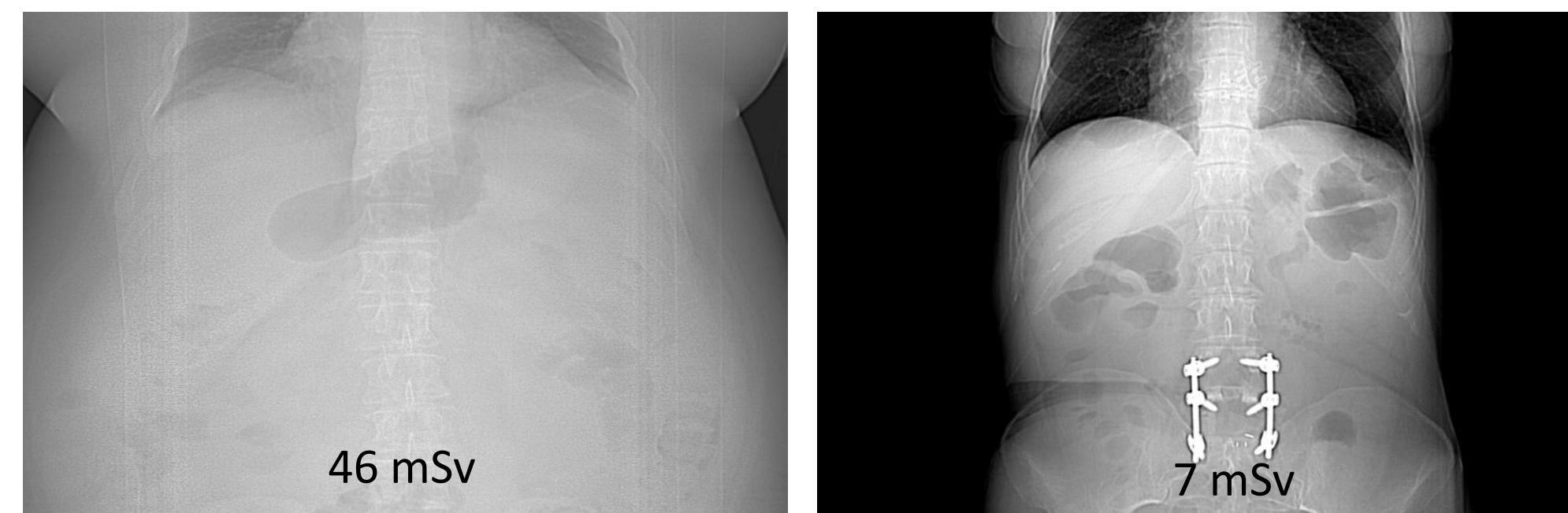


## Problem Statement

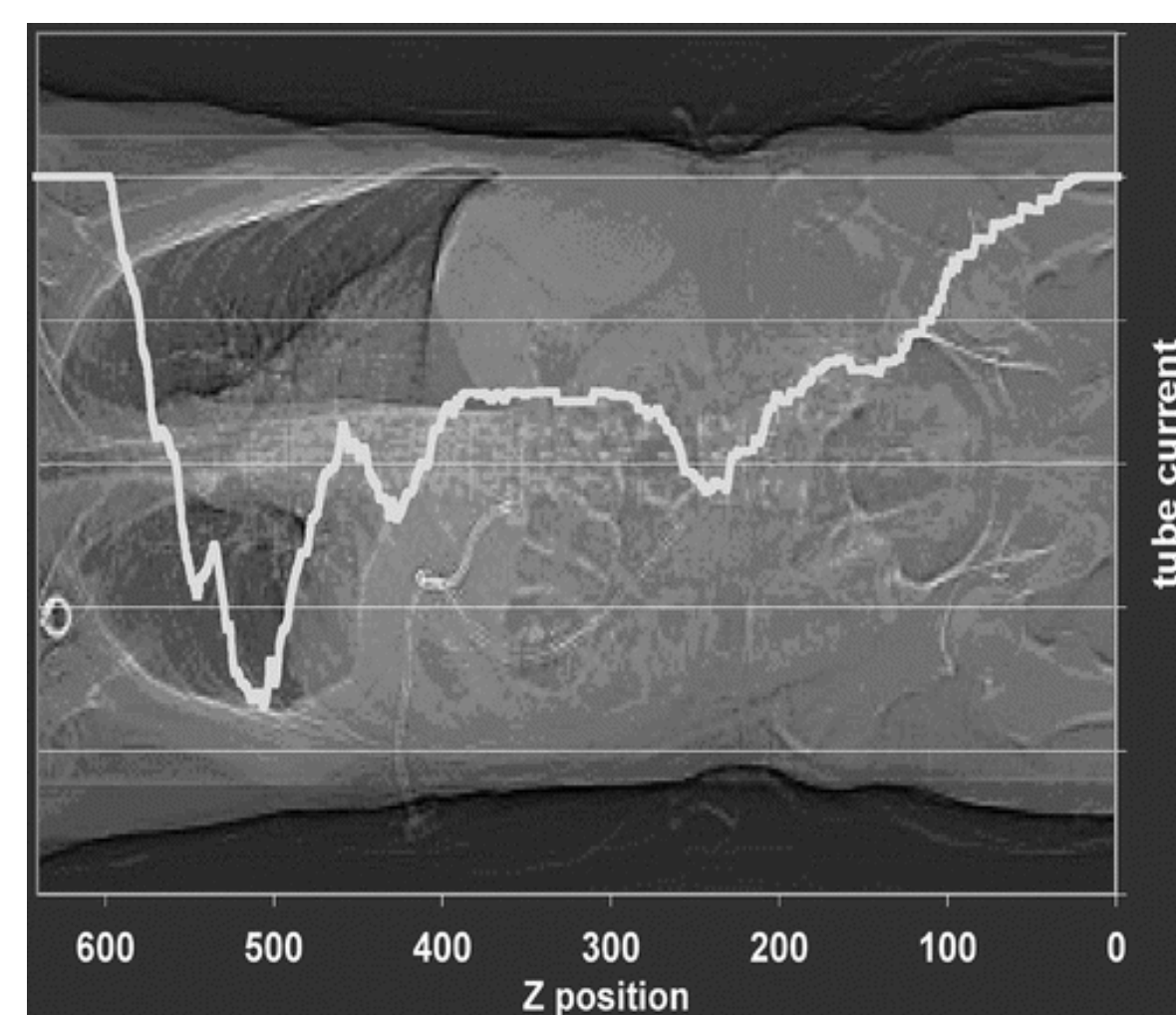
Radiation doses on lumbar spine CT's performed at Memorial campus (particularly in larger patients) are too high resulting in excess cancer risk to patients.

## Background

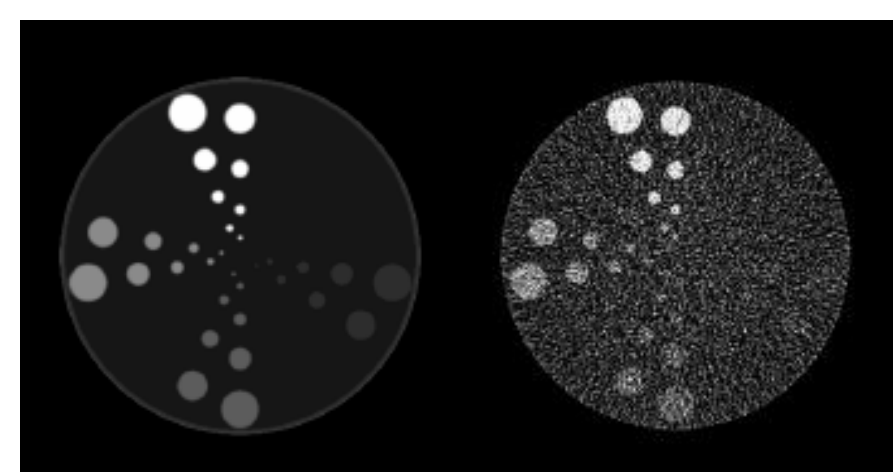
- 2012 – over 68 million CT's performed
- Cancer risk estimate – 1-2% of all cancers
- Radiation dose measured in “seiverts”
- Typical dose for lumbar spine CT – 10 mSv
- At UMass, average dose over 5 months – 15.5 mSv
- 17 cases with doses exceeding 25 mSv
- All occurred in larger patients



