

AI/ML in Healthcare

AI/ML Based Tools: Evaluation and Implementation Criteria

Mayo Clinic's Journey and Experiences

May 08, 2025

Speakers

Praneetha Elugunti, MSHA, MBA, MSc.
Mayo Clinic

Francisco Rodriguez-Campos, MSc, PhD. MRSO
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About the Moderator



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Charles Wickens, CCE is a Section Head for the Healthcare Technology Management (HTM) Division at Mayo Clinic, where he oversees the healthcare technologies at the Arizona campuses as well as HTM Operations and Lifecycle Management enterprise wide.

Charles is a Certified Clinical Engineer and actively involved in local and international engineering initiatives. In addition, he is keenly interested in the evolution of AI-driven applications with an emphasis on clinical and administrative use-cases. With a strong engineering background, he has previously worked in leadership roles at Massachusetts General Hospital and General Electric, contributing to medical technology design, innovation, and adoption.

Charles is also a professor at Arizona State University and an advocate for introducing engineering and technology concepts at all age levels including STEM initiatives.

Logistics

- ❖ All attendees have their microphones muted during the presentation.
- ❖ Questions to the panelists must be submitted via the “Q&A” feature in Zoom at any time. They will be addressed at the Q&A portion.
- ❖ If there is any urgent issue, please use the “chat” feature to communicate with the host/moderator.
- ❖ Please remember to complete the webinar evaluation after attending. A link will be provided at the end.

About the Speaker



Praneetha Elugunti, MSHA, MBA, MSc
Operations Administrator, Mayo Clinic Arizona



Specialties: Center of Regenerative Biotherapeutics, Center for Digital Health, Arizona Advanced Artificial Intelligence and Innovation Hub, and the Generative AI Program

Brief Bio: Praneetha Elugunti is an Operations Administrator at Mayo Clinic in Arizona. She is responsible for the strategic and operational leadership for several service lines including the Center of Regenerative Biotherapeutics, Center for Digital Health as well as the Arizona Advanced Artificial Intelligence and Innovation Hub and the Generative AI Program focused on accelerating AI efforts at Mayo Clinic.

Praneetha holds both a Bachelor's and a Master's of Science in Biology from Georgia State University. Her experience as a volunteer at Grady Memorial Hospital led her to pursue a career in healthcare. She also holds a dual master's degree in Healthcare Administration and Business Administration from the University of Alabama at Birmingham.

Throughout her career, Praneetha has provided strong management and leadership through various areas of the organization including a significant operational and personnel management within numerous clinical practices, research facilities and project management for long term strategic initiatives. She is passionate about transforming healthcare and enjoys meeting new people.

About the Speaker



Francisco Rodriguez-Campos, PhD
Principal Project Officer
Device Safety Group



Francisco Rodriguez Campos, Ph.D., is a Principal Project Officer in the Device Safety group at ECRI Institute subject matter expert for medical imaging technologies, Artificial Intelligence, Oncology, IV compounding robots, image guided surgery.

Before joining ECRI Francisco was a Neuroscientist at the University of Pennsylvania.

He also served as project manager for a Medical Technology assessment project for the El Salvador Social Security Administration, consultant to PAHO/WHO in the deployment of medical technology-related projects in El Salvador and Nicaragua

Director of the Clinical Engineering graduate program at Universidad Don Bosco.

Dr. Rodriguez-Campos obtained his Ph.D. and MSc (Fulbright Scholar) in Biomedical Engineering from the University of Connecticut with a focus in Electrophysiology, Physiological Modeling, and Clinical Engineering and is a certified Magnetic Resonance Safety Officer, MRSO (MRSC™).

Session Description

In this session, we will explore AI in healthcare and AI-based technology evaluation and selection criteria.

We will learn more about Mayo Clinic's approach to it's focus with AI as it relates to increase in staff capabilities, decision making process optimization, diagnostic enhancement, innovation acceleration – and overall improved patient care outcomes.

