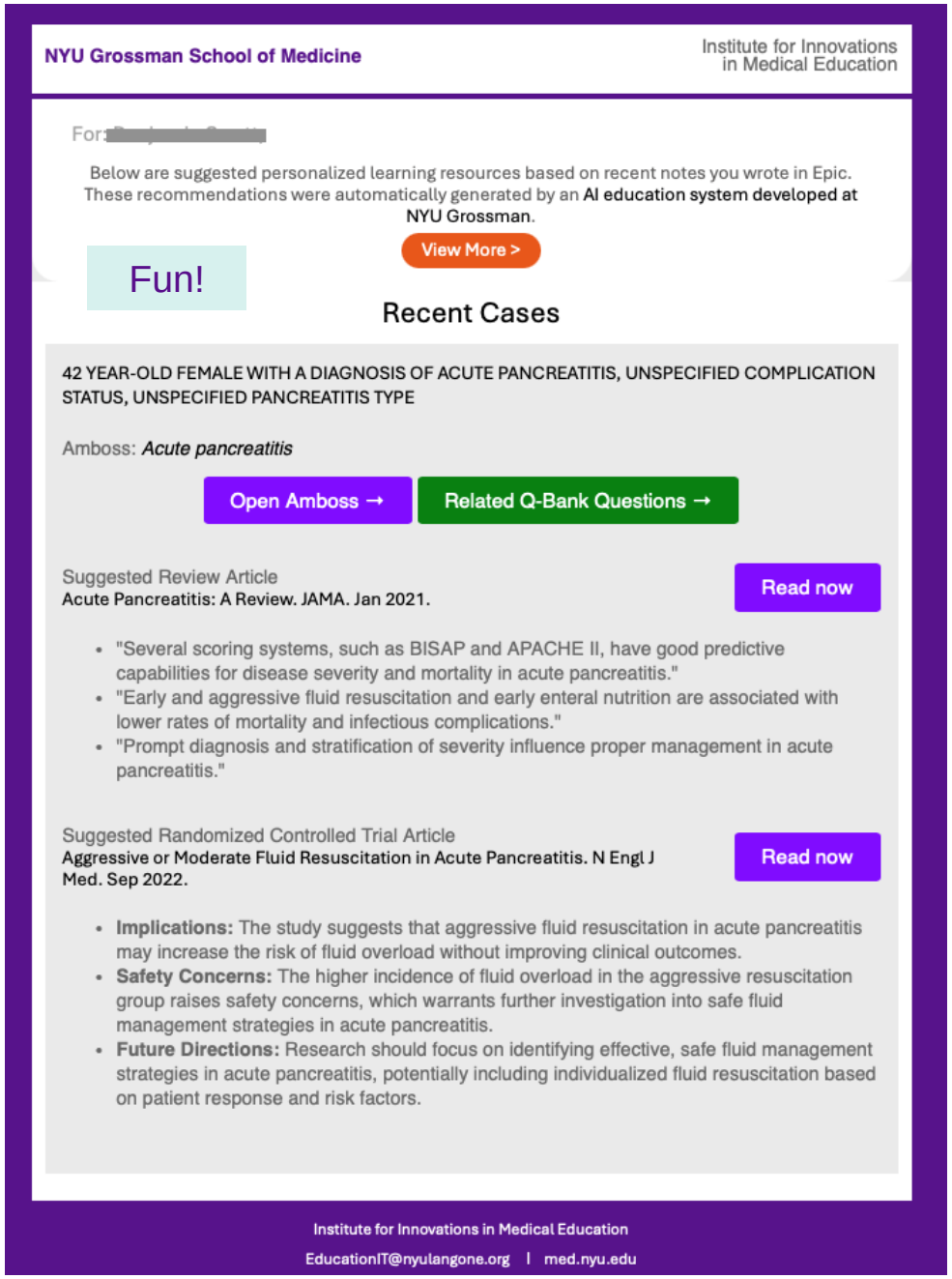
Yesterday you admitted a **44 y.o. woman with cirrhosis and alcoholic hepatitis**. This was **your 3rd admission** of this type at NYU Langone (vs. median 2 for peers) and your **H&P demonstrated high-quality clinical reasoning** – great job! However, your note **lacked supporting evidence** for your leading diagnosis. Below are some AI-generated **educational resources** you might find useful in caring for this patient.

Timely, relevant

CoreIM
- Alcohol-Associated Hepatitis: 5 Pearls Segment

Curbsiders
- Cirrhosis: Initial Evaluation and Management
- Cirrhosis: Medications, decompensation, complications
- NephMadness: Hepatorenal Syndrome vs AKI

UpToDate
- Alcoholic hepatitis: Clinical manifestations and diagnosis
- Pathogenesis of alcohol-associated liver disease



Yoong et al. *Implementation Science*. 2020;15(1):50.

Problem *(3 of 7)*:
How can you systematically and regularly assess clinical reasoning?

University of CINCINNATI

NYU School of Medicine

Laurah Turner
Marc Triola

Opportunity:

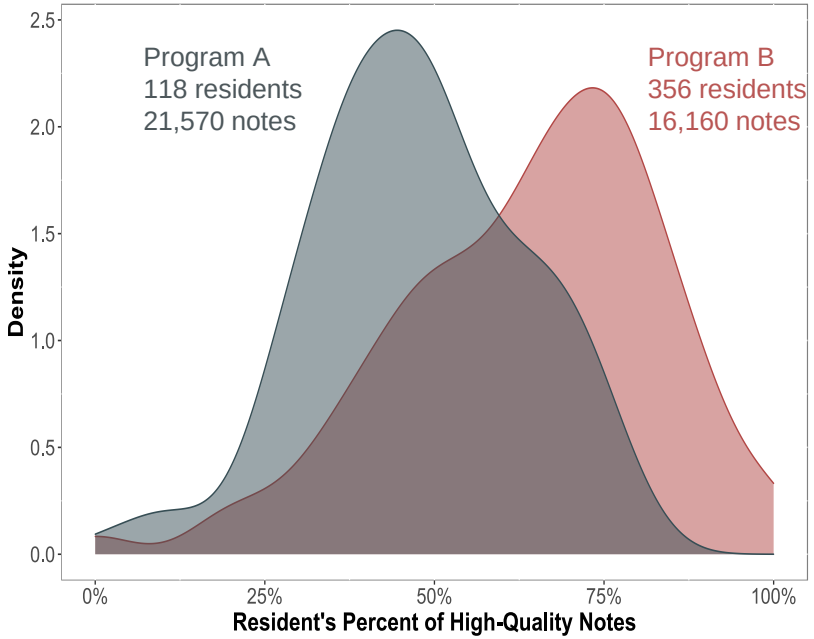
- *NLP on clinical notes*
- *AI tools*

Human-rated notes (R-IDEA scale)