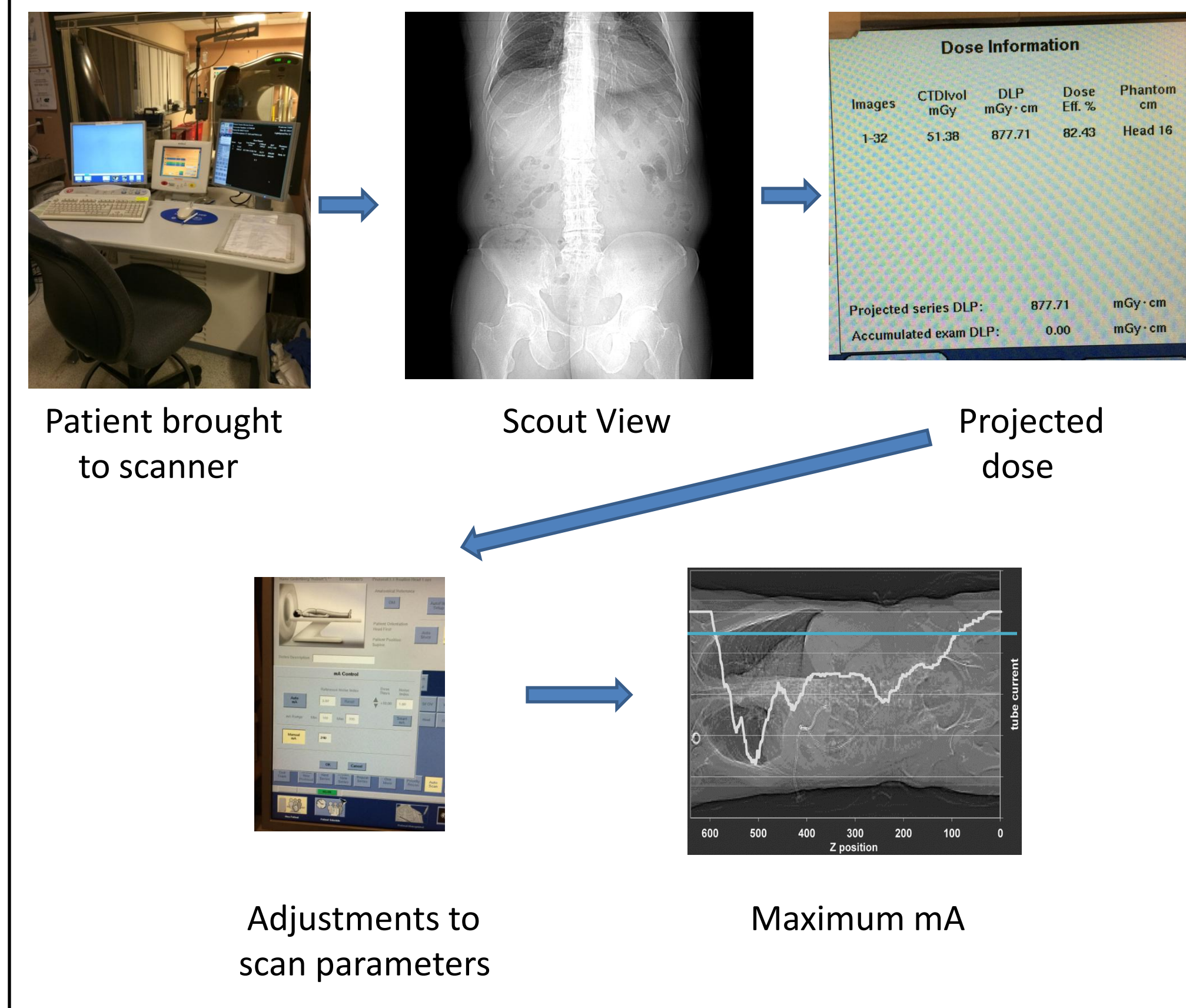
- Different body parts require different amounts of radiation to penetrate tissue.
- Larger patients need higher doses
- Automatic Exposure Control (AEC)



- Radiation vs image quality



## Current Condition



## Root Cause Analysis

Radiation doses too high

Why?

Automatic exposure control modulating too high in larger patients

Why?

No upper limit being set by technologist

Why?

