

# Reading Room Assistance Pilot: Improving Radiologist Workflow

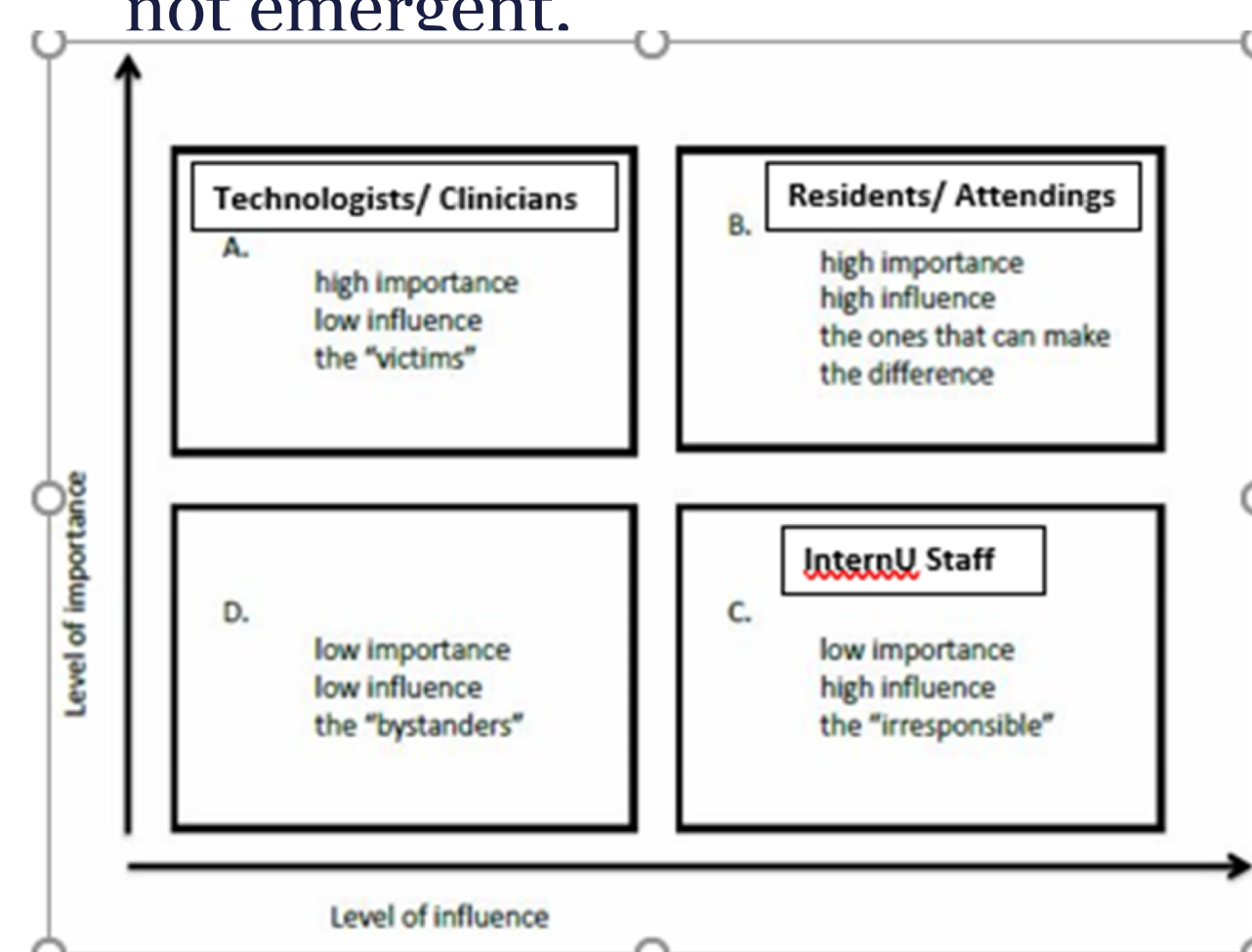
Michael Hoy MD

Christopher G. Roth, MD, MS-HQS

Rashmi Balasubramanya MD

## Problem Definition

Clinical work in the radiology reading room is often interrupted by phone calls. The effects of interruptions have been shown to increase errors in many hospital settings. Yu et al found that on call radiologists are interrupted as frequently as every 4 minutes by telephone calls. This is a problem encountered in the body reading room at Jefferson, with calls from radiology technologists and other members of the radiology team, inpatient teams, outpatient consulting providers, and other miscellaneous sources all contributing to the influx of calls each day. Burnout is an important factor in maintaining staff viability and effectiveness, and is an identified problem based on the most recent faculty StandPoint survey, with the high frequency of phone calls and distractions being a known dissatisfier for residents. Most phone call interruptions are not urgent and do not require immediate communication and are amenable to less immediate and distracting forms of communication than phone calls. A preliminary assessment reveals that a substantial proportion of calls emanates from technologists and do not require immediate communication and are amenable to alternative forms of communication. Other frequent communications originate from clinicians requesting a preliminary interpretation or clarification and the vast majority are not emergent.