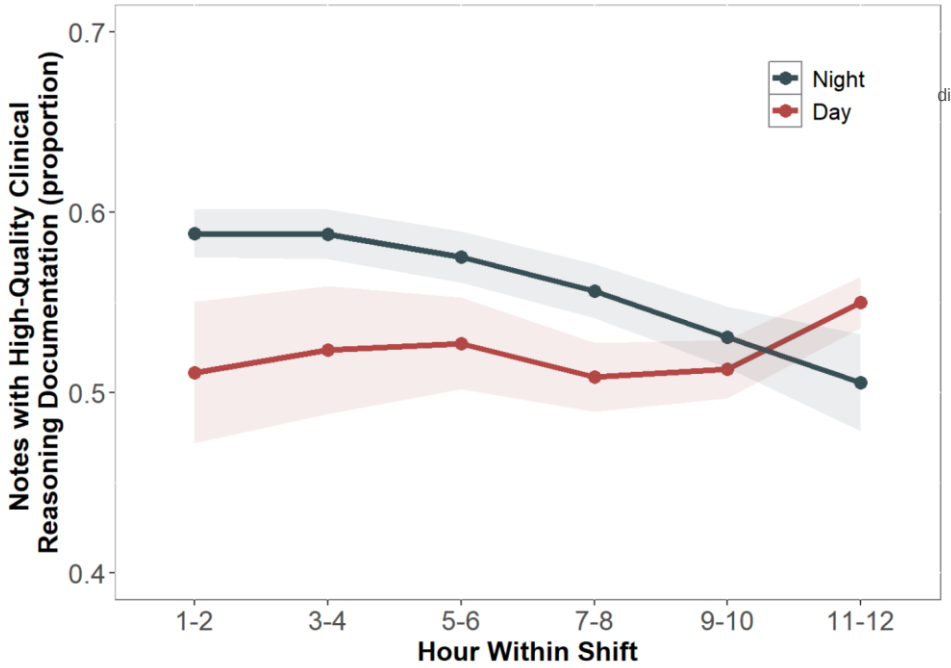
AI (ML, NLP, LLM)

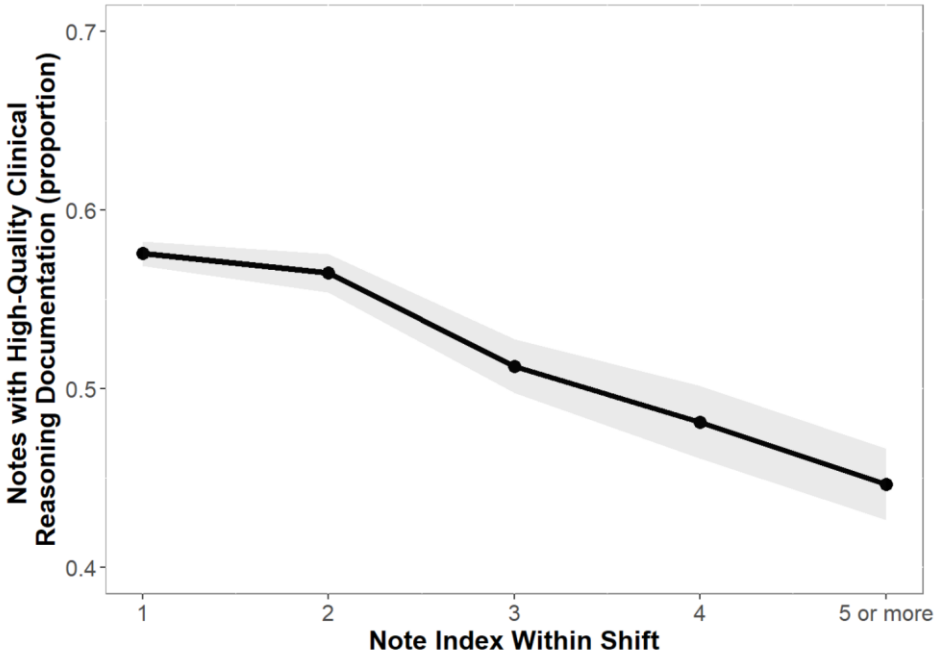
Automated algorithm

Low vs. **High quality** clinical reasoning documentation in resident H&Ps



- AI-based TRACER
  - (TRainee Attributable & Automatable Care Evaluation in Real-time)
- 474 IM residents
- 28,782 patients; 37,750 notes





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NYU Langone Health

NBME

Support: Stemmler Fund

University of CINCINNATI

MICHIGAN MEDICINE

Schaye et al. *J Gen Intern Med.* 2022;37(9):2230-2238.

2-SIGMA Clinical Scenario

Dr. Larauh Turner University of Cincinnati

Help/Support | New Chat

Level of Experience

Case

Generate

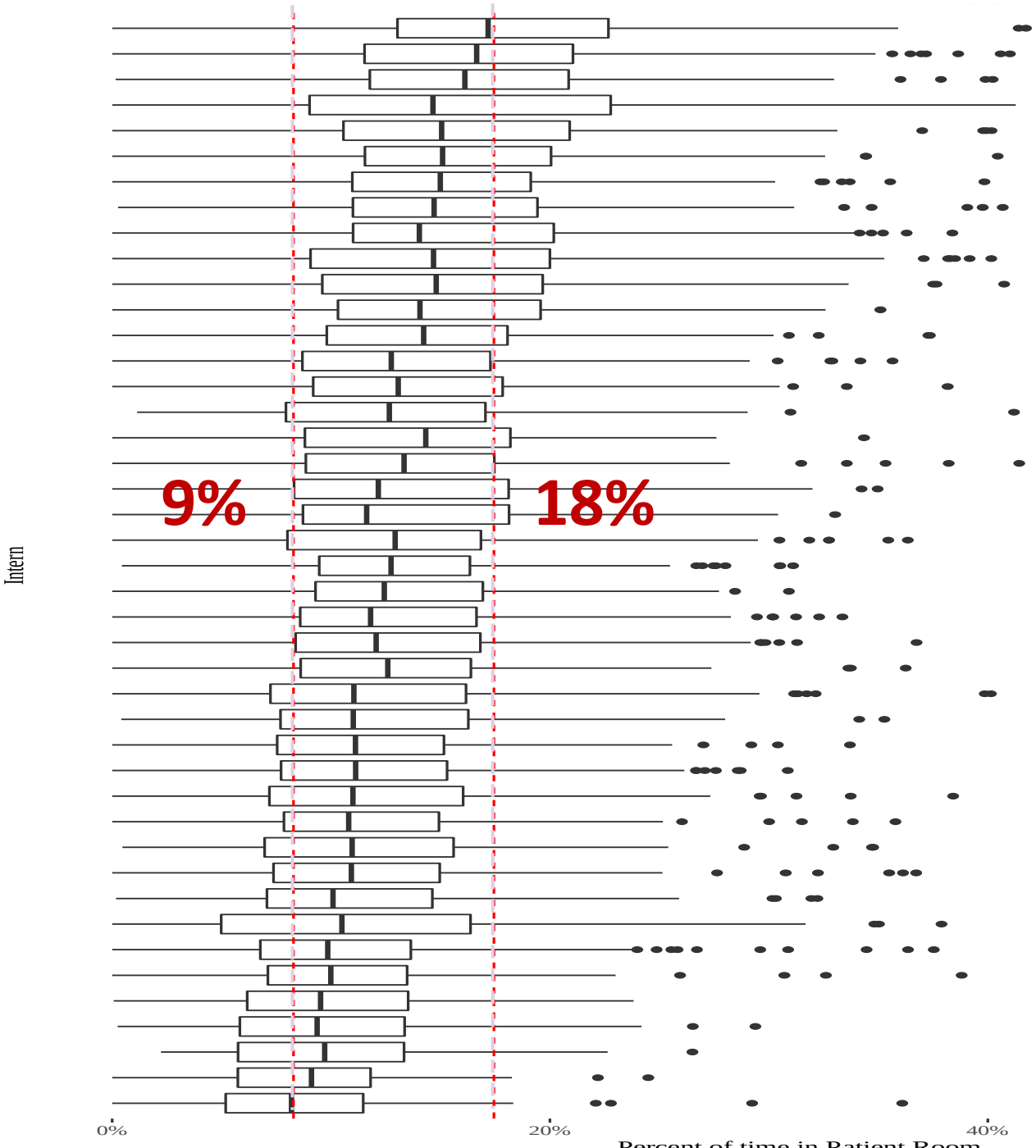
Physical Exam | Supervisor | Diagnostic Studies | Interventions | Submit

Tip: After you finish typing your message, press Tab then Enter to send.