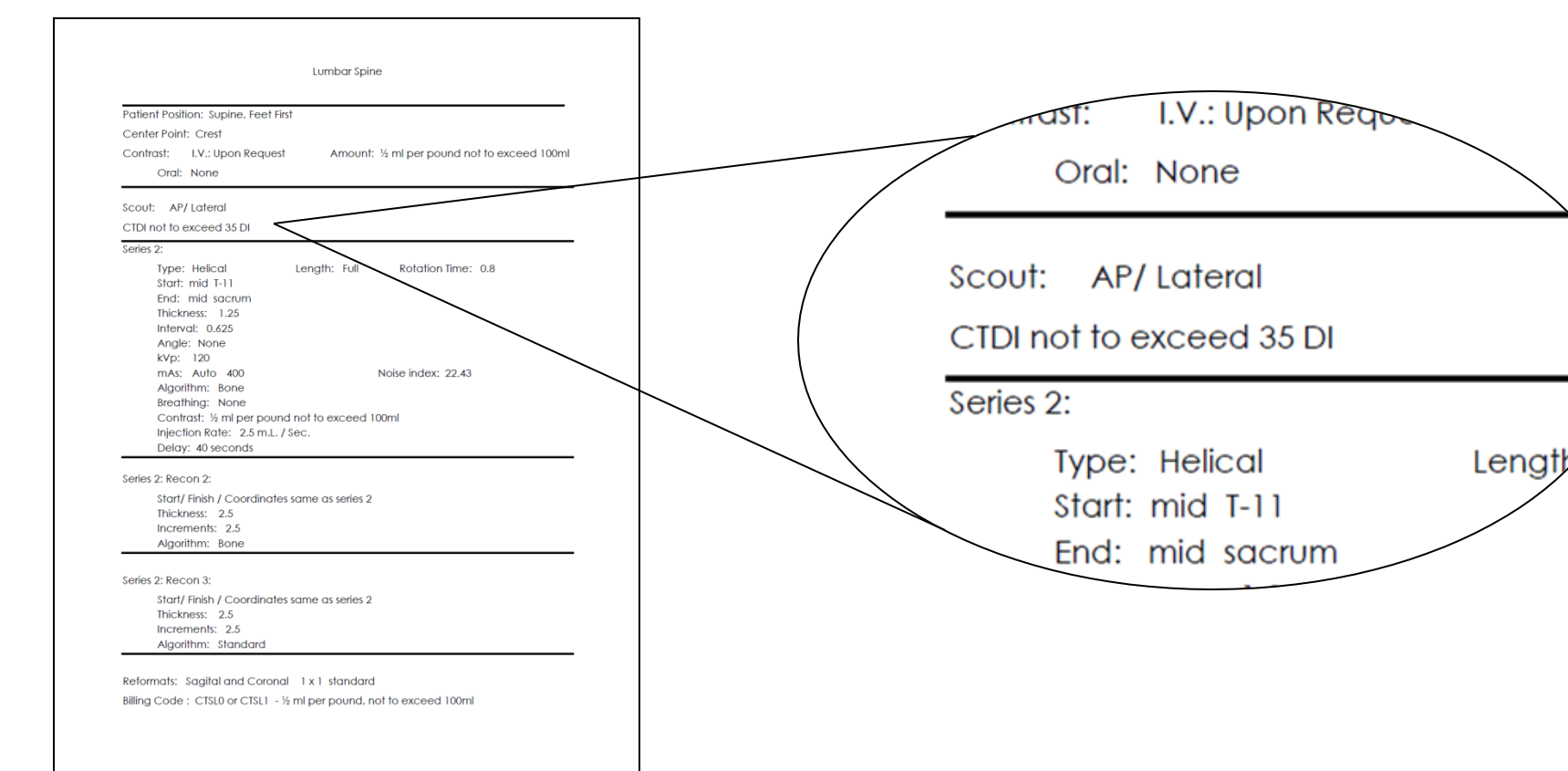
No protocol in place/education

## Goals

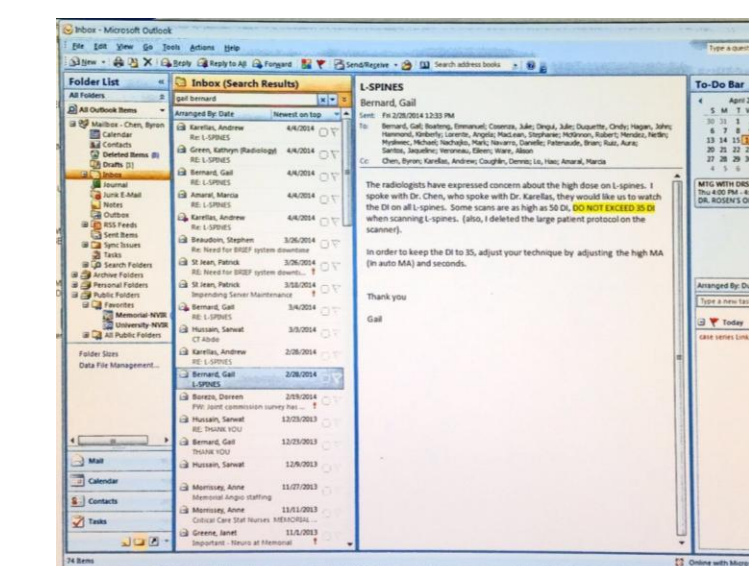
- Lower average radiation dose to 11mSv
- Decrease number of cases >25mSv to zero
- Maintain diagnostic image quality