Stakeholder	Interests	Position	Influence	Involvement	Special Considerations
Attending	Reading room distractions	Less distractions	Most control over workflow	High	
Residents	Reading room distractions	Less distractions	Can provide feedback to attendings	High	Consider job of precept resident
Technologists	Phone feedback	Quick turnaround on requests	Can provide feedback	Varied	Will improvements for Radiologists hurt Technologists?
InternU staff	Learning how to do job	Manageable work	No	High	
Clinicians	Reach, protocols	Outlier reach, fast assistance with protocols	No	Low	Will improvements in workflow improve clinician experience with Radiology?

## Aims For Improvement

Our aim for improvement was to find ways to decrease distractions and phone calls in the body radiology reading room and to convert unpredictable and “immediate-response distractions” to “managed distractions” that can be addressed without aborting patient care/case interpretation immediately and unnecessarily. The goal was to decrease interruptions which would allow more time to be spent on reading cases, learning, and teaching. One metric that we identified was the number of phone calls to the reading room, which we intend to decrease by 50% within the first quarter. Another metric was the radiology attending and resident attitudes toward workflow and efficiency in the reading room. We intend to assess radiologist perception of the workflow environment and a decrease in distractions as measured by a survey administered before and after implementation. Additionally, we expect to improve efficiency and will compare productivity in terms of care delivered/cases reviewed.

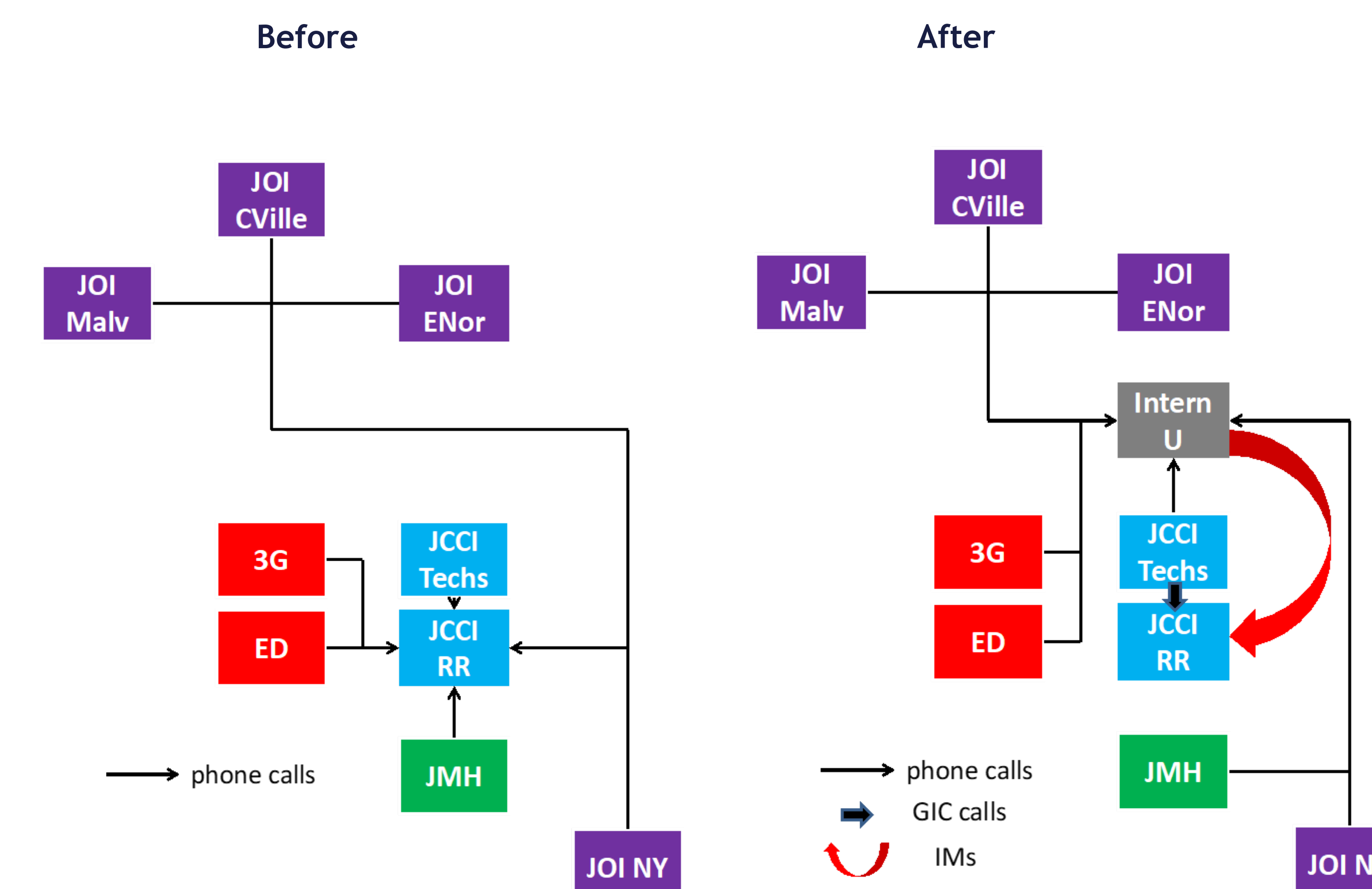
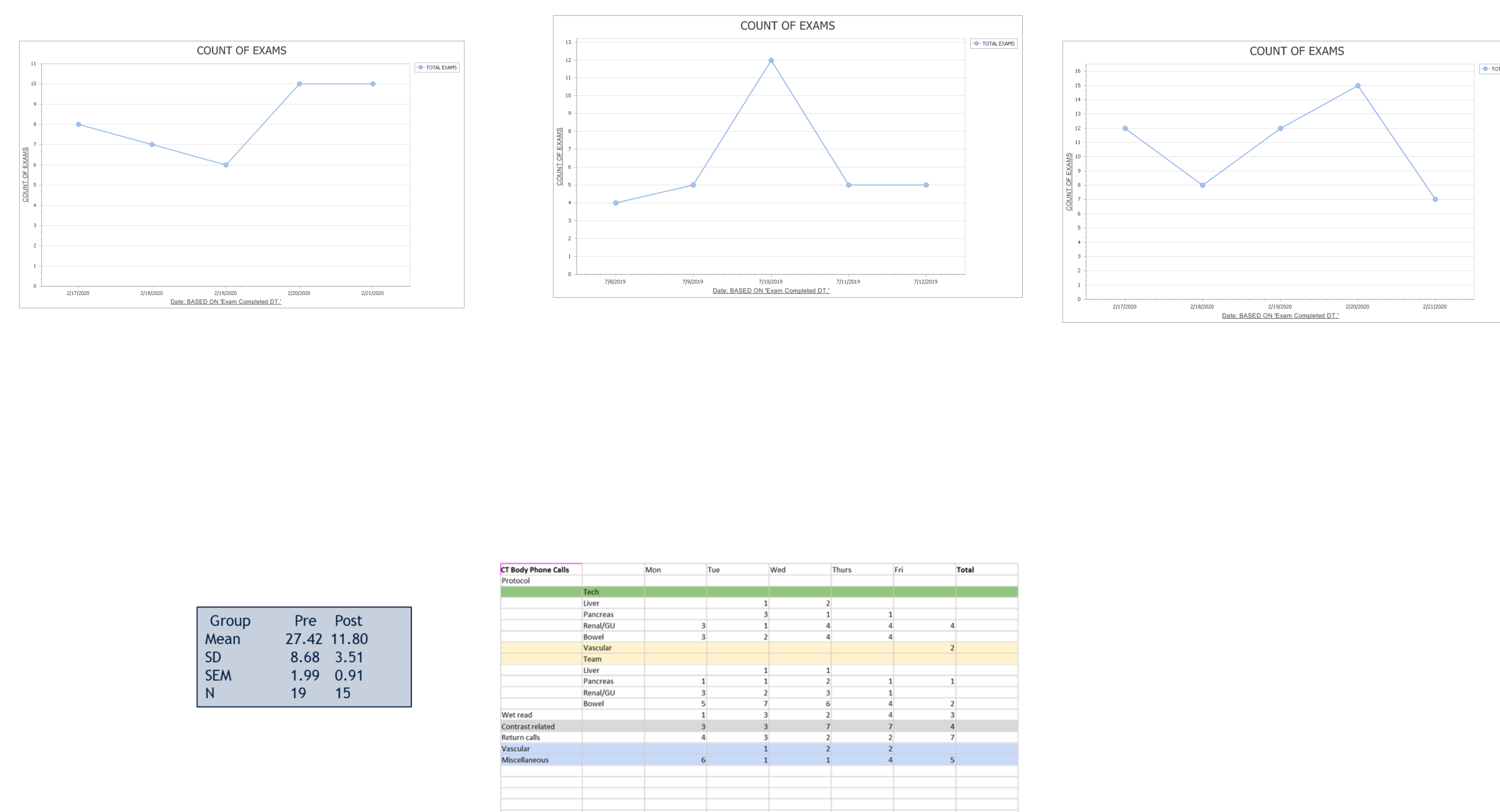
## Intervention

