

How to optimize radiologist reporting and interpretation as validated by Eye Tracking



Herbert Wertheim
College of Medicine

Mona P. Roshan MS¹, Jacklyn Garcia BS¹, Ana B. Cury², Chrisnel Lamy MS¹, Frederico Souza MD^{1,2}, Charif Sidani MD^{1,2}, Ricardo C. Cury MD MBA^{1,2}



1. Herbert Wertheim College of Medicine, Florida International University, Miami, FL 33199
2. Baptist Health of South Florida and Radiology Associates of South Florida, Miami, FL 33176

Introduction

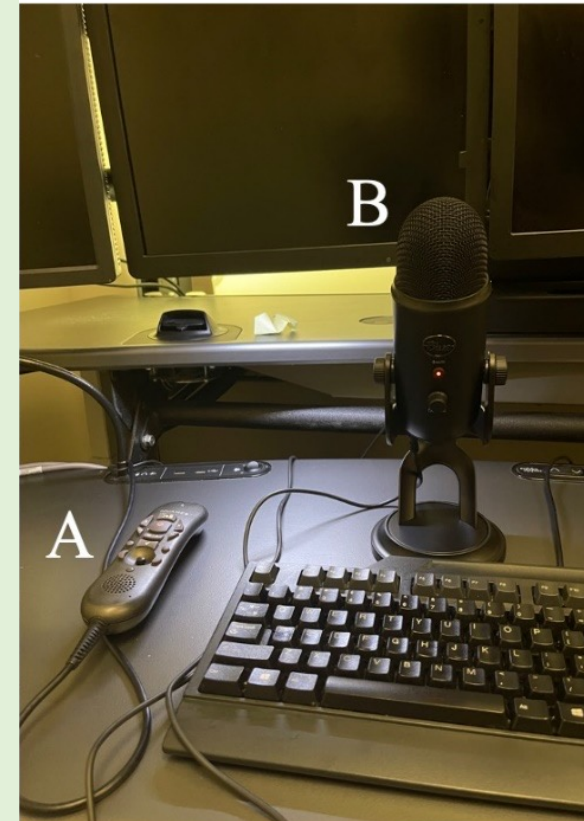
- The radiology report reflects the radiologist's expertise and commitment to interpreting images and understanding the patient's condition
- With the introduction of voice recognition and more recently conversational artificial intelligence (AI), radiologists abandoned the use of transcriptionists and began using voice recognition software [1]
- Conversational AI is a form of advanced voice recognition that understands physicians' speech and converts it into accurate text on a document
- Overall, this process aims to improve the patient-physician experience, enhance workflow efficiency, and reduce physician burn-out [2]
- However, voice recognition added an additional burden to the radiologists' workflow as it has produced an extra role for radiologists as self-editors [3]
- Therefore, there is a demonstrated need for a new dictation style that facilitates the benefits while overcoming the challenges

OBJECTIVE

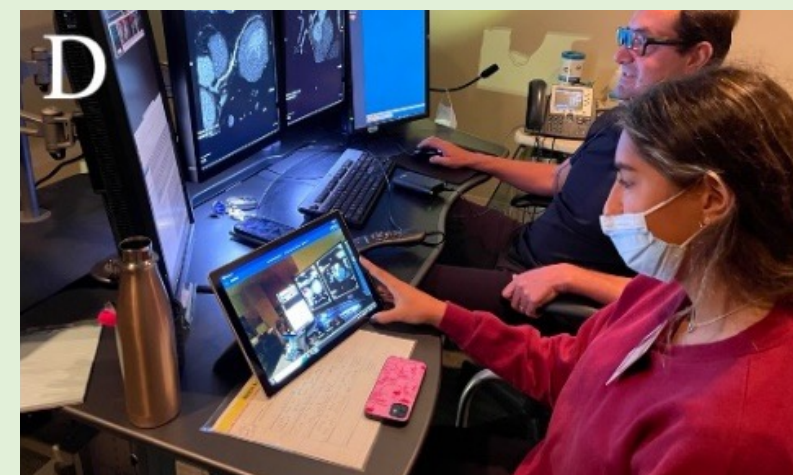
- The purpose of this study is to validate a new reporting style with the intent to maximize radiologist's interpretation time, increase accuracy and minimize dictation time as validated by eye tracking
- The goal is to provide a clinically relevant, concise, and accurate reporting style