Problem *(4 of 7)*:
How do I know which activities improve clinical skill and wellbeing?

Gail Berkenblit
Brian Garibaldi
Maja Artandi
Stephen Russell
KeAndrea Titer

Opportunity:
Real-time data collection



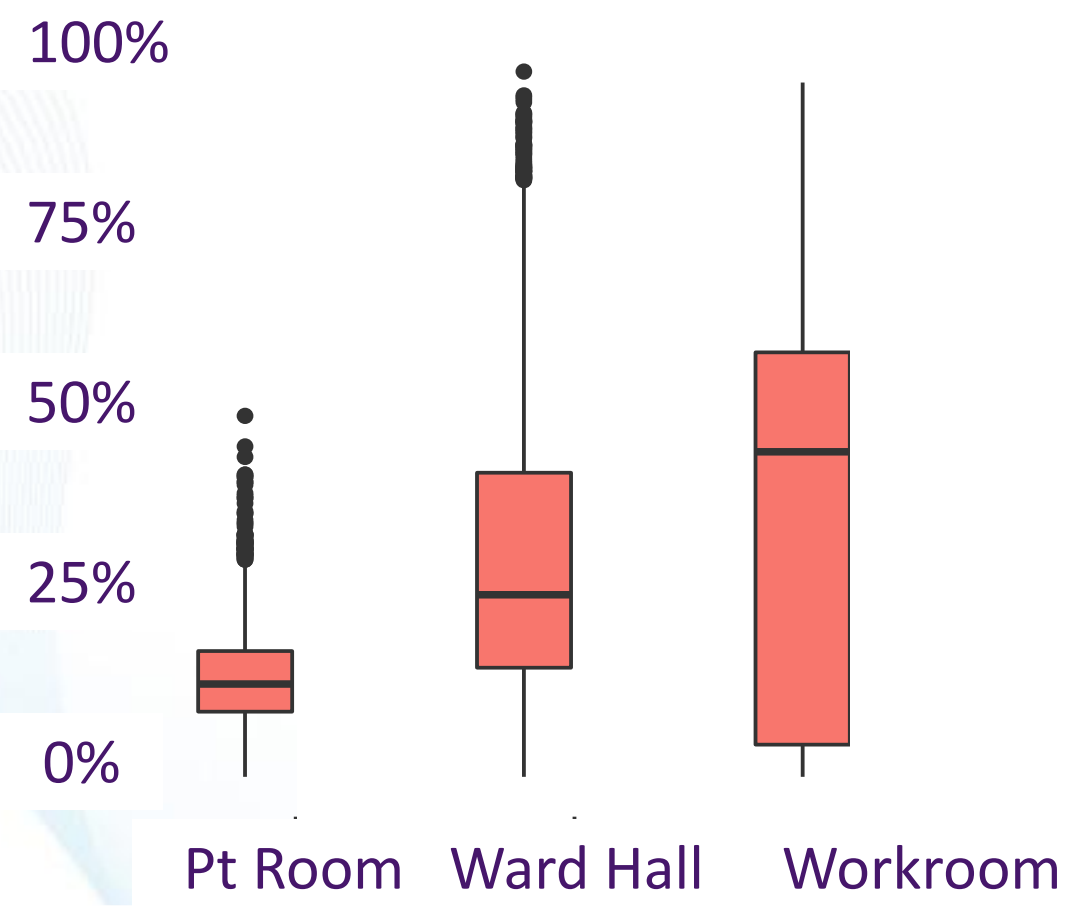
SUBSTANTIAL VARIATION

Highest intern – 18%

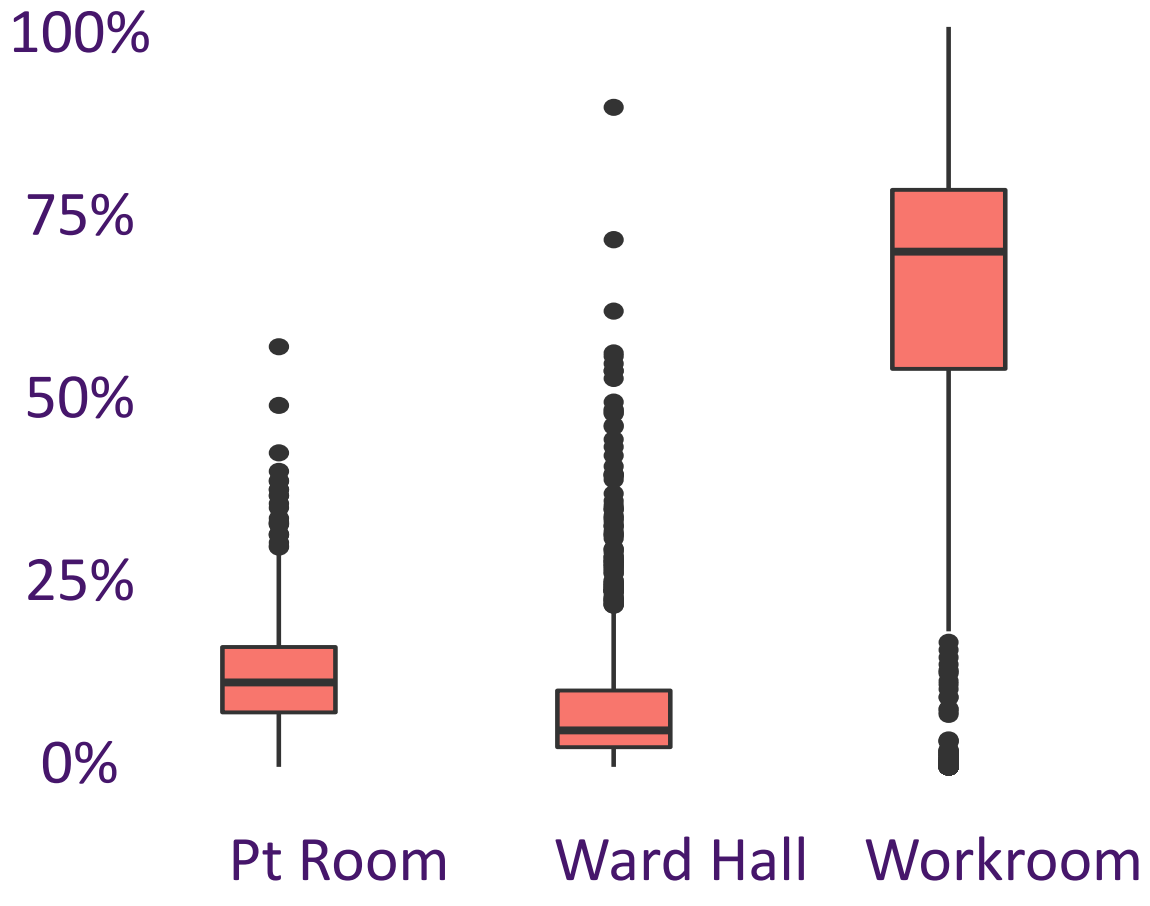
Lowest intern – 8.8%

Over course of year that could translate to **380 more hours at the bedside**

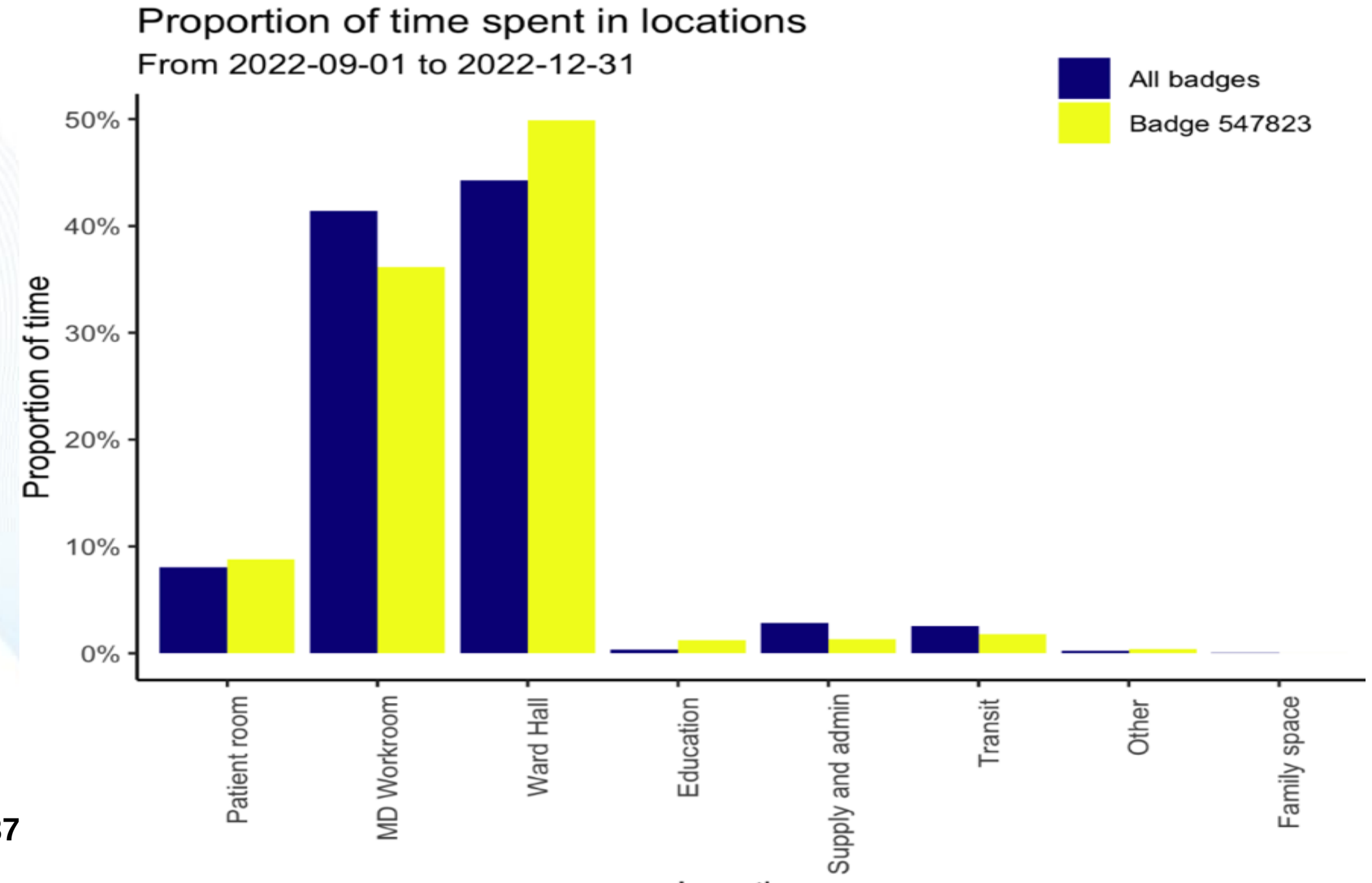
General Internal Wards



Specialty Service



All day


Proportion of time spent in locations
