# Validation of Macro Button Toolbar System for Radiology Report Composition

Brennan Chow, IME Department Jill Speece, IME Department

### Introduction

The continued increase in imaging volume, decreases in payor reimbursements, and a declining radiologist workforce (Henderson, 2022) (Fleishon, 2022) (Maskell, 2022) necessitated the development of a faster way to compose high quality reports.

## Toolbar System

- Interactive toolbars contain macro buttons that deposit text from reference guidelines straight to the report template.
- Reference toolbars include buttons for quick access to images and information radiologists need to complete the report.
- The goal of the toolbar system for report composition is to speed up report turnaround time while also improving quality and reducing radiologist fatigue.

## Methods

- Daily work RVU for 8 full-time radiologists was compiled from an 18-month time frame spanning January 2022 through June 2023.
- Information for 404 complete reports were collected from eight unique radiologists.
- Observed radiologists were categorized into three groups based on their toolbar usage: low, moderate, and high users. The categorization was done based on the methodology of completing an X-ray report.

## Results

- 29% increase in radiologist wRVU productivity with high usage of an advanced macro-button template tool.
- 52.6% decrease in X-ray report completion time with high usage of advanced macro-button templates.

## Acknowledgements

We would like to extend our appreciation to:

- Paul and Sandi Bonderson for funding this research
- CENG Summer Undergraduate Research Program 2023
- Radiology Associates

## References

ACR American College of Radiology. (n.d.). Liver Reporting & Data System (LI-RADS). Retrieved June 17, 2020, from ACR American College of Radiology : https://www.acr.org/Clinical Resources/Reporting-and-Data-Systems/LI-RADS ACR American College of Radiology. (n.d.). Lung CT Screening Reporting & Data System (Lung-RADS). Retrieved June 17, 2020, from https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/Lung-Rads. Chang, C. A., Strahan, R., & Jolley, D. (2011). Non-Clinical Errors Using Voice Recognition Dictation Software for Radiology Reports: A Retrospective Audit. J Digit Imaging, 724-728. doi:10.1007/s10278-010-9344-Coakley, F. V., Liberman, L., & Panicek, D. M. (2003, February). Style Guidelines for Radiology Reporting: A Manner of Speaking. American College of Roentgenology, 180(2). doi:https://doi.org/10.2214/ajr.180.2.1800327 Collins, J. (2020, November 30). Radiologist Salary Update 2020: Show Me The Money! Retrieved from The Reading Room: https://thereadingroom.mrionline.com/2020/11/radiologist-alary-update-2020-show-me-the-money/ Davis, P. L. (2001). Assessing the Potential versus the Actual Earnings of Academic Radiologists: Effects of Unequal Duty Service Assignments. Journal, 782-791. doi:https://doi.org/10.1016/S1076-6332(03)80587-1 Fleishon, H. B. (2022, February 10). The Radiology Labor Shortage. American College of Radiology. Retrieved from https://www.acr.org/Practice-Management-Quality-Informatics/ACR-Bulletin/Articles/March-2022/The-Radiology-Labor-Shortage

