CLINICAL DECISION SUPPORT TOOL DEVELOPMENT FOR CHRONIC RHINOSINUSITIS

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Background

- Chronic Rhinosinusitis (CRS) is an inflammatory condition of the paranasal sinuses lasting >12 weeks
- When disease is refractory to medical therapies, endoscopic sinus surgery is considered
- Shared decision making is important for elective surgery where outcomes may vary
- A clinical decision support tool (CDS) could assist shared decision making around CRS surgery
- We developed a web-based CDS tool to aid patients considering surgery with CRS
- The tool incorporated a mock machine learning algorithm to accommodate a multifactorial surgical outcome

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 a patient reported quality of life outcome (SNOT-22 score) as the primary outcome metric
- The algorithm was developed using data from a multicenter NIH-funded study of sinus therapy outcomes
- XXX surgeons were asked to apply the CDS tool using 3 hypothetical case presentations
- Assessment 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

Results

Figure 1. Iterative design process for CRS-CDS tool development. Wireframing = design principle where sketches were drawn to determine what tool elements were needed

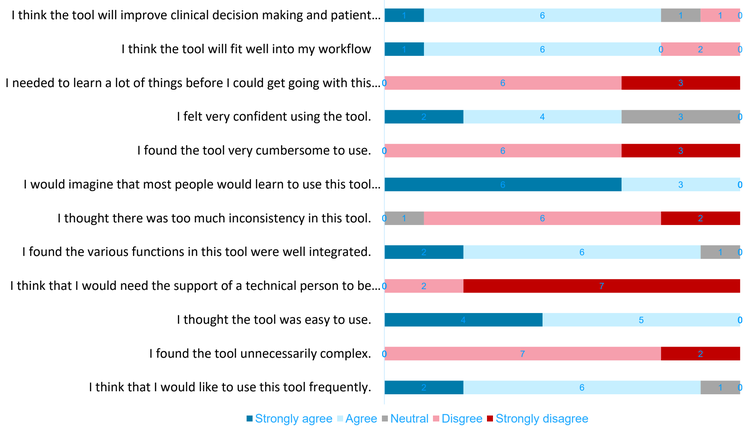

Figure 3. Word cloud from survey short text responses which asked open ended questions

Scan to visit the tool

Figure 2. Likert scale responses to survey. The average time taken to complete the survey was ~5 minutes.

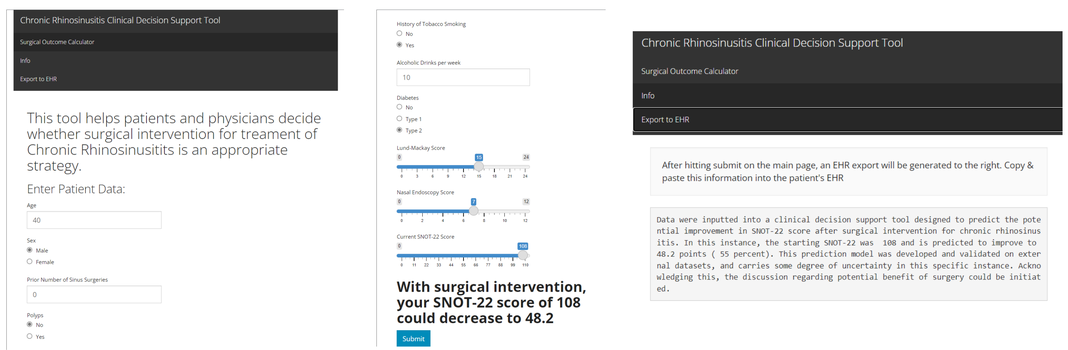

Figure 4. Screenshots of the tool. Left) Prepopulated tool before user input. Center) Tool with variables input after clicking "submit". Right) Text box for users to copy and paste into electronic health record system.

Discussion & Conclusion

- 9 Rhinologists were surveyed to gauge efficacy of the tool and provide feedback
- Most participants found the tool easy to use and would not need technical support to use the tool
- 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 CDS tool design is mobile friendly, however participants were not asked to visit the mobile website
- At this point, the CDS tool is in the proof-of-concept stage, as the prediction model required further refinement and external validation9

Implications & Future Directions

- Suggestions to improve the tool included measurement specifics such as the SNOT-22 MCID, and inclusion of other patient-centered outcomes
- Tool design is capable of iterative refinement. We aim to integrate a validated algorithm, and ideally prepare for reinforcement learning using larger data
- We plan to survey a wider scope of providers to assess the general utility of this type of platform
- Electronic health record integrated clinical decision support tools can have increased efficacy and utilization, which we will pursue in the future

Disclosures

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