Discussion 4

True Success, Physician Sentiment, and Implementation Science

Recap of Case Study

- Your AI model has been deployed in the local hospital's emergency department
- Model automates the ordering of tests (this speeds up – and standardizes) how we deliver care
- Model was validated with a **92% accuracy**
- ***Each group has a different model architecture, with different development and validation processes***

Case Study Evolves

Your model has been deployed, but there has been some resistance from nursing staff and medical trainees in the emergency department...

Discussion 4 – Questions

- Beyond technical knowledge, what are some potential emotional reactions, organizational structure, or cultural factors mediating incorporation of AI into clinical workflow?
- How should impacts of AI tools on training processes be considered?
- How can development teams collaborate with deployers to anticipate such factors at the start of a project and create plans to mitigate their impact?

TIME TO SHARE WITH THE LARGE GROUP

Share both overall thoughts – as well as those specific to your model's architecture and validation process

LARGE GROUP DISCUSSION

Consider your model type in communicating your thoughts to the group

Model A
Non-Generative Model

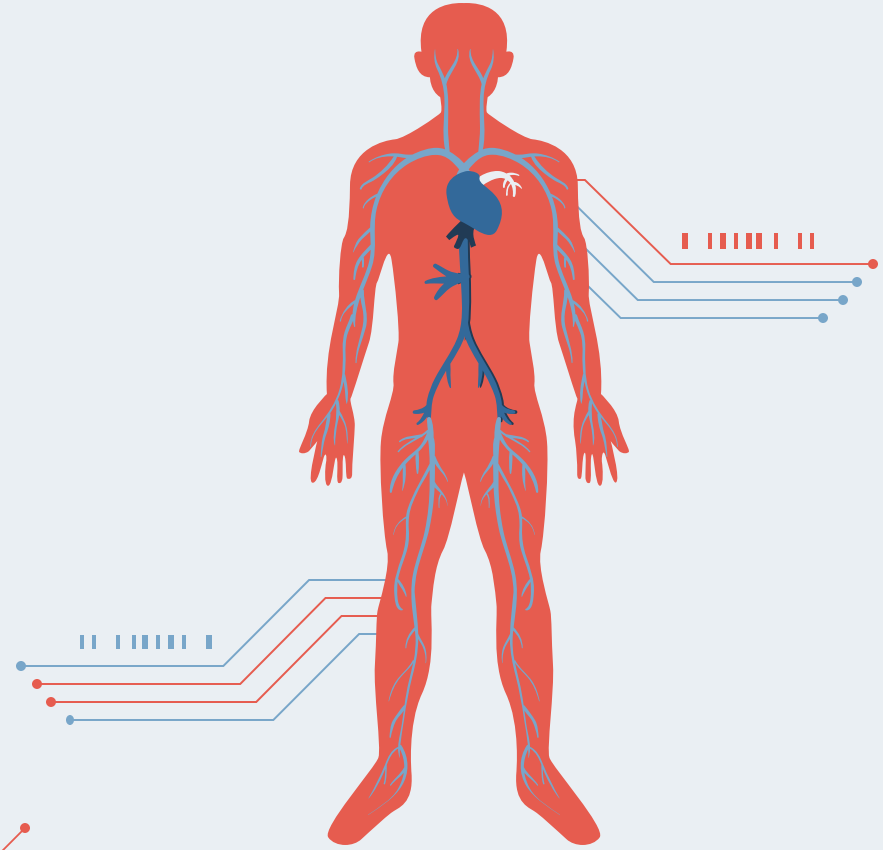
Model B
Non-generative, Image-based Model

Model C
Multimodal Model

Model D
Generative Model

EVIDENCE & RESOURCES

In the following slides, we recommend relevant evidence and resources related to this discussion