From 2022-09-01 to 2022-12-31
All badges
Badge 547823
Proportion of time
50%
40%
30%
20%
10%
0%
Patient room
MD Workroom
Ward Hall
Education
Supply and admin
Transit
Other
Family space

Problem *(5 of 7)*:
How can I assess an individual's clinical competency in a team-based model?

Jesse Burke-Rafel
Ben Kinnear
Stephanie Sebok-Syer

Opportunity:
Informatics enabled attribution and practice variation models

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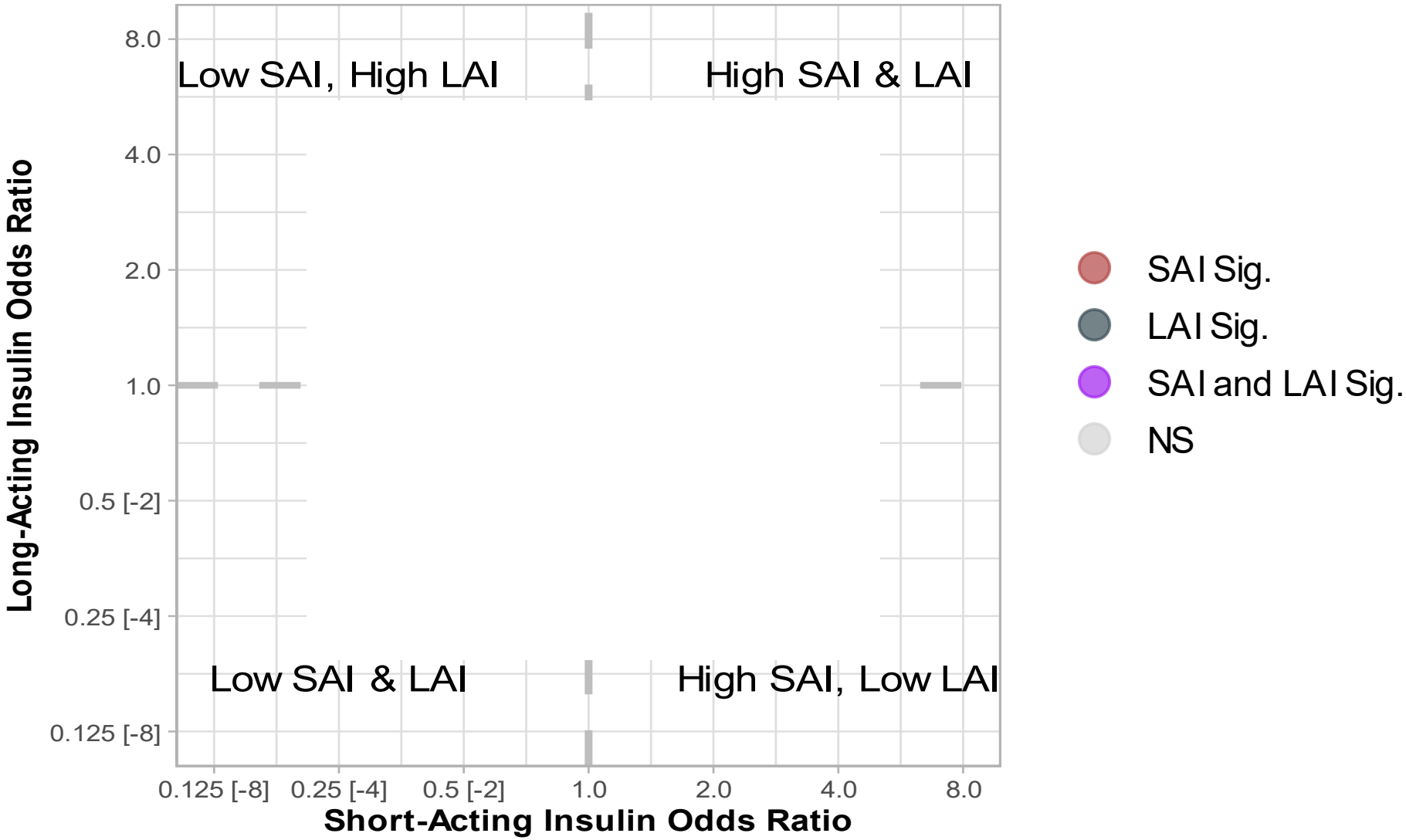
Please do not distribute this slide

