

DEVELOPMENT OF AN ARTIFICIAL INTELLIGENCE BASED SAFETY NET FOR PANCREATIC CYST SURVEILLANCE



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Background

- Pancreatic cysts are common incidental findings on imaging that often require further workup
- The incidence of both pancreatic cysts and pancreatic cancer are increasing
- Variability in clinical guidelines as well as institutional and individual practices can result in inconsistent surveillance and loss to follow up
- We used natural language processing with a large language model to build a pancreatic cyst safety net

Methods

- All abdominal CT and MRI reports (including MRCP from 2022 were included
- Pancreatic cyst patients were identified by a first pass detection by searching for “cyst” (in the pancreas findings), “IPMN”, or “MRCP”
- A natural language processing workflow with a large language model (LLM; Claude API endpoint for Sonnet 3.5) was built
- The radiology reports were assessed for relevant findings including cyst size, number, location, and components of risk stratification (solid components, pancreatic ductal dilation, wall thickening)
- Demographic and clinical information were merged with this data
- Compliance with report recommendations was assessed using a cutoff date of 4/1/2024

Results

- 2593 reports were identified using the search criteria and processed by the large language model
- Parallel assessment of 50 cases revealed no clinically meaningful inconsistencies with the output of the safety net
- 741 patients (29%) had suggested recall for their cysts
- Of 345 patients evaluable for compliance assessment (i.e. whose recall date preceded our data cutoff), 71 completed imaging within the recommended interval, for an overall compliance of 21%.
- Features significantly associated with increased compliance included having a concurrent recommendation for EUS/FNA ($p = 0.007$) and a higher cyst growth rate ($p = 0.04$).

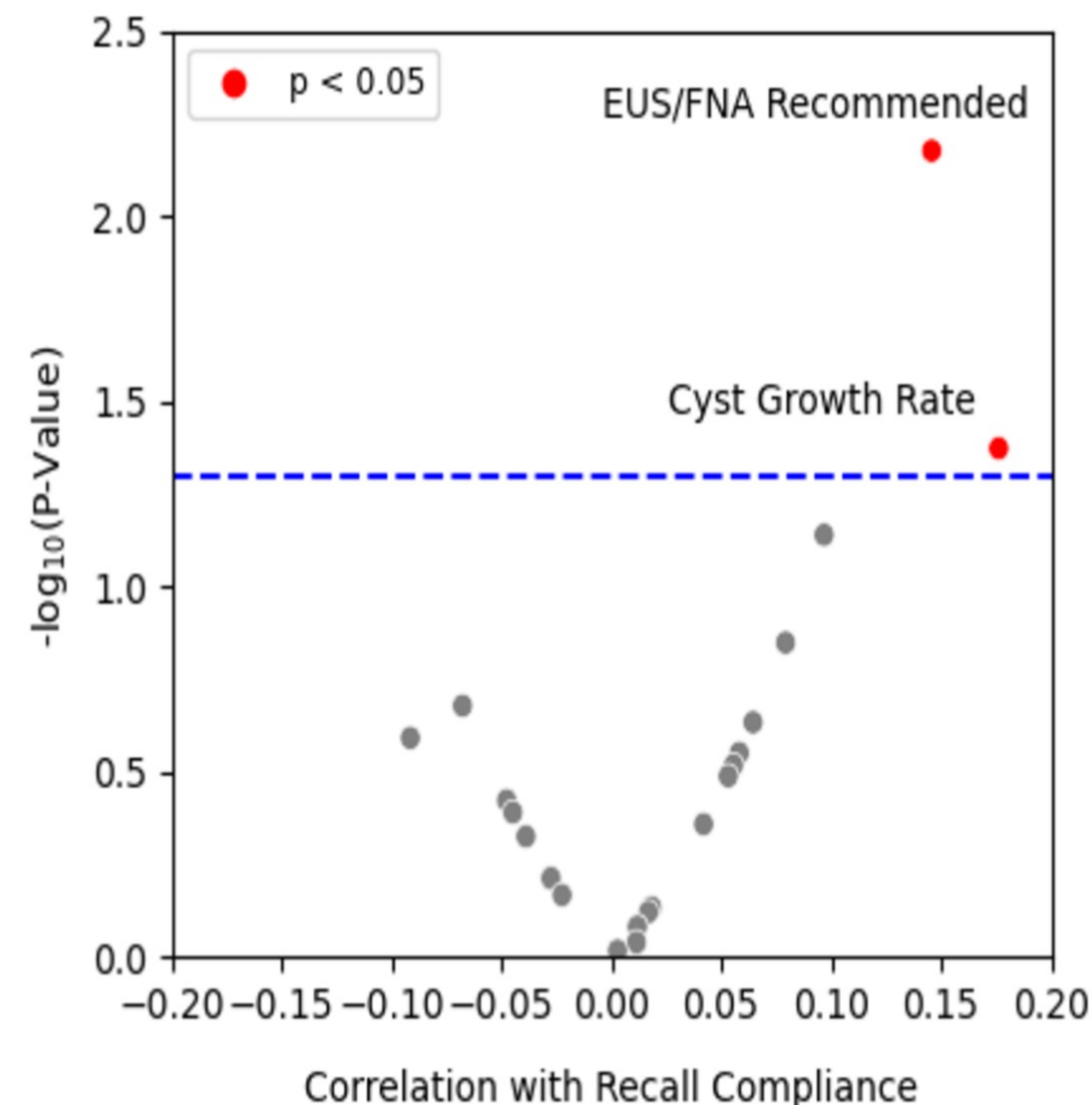


Figure 1. Association between pancreatic cyst report features and compliance for the large language model-based pancreatic cyst safety net. Recommendation for EUS/FNA and higher cyst growth rates were associated with increased compliance.

Conclusion

- We designed an artificial intelligence based safety net to capture pancreatic cyst surveillance recommendations
- There was overall low compliance with clinical guidelines (21%)
- Recommendation for EUS/FNA or higher cyst growth rates were associated with increased compliance with recommendations
- Large language models and artificial intelligence can be used to generate institution-wide pancreatic cyst safety nets that are reliable and quickly updated
- Similar models could be applied to other pathology and surveillance guidelines to allow for more consistent practice and fewer patients lost to follow up

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Reference:
Patel VR, Adamson AS, Liu JB, et al. Increasing incidence and stable mortality of pancreatic cancer in young Americans. *Annals of Internal Medicine* 2024.

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