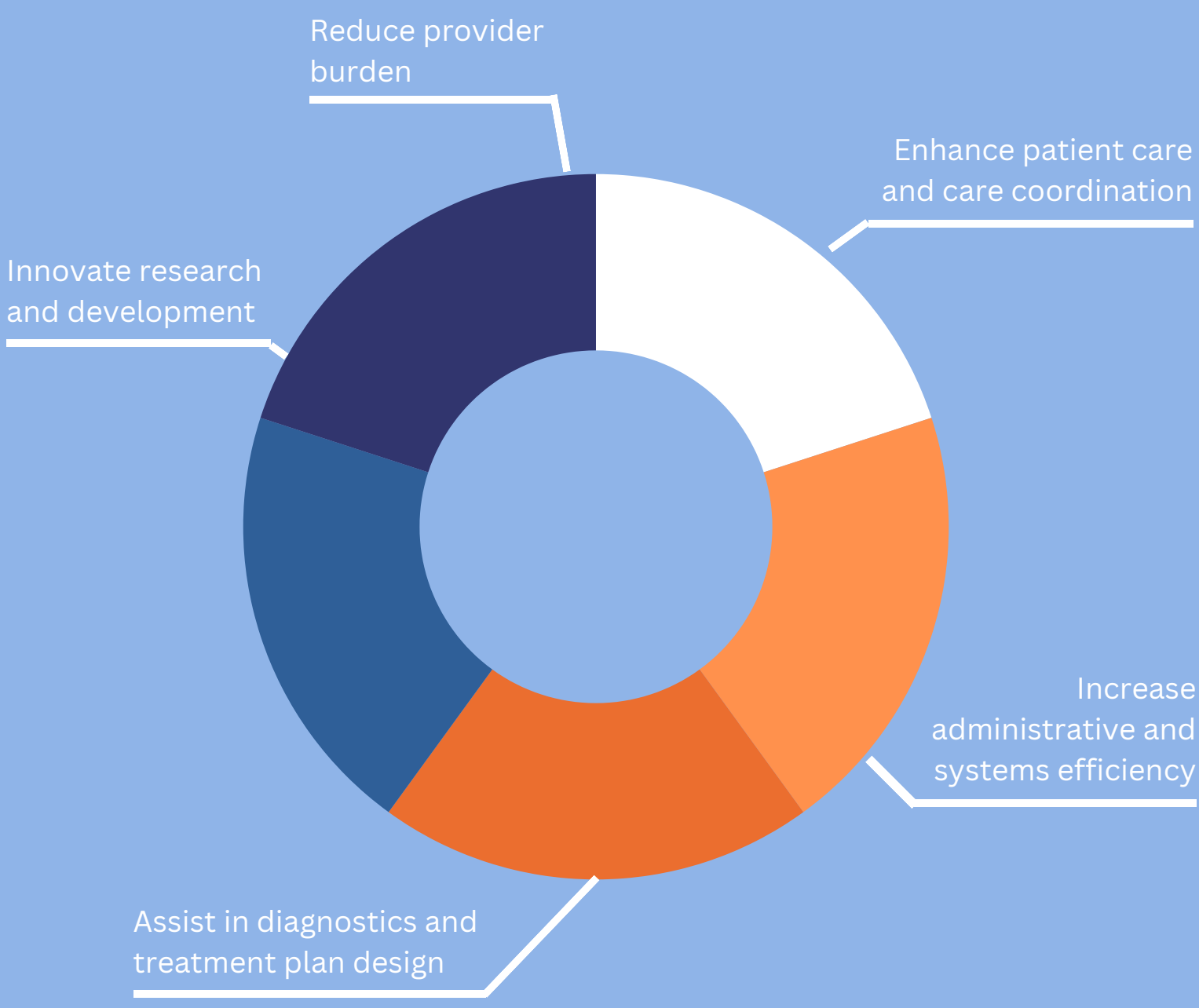
Ambulatory Care Practitioners

Artificial Intelligence: A Primer

What is Artificial Intelligence (AI)?

The theory and development of computer systems to perform tasks that typically requires human cognition. AI is being used in several aspects of healthcare to:

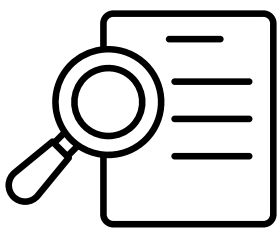


Types of AI

There are many types of AI being used in healthcare, including:

SUPERVISED LEARNING

Computer learns patterns and relationships between given inputs and outputs to make predictions

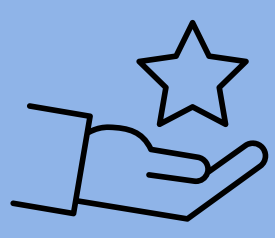


UNSUPERVISED LEARNING

Computer learns patterns and relationships of given inputs to find similarities

REINFORCED LEARNING

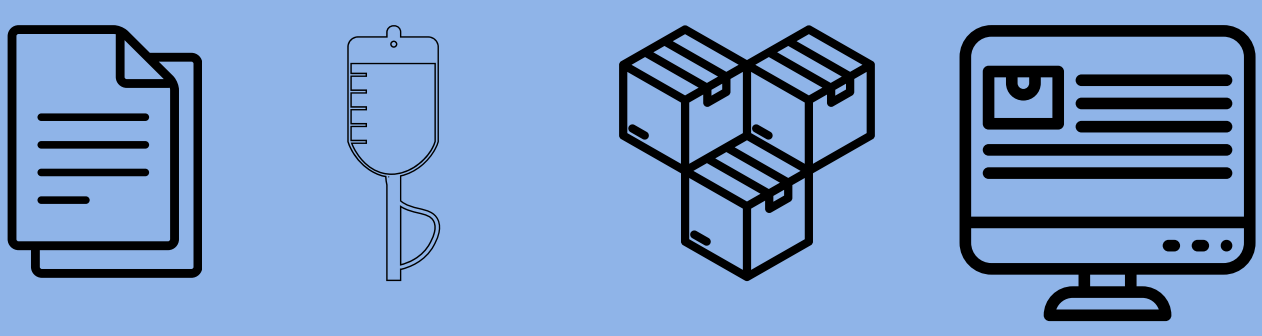
Computer learns to make decisions on own by making many decisions, learning from previous decisions made, and maximizing benefit