- 503 IM residents
- 331 with ≥5 encounters
- 6,070 patients
- 7,850 T2DM encounters
- 4,438 short-acting insulin (SAI) orders
- 1,631 long-acting insulin (LAI) orders



*Adjusted for: site, patient random effects, T2DM risk group, sex, age, insurance, Charlson comorbidity index, primary diagnosis, glycemic team involvement

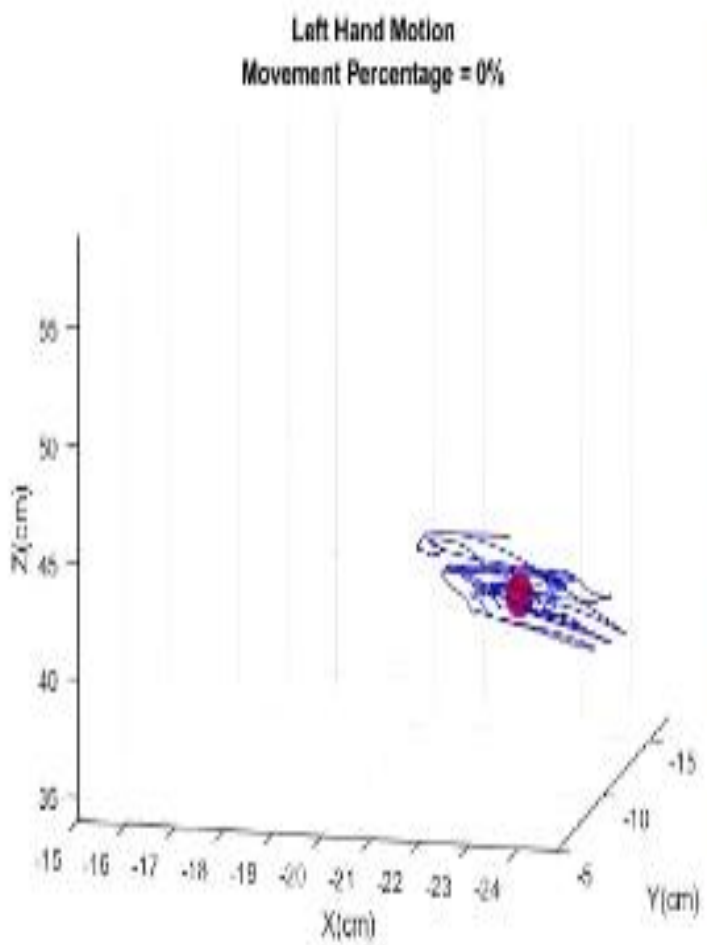
Problem *(6 of 7)*:
How can I provide highly-specific procedural feedback?

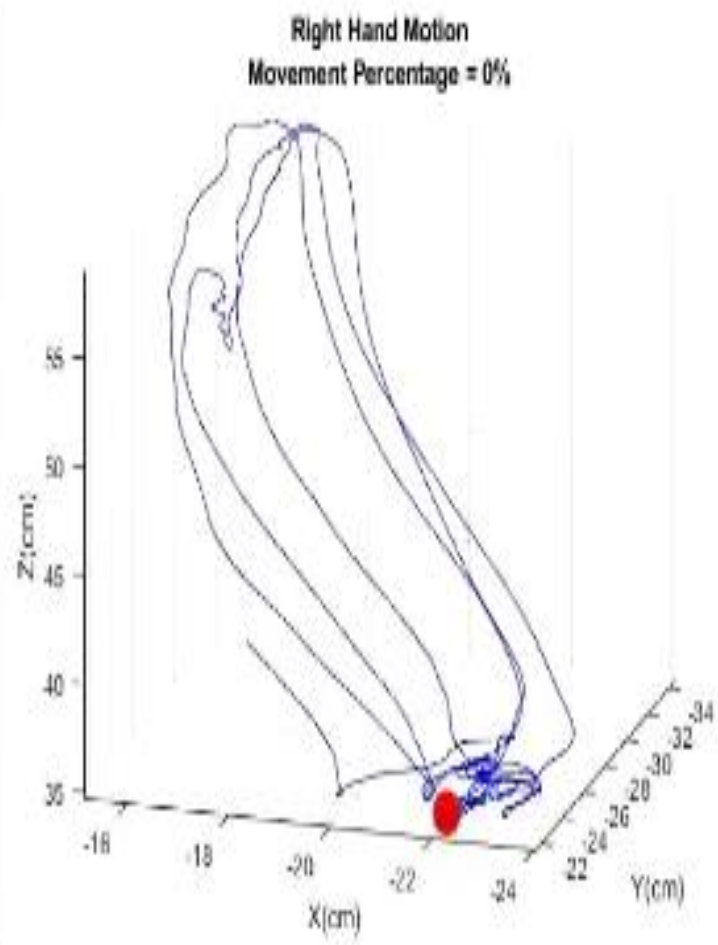
Stanford SCHOOL OF MEDICINE

Carla Pugh

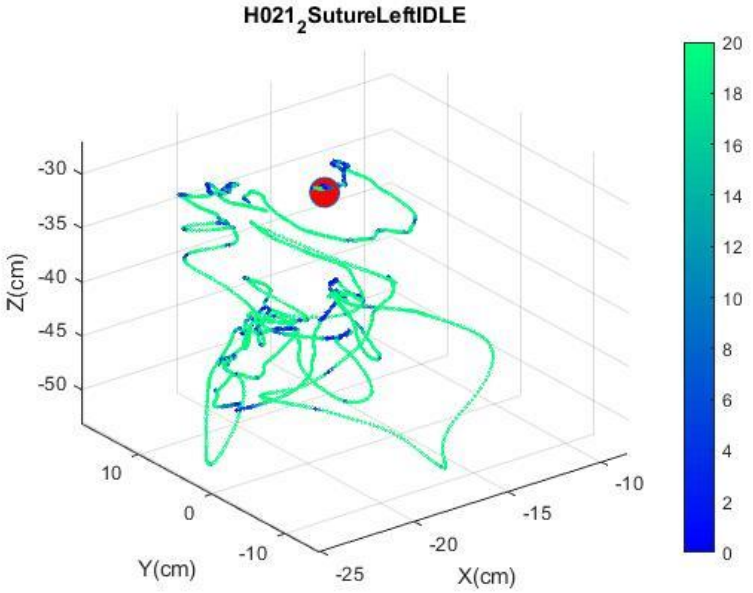
…see one, do one, teach one
…five lines and then you are fine

