MAFP: AI IN FAMILY MEDICINE

ENHANCING CARE, EFFICIENCY, AND CONNECTION

Jason Greenwood MD MS
Marc Matthews MD
Adria Hoffman PhD
David Rushlow MD

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OUR TEAM

Jason Greenwood MD MS
Assistant Professor - FM
Director of Clinical Informatics and AI – FM RST

Marc Matthews MD
Assistant Professor – FM
Director of Innovation – FM RST

Adria Hoffman, PhD
Sr. Education Specialist

David Rushlow MD
Assistant Professor – FM
Chair – FM Rochester MN

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AI is Everything?

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GUIDING QUESTIONS

- What are some of the technologies referred to as AI that are useful in our work as physicians?
- How are AI tools developed?
- How will I determine whether and how to use an AI tool in the clinical setting?

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LEARNING OBJECTIVES

- Define key AI terminology
- Define the rationale for using AI
  - Identify questions to determine an AI tool's affordances and constraints.
  - Apply these questions to critically evaluate whether or not a particular tool is beneficial to you or your patients
- Describe how various AI technologies are developed
- Identify opportunities for AI to decrease burden
- Describe AI model card usage

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THE "BIOCHEMISTRY" OF AI

THE COMPUTER/SERVER

Hard drive – Data storage
Like the file cabinet of records
The bigger the cabinet the longer back we can store

Random Access Memory (RAM) - Data Workspace
The "desk" or workspace of the program/model
The larger the desk the more we can work on at once and the larger projects we can take on

The Central or Graphics Processing Unit (CPU/GPU) - Brain
The "people" working on the problem at the "desk"
The more specialized people we have working on the problem, the faster we can accomplish the goal

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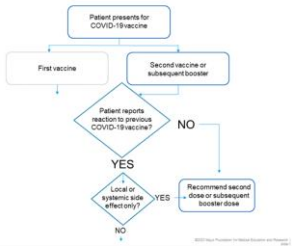
ALGORITHMS
NOT NECESSARILY "AI"

- "a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer" (Oxford)
- They work using **basic mathematical or If-then-else** operations of a basic CPU



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WHAT IS AI?

- Artificial Intelligence: **An umbrella term for many kinds of technologies**, including some that don't currently exist but receive a great deal of media attention.
- How to think about AI: Computer-based systems and tools that are designed by humans to **efficiently find patterns in large data sets** and to **automate tasks** traditionally accomplished manually.

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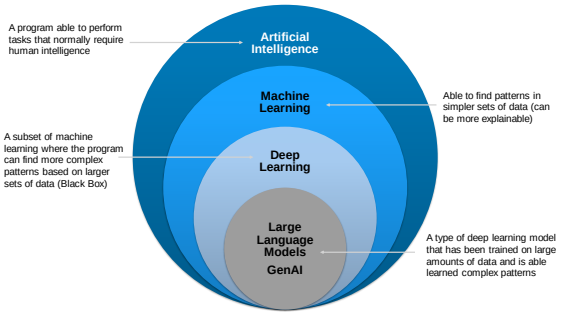

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LARGE LANGUAGE MODELS

- **Large Language Models (LLM)**
  - Examples: GPT-4o, llama 3, Gemini 2.0
  - How & what: predict the probable next word based on existing narrative data
- **ChatGPT, Gemini, Copilot, etc.**
  - What: public interface for GPT based models from Open AI
  - Do not use this for protected health information (PHI) or confidential business information (CBI) (unless your organization has a business agreement (BA) that protects data from being shared outside of your organization)
- **Prompts**
  - Text/data input/instruct an LLM to get desired output
- **Prompt Engineering**
  - Generative AI output quality is highly variable. Prompt engineering carefully crafts inputs for optimized outputs.

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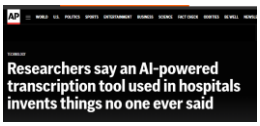

Groundbreaking BBC research shows issues with over half the answers from Artificial Intelligence (AI) assistants

Conducted over a month, the study saw the BBC test four prominent, publicly available AI assistants

Published: 11 February 2025

IMAGING INFORMATICS | ARTIFICIAL INTELLIGENCE

ChatGPT perpetuates racial and gender biases

Will Morton
Jan 2, 2024

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AREAS AI INFLUENCING

- Predictive/Identifying
  - Imaging
    - Radiology, Pathology, Dermatology, etc.
  - Signal
    - ECG, EEG, Voice, PFT, etc.
  - Discrete
    - Labs, Surveys, Drug development, etc.
- Generative
  - Summarization
    - Ambient, Patient History, etc.
  - Information Retrieval
    - Literature, consultation, knowledge, etc.

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THE "PHYSIOLOGY" OF AI

- **Why do we need AI?**
  - Healthcare is progressing at an exponential rate (literature, technology, treatments, etc.)
  - Humans can only process information in a linear fashion – we need help to keep up
  - Decrease burden to allow PCPs to operate at top of license and meet increasing populations needs

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DEVELOPING AI MODELS - STEPS

- **Define the problem space/benefit**
- **Ready to deploy**
  - Ensure model is appropriate for your populations/clinic
  - Run silently in real time
  - Pilot deploy before full deploy
- **Post deploy monitoring**
  - Ensure it is performing as expected
- **Re-evaluate model yearly**
  - Practice, methods or dependent model updates

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Because humans develop and train AI using existing data, these tools are just as “biased” as their human developers/providers. We must work to mitigate this bias.

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AI Model Card (Soup Can Label)

Credit: Duke University

- Training Inputs (patient demographics, AI models, etc.)
- If it requires retraining
- Performance Data
- Last Updated/Reviewed
- 510K Approval Status (FDA)

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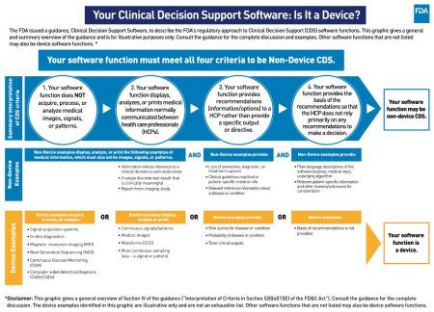

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EXAMPLES OF AI
ADMINISTRATOR APPLICATIONS

- **Personnel/HR**
  - Hospital/clinical staffing needs predictions
- **Meetings/Email/Information**
  - Meeting summarization, email summarizations, email prioritization
  - Chatbot for documentation
- **Financial**
  - Predicted financial burdens/success internal and external, budgets requirements
  - Estimated patient growth

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EXAMPLES OF AI

CLINICAL APPLICATIONS

Pre-visit

- **Note/ Problem summarization (27% of provider time)**
- Predictive models for patient disease risk – help prioritize

Visit

- **Ambient documentation (24% of provider time)**
- HCC, Preventive care, Quality Measures

Post-visit

- **Augmented replies (23% of provider time)**
- Results suggested follow-up/ interventions – decrease referrals

Async-visit

- Augmented patient replies and predict need for return
- Clinical research summarization/interventions
- Care for more patients with less resources – augmenting care

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AMBIENT DOCUMENTATION

- **Present**
  - Multiple vendors
    - Read the contracts!
  - Some are able to flow into the EHR
- **ROI**
  - Saving as much at 80% of documentation time
  - More visits closed same day
  - Decreasing burden
- **Upcoming**
  - Pend up orders, suggest problem list changes, problem-based documentation, and more

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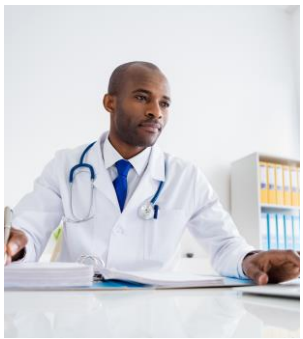
GENERATIVE REPLIES

- **Present**
  - Create a draft reply to a patient message in some cases with an empathetic and adjusted reading level response
- **ROI**
  - Can cut reply times by days/hours
  - Can cut message time by 30-60 secs
- **Upcoming EHR and Present Vendors**
  - Drafts for many other messages/ results, letters, denials, etc.