## Countermeasures

1. Set upper limit of allowable dose prior to scanning
  - American College of Radiology standards
  - Standard work

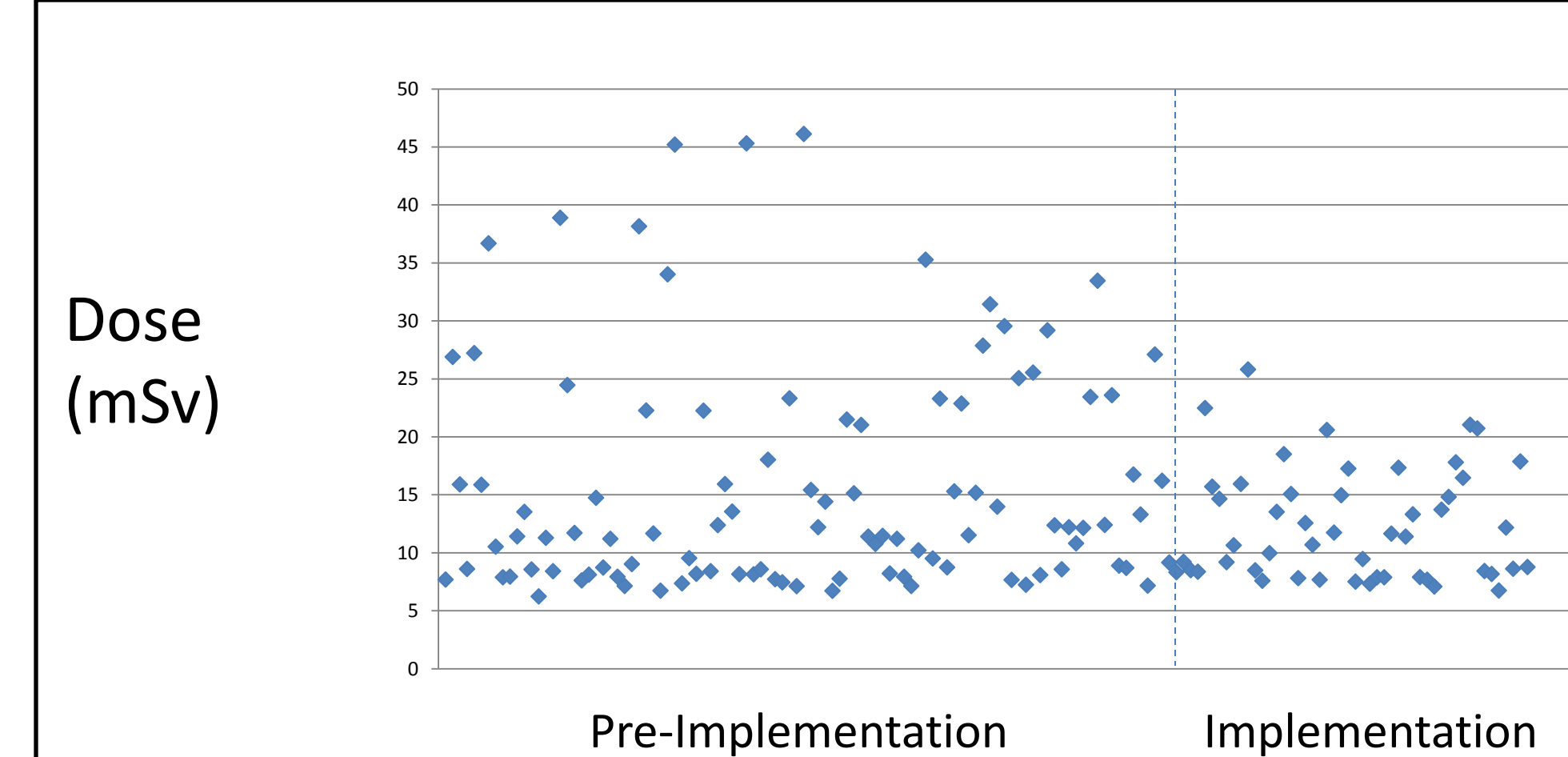


2. Technologist Education



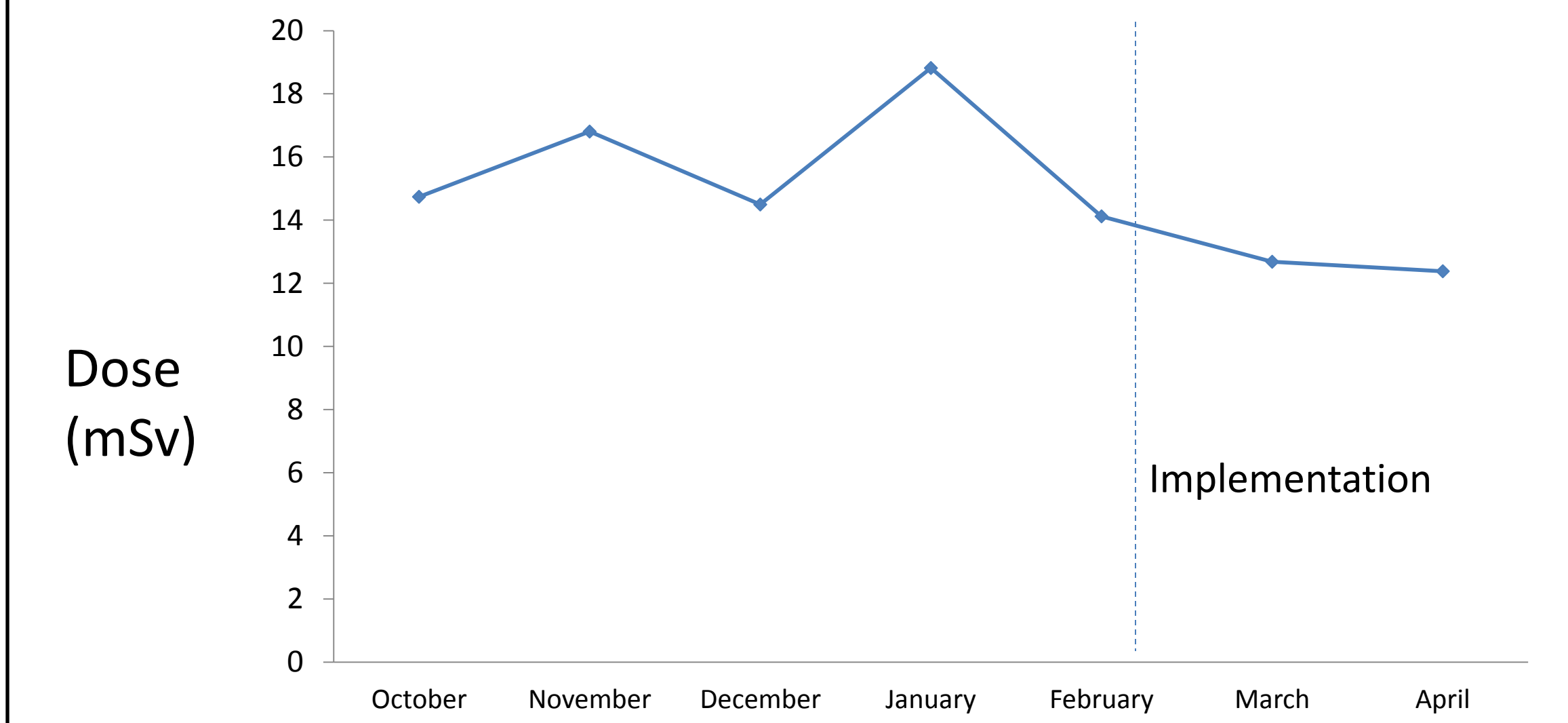
3. Radiologist survey