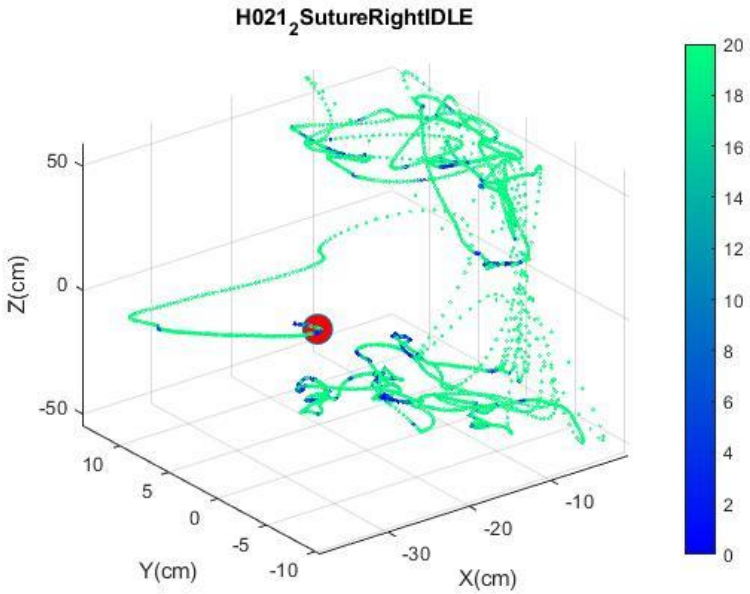
Opportunity:
Scalable, Precision-based Simulation


Left Hand Motion
Movement Percentage = 0%
Z(cm)
X(cm)
Y(cm)

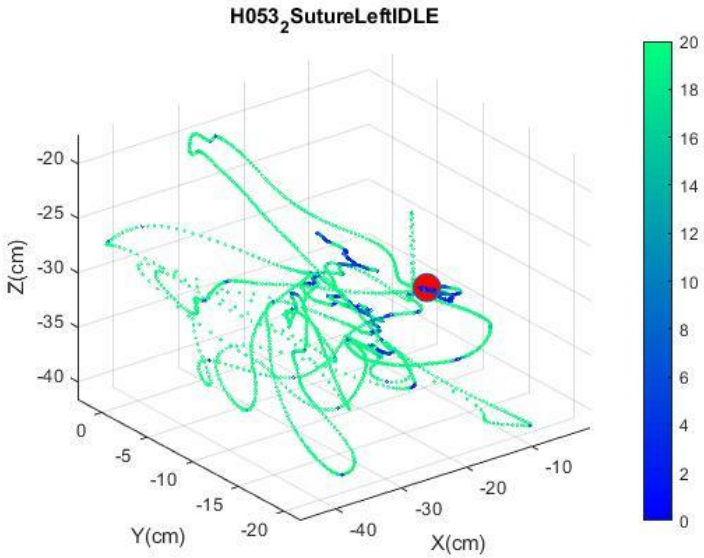

Right Hand Motion
Movement Percentage = 0%
Z(cm)
X(cm)
Y(cm)

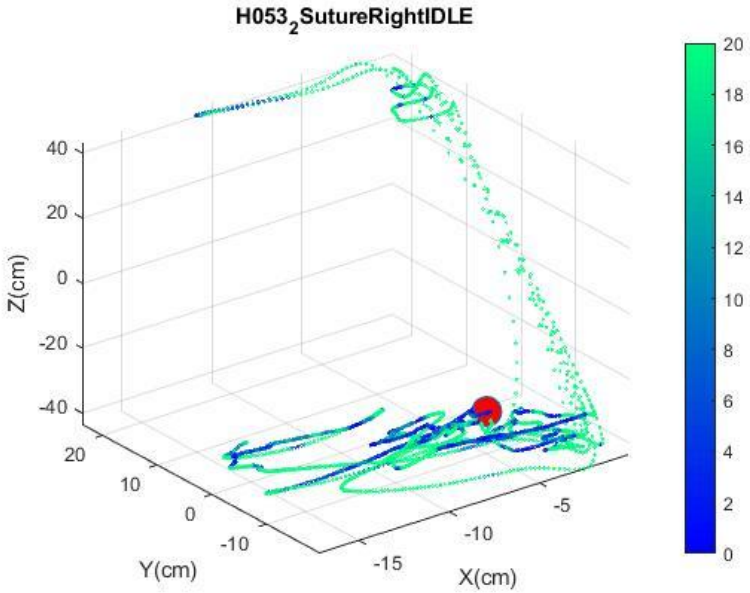
Fellow



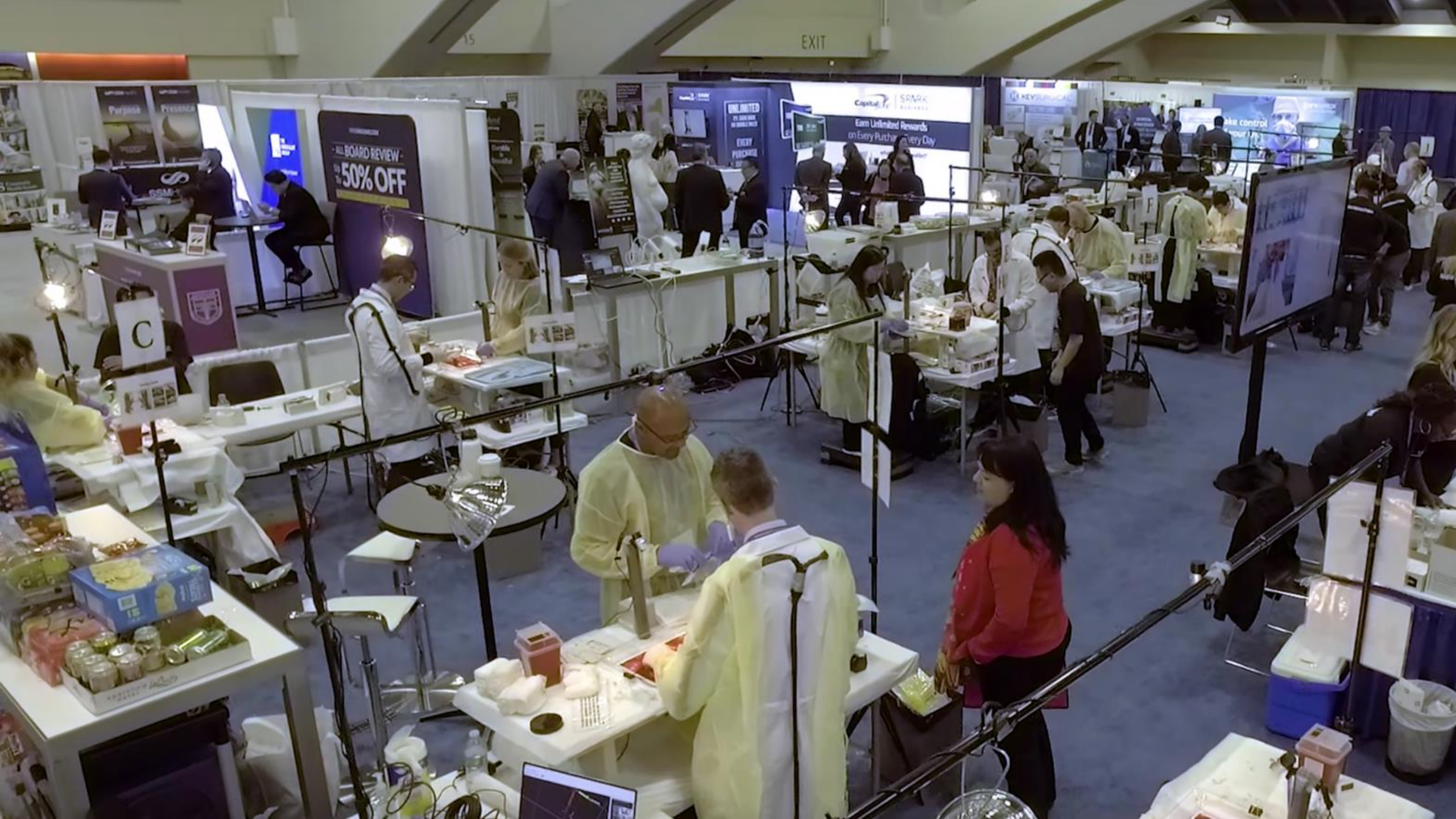


Faculty





Hermsen JL, Mohamadipanah H, Yang S, Wise B, Fiedler A, DiMusto P, **Pugh C**. Multimodal Cardiopulmonary Bypass Skills Assessment Within a High-Fidelity Simulation Environment. Ann Thorac Surg. 2020 Sep 21:S0003-4975(20)31515-0.

