


2018

Advantages of Point of Care Ultrasound over Traditional Imaging

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Recommended Citation

Al Tawil, Khaled H., "Advantages of Point of Care Ultrasound over Traditional Imaging" (2018). *Family Medicine Clerkship Student Projects*. 350.

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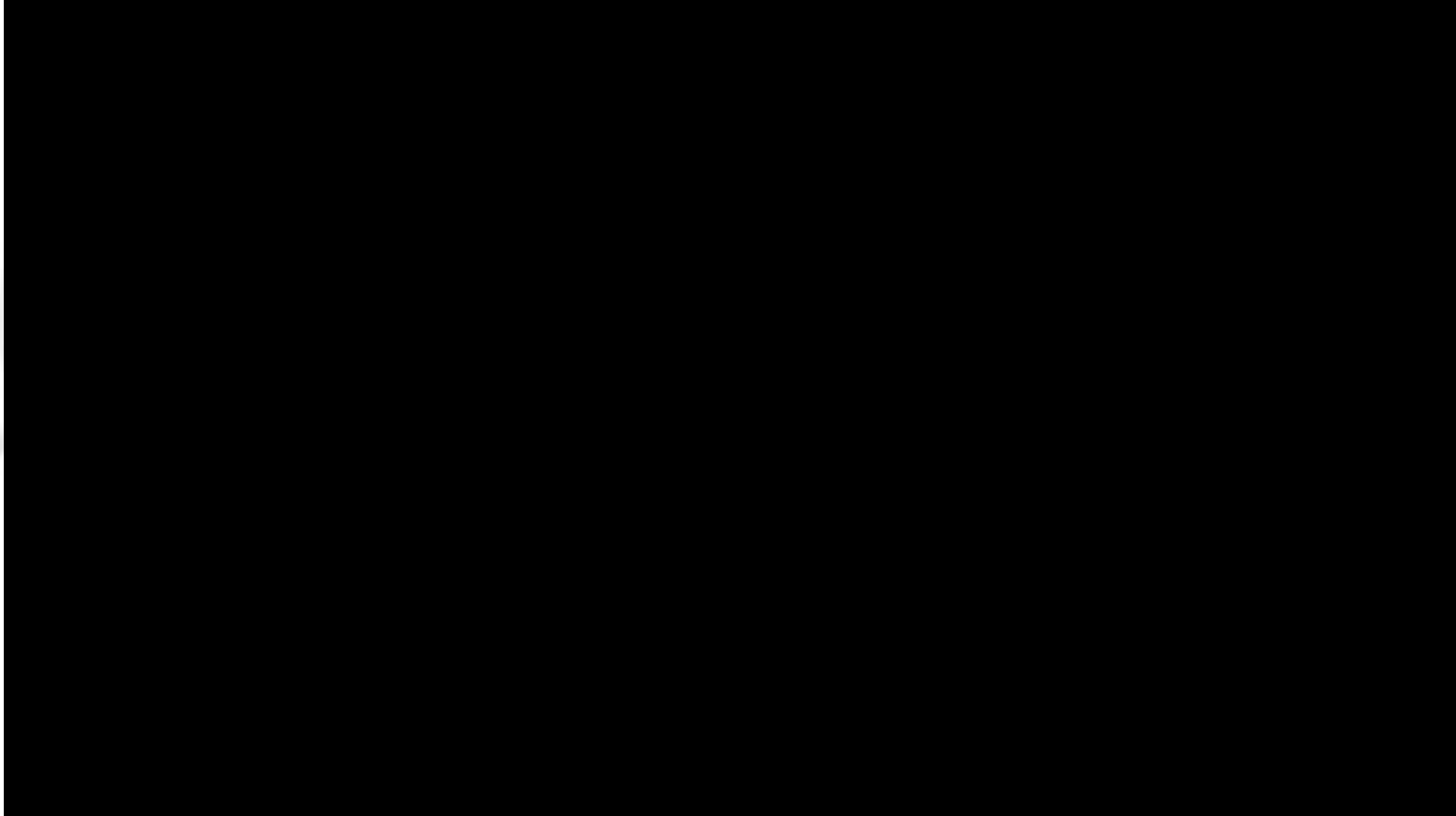
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POCUS/VSCAN At Hudson Headwaters Health Network