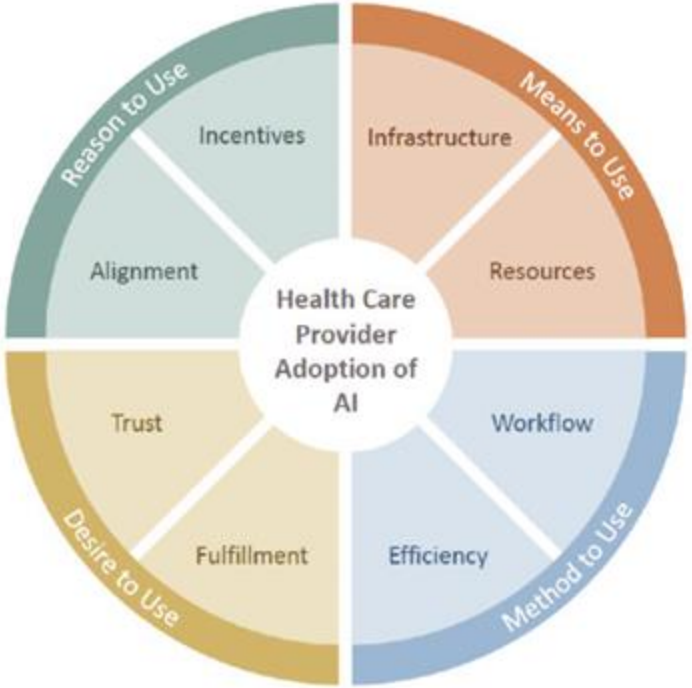
Moving the Dial

A good model does not always improve care

ML Model Works → Model Integrated into Care → Model Improves Care

Challenges to Implementation

- Bias & disparities
- Transparency, explainability
- Dataset quality and availability
- Infrastructure, workflow
- Governance, regulation
- Monitoring & calibration drift



Adler-Milstein J, Aggarwal N, Ahmed M, et al. Meeting the Moment: Addressing Barriers and Facilitating Clinical Adoption of Artificial Intelligence in Medical Diagnosis. *NAM Perspect*. 2022;2022:10.31478/202209c.

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Limitations & Responsible Deployment

Pitfalls…

- Bias in data sets and data prep
- Inequities in access & outcomes
- Technical issues
- User error
- Sycophantic nature of AI
- Lack of attention to implementation science

Organizational structure is needed to support responsible deployment

RESPONSIBILITY	DEVELOPER	DEPLOYER	PHYSICIAN
PLANNING AND DEVELOPMENT			
Ensure the AI system addresses a meaningful clinical goal	○		○
Ensure the AI system works as intended	○		○
Explore and resolve legal implications of the AI system[1] prior to implementation and agree upon appropriate professional and/or governmental oversight for safe, effective, and equitable use of and access to health care AI	○	○	○
Develop a clear protocol to identify and correct for potential bias	○	○	○
Ensure appropriate patient safeguards are in place for direct-to-consumer tools that lack physician oversight	○		
IMPLEMENTATION AND MONITORING			
Make clinical decisions such as diagnosis and treatment			○
Have the authority and ability to override the AI system			○
Ensure meaningful oversight is in place for ongoing monitoring		○	○
Ensure the AI system continues to perform as intended through performance monitoring & maintenance	○	○	
Ensure ethical issues identified at the time of purchase and during use have been addressed[2]		○	
Ensure clear protocols exist for enforcement and accountability, including a clear protocol to ensure equitable implementation	○	○	○

