UNIVERSITY OF KENTUCKY BOARD OF TRUSTEES

Robert DiPaola, Provost and Co-Executive Vice President for Health Affairs

University of Kentucky

AN EQUAL OPPORTUNITY UNIVERSITY

Artificial Intelligence (AI) in Academics

- UK Core
- Bridging All Missions

UK CORE

Opportunities

CURRICULAR FRAMEWORK AND COMPETENCIES

- UK Core curriculum should be more connected to major curriculum
- UK uses a basic menu style and should emphasize few high-impact practices
- Competency area titles should be more intuitive
- There are too many student learning outcomes (SLOs)
- Students desire topics that connect to the workforce landscape

STUDENT EXPERIENCE

- Students desire practical skills
- Prescriptive majors limit student choice in UK Core
- Students feel UK Core is a barrier to some majors
- Some fear there is an inconsistent experience for transfer students

ASSESSMENT

- Mapping artifacts is challenging and time-consuming
- Student input should be included
- Course-level feedback is not always available to faculty
- UK-trained evaluators should have subject matter expertise in curricular area

PROGRAM OVERSIGHT AND ADMINISTRATION

- There should be more administrative oversight for items like marketing, communication and assessment
- There should be an FTE administrator to oversee the UK Core

COMMUNICATION AND MESSAGING

- There are limited people resources for the day-to-day operations
- Documents should be updated and consistent
- Communications plan should be put in place
- Training should be increased for instructors and staff

Updates and Enhancements for AY24-25

PROGRAM OVERSIGHT AND ADMINISTRATION

Developed composition and charge for oversight committee

ASSESSMENT

Standardized rubrics, assessment options, training and workshops, continuous improvement

STUDENT EXPERIENCE

SLOs now included in syllabus, students are integrated into oversight committee, emphasis on practical skills mapping

COMMUNICATION AND MESSAGING

Student input on brand, student-facing website in development, multiple communication assets for all stakeholders will be developed with new brand

CURRICULAR FRAMEWORK AND COMPETENCIES

90+ SLOs streamlined to approximately 30, reflective of workforce skills, developed recommendations on course inventory cleanup and ongoing course review, developing two primary areas for addition: Interpersonal Interactions and **Digital and AI Literacy**

AI IN ACADEMICS

Current Landscape

Where we are

- Currently 15 courses on campus incorporating AI
- AI certificate launched (Computer Science)
- Upcoming AI degree in Bachelor of Science in process (Computer Science)

Where we are going

- Centralized campus oversight and support for AI
- Increase AI course offerings and credentials (e.g., certificates) for all students
- Focus on AI fundamentals, AI ethics and AI specific to disciplines
- Advanced access, training, support, resources, and communities of practice/partnerships for faculty, staff and students to support AI in the curriculum

