



Discussion 3

User Interfaces



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*

User Interfaces (UI)

- **UI:** the point of interaction between a human and computer system.
- UI includes all the visual elements and processes that allow users to communicate with and operate a system/model,
- The UI can take many forms – apps, websites, ML tool in a clinical setting
- Key consideration in developing a UI is who will be using it and what they will need to do with the insight

Key Components of UI

- **Input controls** – Buttons, forms, sliders, checkbox (automatic input?)
- **Navigation** – Menus, tabs, breadcrumbs
- **Information displays** – Graphs, tables, alerts
- **Feedback mechanisms...**

Related Terms

- **User Experience:** How the user feels while interacting with the system
- **Human-Computer Interaction (HCI):** The broader field studying design principles for UI/UX

Discussion 3 – Questions

- What are important aspects of your model to communicate to users through your model's user interface?
- What are some key interactive components of an AI healthcare model that need to be included in a User Interface?
- Are any of the above unique to your type of model (and validation process)?



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**

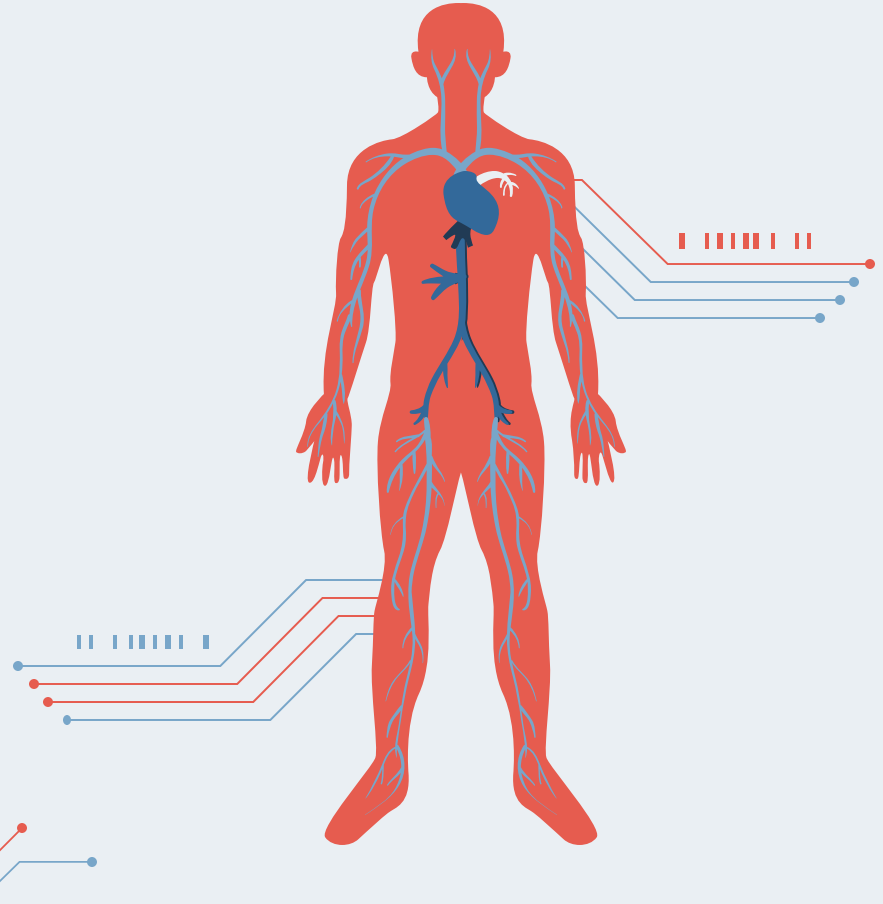
Generative Model





EVIDENCE & RESOURCES

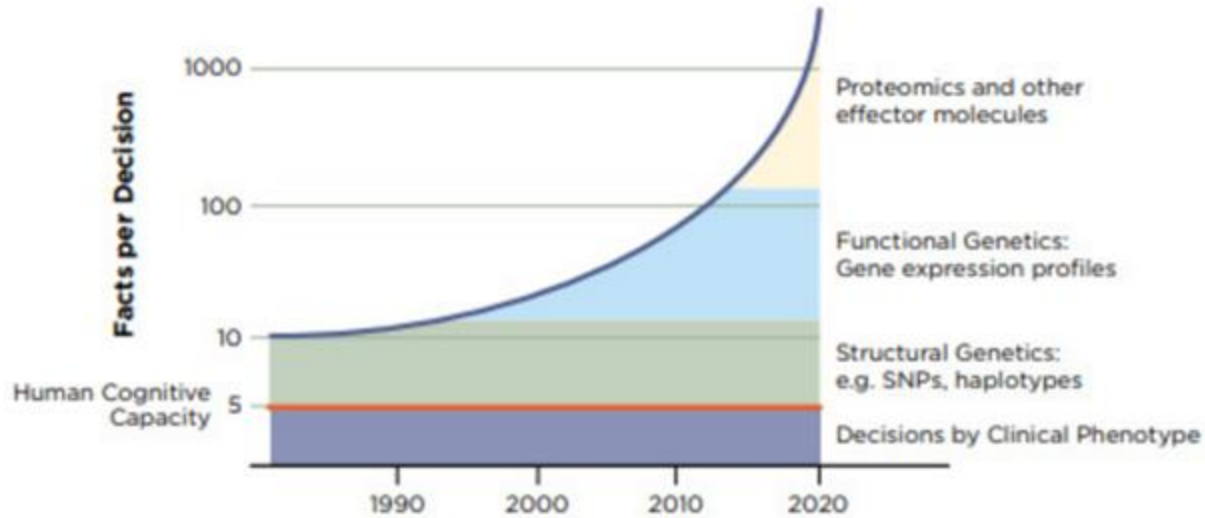
In the following slides, we recommend relevant evidence and resources related to this discussion





What is going on in this image?