## Results

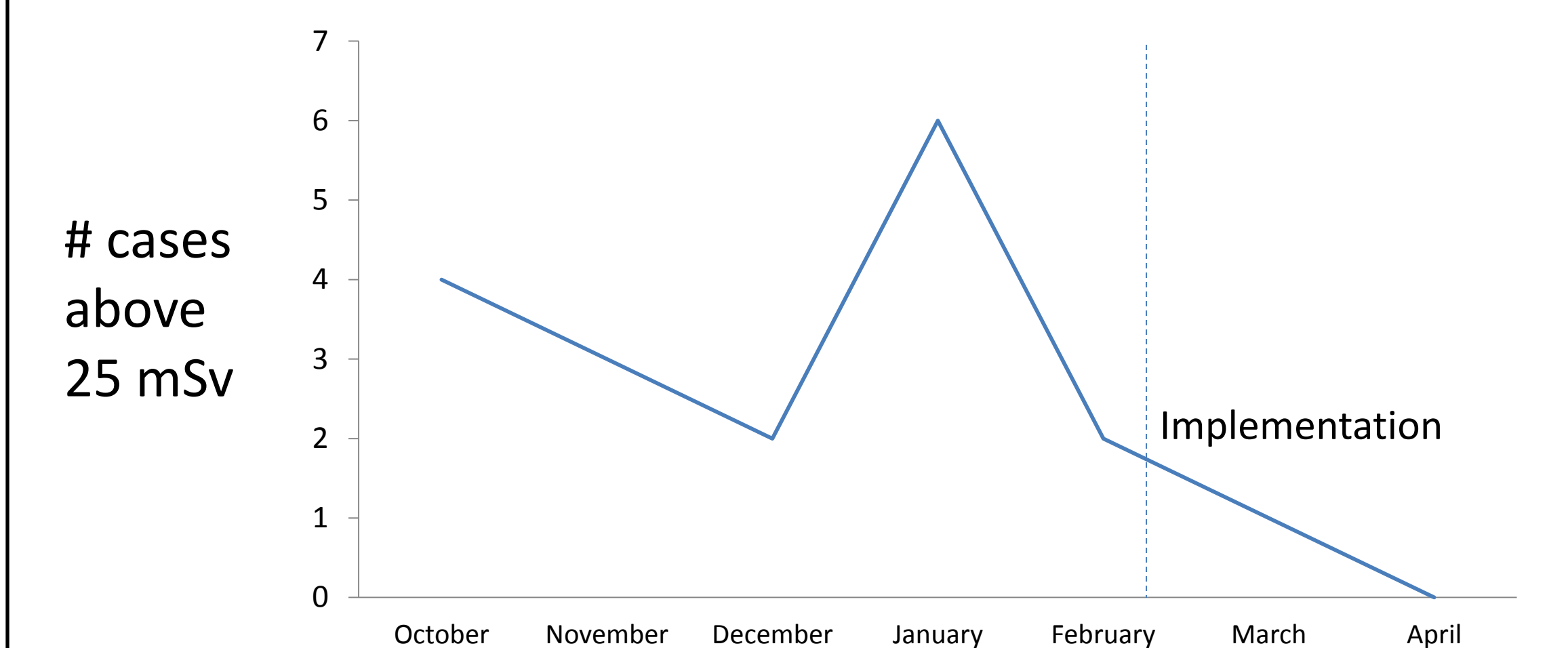


## Results

Average Dose:



Number of cases above 25 mSv



Maintenance of diagnostic image quality

- 4 musculoskeletal radiologists polled
- 4 out of 4 indicated no noticeable change in image quality after countermeasures implemented.

## Conclusions

- Average dose reduced by 19% (15.5 mSv → 12.5mSv)
- Number of cases >25 mSv reduced to zero
- Maintained diagnostic image quality throughout
- Key is root cause analysis
- Next steps:
  - Apply “template” to wider scope
  - Reduce doses even further