link

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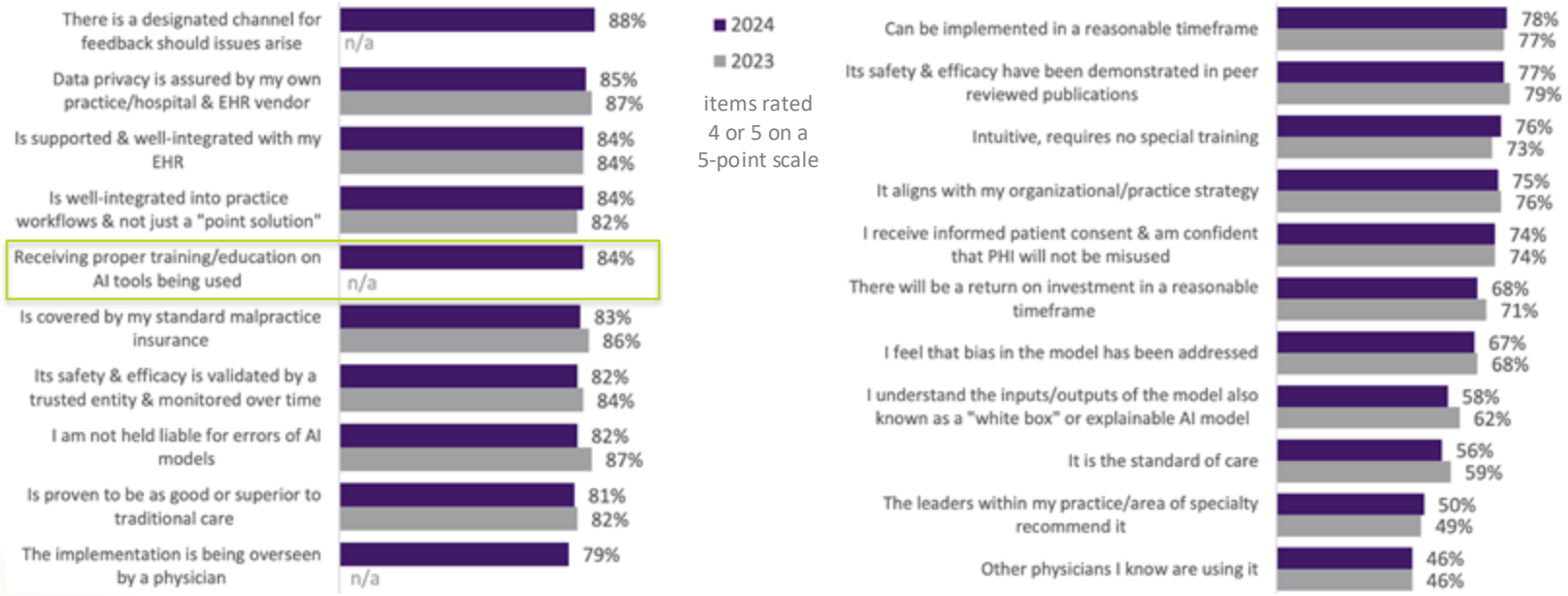
Key Facilitators for AI Adoption



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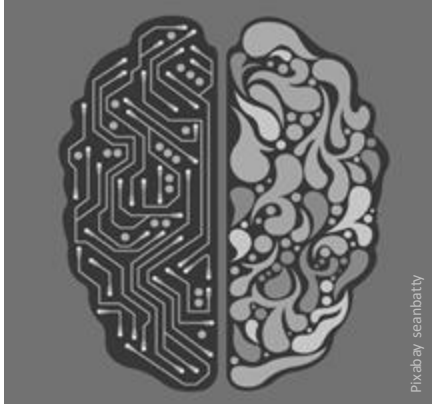
Relational Considerations

Human + AI = optimal care



- Challenges to professional identity
- Shifts in relationships from traditional doctor-patient dyad to team-technology-patient matrix
- Physician's role in communicating with patients, families, communities and provide more human-centered care
- What human attributes are needed to interface effectively with AI?

  Do we need a different type of person in health professions?

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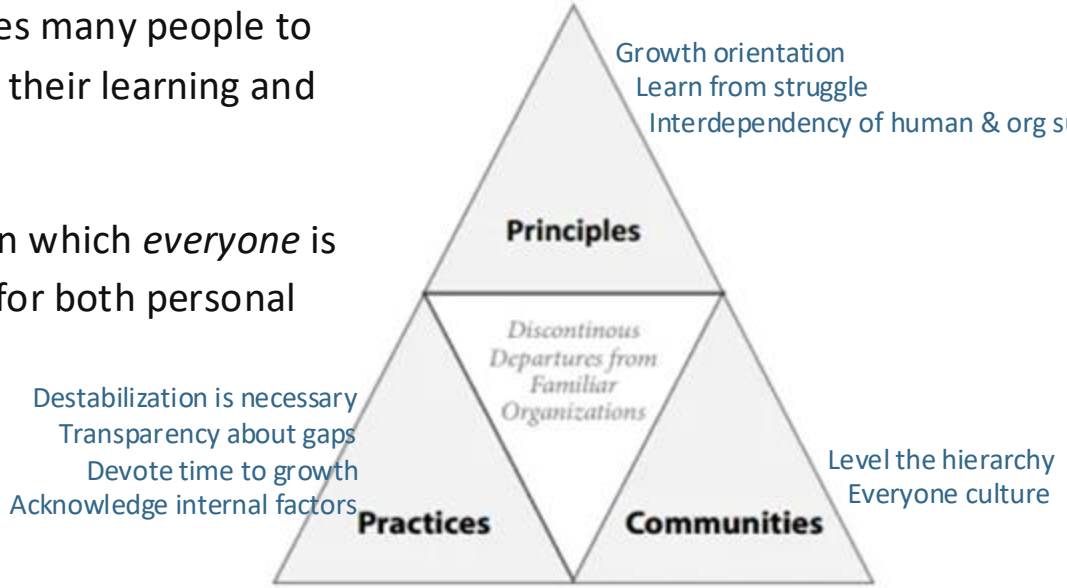
The Deliberately Developmental Organization

Typical organizational culture drives many people to waste time and energy concealing their learning and developmental needs.