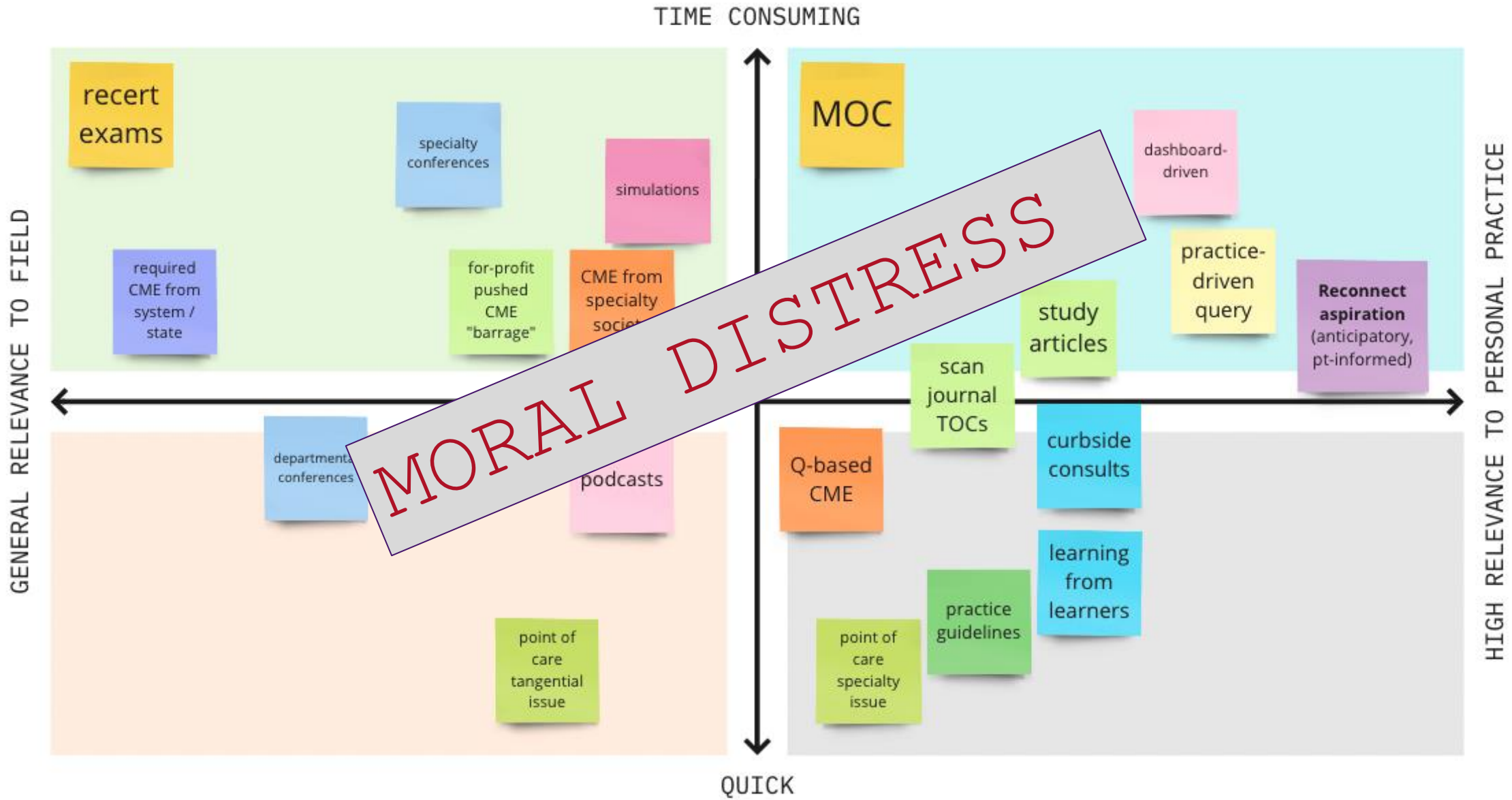

EXIT
ALL BOARD REVIEW
UP TO 50% OFF
Earn Unlimited Rewards
C

Problem *(7 of 7)*:
How can I provide learn integrate my clinical work and learning?

Kim Lomis
Dan Pickhardt
Joe Marks

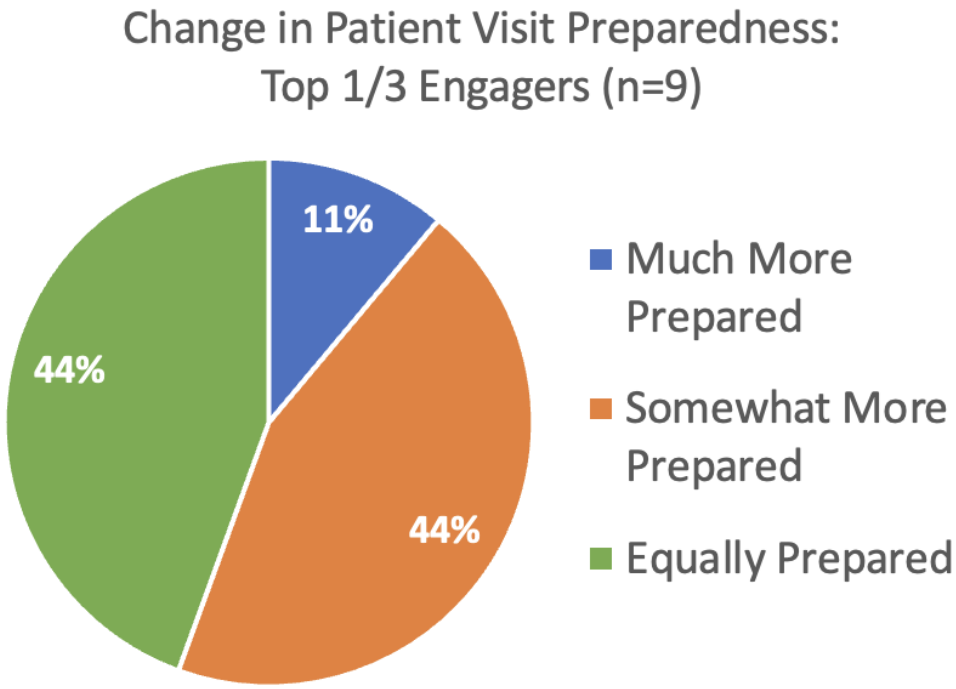
Opportunity:
AI-enabled patient relevant learning

