

Perspectives on Explainable AI in ICU Outcome Predictions

Thank you for participating in our study.

Our research seeks to understand healthcare professionals' experiences and viewpoints regarding AI-driven clinical decision support systems (CDSS). Specifically, this questionnaire focuses on the non-knowledge-based CDSS. Unlike traditional systems that strictly adhere to expert medical knowledge, these AI-driven tools make decisions based on patterns in data.

Given the unique decision-making process of AI (black boxes), Explainable AI (XAI) has emerged as an essential facet. XAI aims to demystify the AI decision process, enhancing trustworthiness and bridging the gap between physicians and AI-based CDSS. This study zeroes in on understanding preferences and perceived effectiveness among three distinct XAI methods.

Your insights are invaluable. They will play a pivotal role in refining AI-driven CDSS designed for ICU outcome predictions. We deeply value your expertise.

PARTICIPATION

Your participation in this study is voluntary and anonymous, and you may refuse to participate before the exercise begins, or discontinue at any time with no penalty.

In this study, you will complete a survey describing your attitude towards AI-based CDSS and feedback towards different XAI methods.

RISKS & BENEFITS

This study asks about your experiences in maternal health. Any questions related to this experience may make you uncomfortable or bring up feelings of stress. You are always free to decline to answer any question or stop your participation at any time.

You will be paid for your participation in this study according to the rates specific on Prolific. We hope to learn about the various perspectives in maternal health and represent these perspectives in the guidelines we develop, and we hope that these guidelines will shape future AI research for maternal health in ways that are useful, ethical, and appropriate for the community.

PRIVACY

We do not collect names or other personally identifiable information. We do collect your ID, but we do not have any way to link this with your identity. We will not release your ID to anyone else.

De-identified data from this survey may be shared with the research community at large to advance science and health. We will remove or code any personal information that could identify you before files are shared with other researchers to ensure that, by current scientific standards and known methods, no one will be able to identify you from the information we share. Responses will be stored securely by our institute with limited access controls to limit exposure to those with a need to know.

QUESTIONS

If you have questions about this study, please send us a message.

* Indicates required question

1. Email *

2. What is your name appears on Upwork profile? *

3. Do you consent to participate in this study? *

Mark only one oval.

Yes, I consent to participate in this study

No, I do not consent to participate in this study
Skip to section 16 (Non-eligible Participants)

4. Are you 21 years old or above? *

Mark only one oval.

Yes

No *Skip to section 16 (Non-eligible Participants)*

5. Which of these is the highest level of education you have completed? *

Mark only one oval.

- No formal qualifications *Skip to section 16 (Non-eligible Participants)*
- High school or GED *Skip to section 16 (Non-eligible Participants)*
- Community college *Skip to section 16 (Non-eligible Participants)*
- College (for example: BA, BS)
- Master's degree (for example: MS, MA, MPH)
- Medical degree (for example: MD, DO)
- Doctorate degree (PhD/other)
- Other professional degree (for example: JD)

6. How many years have you worked in a clinical setting? (If you are currently a medical student, what year of medical school are you in?) *

Mark only one oval.

- < 2 years *Skip to section 16 (Non-eligible Participants)*
- 2 - 5 years
- 5 - 10 years
- 10 - 20 years
- > 20 years

General Questions

This section aims to understand your overall attitude towards AI and experience in clinical setting with AI systems or clinical decision support systems (CDSS).

Definitions for the following question

- **Safety:** Ensuring the system operates reliably and safely, mitigating potential physical, emotional, and psychological harms.
- **Performance:** Delivering consistent, accurate, and timely predictions, inferences, or answers to support clinical decision-making.
- **Accountability:** Maintaining clear attributions of responsibilities and liabilities, with developers and operators being held responsible for the system's impacts, implementing mechanisms for appeal and recourse.
- **Privacy:** Implementing strong privacy safeguards, minimizing the collection of sensitive data and ensuring the provision of notice and consent.
- **Transparency:** Producing understandable decisions, providing insights into the system's decision-making processes.
- **Justice:** Promoting equitable distribution of services and resources, and actively working to address biases and disparities in healthcare outcomes.
- **Beneficence:** Striving to promote patient well-being and positive health outcomes, while minimizing harm and suffering through rigorous validation and mitigation of risks.
- **Fairness:** Treating all people equally, ensuring the system does not reinforce biases or stereotypes, and working equally well for everyone, regardless of their characteristics.
- **Inclusiveness:** Empowering and engaging everyone, considering the needs of people who might otherwise be excluded or marginalized.
- **Dignity:** Upholding the inherent worth of every individual, respecting human rights, and not diminishing human dignity.
- **Human Autonomy:** Preserving people's agency, providing choices to people, and preserving or increasing their control over their lives.
- **Social Good:** Supporting human well-being and flourishing, peace, happiness, and the creation of socio-economic opportunities.
- **Solidarity:** Not increasing inequality, ensuring that the prosperity and the burdens created by AI are shared by all.

7. What is your current position title? *

8. What is your area of specialization (if available)? *

9. How would you describe your overall attitude towards AI? *

Mark only one oval.

1 2 3 4 5

Very Very positive

10. Please select any **Five** values from the list below that you think most important for * CDSS to support decision making in clinical care.

Check all that apply.

- Safety
- Performance
- Accountability
- Privacy
- Transparency
- Justice
- Beneficence
- Fairness
- Inclusiveness
- Dignity
- Human Autonomy
- Social Good
- Solidarity

11. In the past year, have you used or been exposed to AI systems or CDSS in your * clinical care practice?

Mark only one oval.

Yes *Skip to question 12*

No *Skip to question 18*

Experience with AI or CDSS

This section delves into your specific experiences with AI systems or CDSS in your clinical practice. To give some context, here are examples of AI systems and CDSS that you might have encountered:

- Predictive Analysis Tools
- Diagnostics Support
- Medical Imaging Analysis
- Electronic Health Record (EHR) Integrations
- Drug Interaction and Prescription Assistance
- Bedside Clinical Decision Support

Please thinking about the AI systems or CDSS that **you use most often** while you complete this section.

12. What is this AI systems or CDSS tries to do? Can you briefly describe it? *

13. How often have you used AI systems or CDSS in healthcare? *

Mark only one oval.

- Only once
 At least once every six months
 At least once a month
 At least once a week
 Daily

14. How often do you agree with its recommendation or prediction? **Mark only one oval.*

1 2 3 4 5

Never All the time**15. How often do you think its recommendation or prediction is wrong? ****Mark only one oval.*

1 2 3 4 5

Never All the time**16. Considering the AI system or CDSS you use most often, you find it easy to use. ****Mark only one oval.*

1 2 3 4 5

Strongly Agree**17. Is AI systems or CDSS useful in healthcare? (ex: reducing decision making time, improving diagnosis accuracy, etc.) ****Mark only one oval.*

1 2 3 4 5

Strongly Agree

Expectation towards AI or CDSS

This section seeks to understand your expectations regarding AI or CDSS in healthcare.

Don't worry if you haven't engaged with AI or CDSS in clinical work. Your participation is still valuable.

18. Do you expect AI or CDSS will play bigger role in clinical care task? *

Mark only one oval.

Yes

No

19. Which AI or CDSS application area in healthcare are you most interested in? *

Familiarization with Patient Admission Notes

Before we proceed to the XAI methods comparison, we would like you to familiarize yourself with a typical patient admission note. This will give you a context and serve as a basis for understanding the subsequent XAI samples.

Additionally, the AI model we employ in this study is an NLP-based clinical outcome prediction model. This model uses natural language processing (NLP) to analyze and derive insights from textual patient data, such as admission notes, to predict potential clinical outcomes.

Below is a randomly selected patient admission note. Please read through it carefully. This will help you effectively evaluate the different XAI methods in the upcoming section.