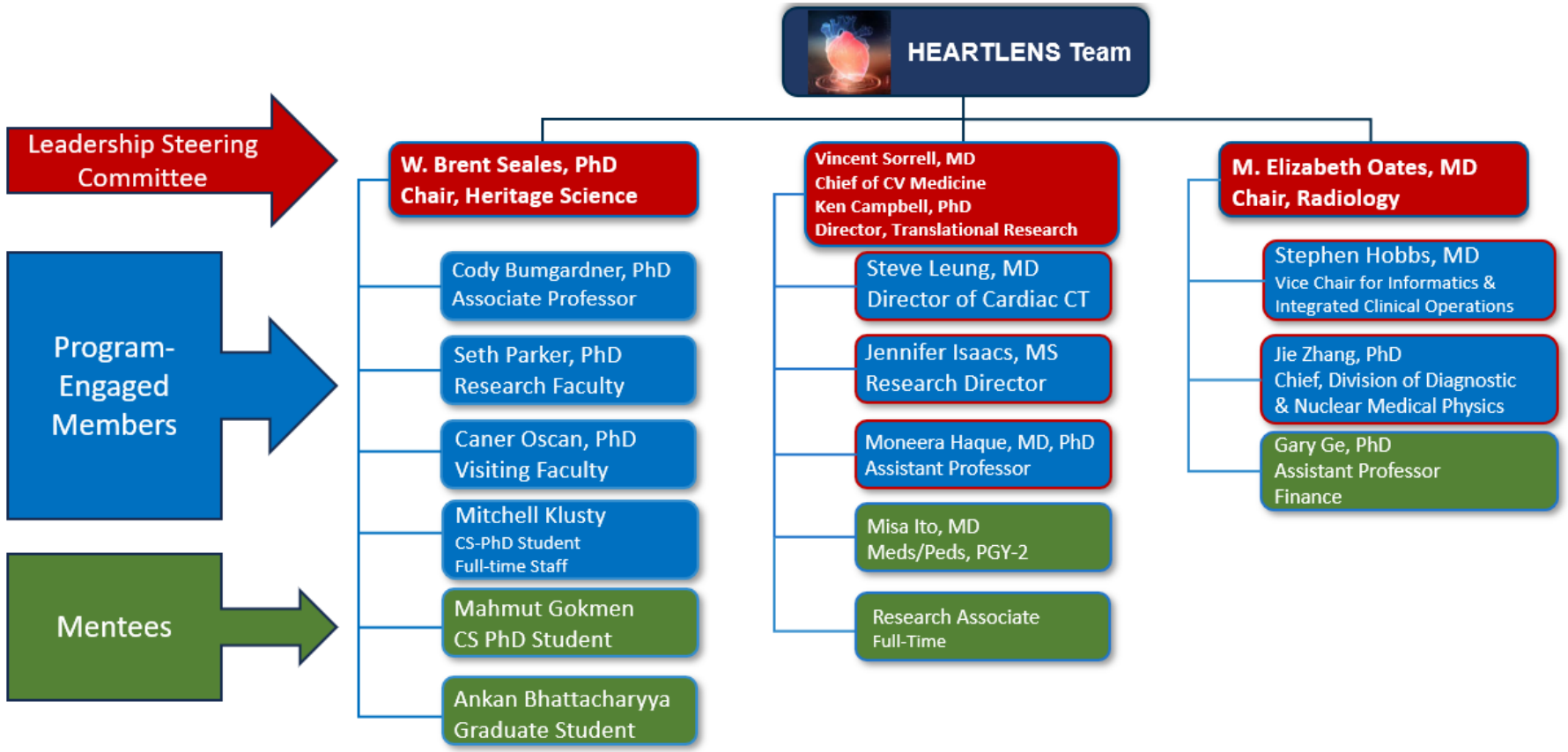
Faculty Training for AI Education

- The annual Center for the Enhancement of Learning and Teaching (CELT) Teaching Innovation Institute currently focuses on AI in education, with a Symposium on AI and Teaching that was held at UK on May 2, 2025.
- Education session for the 2023 and 2024 Commonwealth Computational Summit
- 130 AI-focused events since January 2023
- The second UK Teaching Excellence Symposium, hosted by CELT this October, will feature an AI track for presentations.

AI IN ALL ACADEMIC MISSIONS: HEARTLENS

HeartLens

- Using AI and Advanced Imaging as a New Diagnostic Tool to Revolutionize the Detection and Treatment of Cardiovascular Disease



AI IN ALL ACADEMIC MISSIONS: HEARTLENS

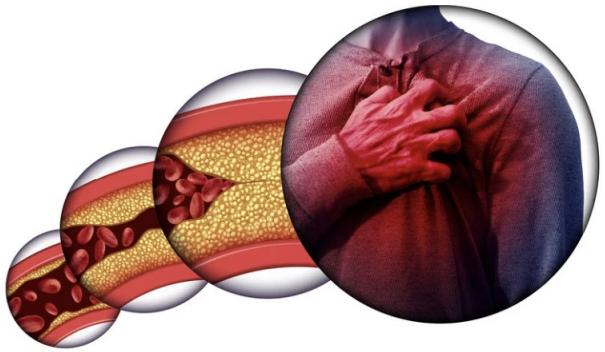
Local, national and global health challenges

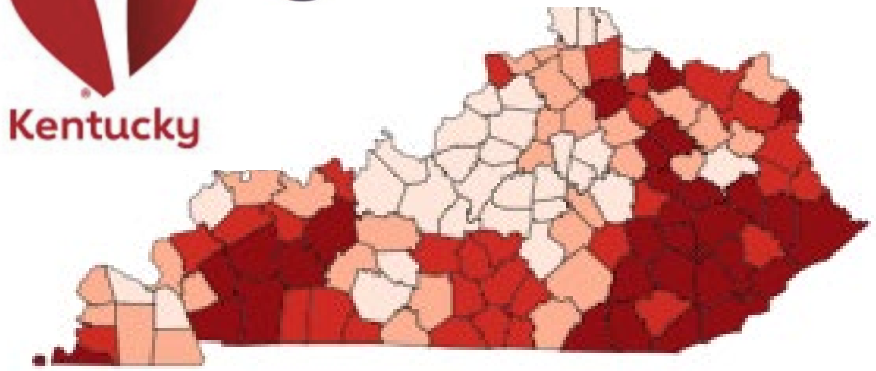
Cardiovascular diseases are the No. 1 cause of death globally.

Cardiovascular disease is the No. 1 killer of women.

Someone in the U.S. dies from cardiovascular disease every 34 seconds.

Heart disease causes one in every five deaths in the U.S.





Top underlying causes of death

In **2022**, the top cause of death in **Kentucky was heart disease**. The age-adjusted death rate of heart disease was 216.3 per 100,000 Kentucky residents. That's 23.3% higher than the overall heart disease death rate in the US.

CDC

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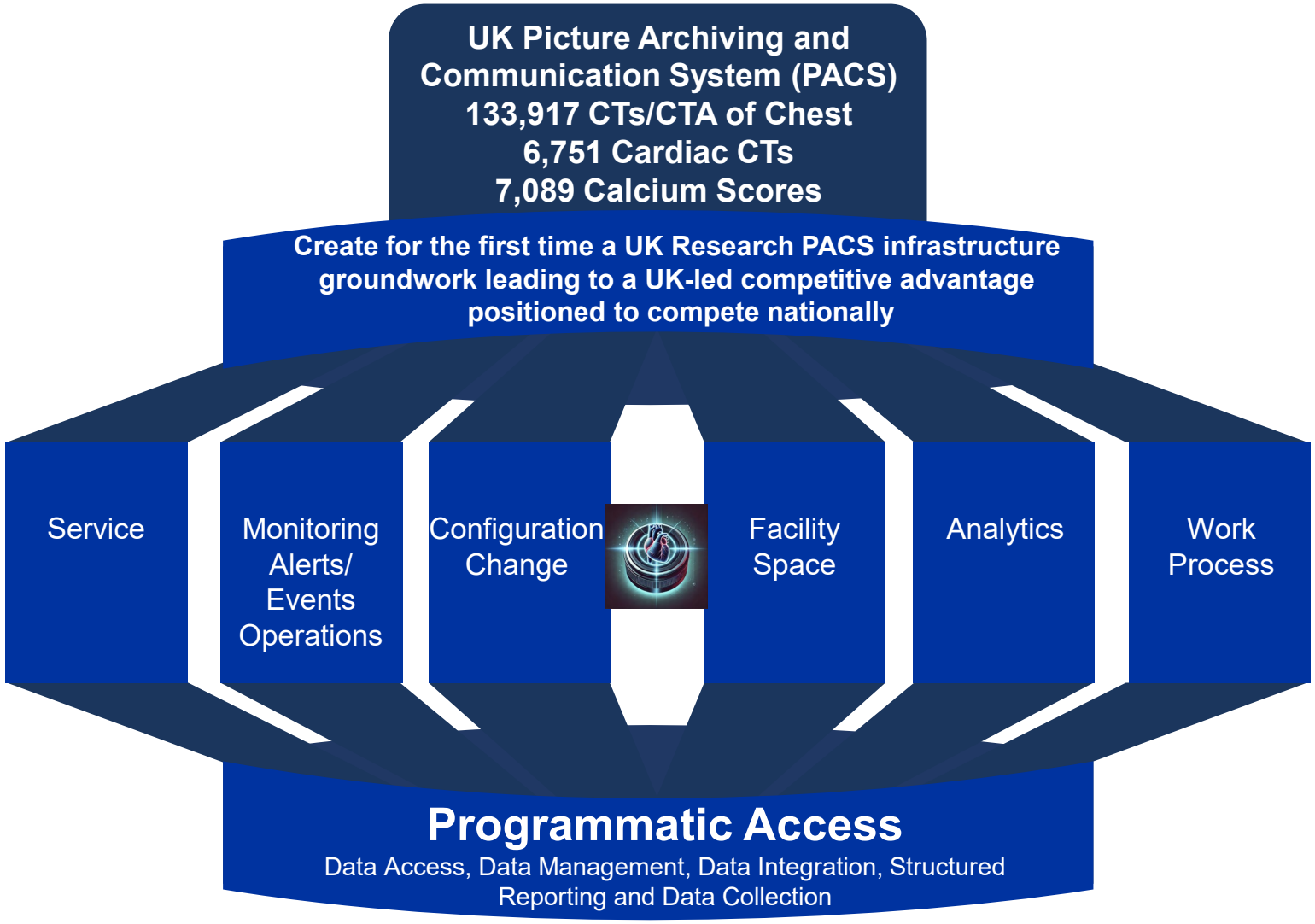
AI IN ALL ACADEMIC MISSIONS: HEARTLENS