A more productive culture is one in which *everyone* is encouraged to use vulnerabilities for both personal and organizational growth.



Adapted from An Everyone Culture: Becoming a Deliberately Developmental Organization. Kegan and Lahey HBR Press 2016

See also: Miller, Nagler, Wolff, Schumacher, Pusic. It Takes a Village: Optimal Graduate Medical Education Requires a Deliberately Developmental Organization. Perspect Med Educ. 2023 Jul 28;12(1):282-293.

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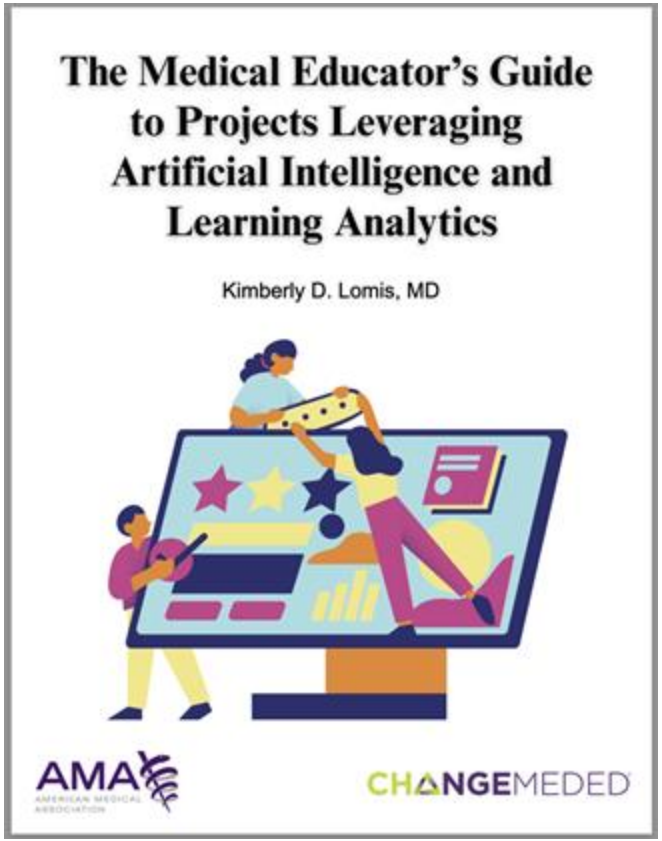
Considerations when Developing AI Models

for health care or health professions education

Key Considerations for Projects Leveraging Artificial Intelligence and Learning Analytics

1. Problem definition
2. Affordances of technology
3. Data considerations
4. Limitations of technologies
5. Costs
6. Implementation science
7. Responsible deployment



