



# Streaming Live Procedures for a Virtual Medical Student Rotation in the Era of COVID-19



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## Introduction

- Visiting medical students banned from in-person rotations at CU due to COVID-19 pandemic.
- Interventional radiology (IR) residency recruits heavily from visiting medical students.
- Virtual elective designed to allow for continued education of interested medical students and to develop relationships with potential applicants.

## Objectives

- Develop IR virtual elective curriculum
- Develop infrastructure for streaming live cases
- Evaluate medical student perceptions of the elective

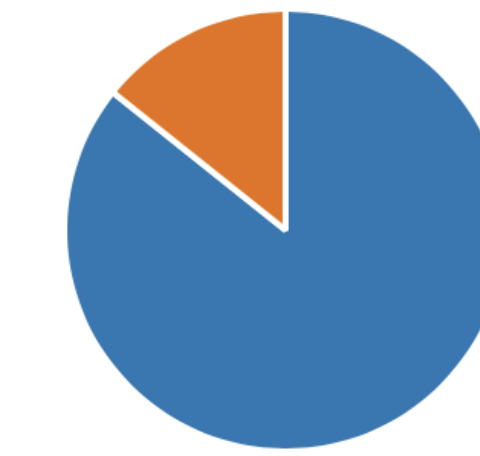
## Materials & Methods

- 2-week virtual elective
- **CURRICULUM:**
  - *Live Content*
    - Daily morning case and imaging review
    - Daily review of inpatient service
    - Live IR and diagnostic radiology resident lectures
  - **Live streamed IR cases**
  - *Pre-recorded lecture content*
    - Core and elective lectures
- **COMPLIANCE**
  - HIPAA compliant, UCHHealth HIPAA approved
  - Data security compliant
    - University Microsoft cloud-based platform
  - Media and marketing patient consent
  - CU Medical School course approval
- **Equipment**
  - Start up cost
    - Initial investment \$1,547
    - Second round \$3,885
      - Majority dedicated laptop
  - Audio
    - eMeet M2 speakerphone
    - Apple AirPods
  - Video
    - GoPro cameras (2x)
    - Video capture device, StarTech
  - Software
    - RTMP Server (MonaServer)
    - Open Broadcast Software (OBS)
    - Microsoft Teams

## Results

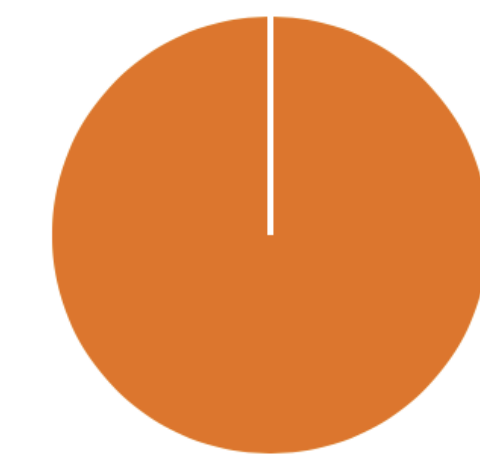
Have you had a previous in-person interventional radiology (IR) elective/rotation?  
[More Details](#)

Yes	6
No	1



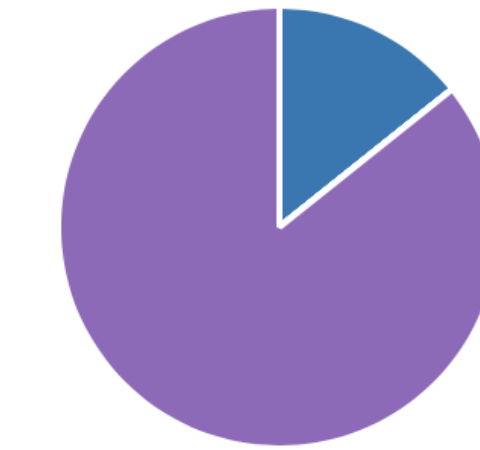
Have you had a previous "COVID-era"/remote learning of interventional radiology (IR) elective/rotation?  
[More Details](#)

Yes	0
No	7



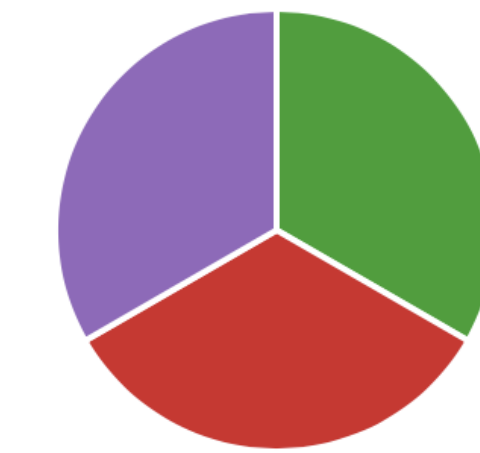
What is your current level of interest in matching into radiology residency, specific to Integrated IR/DR?  
[More Details](#)

None	1
Low	0
Moderate	0
High	0
Very high	6



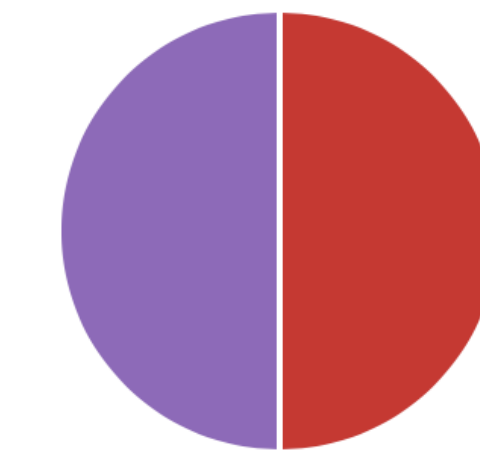
How well did this virtual elective meet your learning expectations?  
[More Details](#)

Far short of expectations	0
Short of expectations	0
Meets expectations	2
Exceeds expectations	2
Far exceeds expectations	2



Relative to the text book study and recorded lectures, how would you rate the effectiveness of the streaming of live cases and procedures overall?  
[More Details](#)

Not effective at all	0
Slightly effective	0
Somewhat effective	0
Very effective	1
Extremely effective	1



- Most students had previously completed traditional in-person IR rotations.
- None had completed a virtual IR rotation.
- Enrolled students were highly interested in matching in IR.
- The rotation met or exceeded expectations of all students that have rotated to date.
- Respondents found live cases to be highly effective relative to book study and pre-recorded lecture materials.

## Conclusions

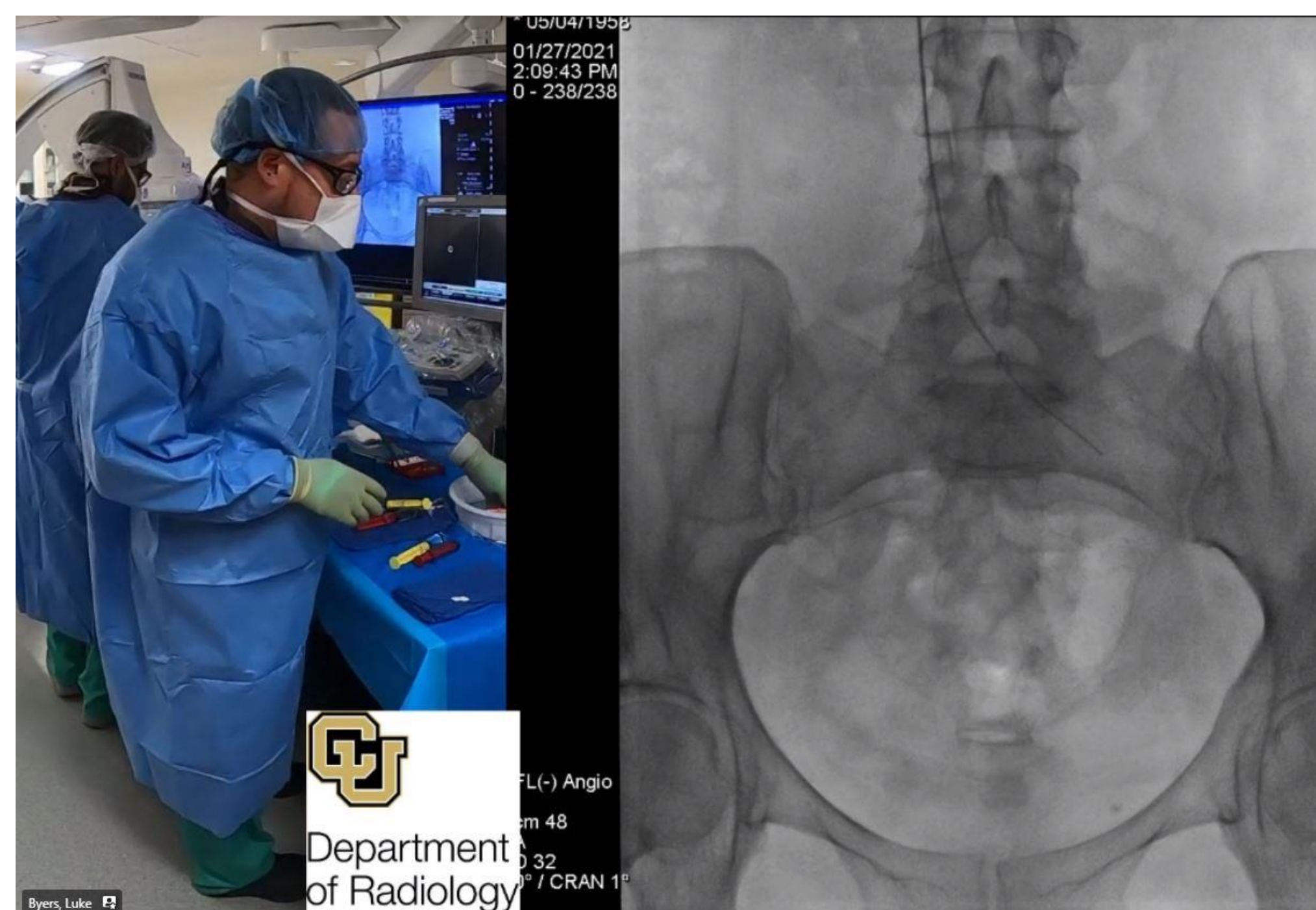
- Live streaming of IR procedures is technically feasible and can be achieved for a relatively low start up cost.
- Virtual rotations can attract highly-interested medical students.
- Live streaming of procedures with real-time teaching is perceived by students to be highly effective relative to book study and pre-recorded lecture content.

## References

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Dr. Rochon teaches during a live case. This is the screen seen by virtual medical student rotators off-site, showing live fluoroscopy feed and live camera feed from the procedure suite. Live two-way audio is available for communication between the student and the procedure room.



“The live cases were exciting and engaging. The radiologists did a great job of keeping me informed about what was happening and asking if I had questions. I really enjoyed these cases, especially when interacting with the radiologists.”  
–Virtual IR Elective Student