The intervention we proposed was the use of a 3<sup>rd</sup>-party company (InternU) to provide “reading room assistance” (RRA) to field the phone calls that were otherwise directly targeting the reading rooms and physicians/radiologists delivering direct patient care by interpreting imaging studies involving the assimilation of massive data requiring maximal concentration and focus. The initial pilot study will involve RRA staff directing calls to the appropriate people, and when possible, communicate with attending radiologists and fellows/residents in the body reading room via an electronic messaging tool.

The data collection involved having a resident record the phone calls they received during the day before and after implementation. We also sent out a survey to all radiology residents and attendings before and after implementation, in order to assess attitudes toward workflow. We have three hypotheses: 1. There will be a statistically significant difference between the average number of calls to the reading room before and after implementation of the RRA program. 2. There will be a statistically significant difference between the survey scores before and after implementation of the RRA program. 3. There will be a statistically significant increase in efficiency in the most heavily distracted radiology staff person (protocolling resident) after implementation of the RRA program.

## Measurement and Results

We recorded 4 weeks of phone calls prior to implementation of the reading room assistants, as well as 3 weeks of phone calls after implementation. The average number of phone calls to the reading room before our “intervention” was 27.4 ± 8.7. The average number of phone calls to the reading room after our “intervention” was 11.8 ± 3.4. InternU staff have averaged approximately 30 calls per day. Using the Wilcoxon rank sum test, there was a significant difference between the two groups. The p-value is < .00001. The result is significant at p < .05. Due to COVID-19 changes, we have been unable to obtain post implementation survey data at this time. With the limited data comparing number of cases read by residents, we did not find a significant difference between number of cases read before and after implementation by our R1 residents.



## Next Steps and Lessons Learned

We have encountered a number of issues and have had to work to resolve them while in the initial phases. One way we were able to do this was by performing a PDSA (Plan-Do-Study-Act) cycle. This allowed us to have a framework for implementing our intervention and helped us assess the early feedback we received. In addition, performing a “stakeholder analysis” involved thinking about all affected parties and allowed us to predict some of the issues we would encounter. The early feedback indicates a predictably favorable response from radiologists experiencing the benefit of the RRA program and a predictably unfavorable response from the technologists accustomed to immediate and unfettered access to radiologists notwithstanding their involvement in patient care.

Next Steps:

This project served as a pilot study in the CT Body division

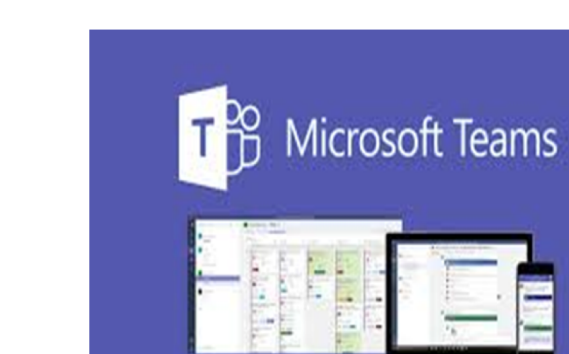
Continue survey data collection

Goal to implement full time use of Reading Room Assistance

Expansion into other departments

- Neuro
- MSK
- Ultrasound

Continued use of Microsoft Teams



Citations:

Drew T, Williams LH, Aldred B, Heilbrun ME, Minoshima S. Quantifying the costs of interruption during diagnostic radiology interpretation using mobile eye-tracking glasses. *J Med Imaging (Bellingham)*. 2018;5(3):031406. doi:10.1117/1.JMI.5.3.031406  
 Acad Radiol. 2014 Dec;21(12):1623-8. doi: 10.1016/j.acra.2014.08.001. Epub 2014 Oct 3. Do telephone call interruptions have an impact on radiology resident diagnostic accuracy? (<https://www.ncbi.nlm.nih.gov/pubmed/25281360>)  
 Levy J.L., Freeman C.W., Cho J.K., Iyalomhe O., Scanton M.H. Evaluating the Impact of a Call Triage Assistant on Resident Efficiency, Errors, and Stress Journal of the American College of Radiology, 2020  
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 John-Paul J. YuMD, PhDAkash P.KansagraMD, MSAJohnMonganMD, PhDa  
<https://www.sciencedirect.com/science/article/pii/S1546144013008508>