Example of Patient Admission Note

CHIEF COMPLAINT: s/p mechanical fall

PRESENT ILLNESS: [**Age over 90 **]F s/p with hx of HTN and hyperlipidemia presenting s/p fall off stepladder while while cleaning the top of the refrigerator. Fell backwards onto back and left side of her head. No LOC, no CP, no SOB. Presented to LGH where a CT head showed a possible frontal contusion vs bleed. CT C spine showed grade 1 anterolithesis of C6 on C7 by 3mm, no acute fracture. CXR showed mildly displaced fractures of lateral aspect of L fourth, fifth, sixth ribs. Interstitial changes with probable mild superimposed pulmonary edema. The pt was transferred to [**Hospital1 18**] for trauma evaluation. In the ED a CT of the chest was performed as well as plain films of the T-spine and the left humerus. The pt was seen by neurosurgery for her closed head injury. their recommendations included close neuro checks. Pt was admitted to the TSICU for polytrauma in stable condition.

MEDICAL HISTORY: PMH: Hypothyroidism, HTN, GERD, HL, Chronic dizziness PSH: Appendectomy, Tonsillectomy

MEDICATION ON ADMISSION: Meclizine 25 mg PRN, Atenolol 50 mg daily, Amlodipine 5 mg daily, Nitroglycerin PRN, Omeprazole 20 mg daily, Isosorbide mononitrate 60 mg daily, Synthroid 50 mcg daily, Gemfibrozil 600 mg [**Hospital1 **]

ALLERGIES: Penicillins / aspirin

PHYSICAL EXAM: Admission physical: O: T: 97.3 BP: 170/78 HR: 80 R 18 O₂Sats 98% Gen: WD/WN, comfortable, NAD. HEENT: Pupils: [**1-16**], equal EOMs intact, small post head laceration Neck: Supple. Lungs: CTA bilaterally. tender to palpation L hemithorax Cardiac: RRR. S1/S2. Abd: Soft, NT, BS+ Extrem: Warm and well-perfused. Neuro: Mental status: Awake and alert, cooperative with exam, normal affect. Orientation: Oriented to person, place, and date. Language: Speech fluent with good comprehension and repetition. Naming intact. No dysarthria or paraphasic errors.

FAMILY HISTORY: non-contributory

SOCIAL HISTORY: Retired. Former smoker, no EtOH

20. Based solely on the patient admission note provided above, how comfortable are * you with analyzing the patient outcome and drawing conclusions?

Mark only one oval.

1 2 3 4 5

Very Very Comfortable

XAI samples -- LIME

In this section, we're introducing an AI explanation method called LIME. Think of LIME as a detective that tries to understand the AI's reasoning by making small changes to the data and observing how the AI reacts.

Definitions for the following question:

- **Explainable:** This term refers to the extent to which an AI system's operations and decision-making processes can be understood and interpreted by humans, providing insight into how and why specific outcomes are reached.
- **Reasonable:** In this context, "reasonable" denotes that the AI system's decisions or suggestions are sensible, justifiable, and align with logical or rational thinking, human values, and expectations.

Here's what you should know:

- **Highlighted Words:** These words had the most influence on the AI's decision. They're the "clues" that LIME identified.
- **Colors of Highlight:**
 - **Red:** These words pushed the AI towards thinking the outcome is "positive" (for instance, predicting a mortality risk).
 - **Blue:** These words nudged the AI towards a "negative" outcome (like predicting survival).
- **Shade Intensity:** The darker the shade, the more influential the word was in the AI's decision. Darker colors mean the AI gave that word more weight.

Please take a moment to read through the provided example. The questions that follow will ask for your thoughts on this explanation approach.

Patient 1 (Survived) -- LIME

Text with highlighted words

CHIEF COMPLAINT: s/p mechanical fall

PRESENT ILLNESS: [**Age over 90 **]F s/p with hx of HTN and hyperlipidemia presenting s/p fall off stepladder while while cleaning the top of the refrigerator. Fell backwards onto back and left side of her head. No LOC, no CP, no SOB. Presented to LGH where a CT head showed a possible frontal contusion vs bleed. CT C spine showed grade 1 anterolithesis of C6 on C7 by 3mm, no acute fracture. CXR showed mildly displaced fractures of lateral aspect of L fourth, fifth, sixth ribs. Interstitial changes with probable mild superimposed pulmonary edema. The pt was transferred to [**Hospital1 18**] for trauma evaluation. In the ED a CT of the chest was performed as well as plain films of the T-spine and the left humerus. The pt was seen by neurosurgery for her closed head injury. their recommendations included close neuro checks. Pt was admitted to the TSICU for polytrauma in stable condition.

MEDICAL HISTORY: PMH: Hypothyroidism, HTN, GERD, HL, Chronic dizziness PSH: Appendectomy, Tonsillectomy

MEDICATION ON ADMISSION: Meclizine 25 mg PRN, Atenolol 50 mg daily, Amlodipine 5 mg daily, Nitroglycerin PRN, Omeprazole 20 mg daily, Isosorbide mononitrate 60 mg daily, Synthroid 50 mcg daily, Gemfibrozil 600 mg [**Hospital1 **]

ALLERGIES: Penicillins / aspirin

PHYSICAL EXAM: Admission physical: O: T: 97.3 BP: 170/78 HR: 80 R 18 O2Sats 98% Gen: WD/WN, comfortable, NAD. HEENT: Pupils: [**1-16**], equal EOMs intact. small post head laceration Neck: Supple. Lungs: CTA bilaterally. tender to palpation L hemithorax Cardiac: RRR. S1/S2. Abd: Soft, NT, BS+ Extrem: Warm and well-perfused. Neuro: Mental status: Awake and alert, cooperative with exam, normal affect. Orientation: Oriented to person, place, and date. Language: Speech fluent with good comprehension and repetition. Naming intact. No dysarthria or paraphasic errors.

FAMILY HISTORY: non-contributory

SOCIAL HISTORY: Retired. former smoker, no EtOH

Patient 2 (Mortality) -- LIME

Text with highlighted words

CHIEF COMPLAINT: cardiac **arrest** at home

PRESENT ILLNESS: 72 year old male with unceratin PMH presents after being found **unresponsive** and not breathing at home. **Family** reported that patient had been **wheezing** for the past few days. He saw his PCP and was given ?abx and **inhalers**, had CXR on [**10-31**] with extensive chronic changes with nodular interstitial changes but nothing acutely seen. He had been heard **wheezing** in bed this a.m. as early as 7:30a.m. on morning of admission. Sometime between 8 and 8:30 a.m., he was found by **family** to be **unresponsive**, blue, and not breathing but still warm. EMS was called. He was found to be in either **asystolic** or **PEA arrest**, intubated in field and coded. He got atropine x 2, Epi x 2 and was brought to [**Hospital1 18**] ED where he receivd more epi/atropine, levoflox, flagyl, 1 amp calcium gluconate, 10 u insulin, 1 amp D50 and ASA 325 x 1. He received CPR both in transport and in the ED. EKG showed diffuse ST depressions. Given this he was emergently cathed. On arrival in the cath lab, he was again **pulseless** and coded. Cath with PA saturations in the 90's with high PCWP but clean coronaries; this was likely due to a failure of peripheral/mitochondrial ability to extract oxygen. He was on levophed and epinephrine and intermittently dropping his blood pressures to 50's, requiring frequent boluses of epinephrine. At transfer to the ICU, the patient was **unresponsive**, difficult to ventilate, in **shock**, and anuric. He continued to have episodes of hypotension requiring boluses of epi every 10 mins. A subclavain line placed for additional access.

MEDICAL HISTORY: history of tobacco use: ?COPD no other known history

MEDICATION ON ADMISSION: **inhalers** (started by PCP this week)

ALLERGIES: Patient recorded as having No Known Allergies to Drugs

PHYSICAL EXAM: Vitals: HR 109 BP 125/58 on multiple vasopressors RR 22 100% A/C 400x14/peep 5 with high PIPs and Plateaus Gen: Intubated, sedated HEENT: MMM, **pupils** dilated. Neck: supple CV: tachy with episodes of irregular tachy. no r/m/g Pulm: Wheezing bilaterally Abd: soft, nt Ext: no edema, cool, clamped. distal pulses not palpable. Neuro: **unresponsive**. dilated pupils..

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: [**12-11**] ppd smoker

21. How understandable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very understandable

22. How reasonable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very reasonable

23. Based on the sample above with highlighted words indicating the top 20% importance for the outcome prediction, would you prefer more or fewer words highlighted? *

Mark only one oval.