By KHALED AL TAWIL

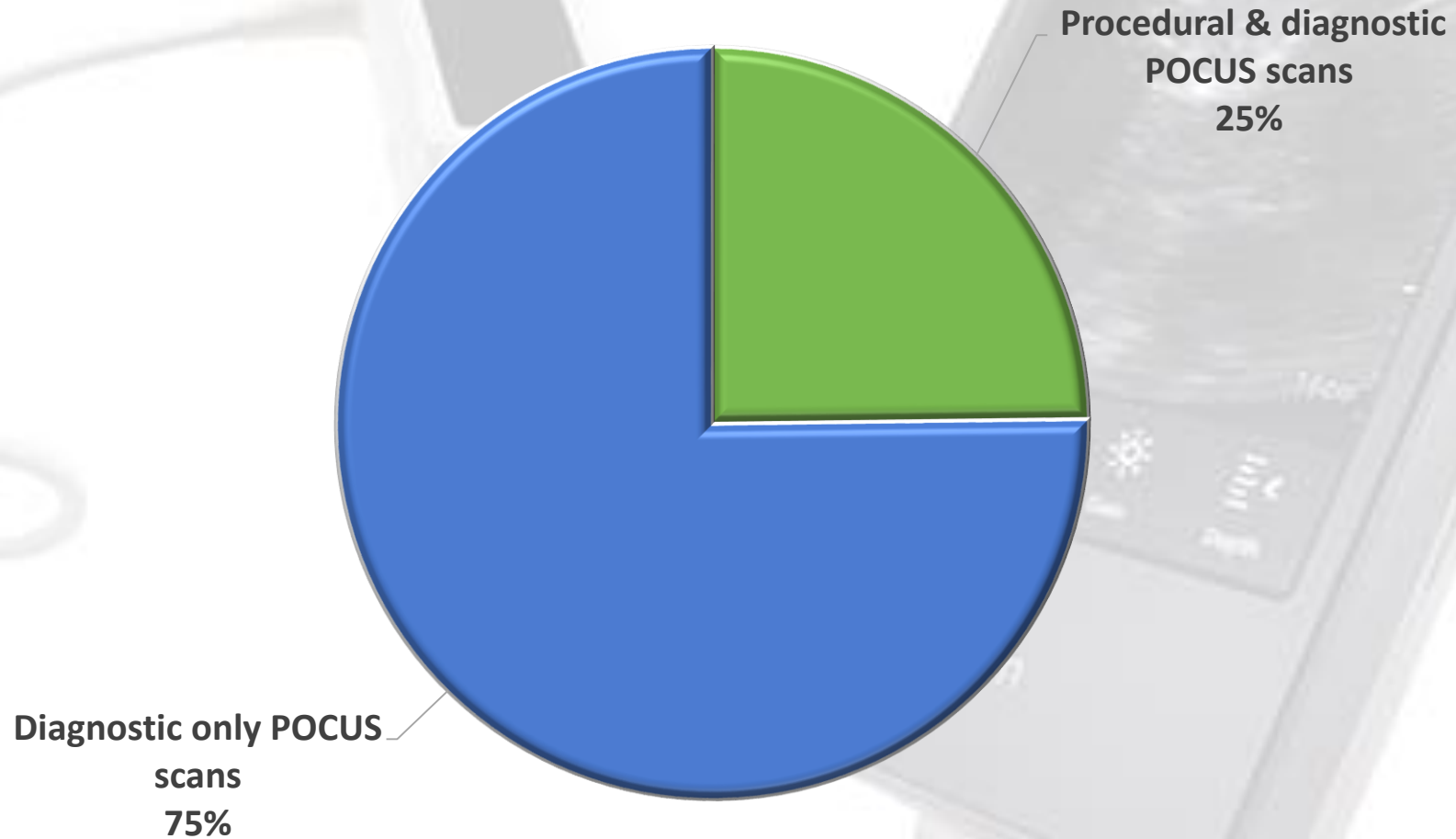
What is the VSCAN?