METHODS

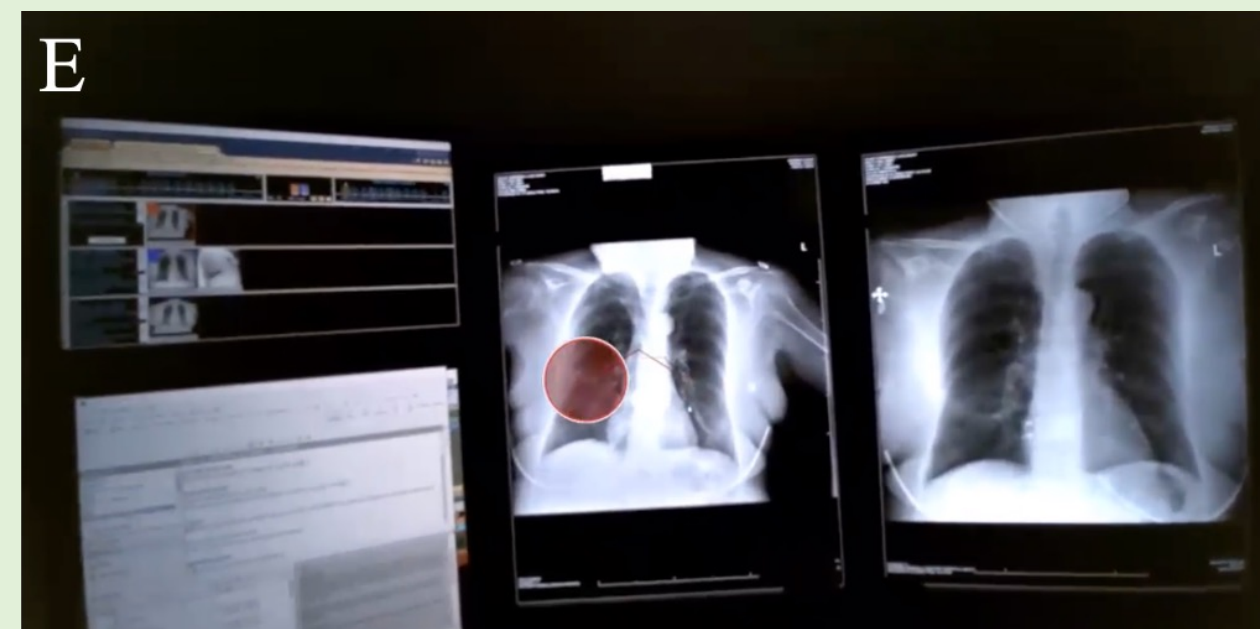
The **positive findings only dictation style** (n=76) using a **podcast stand alone microphone** (Fig. B) was compared with the **standard check-list dictation style** (n=81) using a **handheld microphone** (Fig. A).



An **eye tracking glasses device** (Fig. C) was used to capture eye movement to document radiologist dictation time, interpretation time, and total examination time & to generate thermal heat maps for each style.