What is AI?

- Any current or future machine learning approach to predictive analytics, decision-support systems and/or automated decision-making....



What is AI?

• **AI** refers to the broad concept of enabling machines to sense, reason, act, or adapt like a human by learning patterns to make predictions. AI should not be considered a replacement for human decision-making but rather an aid to human judgment.



Machine learning (ML) is when the prediction calculator can acquire new data to fine-tune its prediction accuracy. In other words, ML is a subset of AI that allows machines to extract knowledge from data and learn autonomously.



Deep learning (DL) is when the prediction calculator is arranged in ways that mimic human brain function. For example, DL applications might be able to perform multiple simultaneous calculations on a variety of data, where the cumulative results of all those calculations are used to achieve a prediction.

Why now?

- AI is taking big steps into healthcare
- Graphical processing units (GPUs)
- COVID-19 prompted providers to deliver care and services through virtual means
 - The collection of electronic health data skyrocketed as a result
- Before COVID-19
 - The growing use of smartphones and wearable devices, enabled health-focused datasets
- ChatGPT
 - Scribes are the **hot** applications to summarize medical notes
- *DATASETS ARE ESSENTIAL FOR AI*

Model Performance on Training Data



Model Performance on Test Data



AI in healthcare

- AI is being implemented in different systems and devices



Types of AI in healthcare

- Medical chatbots (powered by ChatGPT (Generative Pre-trained Transformer) and other LLM (Large language models))
 - Used to obtain initial information either via voice or text based before consult (including tele-health)
 - Prescription fulfillment
 - Appointment scheduling/reminders
 - **Scribes**
- AI triage tools
 - Helps identify high-risk patients
 - Helps clinicians and nurses to reach consensus on health interpretations (sepsis)
- Predictive diagnostics
 - Know if certain patients with heart failure are at high risk for readmission
 - Based on imaging, it will determine risk for breast cancer

Types of AI in healthcare

- AI imaging systems
 - Annotation systems
 - Reconstruction acceleration
 - De-noising
 - Computer aided detection (CAD)
 - Patient positioning (**new: AI-powered robots for patient positioning**)
 - Image rotation
- Clinical decision-making support systems
 - Look at the information contained in the electronic medical records and determine trends and outcomes
 - New foundational models are being tested...
- Orchestrators (Scheduling)
 - Make sure patients with a higher risk are prioritized
- Financial applications, AI used for insurance claims perform repetitive tasks (writing letters...)
- HTM applications, being used to generate PM procedures, manuals, compliance documentation

AI/ML Enabled Tools: Evaluation and Implementation Criteria

- AI implementations want to make the delivery of services more efficient.
 - *We do need to make sure that is really the case!*

Evaluating and Implementing AI-enabled devices

- The Devices can be:
 - Software as a medical device SaMD or Software in a Medical Device (SiMD)



Evaluating and Implementing AI-enabled devices

- For those familiar with our evaluation process, when evaluating AI-enabled devices we are incorporating the impact of:
 - Algorithm Bias
 - Privacy
 - Explainability
 - Unintended consequences (including hallucinations)
 - Security
 - Lack of regulatory clarity (FDA is taking steps to solve this, Predetermined Change Control Plans, PCCPs)

1. Select Technology to Evaluate

All types of medical products are considered.
Only products released to the market are eligible.



2. Develop Criteria and Test Methods

We seek input from clinical users, manufacturers, ECRI experts.



Goals:

- 📊 Highlight performance in clinical use
- 🔍 Assess manufacturer claims

Criteria and Test Methods fall into these categories:

- 📈 Performance
- 🛡️ Safety
- 🔄 Workflow
- 👤 Patient Experience
- 🔗 Interoperability
- 🔒 Cybersecurity
- 🔧 Maintenance
- 👤 User Experience
- 💰 Cost of Ownership

3. Perform Testing

Most devices are borrowed from, or donated by, manufacturers.