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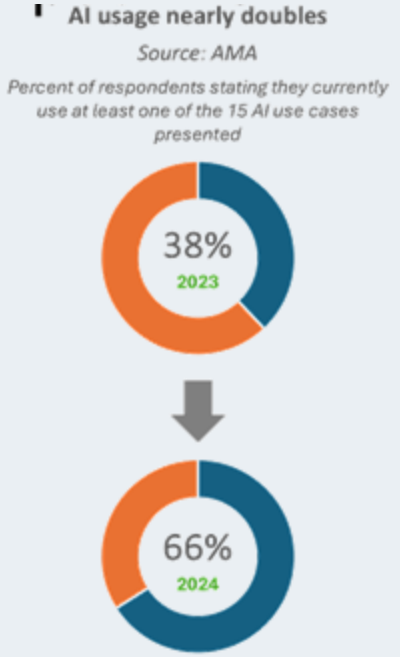
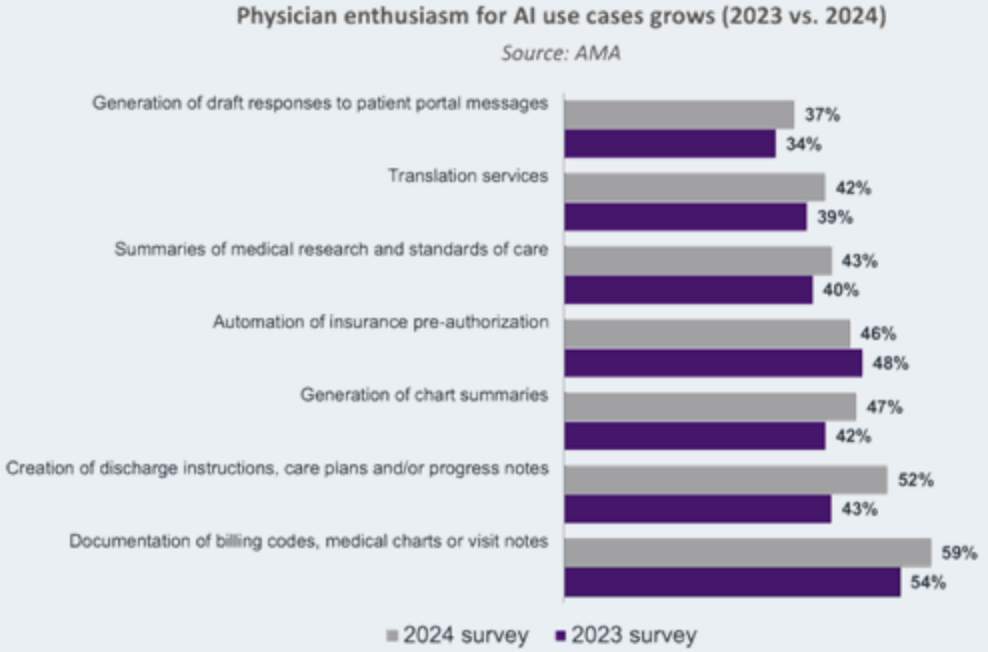
Creating Buy-In

- Acknowledging threats to professional identity
- Acknowledging emotional response to incorporation of new technology

Physician Sentiment Toward AI Trending Positively





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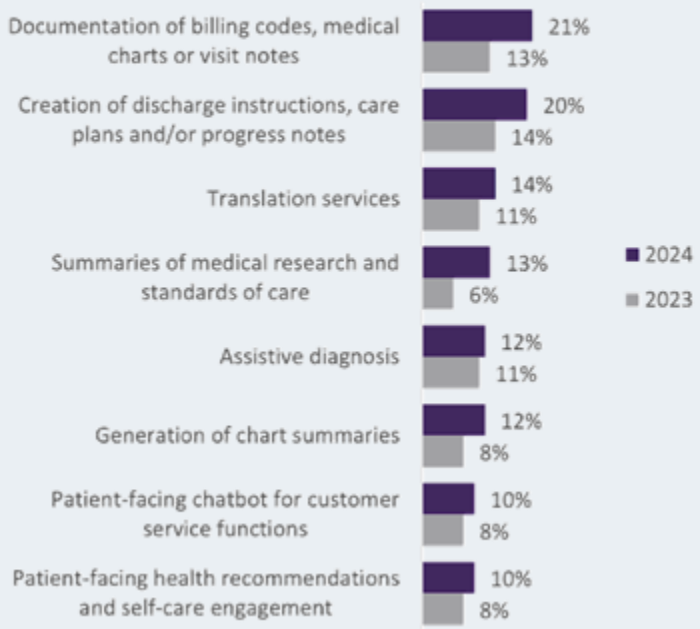
AI Usage Among Physicians Nearly Doubled Between 2023-2024

Rapid increase in AI users

Percent of respondents stating they currently use at least one of the 15 AI use cases presented

Top use cases gain users



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Precision Education

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Relevant Readings

1. Liu, X., et al. (2019). *Reporting guidelines for clinical trial reports for interventions involving artificial intelligence: the CONSORT-AI extension*. Nature Medicine, 26, 1364–1374.

2. Cabitza, F., Rasoini, R., & Gensini, G. F. (2017). *Unintended consequences of machine learning in medicine*. JAMA, 318(6), 517–518.

3. Sendak, M. P., D'Arcy, J., Kashyap, S., Gao, M., Nichols, M., Corey, K., & Ratliff, W. (2020). *A path for translation of machine learning products into healthcare delivery*. npj Digital Medicine, 3(1), 1–4.

THANK YOU FOR PARTICIPATING

Time for another discussion!