1 2 3 4 5

Muc Much more highlighted

24. What aspects or features did you favor or find valuable in the presented interpretable outcomes? *

25. How could this explanation method be improved? *

XAI samples -- Free text rationales

In this section, we present an AI explanation approach utilizing the LLM. It derives its conclusions based on prior knowledge (

like an experienced clinician) and the specific examples provided (not shown in the sample), offering insights grounded in the details of the patient's presentation. Through a Q&A format, it breaks down influential factors and provides hypotheticals that could alter its decision.

Definition in the following questions:

- **Accuracy:** This pertains to the degree to which the explanation is correct or precise when considering the given test example.
- **Completeness:** Addresses the full scope of the test example, ensuring all necessary aspects or details are covered.
- **Consistency:** This measures whether the explanation remains uniform in approach, tone, and content across different Q&A parts.
- **Faithfulness:** Centers on ensuring the explanation doesn't add extraneous details or "make up" aspects not present in the test example.

What to look for in the Q&A:

- **Part 1 (True label explanation):** The user asks for the reasons behind the AI assigning the "true label" or the primary label to the given input. This provides insight into the AI's decision-making process, shedding light on the main factors or attributes of the data that led it to its conclusion.
- **Part 2 (Features for opposite label):** This section evaluates the AI's capability to understand nuances and subtleties in the data that could have potentially led to different outcomes.
- **Part 3 (Features altering the label):** This is akin to exploring "what-if" scenarios or counterfactuals. Counterfactual explanations are a type of XAI where one seeks to understand what changes in input data would lead to a different prediction. This part allows users to understand the sensitivity of the AI's decisions to changes in input

Take a few moments to familiarize yourself with the provided dialogue between the **user (Physician)** and the **assistant (AI)**. The conversation demonstrates how the AI understands, interprets, and explains its reasoning for a patient's potential outcome. The questions that follow will ask for your perspective on this explanation approach.

Patient 1 (Survived) -- Free text rationales

Given the TEST EXAMPLE:

CHIEF COMPLAINT: s/p mechanical fall

PRESENT ILLNESS: [**Age over 90 **]F s/p with hx of HTN and hyperlipidemia presenting s/p fall off stepladder while while cleaning the top of the refrigerator. Fell backwards onto back and left side of her head. No LOC, no CP, no SOB. Presented to LGH where a CT head showed a possible frontal contusion vs bleed. CT C spine showed grade 1 anterolisthesis of C6 on C7 by 3mm, no acute fracture. CXR showed mildly displaced fractures of lateral aspect of L fourth, fifth, sixth ribs. Interstitial changes with probable mild superimposed pulmonary edema. The pt was transferred to [**Hospital1 18**] for trauma evaluation. In the ED a CT of the chest was performed as well as plain films of the T-spine and the left humerus. The pt was seen by neurosurgery for her closed head injury. their recommendations included close neuro checks. Pt was admitted to the TSICU for polytrauma in stable condition.

MEDICAL HISTORY: PMH: Hypothyroidism, HTN, GERD, HL, Chronic dizziness PSH: Appendectomy, Tonsillectomy



MEDICATION ON ADMISSION: Meclizine 25 mg PRN, Atenolol 50 mg daily, Amlodipine 5 mg daily, Nitroglycerin PRN, Omeprazole 20 mg daily, Isosorbide mononitrate 60 mg daily, Synthroid 50 mcg daily, Gemfibrozil 600 mg [**Hospital1 **]

ALLERGIES: Penicillins / aspirin

PHYSICAL EXAM: Admission physical: O: T: 97.3 BP: 170/78 HR: 80 R 18 O2Sats 98% Gen: WD/WN, comfortable, NAD. HEEENT: Pupils: [**1-16**], equal EOMs intact. small post head laceration Neck: Supple. Lungs: CTA bilaterally. tender to palpation L hemithorax Cardiac: RRR. S1/S2. Abd: Soft, NT, BS+ Extrem: Warm and well-perfused. Neuro: Mental status: Awake and alert, cooperative with exam, normal affect. Orientation: Oriented to person, place, and date. Language: Speech fluent with good comprehension and repetition. Naming intact. No dysarthria or paraphasic errors.

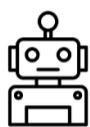
FAMILY HISTORY: non-contributory

SOCIAL HISTORY: Retired. former smoker, no EtOH

Classification Outcome: Survived

Ranked Model Explanation for Patient Survival:

1. Stable Condition: The patient was admitted to the hospital in a stable condition. This indicates that while she has sustained injuries, they are not immediately life-threatening and she is responding well to initial treatments.
2. Absence of Severe Complications: The patient's injuries, while serious, do not include conditions typically associated with high mortality rates such as severe head trauma, internal bleeding, or organ failure. Her injuries are mostly fractures and possible contusion which are generally treatable.
3. Responsive and Oriented: The patient's mental status is good - she is awake, alert, and oriented to person, place, and date. This suggests that she has not suffered severe neurological damage from her fall, which improves her prognosis.



Ranked Model Explanation for Contributing Factors to Potential Mortality:

1. Age: The patient is over 90 years old. Advanced age can complicate recovery from trauma and increase the risk of complications, including mortality.
2. Multiple Injuries: The patient has sustained multiple injuries, including possible frontal contusion or bleed, anterolisthesis of C6 on C7, and rib fractures. These injuries, particularly if they lead to complications such as pneumonia or other infections, could increase the risk of mortality.
3. Chronic Conditions: The patient has a history of several chronic conditions, including hypothyroidism, hypertension, GERD, and hyperlipidemia. These conditions could potentially complicate her recovery and increase her risk of mortality.

Patient 2 (Mortality) -- Free text rationales



Given the TEST EXAMPLE:

CHIEF COMPLAINT: cardiac arrest at home

PRESENT ILLNESS: 72 year old male with unceratin PMH presents after being found unresponsive and not breathing at home. Family reported that patient had been wheezing for the past few days. He saw his PCP and was given ?abx and inhalers, had CXR on [**10-3]** with extensive chronic changes with nodular interstitial changes but nothing acutely seen. He had been heard wheezing in bed this a.m. as early as 7:30a.m. on morning of admission. Sometime between 8 and 8:30 a.m., he was found by family to be unresponsive, blue, and not breathing but still warm. EMS was called. He was found to be in either asystolic or PEA arrest, intubated in field and coded. He got atropine x 2, Epi x 2 and was brought to [**Hospital1 18**] ED where he receivd more epi/atropine, levoflox, flagyl, 1 amp calcium gluconate, 10 u insulin, 1 amp D50 and ASA 325 x 1. He received CPR both in transport and in the ED. EKG showed diffuse ST depressions. Given this he was emergently cathed. On arrival in the cath lab, he was again pulseless and coded. Cath with PA saturations in the 90's with high PCWP but clean coronaries; this was likely due to a failure of peripheral/mitochondrial ability to extract oxygen. He was on levophed and epinephrine and intermittently dropping his blood pressures to 50's, requiring frequent boluses of epinephrine. At transfer to the ICU, the patient was unresponsive, difficult to ventilate, in shock, and anuric. He continued to have episodes of hypotension requiring boluses of epi every 10 mins. A subclavien line placed for additional access.

MEDICAL HISTORY: history of tobacco use: ?COPD no other known history

MEDICATION ON ADMISSION: inhalers (started by PCP this week)

ALLERGIES: Patient recorded as having No Known Allergies to Drugs

PHYSICAL EXAM: Vitals: HR 109 BP 125/58 on multiple vasopressors RR 22 100% A/C 400x14/peep 5 with high PIPs and Plateaus Gen: Intubated, sedated HEENT: MMM, pupils dilated. Neck: supple CV: tachy with episodes of irregular tachy. no r/m/g Pulm: Wheezing bilaterally Abd: soft, nt Ext: no edema, cool, clamped. distal pulses not palpable. Neuro: unresponsive. dilated pupils. .

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: [**12-11**] ppd smoker

Classification Outcome: Mortality

Ranked Model Explanation for Patient Mortality:

1. Cardiac Arrest: The patient had a cardiac arrest at home and was found unresponsive and not breathing. Despite resuscitation efforts, the patient's condition remained critical with episodes of hypotension requiring frequent boluses of epinephrine. This indicates a severe cardiac event which significantly increases the risk of mortality.