LEARNING STRATEGIES OF PHYSICIANS



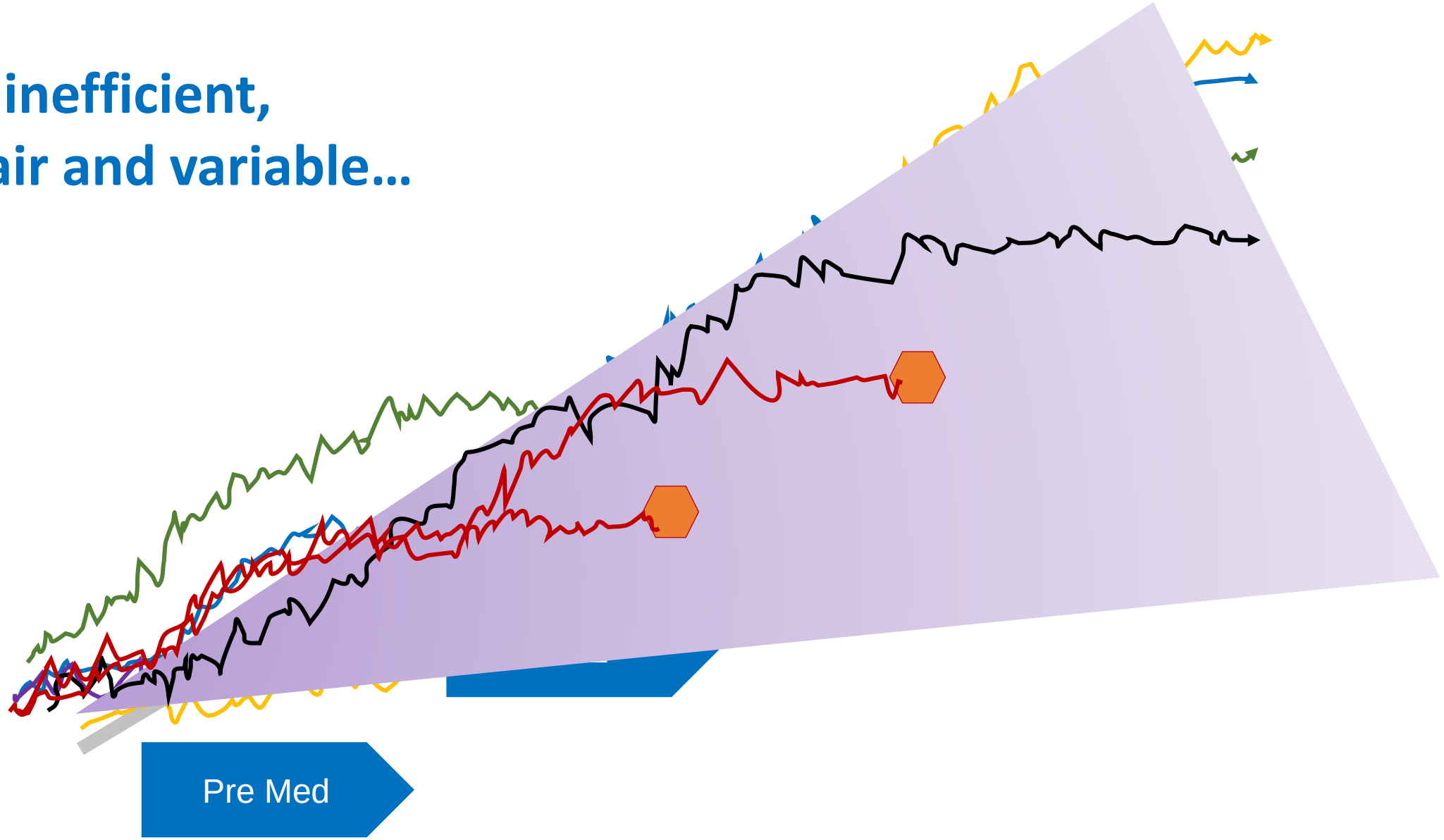
Findings of limited pilot in a health system

- Users engaged with platform for an average of just 10 minutes per week
- Recalled 2-3 articles per week
- Informed 1-2 clinical decisions per week
- *Enhanced sense of preparedness*
- *Qualitative appreciation for assistance*

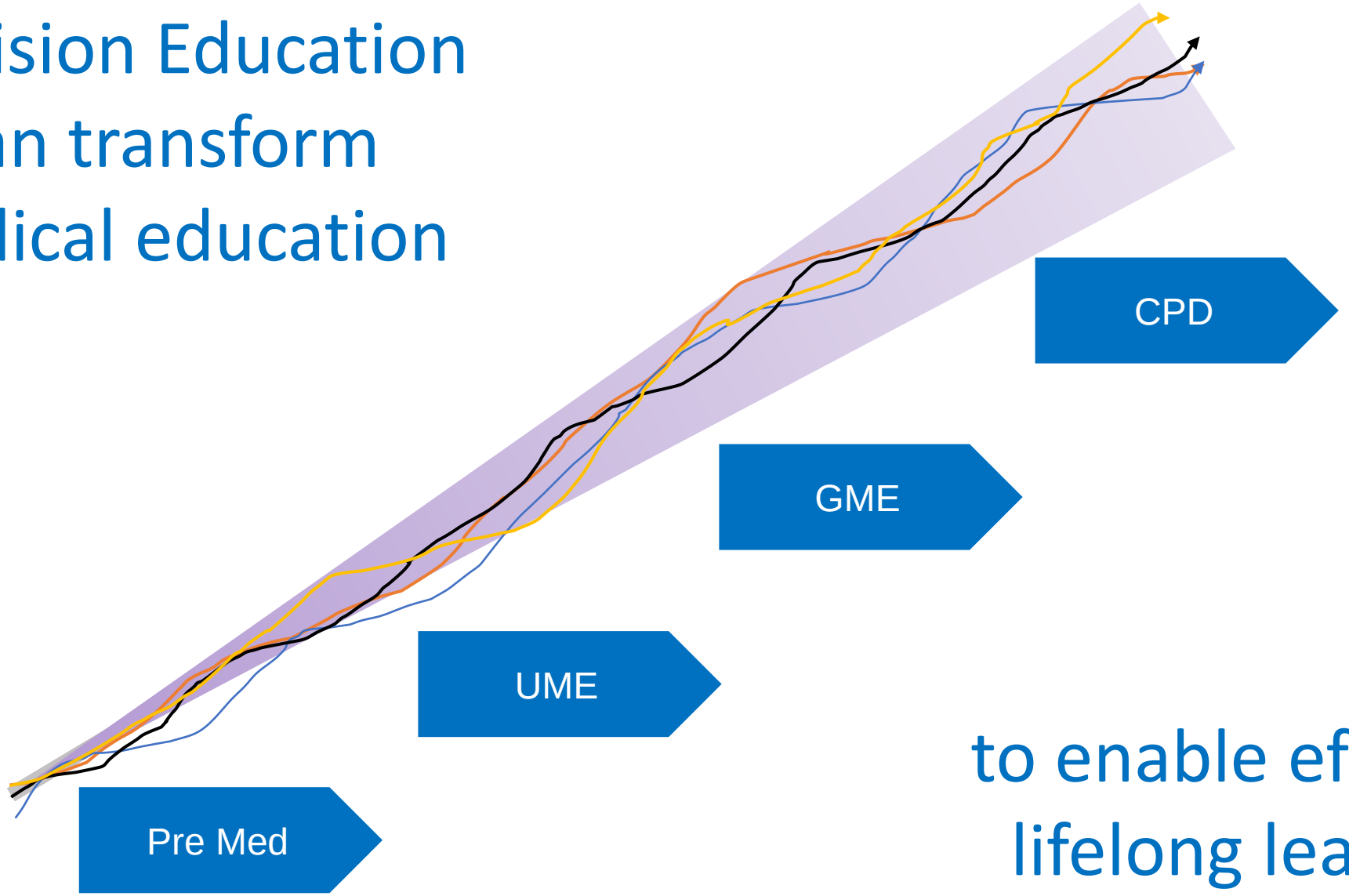


Final Thoughts

Too inefficient, unfair and variable…



Precision Education can transform medical education



to enable effective lifelong learning

Precision Education

Immediate Needs

Cultivate Community and Ecosystem
Develop Theory and Scholarship
Establish Principles and Standards
Ensure Humanism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