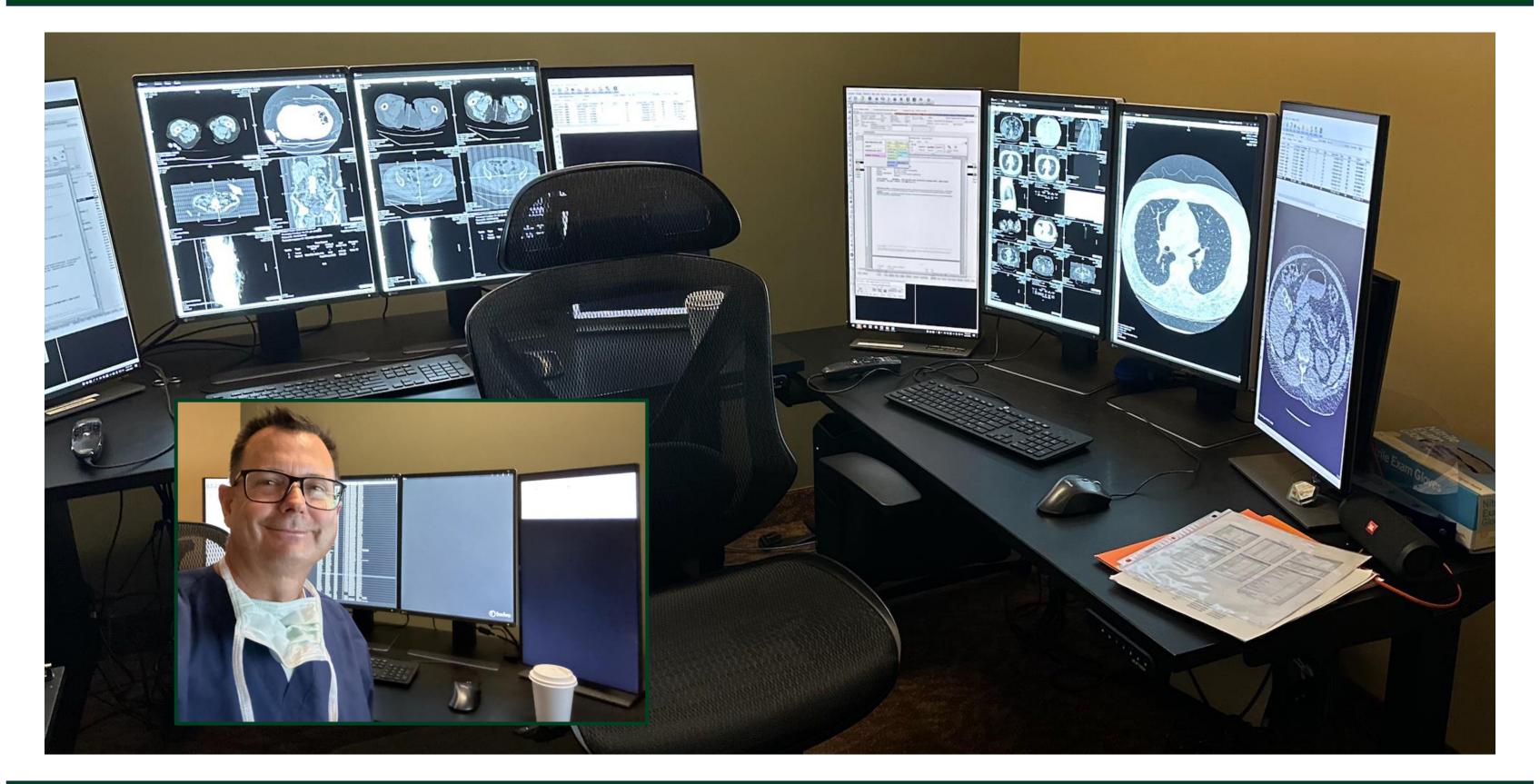
Henderson, M. (2022, May 10). Radiology Facing a Global Shortage. Retrieved August 22, 2023, from RSNA: https://www.rsna.org/news/2022/may/global-radiologist-shortage Maskell, G. (2022, November). Why does demand for medical imaging keep rising? BMJ. doi:https://doi.org/10.1136/bmj.o2614

Merritt Hawkins. (2014). RVU FAQ Understanding RVU Compensation. Irving, Texas: Merritt Hawkins. Retrieved from https://www.merritthawkins.com/uploadedFiles/MerrittHawkins/Pdf/mha-RVU.pdf

Murphy, H. (2022, June 17). Have radiologists' salaries kept up with their workloads? New survey offers detailed insight. Retrieved from https://healthimaging.com/topics/healthcaremanagement/radiologist-salary/have-radiologists-salaries-kept-their-workloads-new

# **Big Idea:** High usage of macro button toolbar system over voice recognition for radiology report composition improves radiologist productivity.

Radiology Reporting Workstation



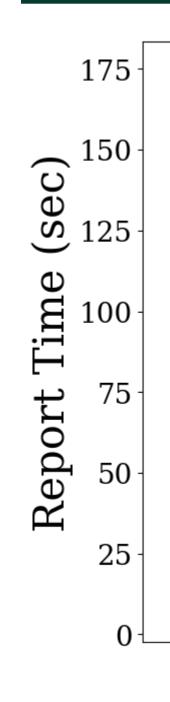
Macro Button Toolbar Example and Radiologist Report Sample

