

# Ultrasound: Improving Standardization of Central Venous Catheter Confirmation

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## INTRODUCTION

### Topic

Ultrasound: Improving Standardization of Central Venous Catheter Confirmation

### Problem

- Chest x-ray for CVC confirmation to verify CVC tip in superior vena cava, delaying the utilization of the CVC.
- Real-time POCUS confirmation of CVC and assessment of complications will allow the administration of life-saving medication and/or blood products that could improve patient mortality in the diagnosis of septic shock (Gelke, 2015).
- Obtaining a post-procedure chest x-ray, the patient may be subjected to delayed receipt of medication as well as potentially decreasing the patient's risk for adverse outcomes (Ablordeppey et al., 2017).
- Chest x-ray is often untimely and unpredictable in the ICU, it exposes the patient to unnecessary ionizing radiation (Gelke, 2015).

### Purpose

- The purpose of this project was to demonstrate that POCUS is a safe and cost-effective alternative to chest x-ray for CVC line placement.

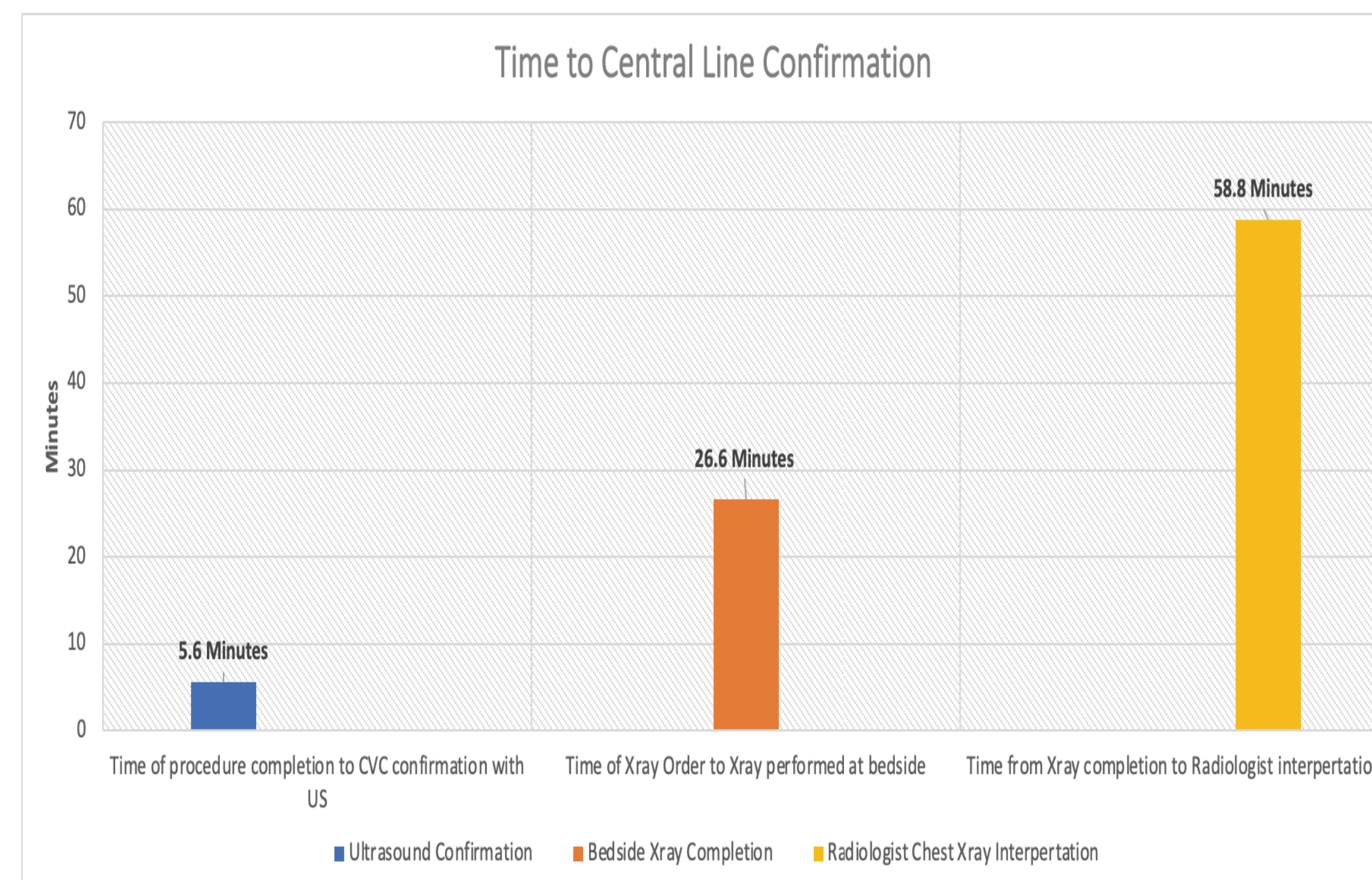
### Aims Include:

- Demonstrate competency among critical care APPs and intensivists utilizing ultrasound to confirm CVC placement
- Demonstrate a reduction of time to use the CVC.
- Demonstrate a reduce cost with POCUS confirmation compared to a chest x-ray.

## RESULTS

Ultrasound confirmation with Rapid Atrial Swirl and no complications obtained.	If not, reason?	Ultrasound interpretation by APP match radiologist Chest Xray interpretation regarding placement and complications.
Yes		Yes
Yes		Yes
Yes		Yes
Yes		Yes
No	Body Habitus	No, unable to obtain US confirmation
Yes		Yes
Yes		Yes
Yes		Yes

Central line confirmation image interpretation between ultrasound by critical care provider and chest Xray by radiologist.



Comparison of Time to Central Line Confirmation between Ultrasound, Bedside Chest Xray, Radiologist Interpretation.

## METHODS

- This is a pilot procedural improvement project designed to reduce the use of chest x-ray for every CVC confirmation and increase the utilization of POCUS for CVC confirmation.
- A CVC stepwise checklist was developed under the direction of the ICU medical director, the APP lead for the ICU and the principal investigator.
- A post-pilot analysis of critical care providers' feasibility of imaging acquisition for CVC confirmation will be completed.
- Comparison of an ultrasound image read by the critical care provider will be compared with a radiologist x-ray interpretation for CVC confirmation.
- Comparison of time to confirmation between POCUS and chest x-ray to evaluate if practice change will be useful.

## IMPLICATIONS FOR PRACTICE

- POCUS reduces time to confirmation or provide an alternative to chest x-ray when unavailable improving patient care, especially in the critically ill.
- POCUS can provide earlier and correct CVC positioning in the superior vena cava.
- Ultrasound is an effective tool to confirm central venous catheter placement in instances where there is a delay in obtaining a confirmatory chest x-ray.
- Body Habitus can play a role in image acquisition for confirmation can not be obtained,

## REFERENCES

Ablordeppey, E. A., Drewry, A. M., Beyer, A. B., Theodoro, D. L., Fowler, S. A., Fuller, B. M., & Carpenter, C. R. (2017). Diagnostic Accuracy of Central Venous Catheter Confirmation by Bedside Ultrasound Versus Chest Radiography in Critically Ill Patients: A Systematic Review and Meta-Analysis. *Crit Care Med*, 45(4), 715-724. <https://doi.org/10.1097/CCM.0000000000002188>

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Scan QR code for CVC checklist and full list of references