Examples of AI

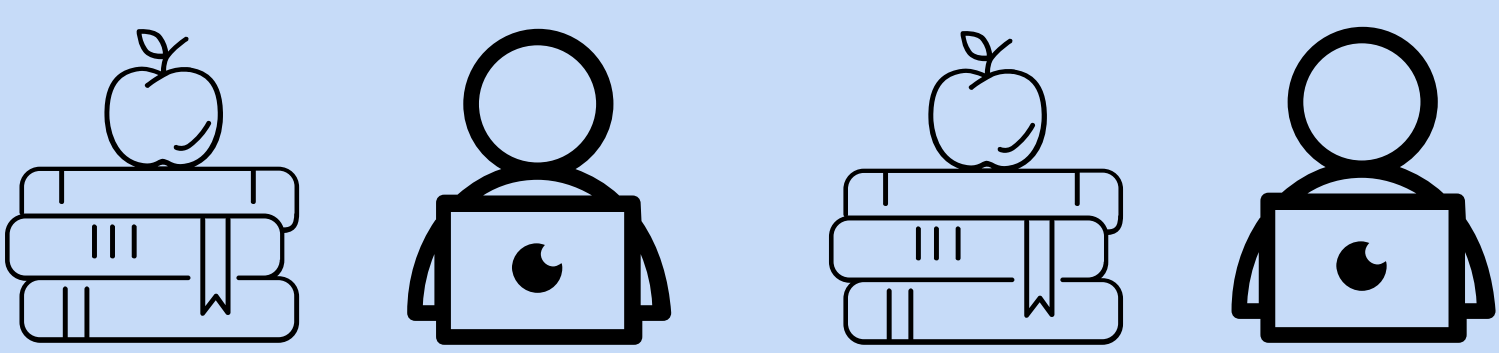
Examples in Healthcare

- AI-generated clinical note generation, drafted responses to patient messages, and patient education materials
- Insulin pumps with AI technology for glucose management
- ChatGPT for writing prior authorization letters
- Automated programming to reduce charge rejections
- Inventory management
- Clinical decision support for dosing and monitoring



Examples in Pharmacy Education

- Enhance learner experiences with AI-generated practice scenarios, generated summaries of learning materials, and simulation-based learning
- New curricular offerings and advanced degrees in AI
  - Long Island University offers a PharmD/MS degree in AI, a Health Analytics and AI Fellowship, and AI learning experiences in Healthcare Informatics courses
  - University of Florida College of Pharmacy has received seven federal grant funds and $5 million in grant funding for AI-related research
- AI can be leveraged for pharmacy educators
  - Automated and/or AI-generated administrative tasks
    - Develop course syllabi, course descriptions, learning objectives, curriculum, and grading assessments
    - Generate content outlines for presentations
    - Brainstorm exam, practice interview, and/or research questions
    - Create patient education handouts
    - Draft letters of recommendations
  - Research and data analysis



Limitations and Threats of AI

Variability and Bias in Data Input Quality

Generative AI depends on high (versus low) quality data inputs, which can be highly variable and potentially biased; appropriate screening and parameters should be determined.

Lacking Clinical Context

Contextual applicability needs to be assessed by creating a systematic approach to determine appropriate use, indicating correlation, causation, and clinical significance of data.

Potential for Errors of Commission/Omission

Automation can encourage or potentiate errors; prioritize productive CDS design; prepare for potential alert fatigue and complacency.

Rules and Regulations Unable to Keep Pace

The rate of AI growth outpaces the rate of enacting rules and regulations, which are necessary for creating safeguards and protections for data security.

New Patient Privacy Risks

Concern exists for introducing vulnerable entry points that threaten patient privacy; algorithm-development with machine learning can create links between de-identified patient information and the patient

New Liability Risks

Commercialization of AI technologies can confer a greater responsibility to corporations, clinics, and public bodies when obtaining, utilizing, and protecting patient health information; these entities are typically ill-equipped to effectively protect patient health information.

Potential for Unethical Practices

Privately owned companies developing AI technologies can be tempted by monetary gains to include Information sharing agreements that can be used to grant private institutions access to patient health information.

What Next?

How Can Pharmacists Get More Involved?

AI can only augment current practices, not replace human intelligence. This augmentation can be leveraged, taking advantage of AI's ability to do more lower level tasks so as to allow opportunity for pharmacists to focus on higher level tasks. By reallocating time and effort, this can potentially lead to service expansion.

There are also ways that pharmacists can get involved in AI development and implementation. For examples, pharmacists can:

- Identify outcome variables in supervised models
- Validate output of supervised models
- Develop clinical significance from output of unsupervised models
- And much more...

AI is a new up and coming component to healthcare and pharmacy practice. And it can be made more successful with the help of the pharmacy workforce.

Key Takeaways

Here are some key takeaways of how the pharmacy workforce can interact with AI, specifically in the ambulatory care practice setting:

AUGMENT

AI can augment pharmacist-managed care, not replace

EXPAND

AI can offer opportunity to reallocate time for pharmacists to expand their focus on more complex clinical tasks and direct patient care

OPTIMIZE

There is need for continual evaluation of accuracy and appropriateness of AI output, and pharmacists can provide domain expertise is key in the model development process to optimizing AI output

EXPLORE

The current landscape of AI is in its early stages, and pharmacists can contribute their unique perspective to explore creative and imaginative possibilities that AI can offer healthcare

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