AI IN HEALTH CARE:
AI CAPABILITIES AND CLINICAL SCENARIOS

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As artificial intelligence (AI) becomes more widespread, understanding where to effectively apply these tools is increasingly important. This list of AI capabilities and scenarios is designed to help health care professionals, administrators and clinicians assess the potential uses of AI systems and the impact on patient care. The tool provides a framework for reviewing key considerations when implementing AI solutions, as well as measures to gauge success, including patient identification, patient education and satisfaction, medication adherence and other outcomes.

Documentation and Summarization

Clinical Scenario	Writing notes in electronic health record for patient visits
Considerations	• Identify unique elements in subspecialties • Review and correct for hallucinations • Consider incorporation of guidelines and patient education • Ensure ambient noise does not affect interpretability
Measures of Success	• Increased patient satisfaction via patient surveys/Press Ganey scores • Clinician happiness survey • Accuracy of transcription • Reduction of documentation time: Measure the impact on health care providers' documentation time, comparing pre- and post-implementation times

Disease Identification

Clinical Scenario	Identify amyloidosis patients to get them to the right doctor at the right time
Considerations	• Ask how the model was trained • Ensure AI algorithm is unbiased across populations • Ongoing algorithm surveillance • U.S. Food and Drug Administration clearance
Measures of Success	• Correct identification of amyloidosis cases • Increase in yield of amyloidosis • Optimal guideline-directed medical therapy (GDMT) for patients • Decrease in urgent admission for late diagnosis (dx) amyloidosis

Diagnostics

Clinical Scenario	Rank ordering ultrasounds so the severe cases are read and addressed first
Considerations	• Parameters • Determine how hierarchy is created • Clinician agreement with hierarchy • Ability to expediate clinical care, interventions or discharge
Measures of Success	• Earlier diagnosis of diseases and complications during hospitalization • Decrease in emergent cases secondary to early diagnosis • Earlier patient discharge for normal studies allowing for better movement of patients safe to home and decompression of emergency room (ER)

Patient Education Chatbots

Clinical Scenario	Risk factor modifications utilizing lifestyle and pharmacological therapy for cardiometabolic syndrome
Considerations	• Trusted source data (i.e., reviewed by the ACC for appropriateness) • Unbiased in the terminology used and how it approaches the patient • Applicability across a variety of care settings • Clear connection to clinician care if patient needs more information • Patient/clinician relationship should not be adversely affected • Patient chatbots are solely designed to offer information about dx not offer dx or recommend treatment
Measures of Success	• Increased patient knowledge of disease process as assessed qualitatively by the clinician • Patient satisfaction with the tool (i.e., are they likely to recommend) • Increased patient agency with lifestyle engagement • Improved medication adherence for disease • Rise in percent of optimal GDMT patients in practice using the chatbot

AI IN ULTRASOUND

Individuals have expressed concern about automated clinical reads of ultrasound resulting in job loss for echocardiographers or increased efficiency of reading leading to excessive volume expectations in a fee-for-service (FFS) model. However, there are useful mechanisms to utilize AI in echocardiography to improve diagnostic accuracy, time to clinical attention, and ability to identify "normal" or "stable" patients for discharge when hospitals are running near full capacity.

Importantly, as hierarchies are created, it is critical to understand the goal of the AI technology. All the examples below are collaborative intelligence, where the AI assist is to complement, not replace, clinical acumen.

1. Using standard deviation from normal measurements and change from previous as a mechanism to highlight echos that are concerning or changing, without specific diagnostic recommendations
2. Using AI algorithms that include location of testing and urgency of order to expedite order of reading. This can be manipulated in a system that is overwrought with volume and therefore cannot stand alone as a rationale for an early read
3. Disease-specific algorithms within scanners, ensuring appropriate images are captured by sonographers and specific cases are identified to be read (i.e., severe aortic stenosis for TAVR, hypertrophic cardiomyopathy for treatment)
4. Emergent AI assessment: defining key severe findings (i.e., aortic dissection) for early consideration (algorithm can be strengthened with clinical presentation data)

The ideal foundational model in cardiology would incorporate multimodality findings of clinical demographics, location and urgency of care, diagnoses, labs and other imaging. However, there is a need to increase the efficiency of ultrasound performance (decrease sonographer injury and increase throughput), and an opportunity to be smarter in how echoes are read. For example, more severe cases should be read more promptly so care can be optimized sooner and urgent events avoided. In addition, images that would allow discharge could be highlighted to encourage hospital turnover, unburden ERs, and improve diagnostic accuracy, especially for dangerous or rare diagnoses.

Therefore, while awaiting perfect, AI in ultrasound can be trained and then must be evaluated and given feedback for iteration by expert clinicians to improve cardiovascular care.

This chapter is part of the American College of Cardiology/MedAxiom Care Transformation Initiative, which provides a comprehensive framework for health systems to effectively integrate community-based care into their delivery models.