2. Respiratory Distress: The patient had been wheezing for several days prior to the cardiac arrest, indicating potential respiratory distress or failure. This could have contributed to the cardiac arrest and further complicates the patient's condition.

3. Poor Response to Treatment: Despite aggressive treatment including intubation, CPR, and multiple medications, the patient remained unresponsive, difficult to ventilate, in shock, and anuric (not producing urine). This suggests that the patient's body is not responding well to treatment, which is a poor prognostic sign.



Ranked Model Explanation for Contributing Factors to Potential Survival:

In this particular example, the patient did not survive. However, if we were to consider factors that could potentially contribute to a survival outcome in a similar scenario, they might include:

1. Immediate Medical Response: The patient was found quickly after the cardiac arrest and received immediate medical attention, including CPR and intubation. Quick response times can significantly improve survival rates in cardiac arrest cases.

2. Aggressive Treatment: The patient received aggressive treatment including multiple rounds of medication, CPR, and intubation. This level of care can sometimes lead to improved outcomes.

3. Clean Coronaries: The patient's catheterization showed clean coronary arteries, which means there was no blockage that could lead to further cardiac complications. This could potentially contribute to a survival outcome if the patient's other conditions were managed effectively.

26. How understandable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very understandable

27. How reasonable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very understandable

28. Based on the sample above with three reasons explained for each question, would you prefer more or fewer reasons explained? *

Mark only one oval.

1 2 3 4 5

Much Much more reasons

29. Please check the appropriate characteristics for each Q&A part (Part 1 = True label explanation; Part 2 = Features for opposite label) *

Check all that apply.

Accuracy Completeness Consistency Faithfulness

**Q&A
Part 1**

| | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|

**Q&A
Part 2**

| | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|--------------------------|--------------------------|--------------------------|

30. What aspects or features did you favor or find valuable in the presented LLM generated explanations? *

31. How could this LLM explanation method be improved? *

XAI samples -- Similar Patient Retrieval

You're about to explore an AI explanation method called "Similar Patient Retrieval." Imagine while you're receiving a patient note, and you feel familiar with this note. You recall a similar case based on your past experience. This method mimics that sense of recall, but on a larger, data-driven scale. The next three sections will delve into this specific method. We'll present both positive (mortality) and negative (survived) samples of its application.

Here's what you should know:

- **Patient Note as a "Query":** The AI takes a patient's admission note and uses it as a "query" to search the database for similar notes
- **Finding Similar Patients:** The AI sifts through a vast number of patient notes and brings back the ones it finds to be the most similar. In our example, it brings back the top three most similar patients, but the actual number is adjustable.
- **Red Highlights:** These represent specific medical terms or details that the AI recognized as matching between the query note and the retrieved notes. Think of them as "matching details" between patients.
- **Other Colors:** Words highlighted in other colors represent unmatched medical terms or details between the query note and each of the retrieved notes. Each note uses a unique color to distinguish its unmatched terms from the others.

Please review the provided examples closely. The subsequent questions will seek your feedback on this explanation method.

Negative (Survived) Samples

In this section, you will observe negative (survived) cases using the Similar Patient Retrieval method. Each case comprises a query note and three retrieved patient notes deemed similar by the AI.

As you review, please note the highlighting:

- **Orange Highlights:** Indicate matching medical terms or details between the query and retrieved notes, representing "matching details."
- **Blue Highlights :** Represent unique, unmatched terms in the query and retrieved notes.

Survived Patient -- Query

CHIEF COMPLAINT: s/p mechanical fall

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MEDICATION ON ADMISSION: Meclizine 25 mg PRN, Atenolol 50 mg daily, Amlodipine 5 mg daily, Nitroglycerin PRN, Omeprazole 20 mg daily, Isosorbide mononitrate 60 mg daily, Synthroid 50 mcg daily, Gemfibrozil 600 mg [**Hospital1 **]

ALLERGIES: Penicillins / aspirin

PHYSICAL EXAM: Admission physical: O: T: 97.3 BP: 170/78 HR: 80 R 18 O2Sats 98% Gen: WD/WN, comfortable, NAD. HEENT: Pupils: [**1-16**], equal EOMs intact. small post head laceration Neck: Supple. Lungs: CTA bilaterally. tender to palpation L hemithorax Cardiac: RRR. S1/S2. Abd: Soft, NT, BS+ Extrem: Warm and well-perfused. Neuro: Mental status: Awake and alert, cooperative with exam, normal affect. Orientation: Oriented to person, place, and date. Language: Speech fluent with good comprehension and repetition. Naming intact. No dysarthria or paraphasic errors.

FAMILY HISTORY: non-contributory

SOCIAL HISTORY: Retired. former smoker, no EtOH

Survived Patient -- Retrieved Patient 1

----- Retrieved Patient: 1 -----

CHIEF COMPLAINT: abdominal pain

PRESENT ILLNESS: 83F known to the Trauma surgery service presents with LLQ pain, right chest pain and hypotension with some amount of diaphoresis. She presnets after three days of symptoms and in the absence of recent trauma. She is appropriately anticoagulated for a St. Jude's valve. Does have a history of prior L-sided fall seven months ago.

MEDICAL HISTORY: PMH 1. Atrial fibrillation 2. Hypercholesterolemia 3. GERD 4. Depression 5. Osteoporosis 6. Retroperitoneal bleed [**4-16**] 7. Diastolic heart failure PSH 1. S/P MVR with mechanical valve [**2145**] 2. S/P L4-5 laminectomy [**12-16**]

MEDICATION ON ADMISSION: [**Known lastname **] 3', simvastatin 40'omeprazole 20', mirtazapine 15', lopressor 25', mtx 12.5 weekly prednisone 5 mg daily

ALLERGIES: Aspirin / Milk

PHYSICAL EXAM: O:96.6 88 108/50 32 100 Gen: WD/WN, comfortable, NAD. HEENT: Pupils: 2.5 min reactive EOMs full Chest CTAB Cor RRR Abd s/nd/ LUQ tenderness most prominent with diffuse tenderness region Ext moves all extremities

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: Patient lives with a 24 hour aide and is able to do ADLs with help from aide. She is a Holocaust survivor. Her son, [**Name (NI) **], is very involved in her medical care and is her HCP. [**Name (NI) 1139**]: Non-smoker EtOH: none Illicits: none

Survived Patient -- Retrieved Patient 2

----- Retrieved Patient: 2 -----

CHIEF COMPLAINT: s/p fall

PRESENT ILLNESS: [**Age over 90 **]F, on [**Hospital 83024**] transferred from outside hospital after unwitnessed fall at nursing home. Per report, patient attempted to climb out of bed and fell to floor. No LOC, but has right forehead laceration. Pt reported to be A&O x 1 in field. Outside hospital head CT report describes the presence of a possible right anterior epidural and subdural hematomas. Upon arrival to [**Hospital1 **], patient was hypotensive (SBP in 70s), but normotensive with IVF. Also received 2 U PRBCs in ED.

MEDICAL HISTORY: Afib, spinal stenosis, hyponatremia, anemia, hypothyroid, chronic back pain

MEDICATION ON ADMISSION: Arimidex 1', Cardizem 180', Cipro 250" (last dose 6/23), Lidoderm (700mg patch) daily, prilosec 20', senokot 8.6', synthroid 50mcg', tylenol 1gram daily, aggrenox 200-25", boniva 3mg/3ml qMon, compazine 5mg Q4-6 PRN, metamucil PRN, oxycodone 2.5mg Q6 PRN .

ALLERGIES: Patient recorded as having No Known Allergies to Drugs

PHYSICAL EXAM: Upon admission: O: T: 98.8 BP: 112/82 HR: 115 R: 20 O2Sats: 100 3L Gen: WD/WN, comfortable, NAD. HEENT: Pupils: R 4-->3 sluggish, L 4-->2 EOMs: Full Bruising and lac over her right eye Neck: Supple. Lungs: CTA bilaterally. Cardiac: tachy, irregular Abd: Soft, nontender nondistended Extrem: Warm and well-perfused. +2 distal pulses Rlp hip and onto buttox with swelling, mild tenderness, Neuro: awake and alert, oriented x 3 , CN II-XII intact

FAMILY HISTORY: Noncontributory

SOCIAL HISTORY: Married, lives with husband

Survived Patient -- Retrieved Patient 3

----- Retrieved Patient: 3 -----

CHIEF COMPLAINT: **Dyspnea** on exertion

PRESENT ILLNESS: Mr. [**Known lastname 5395**] is a 73 year old male with mild symptoms of **dyspnea** on exertion over the last 6-12 months. A recent [**Known lastname 461**] in [**2143-2-1**] revealed severe **aortic stenosis** with [**First Name8 (NamePattern2)**] [**Location (un) 109**] of 0.9cm² and mean gradient of 49mmHg. His LVEF was estimated at 50-55%. Further evaluation included cardiac catheterization which revealed three vessel **coronary artery disease**. Based upon the above, he was referred for cardiac surgical intervention. He denies a history of **chest pain**, **syncope** and congestive heart failure.

MEDICAL HISTORY: **Aortic Stenosis** **Coronary Artery Disease** **Hypertension** **Hypercholesterolemia** **Type II Diabetes Mellitus** Peripheral Vascular Disease Splenic **Artery Aneurysm**, s/p coiling [**2141**] **Squamous Cell Carcinoma Removal** **Tonsillectomy**

MEDICATION ON ADMISSION: **Aspirin**, **Amlodipine** 10 qd, **Lisinopril** 5 qd, **Metformin** 500 [**Hospital1 **], **Atenolo** 100 qd, **Simvastatin** 20 qd

ALLERGIES: **Hydrochlorothiazide** / **Sulfonamides** / **Doxycycline** / **Codeine**

PHYSICAL EXAM: PREOP EXAM Vitals: 130/70, 68, 12 General: WDW male in no acute distress HEENT: Oropharynx benign, EOMI Neck: Supple, no JVD Lungs: CTA bilaterally Heart: Regular rate and rhythm, normal s1s2, 3/6 systolic ejection murmur which radiates to carotids Abdomen: Soft, nontender with **normoactive bowel sounds** Ext: Warm, no edema Pulses: 2+ distally Neuro: Alert and oriented, CN 2-12 grossly intact, no focal deficits noted

FAMILY HISTORY: Denies premature **coronary artery disease**.

SOCIAL HISTORY: Quit tobacco 30 years ago. Admits to very light **ETOH** consumption. Currently married and lives with his wife. [**Name (NI) **] is retired.

Positive (Mortality) Samples

In this section, you will observe positive (mortality) cases using the Similar Patient Retrieval method. Each case comprises a query note and notes from three retrieved patients deemed similar by the AI with the same clinical outcome.

As you review, please note the highlighting:

- **Orange Highlights:** Indicate matching medical terms or details between the query and retrieved notes, representing "matching details."
- **Blue Highlights :** Represent unique, unmatched terms in the query and retrieved notes.

Mortality Patient -- Query

CHIEF COMPLAINT: cardiac arrest at home

PRESENT ILLNESS: 72 year old male with unceratin PMH presents after being found unresponsive and not breathing at home. Family reported that patient had been wheezing for the past few days. He saw his PCP and was given ?abx and inhalers, had CXR on [**10-31**] with extensive chronic changes with nodular interstitial changes but nothing acutely seen. He had been heard wheezing in bed this a.m. as early as 7:30a.m. on morning of admission. Sometime between 8 and 8:30 a.m., he was found by family to be unresponsive, blue, and not breathing but still warm. EMS was called. He was found to be in either asystolic or PEA arrest, intubated in field and coded. He got atropine x 2, Epi x 2 and was brought to [**Hospital1 18**] ED where he receivd more epi/atropine, levoflox, flagyl, 1 amp calcium gluconate, 10 u insulin, 1 amp D50 and ASA 325 x 1. He received CPR both in transport and in the ED. EKG showed diffuse ST depressions. Given this he was emergently cathed. On arrival in the cath lab, he was again pulseless and coded. Cath with PA saturations in the 90's with high PCWP but clean coronaries; this was likely due to a failure of peripheral/mitochondrial ability to extract oxygen. He was on levophed and epinephrine and intermittently dropping his blood pressures to 50's, requiring frequent boluses of epinephrine. At transfer to the ICU, the patient was unresponsive, difficult to ventilate, in shock, and anuric. He continued to have episodes of hypotension requiring boluses of epi every 10 mins. A subclavian line placed for additional access.

MEDICAL HISTORY: history of tobacco use: ?COPD no other known history

MEDICATION ON ADMISSION: inhalers (started by PCP this week)

ALLERGIES: Patient recorded as having No Known Allergies to Drugs

PHYSICAL EXAM: Vitals: HR 109 BP 125/58 on multiple vasopressors RR 22 100% A/C 400x14/peep 5 with high PIPs and Plateaus
Gen: Intubated, sedated HEENT: MMM, pupils dilated. Neck: supple CV: tachy with episodes of irregular tachy. no r/m/g Pulm:
Wheezing bilaterally Abd: soft, nt Ext: no edema, cool, clamped. distal pulses not palpable. Neuro: unresponsive. dilated pupils. .

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: [**12-11**] ppd smoker

Mortality Patient -- Retrieved Patient 1

----- Retrieved Patient: 1 -----

CHIEF COMPLAINT: Found Down

PRESENT ILLNESS: This is a [**Age over 90 **] year old female with history of insulin dependent DM, HTN, and cerebrovascular disease who presented after being found unresponsive at her home and having had a PEA arrest. The patient was last seen three days prior to presentation when she reported feeling somewhat unwell but had no particular localizing symptoms. She was not seen in the ensuing days over the weekend and then today her paperboy noted multiple papers piled up on the porch. He called the police who broke into the house and discovered the patient breathing but minimally responsive. EMS was then called and arrived on the scene found her in rapid AF with hypotension, intubated the patient in the field, and brought her to the ED. En route to the ED the patient did have a PEA arrest and received epinephrine and atropine before arriving in the ED where converted to VF, received one defibrillation attempt, and then another round of epi/atropine before return of spontaneous circulation though she was quite hypotensive. She also received one amp bicarbonate, six liters of fluid, and was started on phenylephrine. ET tube was replaced in ED due to noted abdominal distension and concern field intubation was esophageal. PIV placed in the field noted to be infiltrated with surrounding arm cold. Labs revealed leukocytosis to 19.1, lactate of 6.6 and ABG 7.13/65/38. CT scan head showed hypoattenuation of the entire left parietal lobe, CT chest with bilateral pleural effusions/ consolidations and multiple pulmonary emboli with clot in the left atrial appendage. She received vancomycin and piperillin-tazobactam for undifferentiated shock. Cardiology was consulted regarding atrial fibrillation and recommended against rate control given it was felt high rate was needed to compensate for poor contractility post arrest.

MEDICAL HISTORY: - insulin dependent diabetes - CVA earlier this year causing hallucinations per report - afib on ASA - Hypertension

MEDICATION ON ADMISSION: ASA

ALLERGIES: Penicillins / Sulfa (Sulfonamide Antibiotics)

PHYSICAL EXAM: Vitals: 33 C 154 105/91 33 100% General: Intubated, not sedated, posturing HEENT: Pupils 4 mm, non-reactive Neck: supple, JVP not assessed, no LAD Lungs: Diffuse crackles bilaterally CV: Irreg irreg, normal S1 + S2, no murmurs, rubs, gallops Abdomen: soft, non-tender, non-distended, bowel sounds present, no rebound tenderness or guarding, no organomegaly GU: + foley Ext: Cold, left arm with marked cyanosis distal to site of field IV Neuro: Unresponsive off sedation, no withdraw to pain/noxious stimuli, + posturing, pupils fixed, dilated, non-reactive bilaterally

FAMILY HISTORY: Unknown.

SOCIAL HISTORY: Lives independently in [**Location (un) 1411**].