To avoid conflicts of interest, manufacturers do not pay to participate.



4. Assign and Review Ratings

...based on our judgments in each test category.



- ★★★★★ Excellent
- ★★★★☆ Very Good
- ★★★☆☆ Good
- ★★☆☆☆ Fair
- ★☆☆☆☆ Poor

We carefully consider feedback from external clinicians and manufacturers.



5. QC and Publish

The text undergoes a quality check and editorial review.

The study is posted on the Device Evaluation membership website.



Implementing AI-enabled in your institution

- Establish a multidisciplinary **AI governance committee** composed of:
 - Leadership (c-suite) needs to be aware of what can be realistically achieved with the AI to champion the process of AI adoption.
 - Clinicians need to know what procedure is being enhanced by AI
 - Clinical users need to know how AI will impact them (also they are the ones giving the most feedback during post-implementation monitoring)
 - IT need to approve the application to be used in the Institution (cybersecurity, privacy)
 - CE, like in other medical devices CE will be the owner of PM and other procedures on the device. CE need to request from the vendor quality assurance tools, monitor tools, and procedures.
 - Statisticians, AI needs to be continuously monitored, in-house metrics will need to be defined
 - Data scientists, need to assure the data going into the AI is in the right format and what are the implications for the data structure of the institution.
 - Legal, needs to look at the local laws that will determine liability.
 - Risk management, the risk of adopting the AI model needs to be assessed

Multidisciplinary AI governance committee

- Will create and manage:
 - Policies for AI adoption
 - Process to procure AI-based devices
 - AI-specific information to obtain from vendor
 - Institution wide education roadmaps
 - Procedures for post-implementation monitoring

AI Policies

- Identification of Technical requirements
- Terminology and Taxonomy
- Metrics and Benchmarks
- Risk Management
 - *Does the benefit surpass the risk?*
- An inventory of current and new AI-enabled devices
 - Policies will describe the additional information AI-related that will be required to included in the inventory

Process to procure AI

- Vendor assessment
- AI-Risk assessment
 - Technical
 - Social
 - Ethical
 - Legal

Institution wide education roadmaps

1

Ensure your management leaders understand and are fluent with both the benefits and the barriers to successful AI adoption within the organization

2

Be clear and transparent in your communications about why AI is being considered within the organization and the benefits it is expected to yield (including benefits to the patient).

3

Be clear and transparent about the challenges of using AI in the organization.

Procedures for post-implementation monitoring

Does the device have tools for monitoring?

- It will trigger automated alarms when issues are identified

Are there any human oversight mechanisms in place?

- Procedures where a human will intervene and override or reverse the system outputs

Process to perform “updates” of the model

- This might require increased oversight, performance of the model could variate after an update

In summary when evaluating and adopting AI

- ECRI recommends
 - Establish a multidisciplinary oversight committee for AI applications
 - Incorporate AI risk assessment in the procurement process
 - Reach to us we are adding AI-model assessments to our evaluations
 - Perform vendor assessment during the procurement process
 - Including post-implementation monitoring

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AI/ML trends: Mayo Clinic Journey

Praneetha Elugunti, MSHA, MBA, MSc

ACCE Webinar
May 8th 2025

Mayo Clinic at a glance



Bold. Forward. Transform.

1 Same patient presents to ED with abdominal pain



2 Evaluated by team and CT scan + labs order



3 **Diagnosis:** Appendicitis



4 **Prognosis:** high risk for future cardiac event



65%

1-year heart attack risk

81%

5-year heart attack risk



AI enabled care delivery

Today

- Reactive
- Corrective
- Late detection
- De-personalized
- Slow
- Complicated
- Inconvenient
- Inaccessible



Bold. Forward. AI

- Proactive
- Preventive/Curative
- Early detection
- Personalized/Precise
- Fast
- Uncomplicated
- Convenient
- Accessible