NEGATIVE Conclusion:		NEGATIVE Findings and Conclusion:			NEGATIVE At Cursor:				
Normal	Negative	Neg Trauma Abd/Pel	Neg Abscess	NI Appendix	Gastric Bypass	No Change	a	No Other Change	
NAD	NAF	Neg Trauma CAP	Neg Hematuria	No Appendix Seen	Normal Appendix	No Enhance	ement	t Unremarkable	
Normal For Age	No Expl Sympt	Neg Trauma Chest	Neg Hydro	Neg Diverticulitis	F	POSITIVE At Cursor:			
No Change	OW No Change		Neg Obst Uropathy	Neg N/V	LIVER		PELVIC ORGANS		ans
то	DLS:	POSITIVE Findings and Conclusion:			Granulomas		BPH		
# Conclusion	Align Priors	Liver	Kidneys	Bowel	Liver Cysts		Hysterectomy		
Substitute	< >	Cirrhosis	Bladder Stone	Appendicitis	TSTC		Kidney Cysts		
Undo	Redo	Cirrhosis w/PV HTN	R K Stone B L	Colitis Focal	AORTA/VAS	CULAR	Ute Not Seen		
Clinical Erase	Page Break	Fatty Liver	Ureteral Stone R	Colitis Pancolitis	Arterial Calcs				
COMMUNICATION:		Biliary	Ureteral Stone L	Colitis w/Abscess	BOWEL/MESH	ENTERY BONES			
MD Notified Message		Cholecystectomy	Aorta/Vascular	Diverticulitis	Divertic Pan		Comp F	x	
Office Called	Add. Pending	Cholecystitis	AO Aneurysm	Divertic w/Abscess	Divertic Sig		DDD		
Night Shift	Shift IR Scheduling Gallstones		AO Ectasia	Misty Mesentery	Divertic Sig/Desc		Facet C	A	
RECOMMEND:		Pancreas			Hernia Hiatal		Hip OA	R	
MRI WO	w wo/w	Panc Mass			ABDOMINAL	WALL	Hip OA	L	
CT WO	w wo/w				Hernia Ing R		Hip OA	в	
					Hernia Ing L		Scoliosis	5	
					Hernia Ing B		More Bo	ones	
TOOLBARS LINK TOOLBAR HELP RADIOLOGY HELP					Hernia Mid				





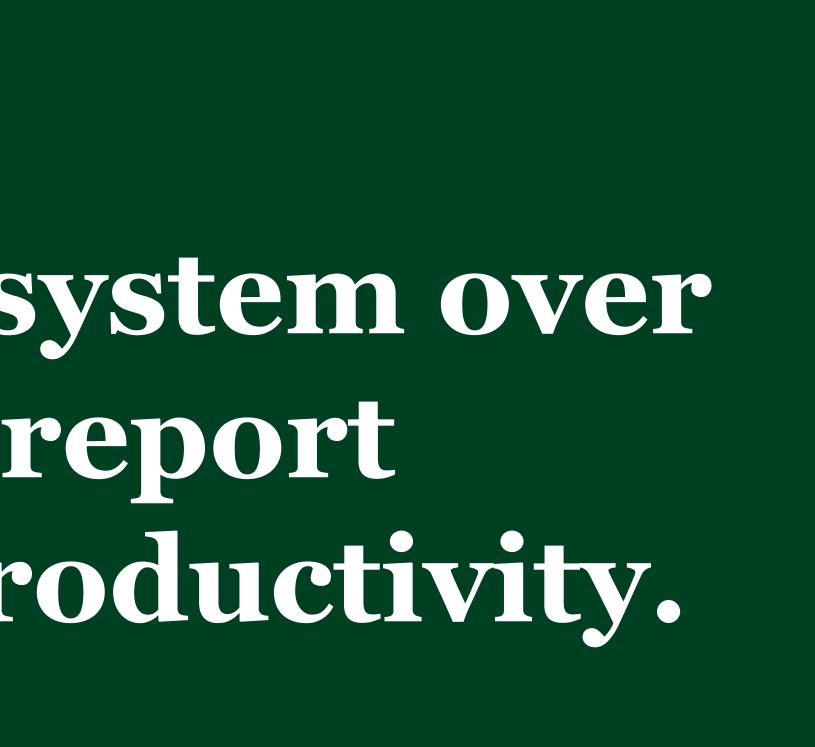
AP TOOLBARS LINK 6.28.19	× :es Mailings Review View Developer Help 🖻
ABDOMEN/PELVIS CHEST	Normal     Negative     Image: Styles     Image: Styles     Image: Styles     Image: Styles     Image: Styles     Image: Styles       NAD     NAF     A     Image: Styles     Image:
RADIOLOGY HELP	Normal For Age       No Expl Sympt         No Change       OW No Change         # Conclusion       Align Priors
PROCEDURE:	CT OF THE CHEST, CT OF THE ABDOMEN WITHOUT AND WITH INTRAVENOUS CONTRAST, & CT OF THE PELVIS WITH INTRAVENOUS CONTRAST
COMPARISON:	None.
INDICATIONS:	
CHEST: LUNGS: BRONCHI: CARDIAC: VASCULAR: HILA/MEDIASTIN PLEURA: CHEST WALL: BONES: OTHER:	No worrisome nodules, masses or consolidation. No bronchiectasis. No chamber enlargement. No pericardial effusion. No aneurysm. IUM: No mass or adenopathy. No mass or adenopathy. No mass or effusion. No mass or axillary adenopathy. No acute findings. Negative.
ABDOMEN/PELV LIVER: BILIARY: PANCREAS: SPLEEN: ADRENALS: KIDNEYS: AORTA/VASCULA RETROPERITON BOWEL/MESENT ABDOMINAL WAI PELVIC NODES:	<ul> <li>No worrisome mass lesions.</li> <li>No intrahepatic duct dilatation.</li> <li>No mass or peripancreatic inflammation.</li> <li>No enlargement.</li> <li>No masses or enlargement.</li> <li>No evidence of obstruction.</li> <li>AR: No evidence of aortic aneurysm.</li> <li>IEUM: No adenopathy.</li> <li>TERY: No bowel obstruction. No inflammatory changes around the bowel.</li> </ul>