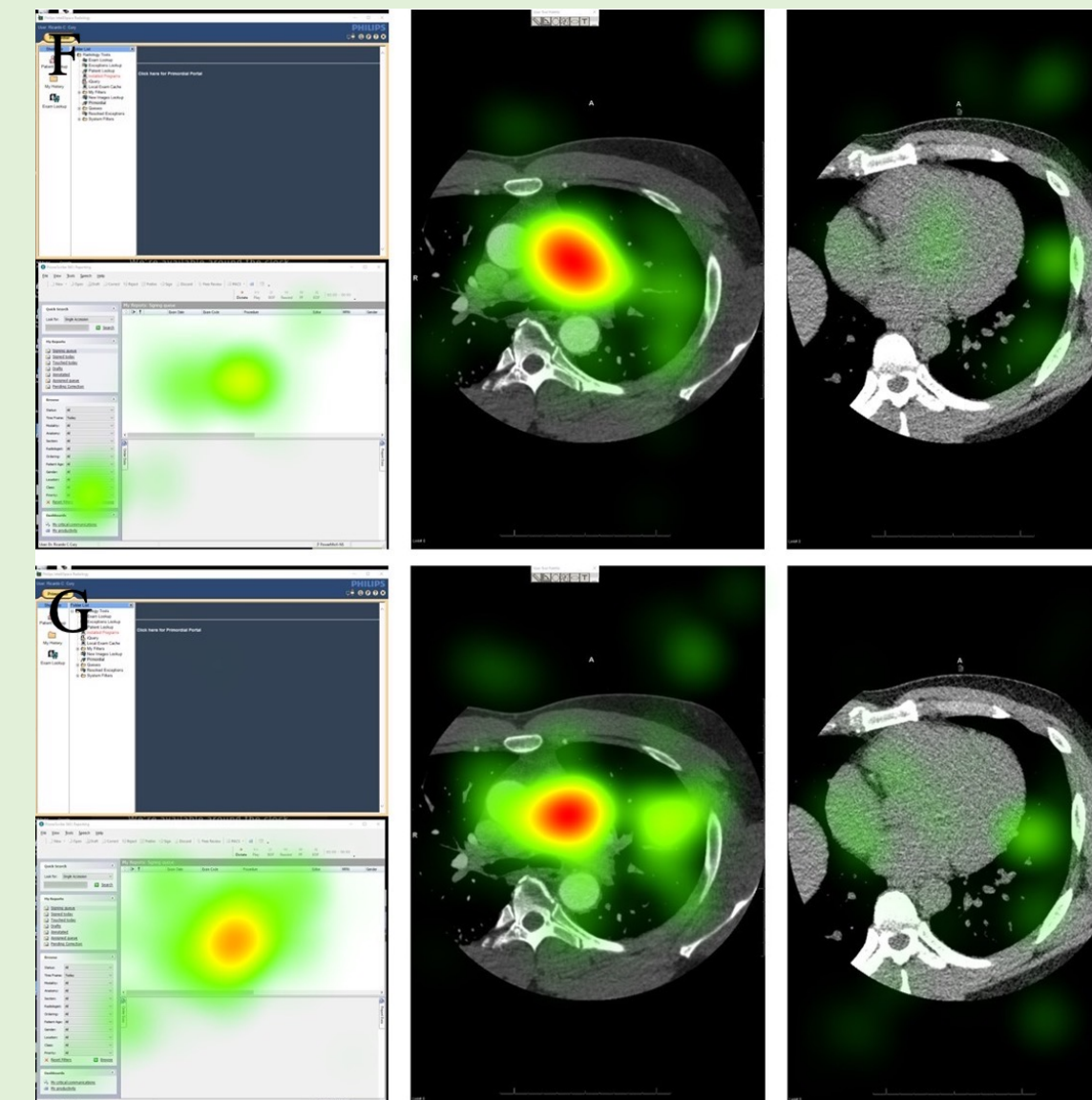
Board-certified diagnostic radiologists used each style for **various imaging modalities including x-rays and different types of CT studies**. The # of voice recognition corrections per case was kept track by medical students (Fig. D, E).



The statistical difference between the two methods was assessed by using descriptive analysis and inferential statistics.

RESULTS

Eye Tracking Comparisons for the imaging modality of Coronary Calcium Score comparing F) **positive findings only dictation style** and G) **standard check-list dictation style**



One can notice that the radiologist's eyes are more focused on the images rather than the reporting for the positive findings only dictation style with reduced heat map overlying the reporting software (lower left monitor in Fig. F) when compared to the standard check-list reporting style with increased heat map (lower left monitor in Fig. G)

Dictation Style	% of Cases w/ at least 1 Voice Correction	Average Dictation Time (s)	Average Interpret. Time (s)	Average Total Exam Time (s)
(+) Findings	5.26%	16.54	70.90	87.45
STD Check-List	14.81%	29.39	64.30	93.69
	$p = 0.0240$	$p = 0.0003$	$p = 0.7799$	$p = 0.3756$

CONCLUSION

- We aimed to demonstrate the evidence-based advantages of using a new structured dictation style using voice commands focused on dictation of positive findings
- Positive findings only dictation style significantly decreased dictation time and the number of voice recognition corrections, without compromising interpretation time and total examination time of radiologists
- With improvements in Conversational AI and ChatGPT, this clinically relevant, concise, and accurate reporting style will be useful for radiologists and the field of medicine

REFERENCES

- Hartung MP, Bickle IC, Gaillard F, Kanne JP. How to create a great radiology report. *Radiographics* 2020;40:1658–70. <https://doi.org/10.1148/rg.2020200020>.
- Krishnaraj A, Lee JKT, Laws SA, Crawford TJ. Voice recognition software: effect on radiology report turnaround time at an academic medical center. *American Journal of Roentgenology* 2010;195:194–7. <https://doi.org/10.2214/AJR.09.3169>.
- Hart JL, McBride A, Blunt D, Gishen P, Strickland N. Immediate and sustained benefits of a "total" implementation of speech recognition reporting. *Br J Radiol* 2010;83:424–7. <https://doi.org/10.1259/BJR/58137761>.

CONTACT INFORMATION

- Mona P. Roshan, MS: mrosh003@med.fiu.edu
- Jacklyn Garcia, BS: jgarc709@med.fiu.edu
- Ricardo C. Cury, MD MBA: rcury@baptisthealth.net