**Transforming
our work**



Get more done with your everyday AI-powered assistant



Clinical Agent | Knowledge Agents

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MAYA Use Case: Prostate Cancer Triage

1. Patient referred to Urology:

- The patient is referred by a primary care physician (PCP) or another specialist after initial signs of prostate abnormalities
- Scheduling of initial consultation and verification for availability of all necessary documentation

2. Initial triage:

- Urology clinic staff performs risk stratification and urgency assessment leveraging triage checklist predefined as a MAYA Macro. MAYA navigates through the full patient record including outside medical records to surface relevant information along with citations and search results within seconds.
- Staff can order additional labs and imaging if required

3. Specialist evaluation:

- Urologist gathers comprehensive insight into the patient's medical history and diagnostic test results leveraging predefined prostate cancer evaluation MAYA Macro and through MAYA's natural language conversational interface. MAYA provides comprehensive insights within seconds allowing the specialist to focus on patient

show me the patient's clinical history of prostate cancer

MAYA Investigational Use

The patient has a confirmed diagnosis of Primary Malignant Neoplasm of Prostate (HCC), which is currently active. The patient is a 78-year-old male with intermediate risk prostate cancer. The cancer was diagnosed on 5/30/2024 with a Gleason score of 4+3=7. The patient underwent a biopsy revealing cancer in 7 out of 10 cores. The patient is undergoing definitive radiation treatment for his prostate cancer.

MAYA is an investigational use tool. Always double check its responses with the search results and the sources cited.



Generated using Model: Gemini Flash

Search Results: **Conditions** Diagnostic Reports Documents +2

SUGGESTED QUESTIONS

- = Show me most recent Gleason score
- = Show me most recent PSA
- = Show me most recent MR prostate
- = Show me most recent PI-RADS score
- = Show me most recent PSMA PET scan

sh



MAYA is a generative AI powered chatbot and is not a substitute for clinical judgment, professional medical advice, diagnosis, or treatment.

MAYA presents contextual and personalized questions in the intelligent typeahead for faster and accurate insights into patient information

← Macro - Prostate Cancer Triage +MAYA

Edit Macro

Macro Name:

Macro Questions

- Show me most recent PSA
- Show me most recent Gleason score
- Show me most recent MR prostate
- Show me most recent PI-RADS score
- When was the patient first diagnosed with prostate cancer?
- How was the diagnosis of prostate cancer made for this patient?
- After the diagnosis, has the patient undergone any therapy or surgery for prostate cancer?
- Did the patient receive chemo therapy post diagnosis of prostate cancer?
- Did the patient receive radiation therapy post diagnosis of prostate cancer?
- Did the patient receive hormonal treatment post diagnosis of prostate cancer?
- Show me most recent PSMA PET scan

Recent Questions:

Advance Configurations

- Set as default macro

Tailored Prostate cancer triage checklist created by a specialist through natural language queries.

Validated macros can be easily shared for prompt adoption.

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Run Macro: Prostate Cancer Triage Part - 1**MAYA Investigational Use****Show me most recent PSA**

The most recent PSA value available is **1.1 ng/mL** and was obtained on **2024-08-11**. The reference range for this PSA test was ≤ 6.5 ng/mL.

**Show me most recent Gleason score**

The most recent Gleason score available is **6 (3+3)**. This score was determined from a microscopic examination of the prostate tissue.

The adenocarcinoma was found to "extensively involve right and left lobes of the prostate." Additionally, perineural invasion was observed, and the tumor involved the apical and basal urethral areas. The seminal vesicles were free of tumor.

Show me most recent MR prostate

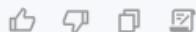
The most recent MR prostate available in the records was performed on February 5, 2024. This MRI was performed without intravenous contrast. The clinical history included a history of prostate cancer, prostatectomy in 2007, and radiation treatment in February 2024.

The PSA level was 11.7 on April 2, 2023. The findings of the MRI showed that the prostate was surgically absent. There was a local site of prostate recurrence at the surgical bed, measuring 2.4 cm on February 5, 2024. The size of the recurrence was 2.2 cm on June 21, 2023. The MRI also showed a revisualized susceptibility artifact in the recurrent prostate cancer nodule, which may have been fiducial markers. The study was negative for pelvic or inguinal adenopathy and metastatic bone lesions. Other findings included colonic diverticula without diverticulitis and a normal bladder. The MRI technique included sagittal and axial T2-weighted series, 3D T2-weighted series with sagittal and coronal reformats, and axial T1-weighted series without IV gadolinium contrast.

Show me most recent PI-RADS score

The PI-RADS score was 5, indicating that clinically significant cancer is highly likely to be present.

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Generated using Model: **Gemini Flash****Search Results:** **Conditions** **Labs** **Diagnostic Reports** **+3**

Type a query here or use @ to ask an agent



MAYA's response to the Prostate Cancer Triage macro (checklist)

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show me the patient's clinical history of prostate cancer

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Generated using Model: Gemini Flash

Search Results: Conditions Diagnostic Reports Documents +2

what are the treatment options for this patient?

MAYA Investigational Use AskMayoExpert

Treatment Options for 78-Year-Old Male with Intermediate-Risk Prostate Cancer

This 78-year-old male presents with intermediate-risk prostate cancer (Gleason 4+3=7, positive in 7/10 cores) and is currently undergoing definitive radiation therapy. The information provided focuses on his prostate cancer treatment, and does not include information about the HCC diagnosis mentioned in the initial clinical information. Therefore, this response addresses only the prostate cancer treatment.

Current Treatment: The patient is already receiving definitive radiation therapy, a standard first-line treatment for intermediate-risk prostate cancer. This approach aims to eradicate the cancer cells within the prostate gland.

Evidence-Based Support: The choice of radiation therapy is supported by numerous clinical guidelines and research demonstrating its efficacy in localized prostate cancer. The National Comprehensive Cancer Network (NCCN) guidelines recommend radiation therapy as a primary treatment option for intermediate-risk prostate cancer, often combined with androgen deprivation therapy (ADT) depending on specific risk factors. The patient's age and risk profile would need to be carefully considered in the decision-making process.

Type a query here or use @ to ask an agent



Deep evidence-based insights from AskMayoExpert (knowledge source) contextualized to the patient record

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Our vision for a smarter, more helpful in 2025



TODAY



SELF-SERVICE
KNOWLEDGE EXTRACTION



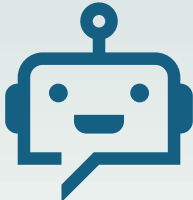
AI Chatbot

Intent-based knowledge extraction through natural language conversation

KNOWLEDGE EXTRACTION
IT, Harwick, EHR, HR, Policy etc.

Q2 2025

COMPLETING
ACTIONS



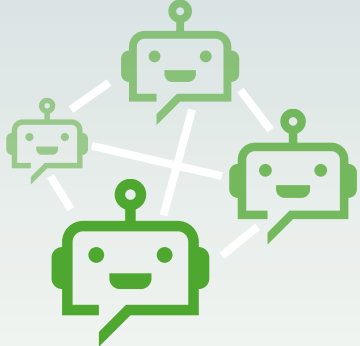
AI Assistant

Simple **actions** through explicit user prompts and dynamic interactions

ACTIONS
Submit or update an incident, draft a job posting or prior-auth letter

BEYOND

TASK
AUTOMATION



Agentic AI

Human goals-driven system of agents completing supervised actions

TASKS
Complete a purchase requisition, sell pre-elected PTO, submit a travel request

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Please type your questions to the Zoom Q&A window

Thank You

Any question?

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Please complete the online evaluation form at
https://www.surveymonkey.com/r/ACCE_05-08-25BBBG