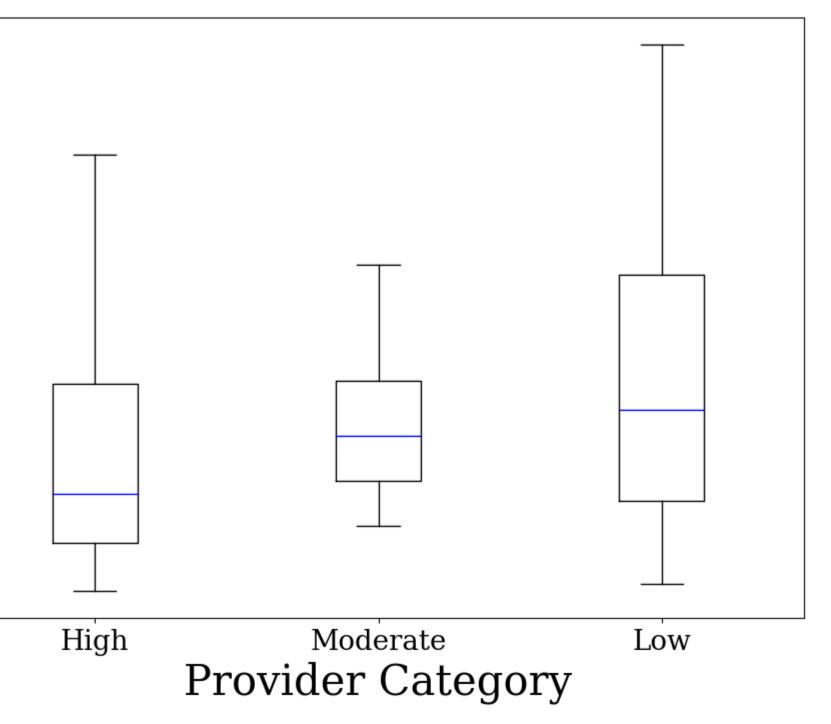
	Dail
	200
	175-
'Us	150-
r RV	125-
/ork	100-
y M	75 -
Dail	50 -
	25-
	0

*Chart 2*: Comparison of daily wRVU productivity between radiologist toolbar usage groups

# LEARN BY DOING College of Engineering



### Report Completion Time for XR Exams



*Chart 1*: Comparison of report completion time between radiologist toolbar usage groups

### ly wRVUs (Jan 2022 – June 2023)