The Response

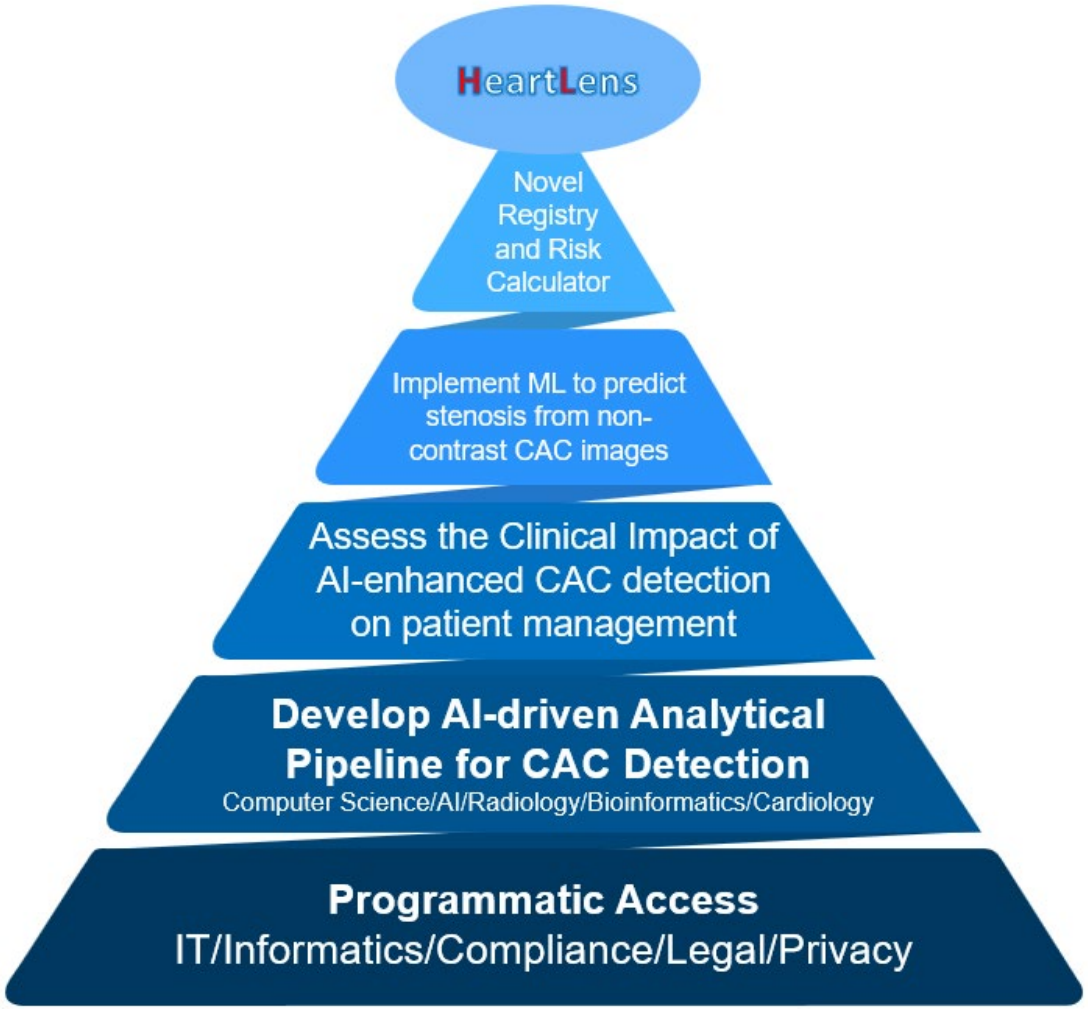
Key Innovation

- New approach uses AI for accelerating care using underleveraged data to eliminate late or missed diagnosis of heart disease
- Move to a new paradigm: real-time, explainable, risk prediction
- The project aims to intervene earlier, save lives and reduce preventable cardiovascular events across Kentucky



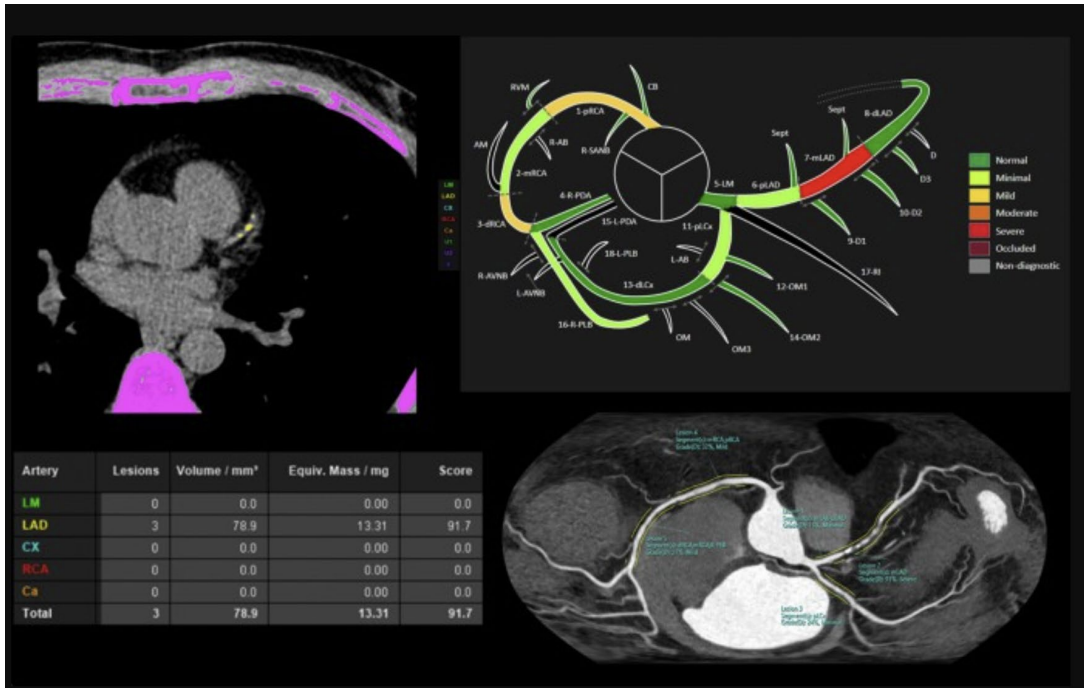
HeartLens: A Technical Platform for Discovery, Efficiency, Accuracy

- Plans to integrate multimodal data, including imaging, labs, electronic health record (EHR) narratives and social determinants of health
- Provides interpretable, clinically actionable tools that work directly in EPIC
- Enables development of image-based risk scores that are contextualized, thereby enhancing physician trust and improving outcomes

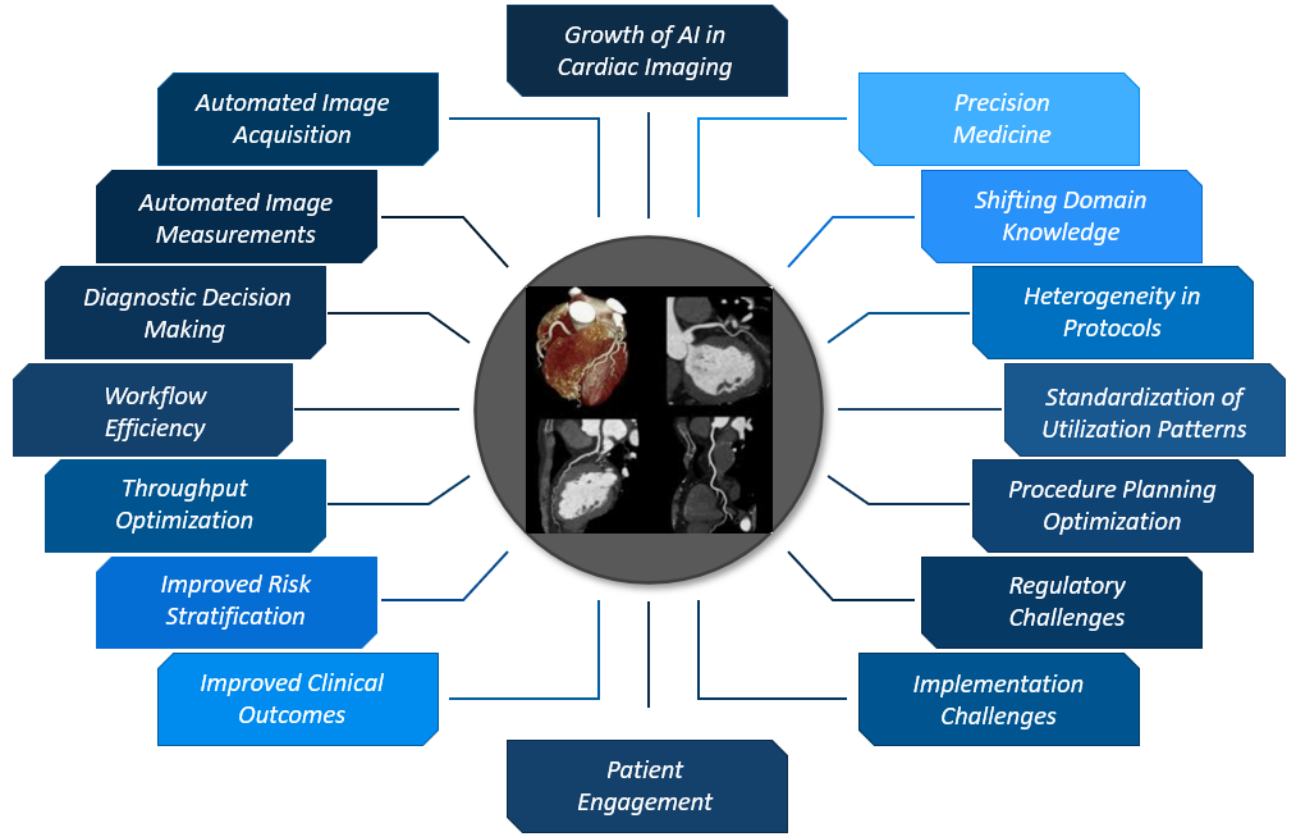


Embracing Technology to Advance with Accuracy

Current Radiology and Cardiology Workflow at the University of Kentucky



HeartLens AI Application "Supercharging" Clinicians To Deliver Precision Care to Patients



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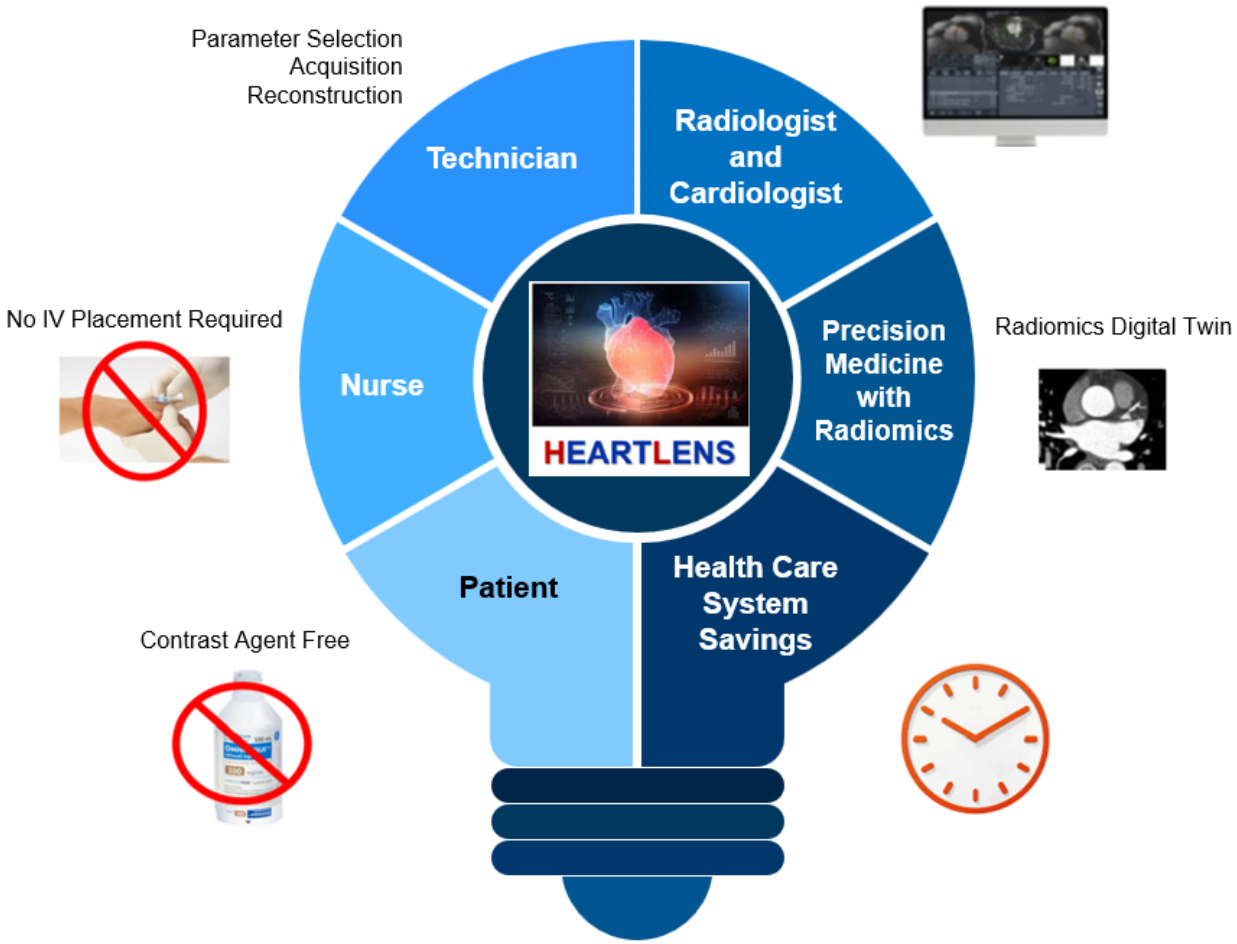
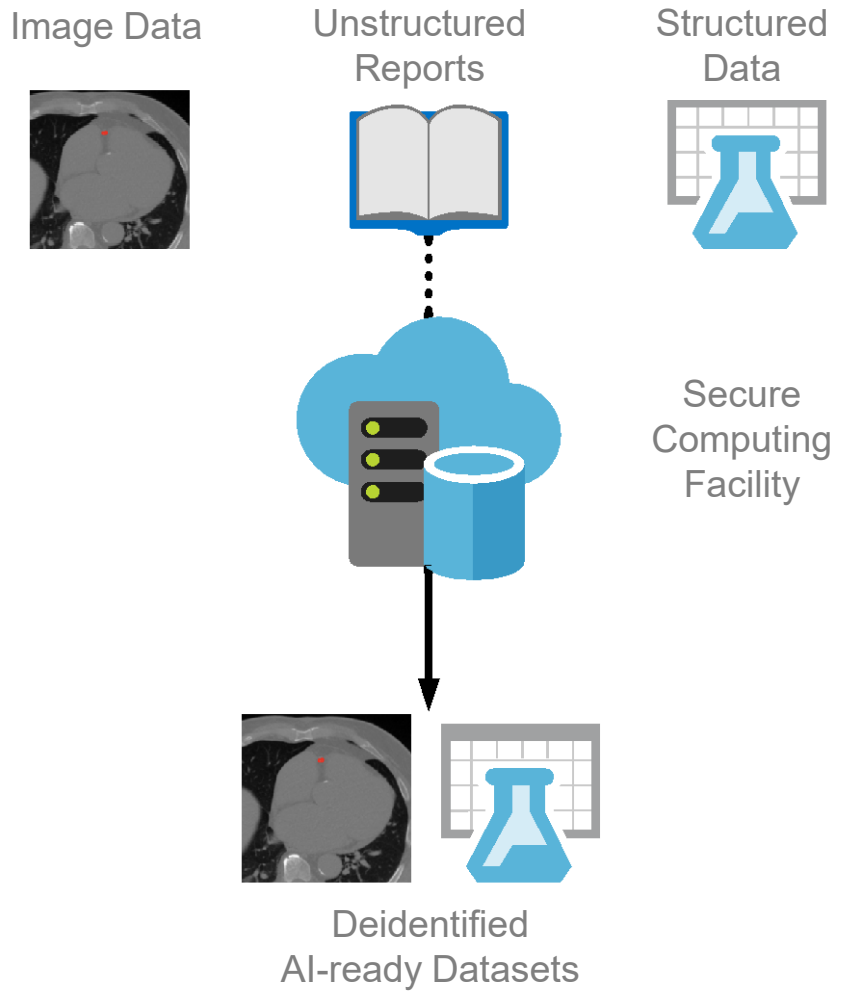
What Success Looks Like

- Primary care providers are alerted in real time when coronary artery calcium (CAC) is detected.
- Patients at high risk begin preventive therapy (e.g., statins) before their first cardiac event.
- Clinical decisions are elevated — more timely, more personalized, more precise.
- Be a national leader in ethical, explainable, real-world AI for health outcomes across Kentucky, especially in rural and underserved areas.
- Most importantly: **lives are saved.**



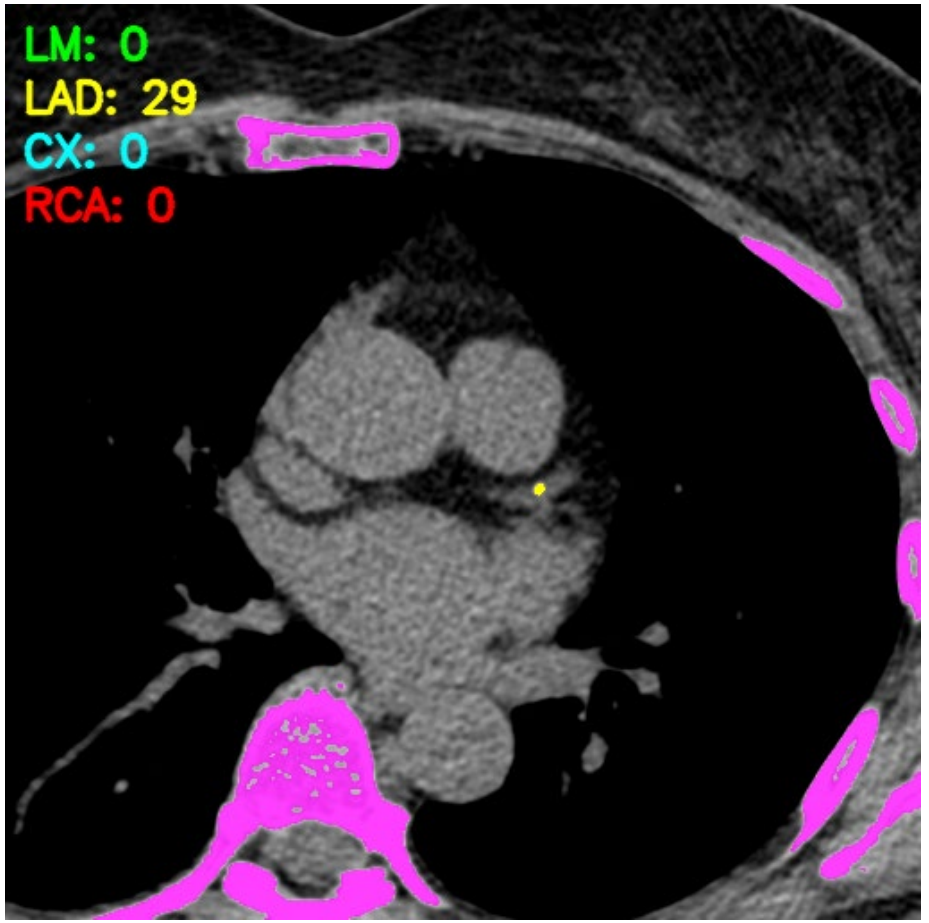
Data Acquisition and Processing

- Public Data
  - Stanford: Coronary Calcium (COCA) and chest computed tomography (CT)
  - 447 cases with imaging, annotations and score
- UK Data
  - 100,000 chest CTs resulted in 3,200 cardiac calcium cases
  - Acquisition Process
    - Collaborated with the Center for Clinical and Translational Science to identify patient cohort and acquire case data without imaging
    - Collaborated with hospital IT and compliance teams to acquire identified images
    - Merged deidentified dataset was created
  - UK HeartLens v1a:
    - Deidentified native CT images
    - Deidentified annotated CT images matched to original CT images
    - Deidentified case data (score, age, etc.)



What HeartLens has Learned to Date

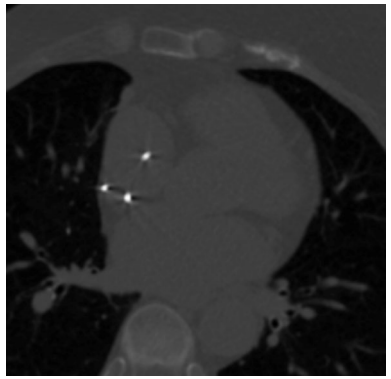
- Key Findings
  - Models can predict calcification scores with moderate to high accuracy.
  - Imaging data significantly improves prediction, slice-level annotation is required for some techniques.
  - Score calculations and classes vary by implementation, scan and practice.
- Clinical Applicability
  - Potential for replacing existing semi-automated methods for both annotation and scoring.
  - Greater potential to describe findings beyond a simple score.
- Limitations
  - No slice-level ground truth (scores).
  - Issues matching slice annotations to ground truth case scores.



Mild coronary calcification with an Agatston score = 62 using the AJ-130 method, which represents 89 percentile when matched for age, gender and ethnicity

Next Steps and Foundational Elements

- Shift Focus to Outcomes
  - Move beyond calcification scores to predict patient outcomes (e.g., heart attacks, mortality)
  - Use foundational image and language models (e.g., contrastive language-image pre-training [CLIP], Vision Transformers)
- Expand Data
  - Acquire more private data to improve model generalizability
  - Explore partnerships for additional public datasets
- Model Refinement
  - Optimize models for clinical use (e.g., faster inference, explainability)
  - Validate models with hospital clinicians for real-world applicability
- Expansion
  - Expand HeartLens to compile a longitudinal registry and work with EPIC for provider adoption
  - Create an institutional hub for AI health care strategy, training and validation

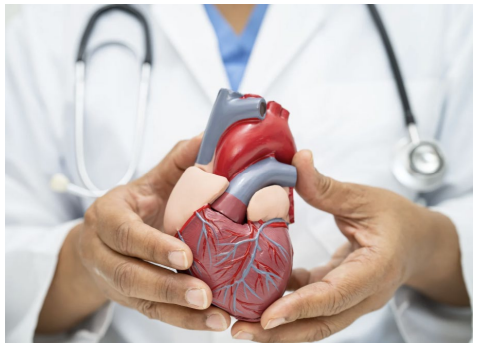


f_0	f_1	...	f_767
0.019998	-0.0219	0.52670592	0.098922
0.110704	-0.31142	-0.0074099	-0.06965
-0.20204	0.098922	0.01999803	-0.00741
0.526706	-0.20204	0.11070408	0.019998
-0.06965	0.019998	-0.0219024	-0.31142
-0.31142	-0.20204	0.11070408	0.526706
0.098922	-0.06965	-0.0219024	-0.20204

Image Features

Real Challenges that are Worth Solving

- Acquiring the infrastructure, faculty and protected time to overcome solvable problems like scanner variability, data silos and uneven EHR access
- Understanding why accurate manual calculations of scores is not feasible using the provided clinical annotations
- Developing robust “gold standard” evaluation datasets to ensure consistency and reliability in model assessment
- Integrating novel multi-modal data sources — such as clinical reports, demographic information, laboratory values and imaging data
- Defining the appropriate framework and methodology for clinical validation of these tools to ensure their efficacy and real-world applicability
- Ensuring models capture knowledge from large numbers of trained examples and advanced data analysis to match and exceed expert, human-based scoring
- Leadership support to help unlock new frontiers in detection and outcomes



QUESTIONS

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