Point-of-Care Ultrasound as a Diagnostic Equalizer: Addressing Delayed Recognition of Critical Illness in Rural Family Medicine

Sana Anwar, MD[1]; Gabriela Alvarez Perez, MD[1]; Bruno Bittencourt Dos Santos, MD[2]

[1] DEPARTMENT OF FAMILY AND COMMUNITY MEDICINE | TTUHSC PERMIAN BASIN

[2] REEVES COUNTY REGIONAL HOSPITAL

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Introduction

Background

- Rural imaging and specialty access may be delayed
- POCUS provides immediate focused bedside imaging
- Findings may change triage, treatment, referral, or transfer
- Family physicians can use POCUS across clinic, hospital, and emergency settings

Objective

- In rural family medicine, can clinician-performed POCUS improve diagnostic performance and support faster, safer bedside decisions when conventional imaging is limited?

Methods

Study Design

- Structured evidence-based review using PubMed/MEDLINE and reference review

Search & Selection

- Core concepts: POCUS + rural/family medicine + pneumothorax + DVT
- Included evidence had to address diagnostic performance, clinical decision-making, or rural/generalist implementation

Population

- Adults with focused acute-care indications and rural/generalist clinicians
- Excluded pediatric-only, obstetric-only, simulation-only, and opinion reports

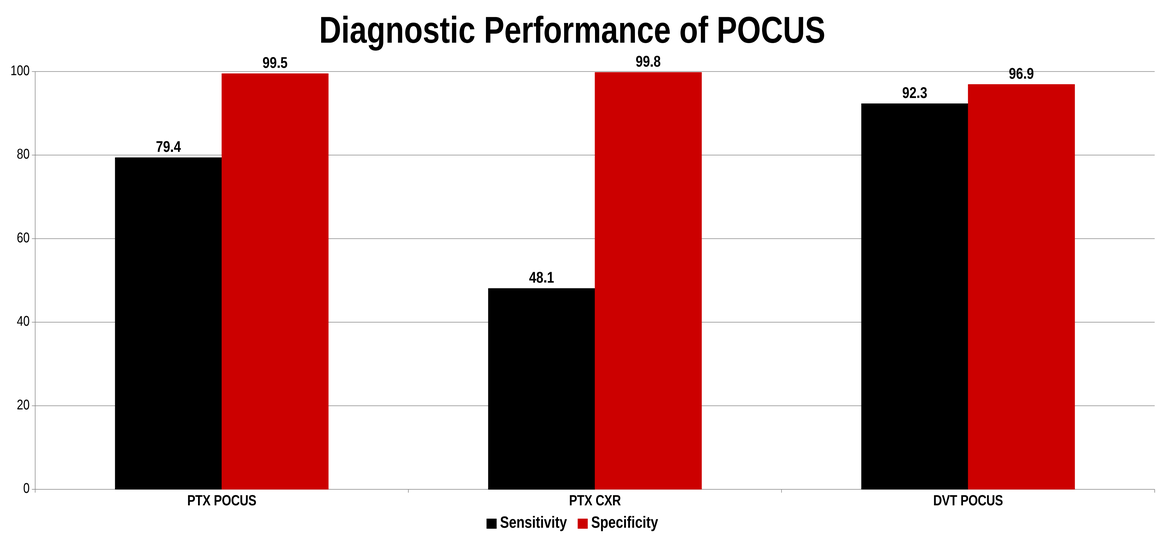
Outcomes

- Primary: sensitivity, specificity, time to diagnosis
- Secondary: diagnostic contribution, management, disposition/transfer, patient-care impact

Evidence Flow

QUESTION	Focused rural clinical needs
ACCURACY	Meta-analyses
APPLICABILITY	Rural/generalist studies
SYNTHESIS	12 final sources

Results



Sources: PTX graph - Bouillon-Minois et al., Ultrasound J. 2025;17:37 | DVT - Zaki et al., Ultrasound J. 2024;16:37
PTX 99.1%, n=3,840 - Ranganath et al., Cureus. 2026;18:e100652 | Rural 71%, 4% - Nixon et al., Aust J Rural Health. 2018;26:342-349

Pneumothorax: pooled specificity 99.1% in a 2026 meta-analysis (15 studies; n=3,840). **DVT**: two-point compression sensitivity 92.3% and specificity 96.9%

71% reviewed studies reported a positive impact of POCUS on patient care decisions

4% absolute reduction in admissions or urban transfers where POCUS informed disposition

From Evidence to Rural Clinical Action

FOCUSED CLINICAL QUESTION → BEDSIDE POCUS → ACTIONABLE FINDING → TREAT • REFER OR TRANSFER

ONE CLINICAL QUESTION | Can POCUS strengthen the first rural bedside decision?

What the Evidence Supports

- Rural-specific patient-outcome evidence remains limited
- Mortality benefit has not been established
- Performance depends on operator skill, protocol, and image quality
- Rural implementation studies are heterogeneous and often observational

Clinical Interpretation

When imaging is delayed, POCUS can strengthen the FIRST clinical decision: identify a focused finding, narrow the differential, initiate appropriate treatment, and determine whether referral or transfer is needed

Safe Expansion Requires

TRAIN	ASSESS	REVIEW	INTEGRATE
structured education	competency	image quality	referral pathway

Discussion

- Selected POCUS applications show strong diagnostic performance
- Rural evidence supports meaningful effects on diagnostic reasoning and disposition
- Greatest value is actionable bedside information when imaging is delayed
- POCUS remains an adjunct to definitive imaging and referral

Limitations

- Rural-specific patient-outcome evidence is limited
- Mortality benefit has not been established
- Performance varies by protocol, operator, and image quality
- Low-resource evidence is not equivalent to US rural practice

Implication for Clinical Practice

- Use POCUS to support earlier recognition, triage, treatment, referral, and transfer decisions
- Require structured training, competency assessment, quality assurance, and image review
- 2026 family medicine recommendations support competency-based POCUS education

Take-Home Message

POCUS can reduce diagnostic uncertainty at the bedside when rural clinicians face delayed access to imaging, but its value depends on a focused question, trained operators, quality assurance, and a clear referral pathway

References

12-source evidence set
Scan for PubMed records

PMIDs
41635328 | 40742513 | 39080184
30303278 | 35786524 | 31749019
38383018 | 37684568 | 39776068
42015811 | 42546336 | 42308619