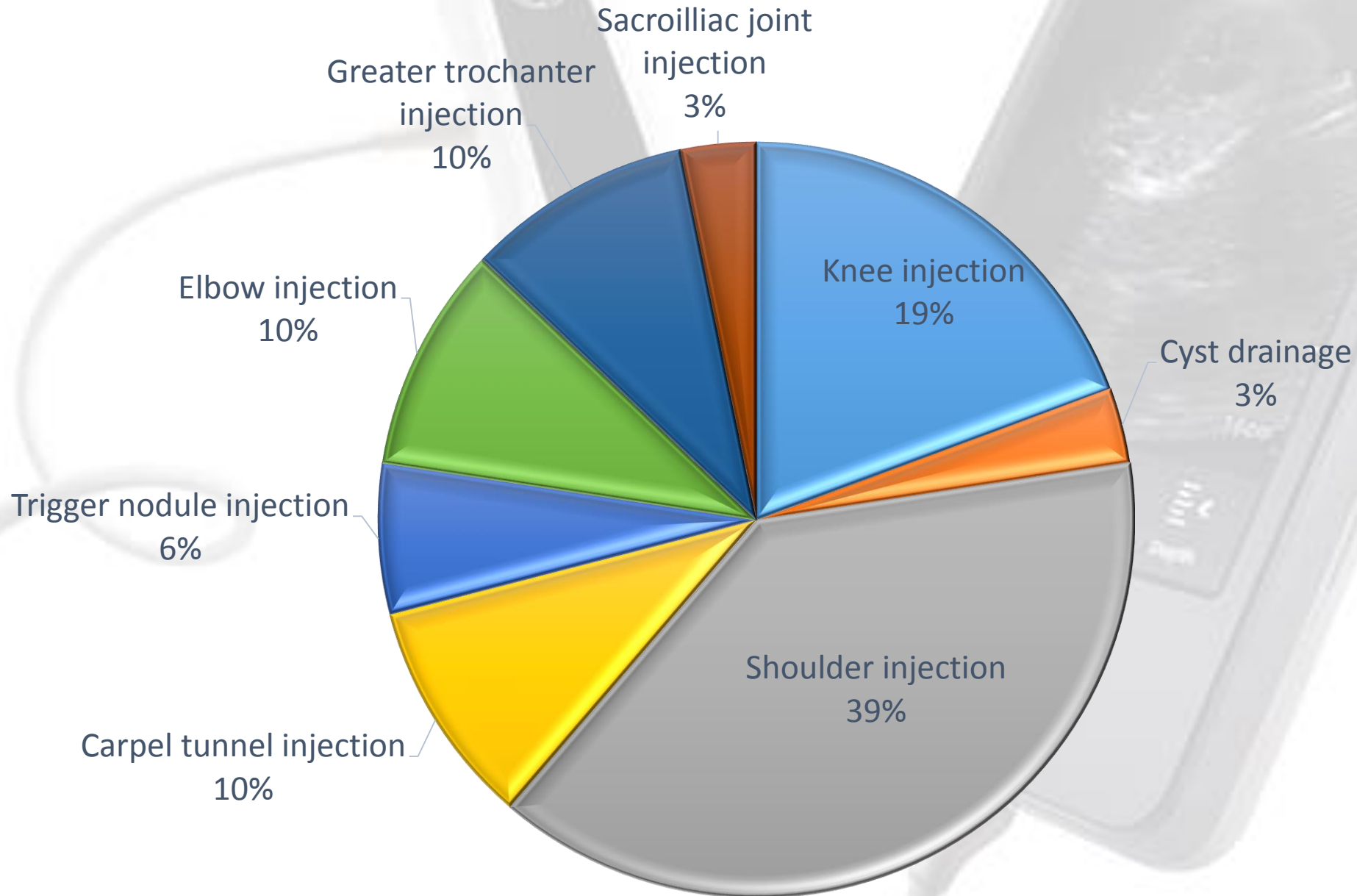
Goals of the study:

- Main goal: to outline the advantages of the POCUS and understand its limitation.
- Measuring the consistency of POCUS imaging with the follow up imaging.
- To measure the effectiveness of POCUS in ruling out disease versus ruling in disease.
- To uncover any other unforeseen benefits.
- 125 patients seen by Dr. Leonard and Dr. Hicks over the period of one year for multiple organ systems pathologies.

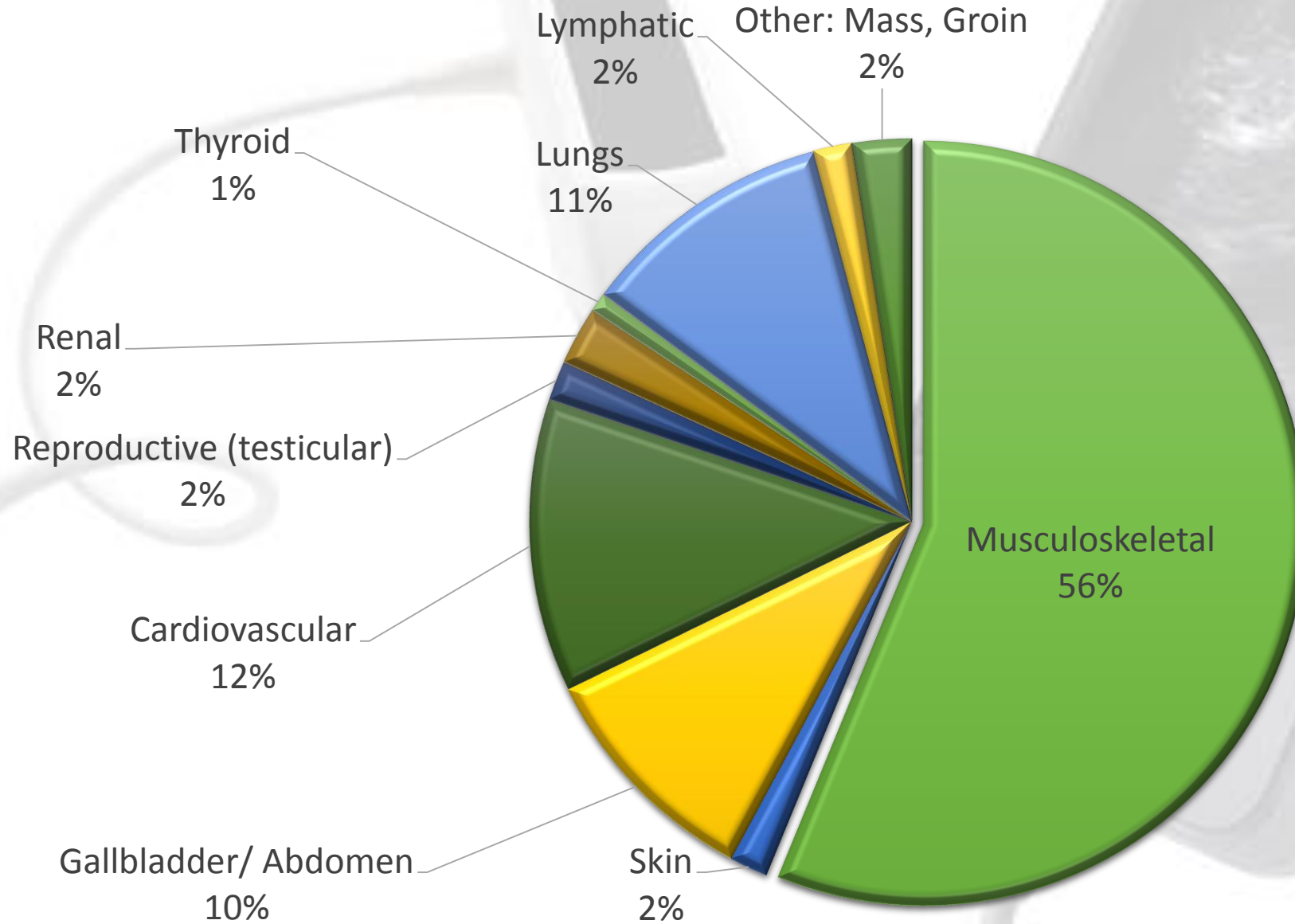
Diagnostic versus procedural



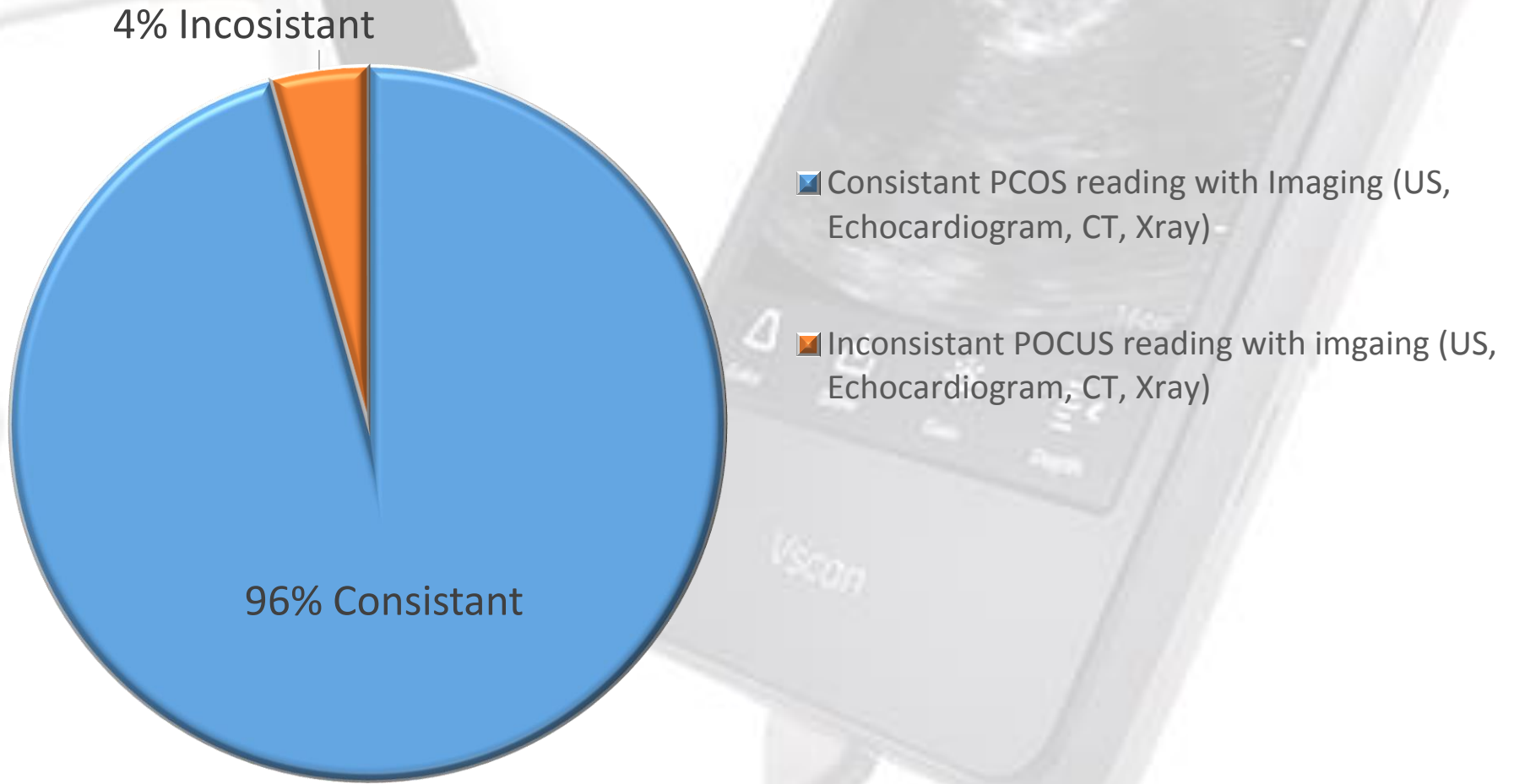
Procedural use of POCUS:



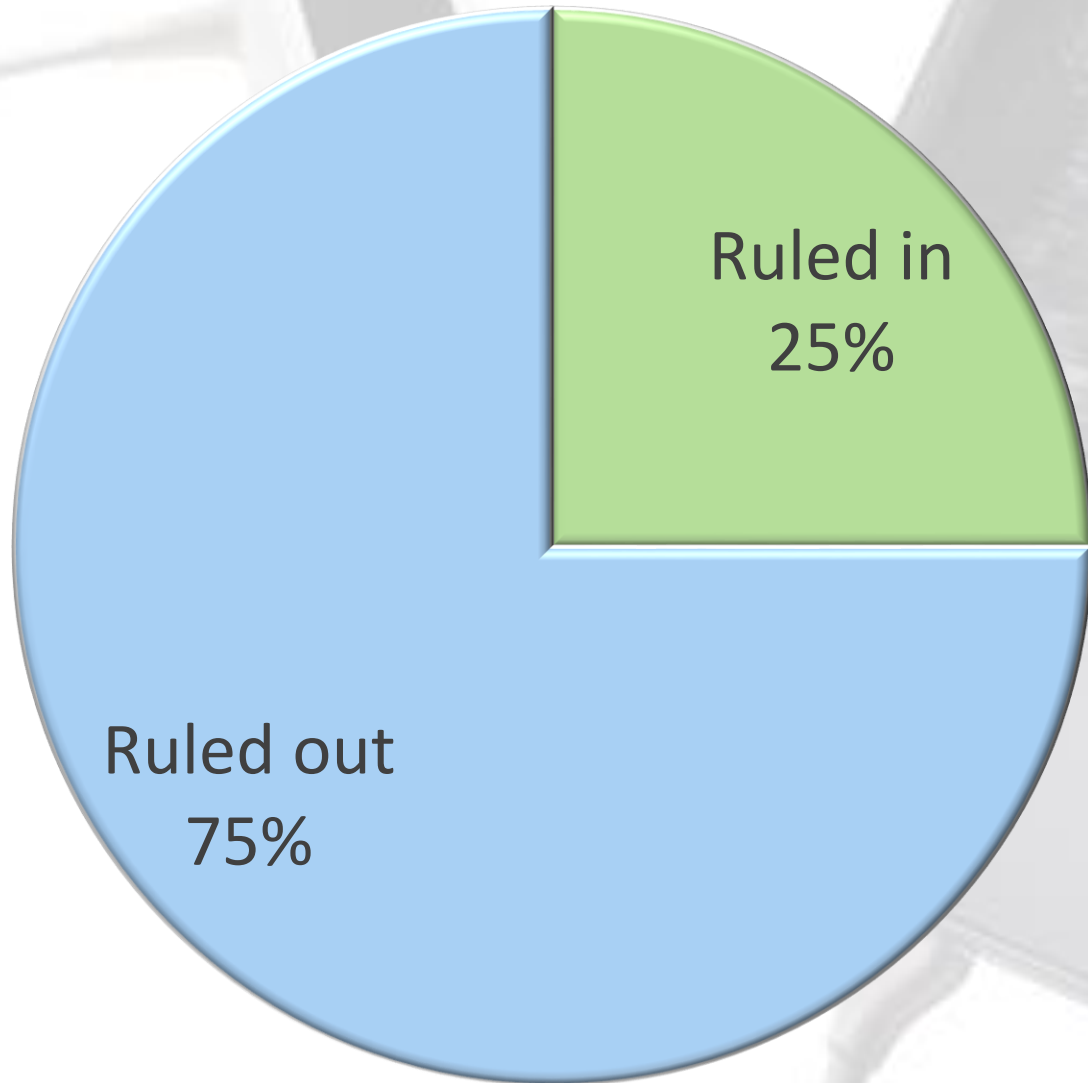
Diagnostic POCUS breakdown by organ system