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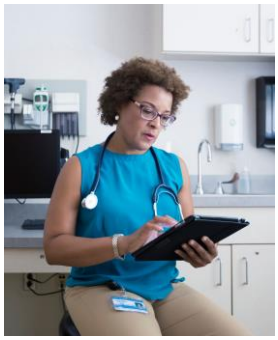

SUMMARIZATION

- **Present**
  - Able to create a summary of patient's hospital course, since your last visit, etc.
  - Be able to summarize literature
  - Multiple vendors and built into some EHRs
- **ROI**
  - Up to a 40% decrease prep time
  - Some as high as 98% felt better prepared
- **Upcoming EHR and Present Vendors**
  - Full chart summary, suggested follow up items, suggested HCC coding, integration with literature summarization, etc.

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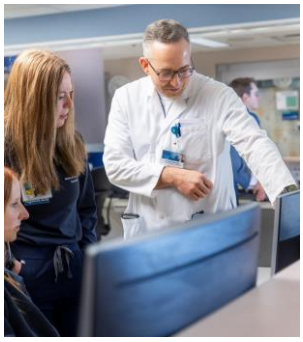
DATA EXTRACTION

- **Present**
  - Many vendors, homegrown tools and EHRs
  - Ensure to validate with your own data
- **ROI**
  - Able to help alleviate the chart diving burden
  - Can be used to trigger additional Clinical Decision Support (CDS)
  - Helpful in research
- **Upcoming EHR and Present Vendors**
  - Expect more fields, incidental findings, etc.



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PREDICTIVE MODELS

- **Present**
  - Many institutions, vendors and EHRs offer solutions to predict outcomes/disease
  - Be sure to be at the table during development and implementation
- **ROI**
  - Able to reduce adverse outcomes
  - Could help predict resource needs
  - Might increase referrals/testing
- **Upcoming EHR and Present Vendors**
  - More and more models to come with the hope of more generalizability

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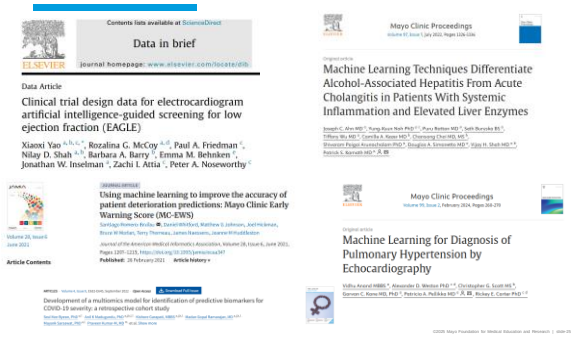

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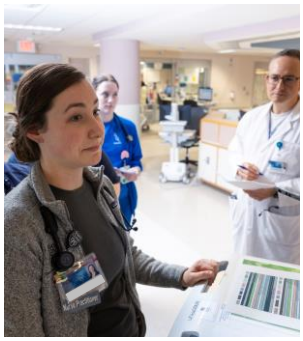
DATA ANALYSIS

- **Present**
  - Vendors and EHRs offer their own solution
- **ROI**
  - Less of a learning curve with understanding the data
  - Gain further insights not previously seen in data
- **Upcoming EHR and Present Vendors**
  - Possibly anticipate outcomes based on current trends in data
  - Might cause increased worry or excitement



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TAKE AWAYS

- Not everything is AI and that is OK
- Why do we need AI? - Information and data are increasing, we need help distilling
- When implementing and using AI educate users of the risks and look how it was created (i.e. AI Model Card)
- There are many examples of how AI can help clinical and administrative teams
  - Look at problem space and ROI
  - May not save time or make extra money but may decrease burden of the provider/care team and that is also OK

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QUESTIONS & ANSWERS

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