

# Worth It or Wasteful? Improving Renal Ultrasound Utilization for Patients with Recent Cross-Sectional Imaging



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## INTRODUCTION

- Renal ultrasound (RUS) is commonly utilized in the work-up for acute kidney injury (AKI) and to evaluate for kidney mass(es), nephrolithiasis, genitourinary obstruction, and hydronephrosis.
- Various organizations have established guidelines regarding the usefulness of RUS imaging in hospitalized patients who have recently undergone abdominal CT or MRI cross-sectional imaging (CSI).
- If a patient's clinical status remains unchanged since the CSI, RUS performed on inpatients within 48 hours of recent abdominal CSI may have limited clinical utility.
- Although RUS is a non-invasive, low-cost imaging method that does not expose patients to radiation, excessive use of it may lead to increased healthcare costs and resource over-utilization in certain patient populations.

## PURPOSE

- While other studies have generally examined the overuse of ultrasounds, the literature is lacking on quality improvement interventions aimed at reducing over-utilization of renal ultrasounds in inpatient settings, particularly for patients who have already recently undergone CSI.
- This study aims to assess the use of RUS in inpatients who have had CSI within the past 48 hours and identify interventions that can potentially decrease over-utilization of RUS.
- Such measures can be used to:
  - Eliminate redundant studies on patients that do not provide significant clinical value.
  - Enhance ultrasound team workflow and resource allocation by minimizing number of studies with limited clinical value for patient management.
  - Prioritize patients with studies of higher clinical significance to be scanned and reviewed in a more timely manner.
  - Reduce healthcare costs

## METHODS

### Pre-Intervention Analysis

- "Pre-intervention" = data collected over the 1-month time period prior to intervention implementation
- 4 trainees (1 medical student, 3 radiology residents) and 2 board-certified attending radiologists reviewed the electronic medical record data of patients for which RUS orders were placed within the identified pre-intervention period

Data collected for patients with completed RUS orders include:

- Recent CSI within 48 hours: Yes or No
- Study indication
- Ordering Department
- Clinical benefit (determined by confirming whether or not the RUS findings were consistent with the renal findings identified on the recently-performed CSI by reviewing radiology reports)

### Study Intervention:

- Ultrasound technologists (UST) manually screen RUS orders and identify patients who have undergone CSI (abdominopelvic CT or MRI) in the past 48 hours
- UST initiate discussion with the ordering team regarding the benefit of RUS for hospitalized patients with recent CSI and cancel orders determined to be low-yield
- Post-Intervention Analysis**
- "Post-intervention" = data collected over a 3-month period during which intervention is implemented
- Pre- and post-intervention data was compared via Chi-square test

