Emergency Department Dementia Algorithm

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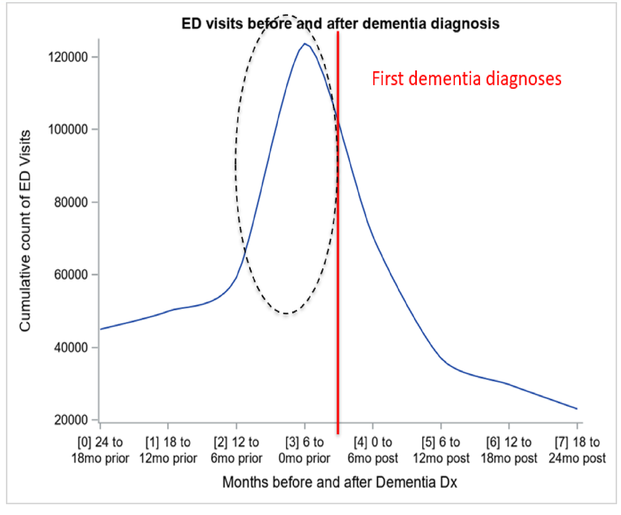
JH AITC Aging Focus Pilot Core

Problem:

- In the US, currently >7 million persons living with dementia (PLwD), with nearly 12 million estimated by 2040.
- PLwD have increased rates of health care usage, admission from the ED, co-morbidities (delirium, falls), and mortality compared to patients without dementia after an ED visit.
- Routine assessment of cognitive impairment uncommon in ED; under-recognition rates as high as 57-83%
- Under-recognition:
  - broad consequences: longer hospital stays, increased costs, accelerated cognitive declines.
  - associated with decreased diagnostic accuracy for unrelated comorbidities and increased rates of adverse events.

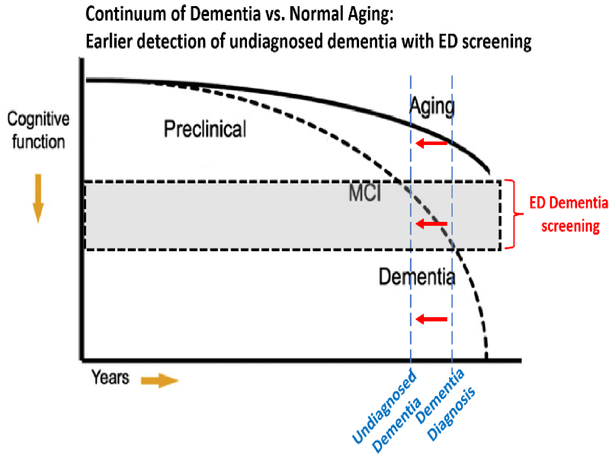
Opportunity:

Preliminary data shows spike in PLwD ED visits 6-12 months before diagnosis.



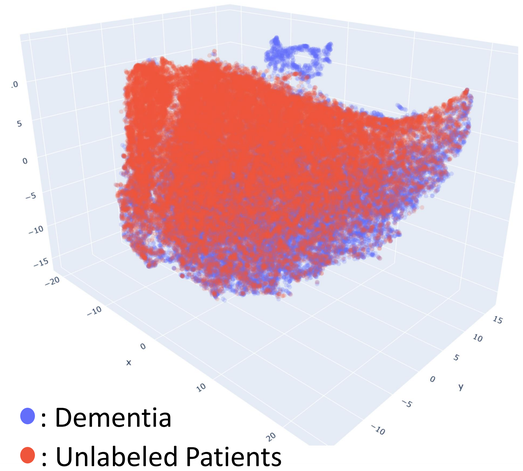
Solution: EDDA

- Integrating AI-based detection for high risk undiagnosed dementia and cognitive impairment offers novel approach
  - increase screening of at-risk patients
  - increase detection in the ED setting.
- Expand and build upon existing collaborations and IT between JHU and Yale to develop the EDDA
- Clinical Decision Support (CDS) tool identifies ED patients at-risk for developing dementia
- Allows for the flagging of patients within the EHR to notify physicians and initiate care pathways.



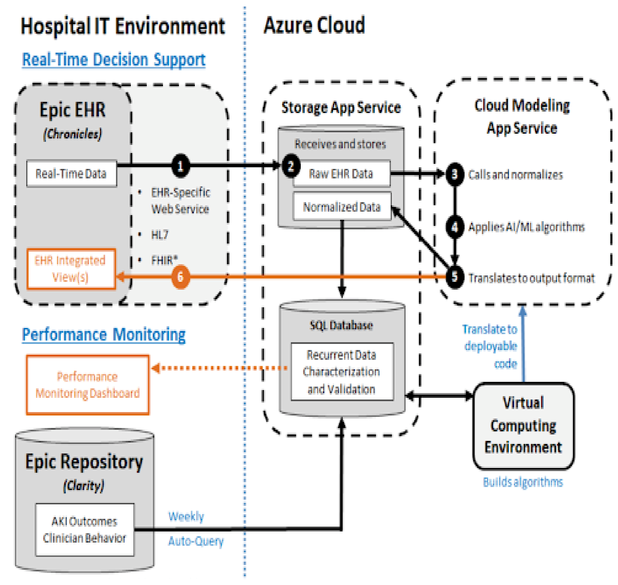
Technology:

- Use advanced embedding and clustering mechanisms to identify patients with or at risk for dementia
- Using known dementia patients, leverage positive/unlabeled clustering metrics to group patients at risk for dementia without a current diagnosis.
- Using cloud computing services integrated into EPIC EHR, extract structured patient information as they present to the ED
- Data then integrated into the CDS system to assign risk scores to patients helping inform a physicians evaluation process.



The Ask:

1. Seeking 1.25m of R01 funding to pilot EDDA in real-time in multiple ED sites and product evaluation in exchange for a convertible note.
2. Commercial expertise in the distribution and integration of the EDDA across institutions after training and validation is complete.



Next Steps:

- Complete finalized risk predictions and patient classification software.
- Final algorithmic structure will balance prediction accuracy with generalizability to outside healthcare systems.
- By using common data pipelines, we can insure smooth integration into outside EHRs.
- Integrate the algorithm in to the AHRQ-funded machine learning-based Acute Kidney Injury-Clinical Decision Support (AKI-CDS) system and E-triage, an AHRQ-funded machine learning-based electronic triage support tool, developed by Dr. Levin that is currently deployed within the Yale System.

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