

# CLINICAL DECISION SUPPORT TOOL AIDS IN MEDICAL SHARED DECISION MAKING FOR CHRONIC RHINOSINUSITIS ENDOSCOPIC SINUS SURGERY

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# Background

- Chronic Rhinosinusitis (CRS) is an inflammatory condition of the paranasal sinuses lasting >12 weeks despite treatment
- If antibiotics fail in treatment, endoscopic sinus surgery is recommended.
- Shared decision making between patients and providers is necessary
- A clinical decision support tool (CDS) could assist shared decision making around CRS surgery
- This project prototypes a web-based CDS tool to aid patients considering surgery for CRS
- The user interface (UI) of the tool incorporated stakeholder preferences and user-centered design principles

## **Methods**

- An interdisciplinary team spanning otolaryngology, clinical informatics, and computer science collaborated to develop the tool
- A web based clinical decision support tool was created using R- Shiny apps
- The tool uses a mock random-forest based machine learning algorithm with SNOT-22 score as the outcome metric
- The algorithm used data from a multi-system NIH/NIDCD study of sinus therapy outcomes with SNOT-22 as the outcome metric
- Surveying of the tool's utility was conducted using the System Usability Scale, Likert based survey questions used in previous clinical decision support tool creations, and free-text input for additional comments
- The survey included mock scenarios to guide participants through the tool

#### Results Rapid prototype Prototype Asynchronous Prototype restructuring to Development of Static design development evaluation with Requirement user testing mock machine accommodate Gathering wireframing using R Shiny interdisciplinary with case learning model preliminary scenarios feedback Figure 1. Iterative design process for CRSCDS tool development. Wireframing = design principle where sketches were drawn to determine what tool elements were needed clinical work clinical decision specifically rhinologists I think the tool will improve clinical decision making and patient... patient tool Easy straightforward I think the tool will fit well into my workflow I needed to learn a lot of things before I could get going with this... plan with patients Tool was intuitive I felt very confident using the tool. Intriguing and promising **Figure 3.** Word cloud from survey short text I found the tool very cumbersome to use. responses which asked open ended questions I would imagine that most people would learn to use this tool... I thought there was too much inconsistency in this tool. I found the various functions in this tool were well integrated. I think that I would need the support of a technical person to be I thought the tool was easy to use. I found the tool unnecessarily complex. I think that I would like to use this tool frequently. Scan to visit the tool ■ Strongly agree ■ Agree ■ Neutral ■ Disgree ■ Strongly disagree Figure 2. Likert scale responses to survey. The average time taken to complete the survey was 5 minutes. onic Rhinosinusitis Clinical Decision Support Tool Chronic Rhinosinusitis Clinical Decision Support Tool O Type 1 port to EHR This tool helps patients and physicians decide whether surgical intervention for treament of Chronic Rhinosinusitits is an appropriate After hitting submit on the main page, an EHR export will be generated to the right. Copy & strategy. paste this information into the patient's EHR Enter Patient Data: Data were inputted into a clinical decision support tool designed to predict the pote ntial improvement in SNOT-22 score after surgical intervention for chronic rhinosinus itis. In this instance, the starting SNOT-22 was 108 and is predicted to improve to 48.2 points ( 55 percent). This prediction model was developed and validated on exter nal datasets, and carries some degree of uncertainty in this specific instance. Ackno wledging this, the discussion regarding potential benefit of surgery could be initiat With surgical intervention, your SNOT-22 score of 108 could decrease to 48.2

Figure 4. Several screenshots of the tool (Left) Prepopulated tool before user input. (Center) Tool with variables input after clicking submit (Right) Text box for

users to copy and paste into preferred health record platform

### **Discussion & Conclusion**

- Rhinologists who perform endoscopic sinus surgeries were surveyed to gauge efficacy of the tool
- Preliminary findings suggest that most participants found the tool easy to use and would not need technical support to use the tool.
- Survey data indicated that nearly all participants agreed that they would use the tool frequently
- Most agreed that the tool would improve clinical decision making and patient care.
- The tool is mobile friendly, however participants were not asked to visit the mobile website
- The tool is a proof of concept and does not include a clinically validated model

## **Implications & Future Directions**

- Suggestions were made to improve the tool such as measurement specifics, including MCID, and including other diseases into the tool
- The tool is capable of quick adjustments; therefore, we aim to integrate a validated algorithm in the future
- We plan to have a wider scope of providers complete the survey beyond rhinologists to see the general utility of a similar platform
- Electronic health record integrated clinical decision support tools can have increased efficacy and utilization, which we will pursue in the future.

# Disclosures References

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