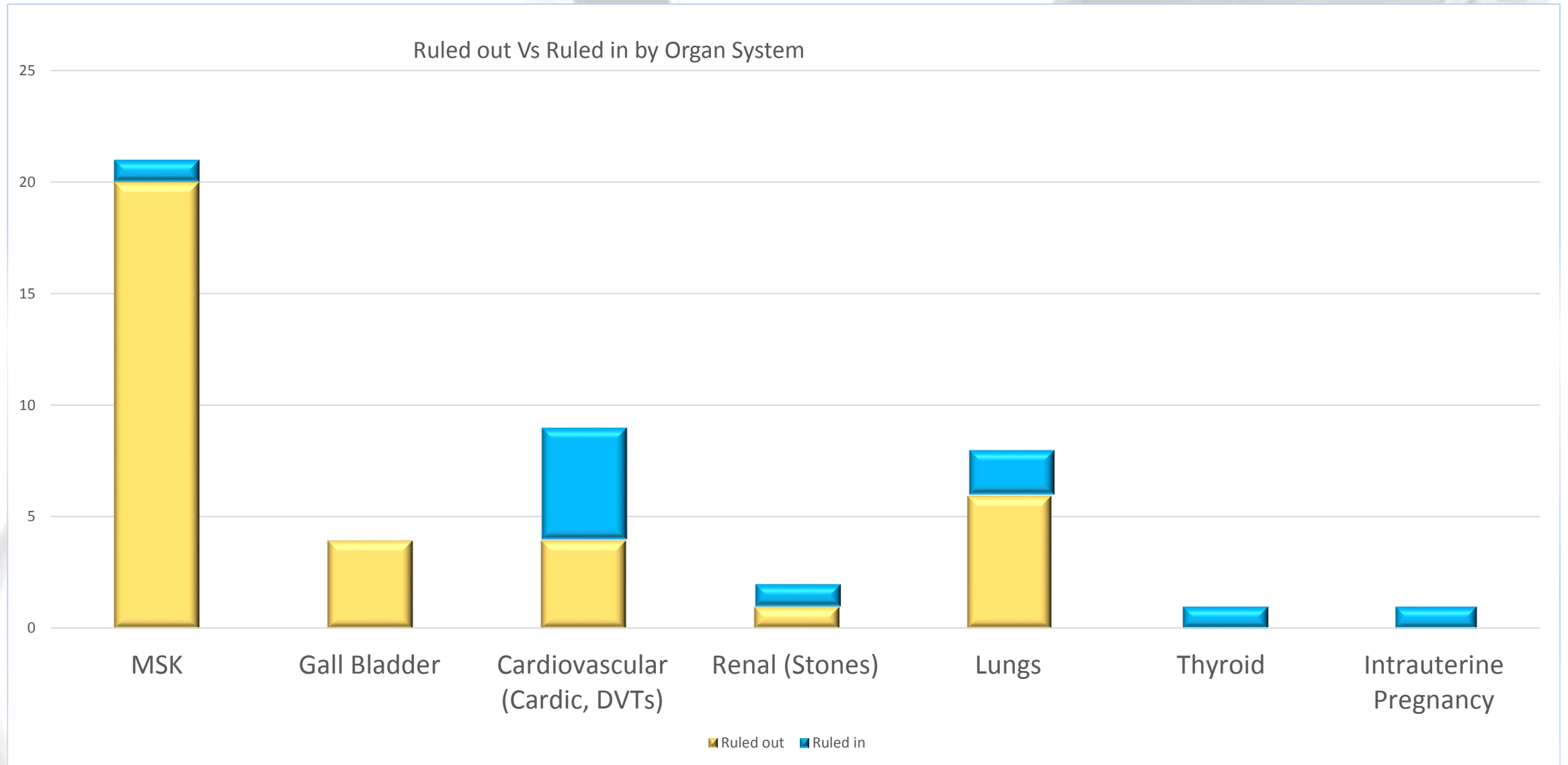
POCUS diagnostic readings: Consistent VS. Inconsistent with corresponding imaging modality.



Ruled in versus ruled out disease in diagnostic POCUS

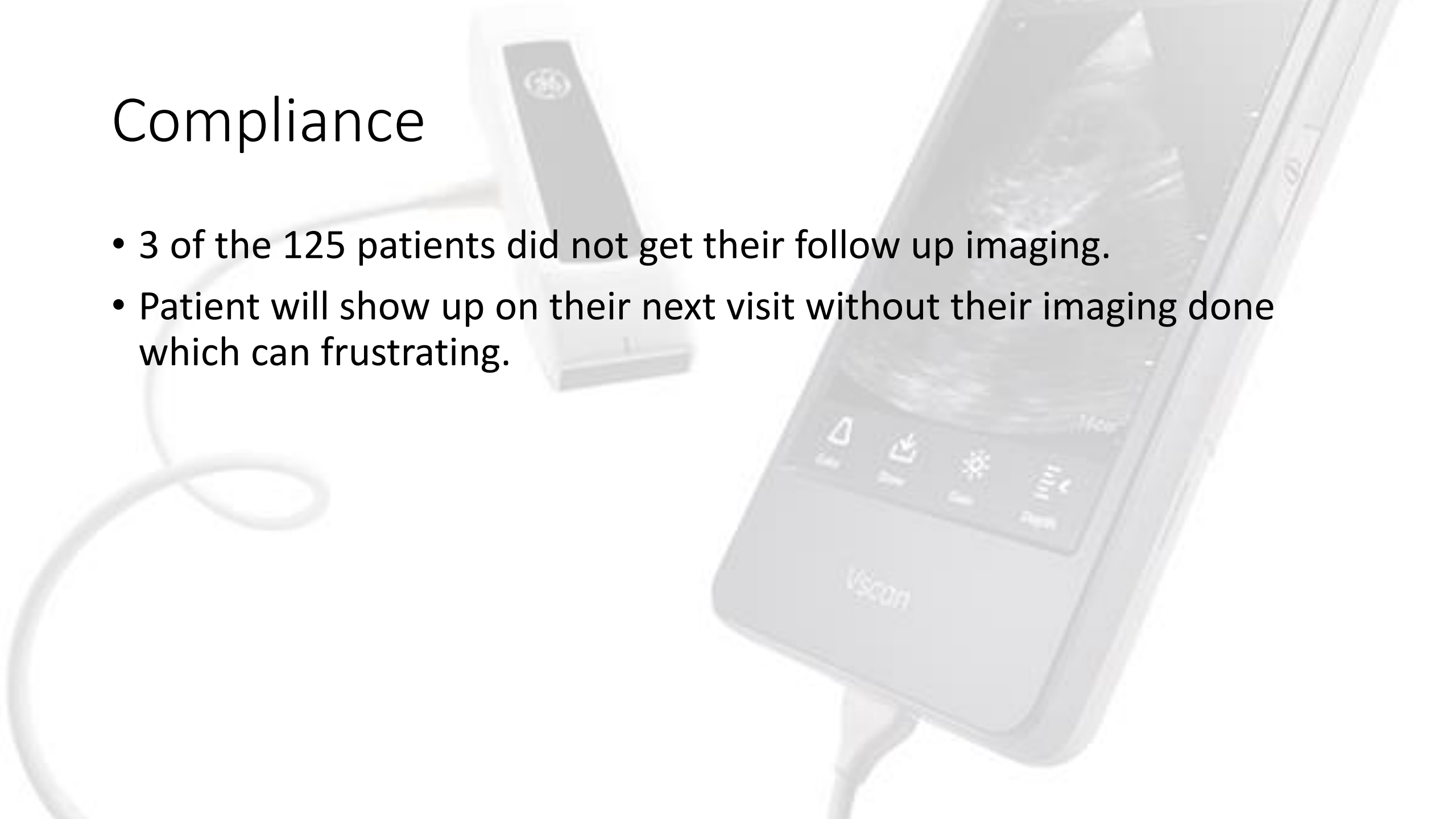


Ruled in versus ruled out by organ system



Compliance

- 3 of the 125 patients did not get their follow up imaging.
- Patient will show up on their next visit without their imaging done which can be frustrating.



Time to diagnosis:

- The time of Diagnosis with POCUS is considered to be the time of the visit.
- The time of the traditional diagnostic imaging is the time of the actual reading.
- For X-Rays in the Urgent care setting (Chest XR, Joint XR, Abdominal XR,..) the Average time to diagnosis was 3.5 hours in comparison to Zero hours with the POCUS.
- Gall Bladder scan outpatient took 2-5 days.
- DVT scans took between 2.5 hours to 6 days depending on the acuity.
- Other studies such as Cardiac Echograms and Thyroid scans took weeks to complete in the outpatient setting.

Accuracy of injections:

- 540 Joint injections were done at HHHN in 2017. Many other patients were referred to a third party for their injections.
- Meta-analysis study: Four cadaveric studies (300 cadaveric shoulders) and nine live human studies (514 patients) were reviewed. For the AC joint, the accuracy of US versus a landmark-guided injection was 93.6% vs 68.2% ($p < 0.0001$).
- The US group had a significantly greater reduction in pain (mean difference (MD)=1.47, 95% CI 1.0 to 1.93), and improvement in function (standardized MD=0.70, 95% CI .0.39 to 1.01) at 6 weeks post injection.
- Accuracy of US versus a landmark-guided injection was 65% vs 70% for the subacromial space. The SA space was the joint with the least difference in accuracy.
- We have the chance to increase the accuracy of injections by 20%!

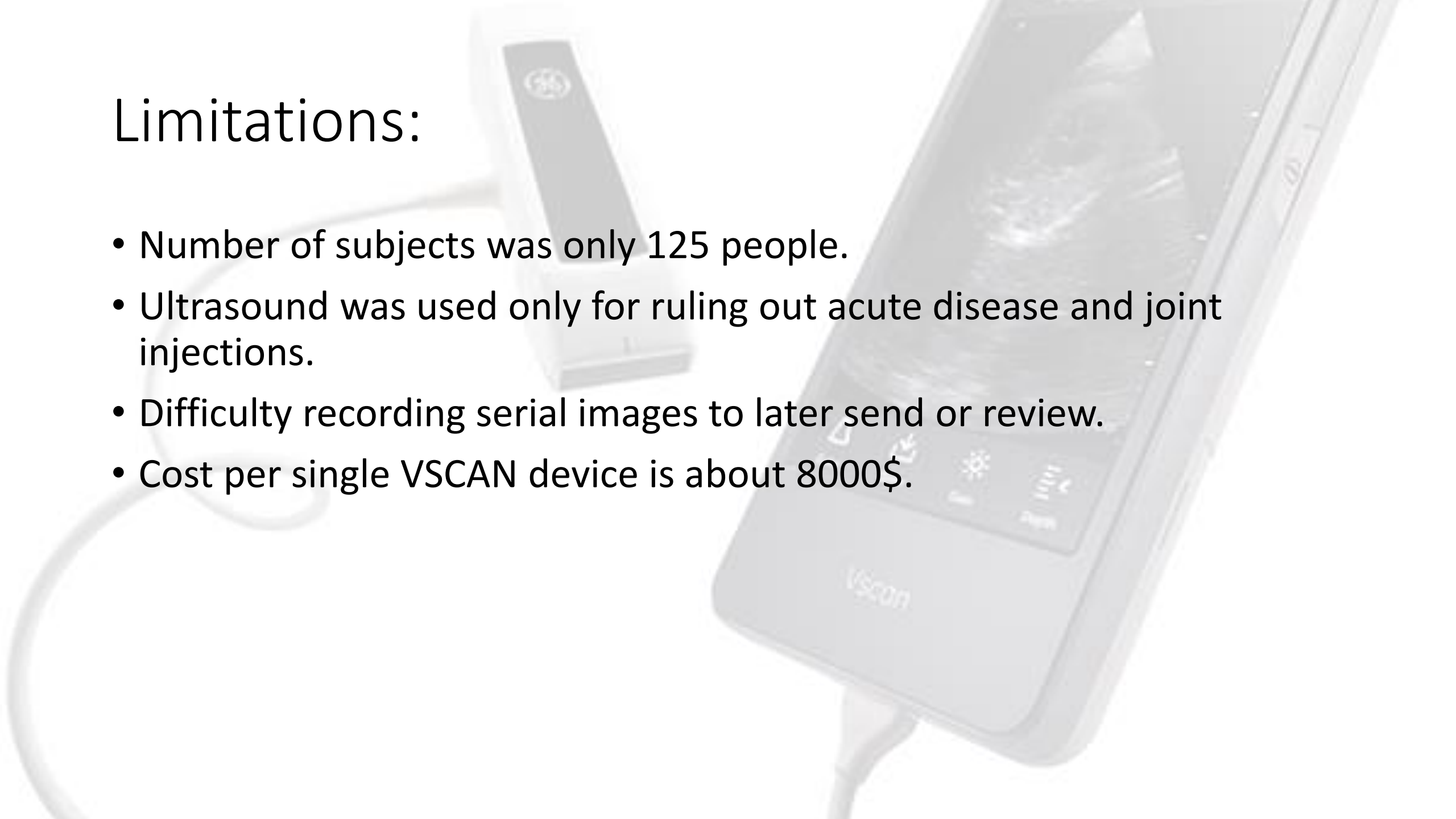
Other noteworthy benefits:

- Current evidence suggests that improved injection achieved with ultrasound guidance are not only cost effective!
 - 1- 81% reduction in injection pain ($p < 0.001$),
 - 2- 35% reduction in pain scores at outcome ($p < 0.02$),
 - 3- 38% increase in the responder rate ($p < 0.003$),
 - 4- 34% reduction in the non-responder rate ($p < 0.003$),
 - 5- 8% reduction (\$7) in cost/patient/year, and a
 - 6- 33% (\$64) reduction in cost/responder/year for a hospital outpatient ($p < 0.001$). N=244.

Source: Sibbitt WL Jr et al

Limitations:

- Number of subjects was only 125 people.
- Ultrasound was used only for ruling out acute disease and joint injections.
- Difficulty recording serial images to later send or review.
- Cost per single VSCAN device is about 8000\$.



Conclusions:

- Many benefits to incorporating the ultrasound in our medical practice: Reduced time to diagnosis, cost, pain, and missed diagnosis with increased accuracy of injections, and patient satisfaction. Very good accuracy in diagnosing disease accurately and ruling out serious disease.
- Limitations to the use of the portable ultrasound. Imaging quality and availability of serial imaging and current cost of the device.
- Overall, the data strongly suggests that there is a great advantage to using the POCUS to rule out acute disease and administering joint injections.

Food for thought:

- POCUS imaging would be beneficial in rural areas where there is no access to imaging facilities.
- Further cost versus savings analysis for Hudson Headwaters Health Network.
- Should be there a certification requirement? (Stethoscope & EKG versus POCUS).
- Is it worth the investment?

“Investing in tomorrow’s technology is more critical than ever ..” Bill Gates.

A healthcare professional in blue scrubs is shown from the chest down, holding a smartphone in their right hand. The phone's screen displays a grayscale ultrasound image. In their left hand, they hold a white ultrasound probe against a patient's arm. The patient is lying in a hospital bed with white linens. The background is a blurred hospital room. The text 'Questions?' is overlaid at the top, and 'Thanks to: Dr. Kyle Leonard, and Dr. James Hicks' is overlaid at the bottom.

Questions?

Thanks to: Dr. Kyle Leonard, and Dr. James Hicks