Mortality Patient -- Retrieved Patient 2

----- Retrieved Patient: 2 -----

CHIEF COMPLAINT: s/p multiple cardiac arrests

PRESENT ILLNESS: Mr [**Known firstname **] [**Known lastname 32296**] is an 89yoM with PMH of DM, HTN, splenectomy [**1-27**] ruptured spleen, possible brain infection 2 years ago, who is presenting s/p multiple episodes of cardiac arrest. Per wife he was reportedly at an OSH this morning but later sent home. He was not feeling well this afternoon, with stomach pains. He then went to the bathroom, where he was found to be unresponsive. He was down for ~30 minutes before EMS arrived, found to be in PEA, then had spontaneous return of circulation quickly with 1 round of epinephrine. Coded a second time at [**Hospital1 **] [**Location (un) 620**] (reportedly asystolic) when preparing for med flight and returned to spontaneous circulation with 5 epi and 3 amps bicarb. In Med Flight had V Fib arrest and shocked once with ROSC. In the [**Hospital1 18**] ED, he was given amiodarone, then again had PEA arrest and received two doses of epi with return to spontaneous circulation. . There is questionable inferior ischemic changes on ECG. Lowest pH 7.06, lactate 14.3, PaO₂ 63 on unknown amount of O₂. Femoral line placed (dirty). In shock physiology, unknown which type, maxed on levophed, phenylephrine, and dopamine with SBPs 70s-80s. Bicarb gtt started. Echo in ED by cardiology fellow shows blown RV, high concern for PE but pt too unstable to go get CTPA. . Upon arrival to the CCU, the patient is intubated and not moving extremities or following commands. He has bilateral blown pupils and is unresponsive. His GSC is 3. Epinephrine and vasopressin drip was started. . Unable to obtain full review of systems.

MEDICAL HISTORY: PAST MEDICAL HISTORY: 1. CARDIAC RISK FACTORS: +Diabetes, +Hypertension 2. CARDIAC HISTORY: 3. OTHER PAST MEDICAL HISTORY: - s/p splenectomy [**1-27**] ruptured spleen - Possible brain infection (unknown details) 2 years ago

MEDICATION ON ADMISSION: unknown

ALLERGIES: No Allergies/ADRs on File

PHYSICAL EXAM: ADMISSION PHYSICAL EXAMINATION: VS: T= BP= 75/41 on 3 pressors, 100/65 on 5 pressors HR= 106-130 RR= 14 on CMV O₂ sat= 95% on FiO₂ 100% GENERAL: Elderly male, intubated, unresponsive, GSC 3, pupils dilated and unresponsive to light bilaterally. HEENT: NC/AT. Sclera anicteric. Conjunctiva were pink, no pallor or cyanosis of the oral mucosa. No xanthomas. CARDIAC: PMI located in 5th intercostal space, midclavicular line. tachycardic, no audible murmurs although hard to hear over very jangly breath sounds and ventilator LUNGS: diffuse, jangly breath sounds/rales in all lung fields ABDOMEN: Soft, NTND. EXTREMITIES: femoral pulse palpable, distal pulses not palpable. Arterial stick site on right arm has pulsatile bleeding if unwrapped, is currently in a pressure wrap SKIN: Cool skin, especially in distal extremities. Bilateral seborrheic keratosis at t4 level PULSES: Right: Carotid 1+ Femoral 1+ Popliteal 0 DP 0 PT 0 Left: Carotid 1+ Femoral 1+ Popliteal 0 DP 0 PT 0 . DISCHARGE PHYSICAL EXAM:

FAMILY HISTORY: - unknown

SOCIAL HISTORY: - Tobacco history: unknown - ETOH: unknown, although alcohol level 16 in ED - Illicit drugs: unknown

Mortality Patient -- Retrieved Patient 2

----- Retrieved Patient: 2 -----

CHIEF COMPLAINT: s/p multiple **cardiac arrests**

PRESENT ILLNESS: Mr [**Known firstname **] [**Known lastname 32296**] is an 89yoM with PMH of **DM**, **HTN**, splenectomy [**1-27**] ruptured spleen, possible **brain infection** 2 years ago, who is presenting s/p multiple episodes of **cardiac arrest**. Per wife he was reportedly at an OSH this morning but later sent home. He was not feeling well this afternoon, with **stomach pains**. He then went to the bathroom, where he was found to be unresponsive. He was down for ~30 minutes before EMS arrived, found to be in **PEA**, then had spontaneous return of circulation quickly with 1 round of **epinephrine**. Coded a second time at [**Hospital1 **] [**Location (un) 620**] (reportedly **asystolic**) when preparing for med flight and returned to spontaneous circulation with 5 epi and 3 amps bicarb. In Med Flight had V Fib arrest and shocked once with ROSC. In the [**Hospital1 18**] ED, he was given **amiodarone**, then again had **PEA** arrest and received two doses of epi with return to spontaneous circulation. . There is questionable inferior ischemic changes on ECG. Lowest pH 7.06, lactate 14.3, PaO₂ 63 on unknown amount of O₂. Femoral line placed (dirty). In **shock** physiology, unknown which type, maxed on **levophed**, **phenylephrine**, and **dopamine** with SBPs 70s-80s. Bicarb gtt started. Echo in ED by cardiology fellow shows blown RV, high concern for PE but pt too unstable to go get CTPA. . Upon arrival to the CCU, the patient is intubated and not moving extremities or following commands. He has bilateral blown pupils and is unresponsive. His GSC is 3. **Epinephrine** and **vasopressin** drip was started. . Unable to obtain full review of systems.

MEDICAL HISTORY: PAST MEDICAL HISTORY: 1. CARDIAC RISK FACTORS: +Diabetes, +Hypertension 2. CARDIAC HISTORY: 3. OTHER PAST MEDICAL HISTORY: - s/p splenectomy [**1-27**] ruptured spleen - Possible **brain infection** (unknown details) 2 years ago

MEDICATION ON ADMISSION: unknown

ALLERGIES: No Allergies/ADRs on File

PHYSICAL EXAM: ADMISSION PHYSICAL EXAMINATION: VS: T= BP= 75/41 on 3 **pressors**, 100/65 on 5 **pressors** HR= 106-130 RR= 14 on CMV O₂ sat= 95% on FiO₂ 100% GENERAL: Elderly male, intubated, unresponsive, GSC 3, pupils dilated and unresponsive to light bilaterally. HEENT: NC/AT. Sclera anicteric. Conjunctiva were pink, no **pallor** or **cyanosis** of the oral mucosa. No xanthalesma. CARDIAC: PMI located in 5th intercostal space, midclavicular line. tachycardic, no audible **murmurs** although hard to hear over very junky breath sounds and ventilator LUNGS: diffuse, junky breath sounds/rales in all lung fields ABDOMEN: Soft, NTND. EXTREMITIES: femoral pulse palpable, distal pulses not palpable. Arterial stick site on right arm has pulsatile **bleeding** if unwrapped, is currently in a pressure wrap SKIN: Cool skin, especially in distal extremities. Bilateral seborrheic **keratosis** at t4 level PULSES: Right: Carotid 1+ Femoral 1+ Popliteal 0 DP 0 PT 0 Left: Carotid 1+ Femoral 1+ Popliteal 0 DP 0 PT 0 . DISCHARGE PHYSICAL EXAM:

FAMILY HISTORY: - unknown

SOCIAL HISTORY: - Tobacco history: unknown - **ETOH**: unknown, although **alcohol** level 16 in ED - Illicit drugs: unknown

Mortality Patient -- Retrieved Patient 3

----- Retrieved Patient: 3 -----

CHIEF COMPLAINT: s/p **cardiac arrest**

PRESENT ILLNESS: Mr. [**Known lastname **] is a [**Age over 90 **]y/o gentleman with **CAD**, **AI**, and **CHF** who was transferred to [**Hospital1 18**] **s/p arrest**. He had witnessed **arrest** at home with family initiating CPR. He was taken to [**Location (un) **] and had spontaneous return of circulation. He then lost pulses at least once and received a **shock**. [**Location (un) **] brought him to [**Hospital1 18**]. He was intubated in the field. He lost pulses again. They shocked him in the helicopter x 2. As they were landing, he lost pulses again. He was bought into the ER actively coding. He was given **epinephrine**, **calcium**, **atropine**. He was started **amiodarone** drip and had return of circulation for about 10 minutes. Then he lost circulation again, and was shocked x 2. He then stayed stable for 20 minutes and then coded again at which time a non-sterile femoral line was placed. He was then started on **norepinephrine** drip (maximum dose). He then lost pulses with CPR initiated. He then received epi x 1 and **calcium** with return of circulation. A sterile left art line was placed. He also underwent Arctic Sun cooling process. . VS on transfer: HR 89 BP 116/78 RR 20 on vent (T_v 550, PEEP 11, CMV) with **O₂ sat** 56 %. . On the floor, patient is intubated, unresponsive to verbal or painful stimulus. Family is at the bedside.

MEDICAL HISTORY: **CAD** Systolic **CHF** (EF 45%) **HTN** Mitral regurgitation Aortic insufficiency **BPH** s/p **TURP** in [**2173**] **Bradycardia** s/p **VVI PMP** in [**1-14**] **Colon cancer** [**2167**], s/p resection at [**Hospital3 3765**] **Renal artery stenosis** with baseline **creatinine** 3.0 Recent hospitalization for PNA and severe **UTI**

MEDICATION ON ADMISSION: Unable to record medication list before .

ALLERGIES: **Cipro** / Ace Inhibitors

PHYSICAL EXAM: HR: 83 (83 - 99) bpm BP: 97/60(73) {97/60(73) - 114/67(85)} mmHg RR: 20 (16 - 20) insp/min SpO₂: 89% Heart rhythm: AF (**Atrial Fibrillation**) **O₂** Delivery Device: Endotracheal tube Ventilator mode: CMV/ASSIST Vt (Set): 550 (550 - 550) mL RR (Set): 20 PEEP: 11 cmH₂O FiO₂: 100% PIP: 37 cmH₂O Plateau: 31 cmH₂O SpO₂: 89% ABG: 7.19/27/246/10-16 Ve: 10.8 L/min PaO₂ / FiO₂: 246 General: Elderly gentleman, intubated HEENT: NCAT Neck: obese, jugular venous pulsations visible to the earlobe Lungs: coarse breath sounds throughout all fields bilaterally CV: Tachycardia, S1 + S2, S3 audible, no murmur audible Abdomen: soft, non-distended, no masses GU: foley in place Ext: cool, 1+ DP pulses and carotid pulse Neuro: unresponsive to **painful stimulus**

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: The patient lives with his daughter, son-in-law, and **granddaughter** in [**Name (NI) 11269**], MA. He does not **smoke** cigarettes and has not had **EtOH** for the past 3 years. He was married for 60 years and his wife passed away in [**2168**].

Mortality Patient -- Retrieved Patient 3

----- Retrieved Patient: 3 -----

CHIEF COMPLAINT: s/p **cardiac arrest**

PRESENT ILLNESS: Mr. [**Known lastname **] is a [**Age over 90 **]y/o gentleman with **CAD**, **AI**, and **CHF** who was transferred to [**Hospital1 18**] **s/p arrest**. He had witnessed **arrest** at home with family initiating CPR. He was taken to [**Location (un) **] and had spontaneous return of circulation. He then lost pulses at least once and received a **shock**. [**Location (un) **] brought him to [**Hospital1 18**]. He was intubated in the field. He lost pulses again. They shocked him in the helicopter x 2. As they were landing, he lost pulses again. He was brought into the ER actively coding. He was given **epinephrine**, **calcium**, **atropine**. He was started **amiodarone** drip and had return of circulation for about 10 minutes. Then he lost circulation again, and was shocked x 2. He then stayed stable for 20 minutes and then coded again at which time a non-sterile femoral line was placed. He was then started on **norepinephrine** drip (maximum dose). He then lost pulses with CPR initiated. He then received epi x 1 and **calcium** with return of circulation. A sterile left art line was placed. He also underwent Artic Sun cooling process. VS on transfer: HR 89 BP 116/78 RR 20 on vent (Tv 550, PEEP 11, CMV) with **O2 sat** 56 %. On the floor, patient is intubated, unresponsive to verbal or painful stimulus. Family is at the bedside.

MEDICAL HISTORY: **CAD** Systolic **CHF** (EF 45%) **HTN** Mitral regurgitation Aortic insufficiency **BPH** s/p **TURP** in [**2173**] **Bradycardia** s/p **VVI PMP** in [**1-14**] **Colon cancer** [**2167**], s/p resection at [**Hospital3 3765**] **Renal artery stenosis** with baseline creatinine 3.0 Recent hospitalization for PNA and severe **UTI**

MEDICATION ON ADMISSION: Unable to record medication list before .

ALLERGIES: **Cipro** / Ace Inhibitors

PHYSICAL EXAM: HR: 83 (83 - 99) bpm BP: 97/60(73) {97/60(73) - 114/67(85)} mmHg RR: 20 (16 - 20) insp/min SpO2: 89% Heart rhythm: AF (**Atrial Fibrillation**) **O2** Delivery Device: Endotracheal tube Ventilator mode: CMV/ASSIST Vt (Set): 550 (550 - 550) mL RR (Set): 20 PEEP: 11 cmH2O FiO2: 100% PIP: 37 cmH2O Plateau: 31 cmH2O SpO2: 89% ABG: 7.19/27/246/10/-16 Ve: 10.8 L/min PaO2 / FiO2: 246 General: Elderly gentleman, intubated HEENT: NCAT Neck: obese, jugular venous pulsations visible to the earlobe Lungs: coarse breath sounds throughout all fields bilaterally CV: Tachycardia, S1 + S2, S3 audible, no murmur audible Abdomen: soft, non-distended, no masses GU: foley in place Ext: cool, 1+ DP pulses and carotid pulse Neuro: unresponsive to **painful stimulus**

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: The patient lives with his daughter, son-in-law, and **granddaughter** in [**Name (NI) 11269**], MA. He does not **smoke** cigarettes and has not had **EtOH** for the past 3 years. He was married for 60 years and his wife passed away in [**2168**].

Feedback Questions for Similar Patient Retrieval

If you need to refer back to the samples for clarity or context, feel free to navigate to the previous sections. It's essential for us that you understand the method and samples while providing feedback.

32. How understandable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very understandable

33. How reasonable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very reasonable

34. Based on the sample above with three similar patients retrieved, would you prefer * more or fewer similar patients?

Mark only one oval.

1 2 3 4 5

Muc Much more patients

35. What aspects or features did you favor or find valuable in the presented * interpretable outcomes?

36. How could this explanation method be improved? *

XAI samples -- Attention-based Approach

In this section, you'll see an example of how an AI "pays attention" to certain words when making its decisions. Just like when we read a text and some words stand out to us as crucial, the AI similarly "focuses" on particular words.

Definitions for the following question:

- **Explainable:** This term refers to the extent to which an AI system's operations and decision-making processes can be understood and interpreted by humans, providing insight into how and why specific outcomes are reached.
- **Reasonable:** In this context, "reasonable" denotes that the AI system's decisions or suggestions are sensible, justifiable, and align with logical or rational thinking, human values, and expectations.

What to look for:

- **Highlighted Words:** These are words that the AI "focused" on most when deciding. Imagine them as words that caught the AI's "eye".
- **Shade of Highlight:** The darker the highlight, the more attention the AI gave to that word. It's like the AI saying, "This word really matters."

Please review the provided sample thoroughly. Your feedback on this explanation style will be crucial in the subsequent questions.

Patient 1 (Survived) -- Attention

CHIEF COMPLAINT: s/p mechanical fall

PRESENT ILLNESS: [**Age over 90 **]F s/p with hx of HTN and hyperlipidemia presenting s/p fall off stepladder while cleaning the top of the refrigerator. Fell backwards onto back and left side of her head. No LOC, no CP, no SOB. Presented to LGH where a CT head showed a possible frontal contusion vs bleed. CT C spine showed grade 1 anterolysisis of C6 on C7 by 3mm, no acute fracture. CXR showed mildly displaced fractures of lateral aspect of L fourth, fifth, sixth ribs. Interstitial changes with probable mild superimposed pulmonary edema. The pt was transferred to [**Hospital1 18**] for trauma evaluation. In the ED a CT of the chest was performed as well as plain films of the T-spine and the left humerus. The pt was seen by neurosurgery for her closed head injury. their recommendations included close neuro checks. Pt was admitted to the TSICU for polytrauma in stable condition.

MEDICAL HISTORY: PMH: Hypothyroidism, HTN, GERD, HL, Chronic dizziness PSH: Appendectomy, Tonsillectomy

MEDICATION ON ADMISSION: Meclizine 25 mg PRN, Atenolol 50 mg daily, Amlodipine 5 mg daily, Nitroglycerin PRN, Omeprazole 20 mg daily, Isosorbide mononitrate 60 mg daily, Synthroid 50 mcg daily, Gemfibrozil 600 mg [**Hospital1 **]

ALLERGIES: Penicillins / aspirin

PHYSICAL EXAM: Admission physical: O: T: 97.3 BP: 170/78 HR: 80 R 18 O2Sats 98% Gen: WD/WN, comfortable, NAD. HEENT: Pupils: [**1-16**], equal EOMs intact. small post head laceration Neck: Supple. Lungs: CTA bilaterally. tender to palpation L hemithorax Cardiac: RRR. S1/S2. Abd: Soft, NT, BS+ Extrem: Warm and well-perfused. Neuro: Mental status: Awake and alert, cooperative with exam, normal affect. Orientation: Oriented to person, place, and date. Language: Speech fluent with good comprehension and repetition. Naming intact. No dysarthria or paraphasic errors.

FAMILY HISTORY: non-contributory

SOCIAL HISTORY: Retired. Former smoker, no EtOH

Patient 2 (Mortality) -- Attention

CHIEF COMPLAINT: cardiac arrest at home

PRESENT ILLNESS: 72 year old male with unceratin PMH presents after being found unresponsive and not breathing at home. Family reported that patient had been wheezing for the past few days. He saw his PCP and was given ?bx and inhalers, had CXR on [**10-31**] with extensive chronic changes with nodular interstitial changes but nothing acutely seen. He had been heard wheezing in bed this a.m. as early as 7:30a.m. on morning of admission. Sometime between 8 and 8:30 a.m., he was found by family to be unresponsive, blue, and not breathing but still warm. EMS was called. He was found to be in either asystolic or PEA arrest, intubated in field and coded. He got atropine x 2, Epi x 2 and was brought to [**Hospital1 18**] ED where he received more epi/atropine, levoflox, flagyl, 1 amp calcium gluconate, 10 u insulin, 1 amp D50 and ASA 325 x 1. He received CPR both in transport and in the ED. EKG showed diffuse ST depressions. Given this he was emergently cathed. On arrival in the cath lab, he was again pulseless and coded. Cath with PA saturations in the 90's with high PCWP but clean coronaries; this was likely due to a failure of peripheral/mitochondrial ability to extract oxygen. He was on levophed and epinephrine and intermittently dropping his blood pressures to 50's, requiring frequent boluses of epinephrine. At transfer to the ICU, the patient was unresponsive, difficult to ventilate, in shock, and anuric. He continued to have episodes of hypotension requiring boluses of epi every 10 mins. A subclavian line placed for additional access.

MEDICAL HISTORY: history of tobacco use: ?COPD no other known history

MEDICATION ON ADMISSION: inhalers (started by PCP this week)

ALLERGIES: Patient recorded as having No Known Allergies to Drugs

PHYSICAL EXAM: Vitals: HR 109 BP 125/58 on multiple vasopressors RR 22 100% A/C 400x14/peep 5 with high PIPs and Plateaus Gen: Intubated, sedated HEENT: MMM, pupils dilated. Neck: supple CV: tachy with episodes of irregular tachy. no r/m/g Pulm: Wheezing bilaterally Abd: soft, nt Ext: no edema, cool, clamped. distal pulses not palpable. Neuro: unresponsive. dilated pupils. .

FAMILY HISTORY: Non-contributory

SOCIAL HISTORY: [**12-11**] ppd smoker

37. How understandable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very understandable

38. How reasonable is the interpretation of the outcome prediction? *

Mark only one oval.

1 2 3 4 5

Not Very reasonable

39. Based on the sample above with highlighted words indicating the top 30% importance for the outcome prediction, would you prefer more or fewer words highlighted? *

Mark only one oval.

1 2 3 4 5

Muc Much more highlighted

40. What aspects or features did you favor or find valuable in the presented interpretable outcomes? *

41. How could this explanation method be improved? *

Comparison of XAI samples

Now that you've been introduced to three distinct AI explanation methods, this section aims to understand your perspective on each.

Definitions for the following question

- **Explainable:** This term refers to the extent to which an AI system's operations and decision-making processes can be understood and interpreted by humans, providing insight into how and why specific outcomes are reached.
- **Reasonable:** In this context, "reasonable" denotes that the AI system's decisions or suggestions are sensible, justifiable, and align with logical or rational thinking, human values, and expectations.
- **Enhances Confidence:** This statement implies that the AI explanation method provides sufficient clarity and understanding, allowing users to feel more assured and secure in relying on the AI's outputs or decisions.
- **Broadens Perspective:** This suggests that the AI explanation method offers diverse insights and viewpoints, enabling users to see a situation or decision from multiple angles and consider various aspects they might not have thought of on their own.
- **Increases Trust:** This means that the AI explanation method fosters reliability and credibility, encouraging users to believe in the AI's capabilities and to depend on its results or recommendations.

Please keep these aspects in mind as you answer the following questions. Your feedback will be crucial in tailoring AI-driven tools that best support healthcare professionals like yourself.

42. Please rank the following XAI methods based on how **understandable** they are to * you (1 being the most understandable):

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| LIME | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Attention | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Similar patient retrieval | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Free text rationales | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

43. Please rank the following XAI methods based on how **reasonable** they are to you *
(1 being the most reasonable):

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| LIME | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Attention | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Similar patient retrieval | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Free text rationales | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

44. Please rank the following XAI methods based on **which one you'd prefer to use** *
as a clinical care assistant (1 being the most preferred):

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| LIME | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Attention | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Similar patient retrieval | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Free text rationales | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

45. Considering the XAI method you selected as your most preferred, do you believe it will reduce the time required to make decisions or draw conclusions, compared to the example provided earlier without explanation? *

Mark only one oval.

1 2 3 4 5

No t Significantly less time needed

46. For each AI explanation method, please indicate whether you agree with the following statements: *

Check all that apply.

| | Enhances Confidence | Broadens Perspective | Increases Trust |
|----------------------------------|--------------------------|--------------------------|--------------------------|
| LIME | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Attention | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Similar patient retrieval | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Free text rationales | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Socio-demographic Questions

In this concluding section, we'd like to gather some general demographic information about you. This data helps us understand the diverse backgrounds and experiences of our respondents, ensuring that our findings reflect the varied perspectives within the healthcare community.

Please note that all information provided is confidential and will be used solely for research purposes.

47. Gender *

Mark only one oval.

- Male
- Female
- Non-binary
- Prefer not to say

48. Age *

Mark only one oval.

- 18-24
- 25-30
- 31-35
- 36-40
- >40

49. Racial/Ethnic background *

Mark only one oval.

- African-American/Black
- Middle Eastern/North African
- Native American/Alaska Native/First Nations
- Pacific Islander
- Hispanic/Latino/a/x
- East Asian (including Chinese, Japanese, Korean, Mongolian, Tibetan, and Taiwanese)
- South Asian (including Bangladeshi, Bhutanese, Indian, Nepali, Pakistani, and Sri Lankan)
- Southeast Asian (including Burmese, Cambodian, Filipino, Hmong, Indonesian, Laotian, Malaysian, Mien, Singaporean, Thai, and Vietnamese)
- White
- Other: _____

Feedback

Thank you for dedicating your time and expertise to this survey. Your insights are invaluable to our research.

50. Would you be interested in participating in a follow-up interview related to this survey? Participants selected for the interview will receive compensation for their time. *

Mark only one oval.

- Yes
- No

51. If you have any additional comments, suggestions, or feedback about the questionnaire or the topic, please share them in the space below.

[Skip to section 17 \(End of Survey\)](#)

Non-eligible Participants

You are not eligible for this survey, because your answer is not consistent with the screening responses or you do not consent to participate in this survey.

Thank you for your interest.

End of Survey

Thank you for completing the survey!

To receive your compensation, please submit your completed survey through this Google Form. Then, message us on Upwork to confirm your submission.

We'll process your payment promptly after confirmation. Your insights are greatly appreciated!

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