Information overload



William Stead, IOM Meeting, 8 October 2007. Growth in facts affecting provider decisions versus human cognitive capacity.

Matheny M, Ahmed M, Whicher D. Artificial intelligence in health care: the hope, the hype, the promise, the peril. NAM special publication. 2019, National Academy of Medicine.

System challenges

- High patient volumes
- Reduced encounter times
- Super-specialization
- Fragmented care
- Clinical information hard to find
- Lack of interoperability
- Frequent interruptions
- Communication challenges
- Frequent staff turnover
- Administrative burdens



Estimating harm from diagnostic error

A US study in 3 phases

- (1) What dangerous diseases account for the majority of serious misdiagnosis-related harms?

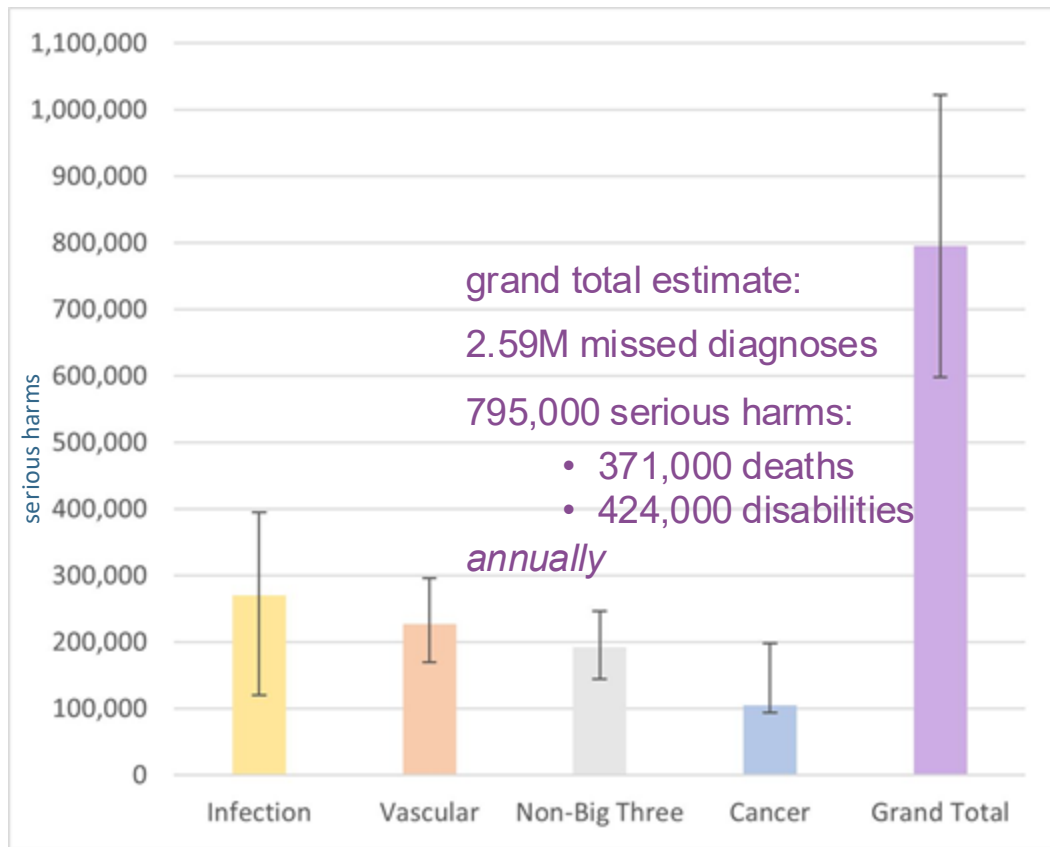
Based on 10 years of malpractice & clinical data

- (2) How common are diagnostic errors causing harm among these dangerous diseases?

Using high-quality clinical studies

- (3) What is the overall epidemiological incidence of diagnostic errors and harms among these dangerous diseases?

Using national databases for dangerous disease incidence then multiply these by error and harm rates



Newman-Toker DE, Nassery N, Schaffer AC, *et al.* Burden of serious harms from diagnostic error in the USA *BMJ Quality & Safety* 2024;33:109-120

Relevant Readings

1. Johnson, C. M., Johnson, T. R., & Zhang, J. (2005). *A user-centered framework for redesigning health care interfaces*. Journal of Biomedical Informatics, 38(1), 75–87
2. Ratwani, R. M., & Fong, A. (2015). *Designing for clinician cognition: Cognitive load theory and EHR usability*. Journal of the American Medical Informatics Association, 22(6), 1012–1016.
3. Bussone, A., Stumpf, S., & O’Sullivan, D. (2015). *The role of explanations on trust and reliance in clinical decision support systems*. 2015 International Conference on Healthcare Informatics.
4. Amann, J., Blasimme, A., Vayena, E., Frey, D., & Madai, V. I. (2022). *Explainability for artificial intelligence in healthcare: a multidisciplinary perspective*. BMC Medical Informatics and Decision Making, 22(1), 1–9.



THANK YOU FOR PARTICIPATING

Time for another discussion!