## RESULTS

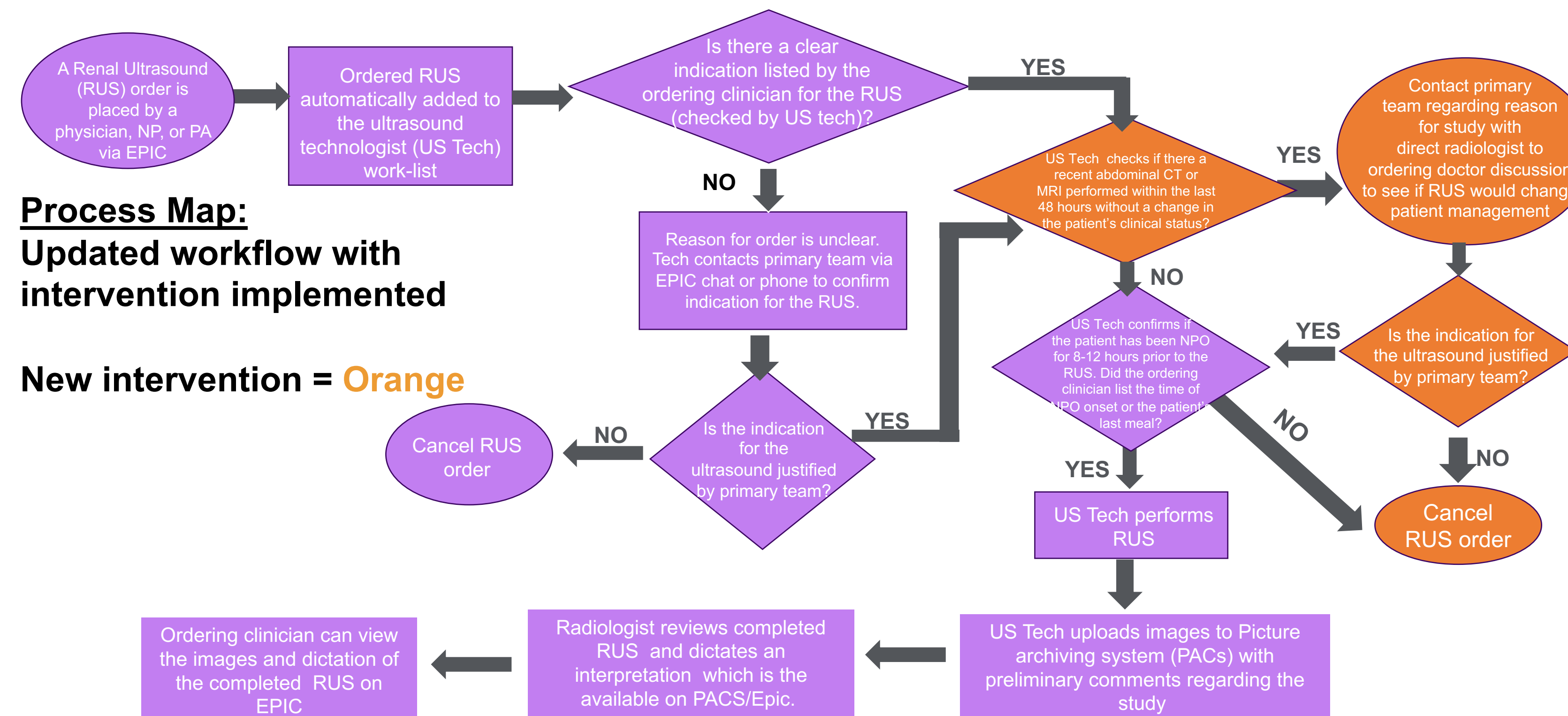
- The pre-intervention group (N=210) had 9.04% (19/210) of RUS orders for patients who had undergone CT/MRI CSI within the previous 48 hours, and 100% of these orders were for clinical indications already addressed on previous imaging findings.
- In the post-intervention group (N=714), 6.02% (43/714) of orders were for patients who had undergone recent CSI, and of these orders, 32.6% were considered clinically beneficial while the remaining 67.4% were for clinical questions already answered on these recent CSI studies.
- Among the post-intervention orders for patients with recent imaging, 62.79% (27/43) were placed by internal medicine providers. Ordering department data is shown below.
- With this intervention, the percentage of RUS orders for patients with recent CSI decreased from 9.05% to 6.02%, although this decrease was not statistically significant (p=0.12).

Department providers ordering RUS studies for patients with recent CSI:

Ordering Department	Frequency	Percent
Internal Medicine	27	62.79%
Nephrology	4	9.30%
Urology	3	6.98%
Emergency Medicine	3	6.98%
Pulmonology	3	6.98%
Hematology-Oncology	3	6.98%

## DISCUSSION & NEXT STEPS

- The intervention of having US tech review RUS orders for patients who have undergone CSI within the past 48 hours yields some benefit in decreasing redundant RUS studies, though not statistically significant.
- To streamline workflow based on these findings, a best-practice advisory (BPA) tool was developed within the hospital EMR system. The BPA tool informs ordering clinicians of recent CT or MRI imaging in patients for whom RUS was ordered, and asks them to confirm their decision to proceed with the order (see below).
- In the first month of implementing the BPA tool, 34.5% of RUS orders were canceled after the BPA was triggered.



Best-practice advisory (BPA) Tool:

