



TITLE: Portable Ultrasound Devices for Obstetrical or Prenatal Assessment in Rural or Remote Settings: A Review of the Diagnostic Accuracy

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CONTEXT AND POLICY ISSUES

Ultrasound, or sonography, uses high frequency sound waves to develop images of organs and structures inside the body.¹

Ultrasound is well suited for the assessment of fetal problems because of a lack of fetal exposure to ionizing radiation.² It is used to confirm intrauterine pregnancy, monitor fetal growth, and evaluate pregnancy-related complications.² Complications such as fetal malpresentation, multiple gestations, ectopic pregnancy, and placenta previa may be identified earlier and appropriately managed with the use of ultrasound.³ It is estimated that approximately 15% of all pregnancies have medical or obstetric complications that greatly increase the risk of mortality or severe morbidity for the mother and newborn.⁴

The development of portable ultrasound units offers the opportunity to improve ultrasound access in rural or remote settings where patients may have limited access to imaging diagnostics.^{5,6} Current portable ultrasound machines are lightweight, provide high image quality, and perform well compared to traditional ultrasound machines.⁶ Portable ultrasound has long been used for trauma assessment in austere environments.⁵

The use of portable ultrasound may be accompanied by a 'remote virtual mentor', which relies on communication between those performing the ultrasound on-site and those interpreting the ultrasound remotely (the remote virtual mentor).² The success of this communication relies on the willingness of the on-site provider to listen, pay attention, and respond to the direction of the remote expert.²

The purpose of this review is to examine the clinical evidence regarding the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings, and the use of a 'remote virtual mentor' on diagnostic accuracy.

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RESEARCH QUESTIONS

1. What is the clinical evidence regarding the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings?
2. What is the clinical evidence regarding the effect of a ‘remote virtual mentor’ on the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings?

KEY FINDINGS

No relevant literature regarding the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings, or for the effect of a ‘remote virtual mentor’ on diagnostic accuracy, was identified.

METHODS

Literature Search Strategy

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 10), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and October 14, 2014.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Population	Healthy adult females undergoing routine obstetric care in rural or remote settings
Intervention	Portable ultrasound used by a multidisciplinary team (physicians, nurses, midwives)
Comparator	Other portable or fixed ultrasound devices
Outcomes	Diagnostic accuracy, clinical benefit and harm
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies

Exclusion Criteria

Studies were excluded if they did not satisfy the selection criteria, if they were duplicate publications, or were published prior to 2009.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 203 citations were identified in the literature search. Following screening of titles and abstracts, 198 citations were excluded and five potentially relevant reports from the electronic search were retrieved for full-text review. No potentially relevant publications were retrieved from the grey literature search. Of these potentially relevant articles, five publications were excluded for various reasons, while no publications met the inclusion criteria for this report. Appendix 1 describes the PRISMA flowchart of the study selection.

Summary of Findings

There was no evidence found regarding the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings, or for the effect of a 'remote virtual mentor' on diagnostic accuracy. Therefore no summary can be provided.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

No relevant literature was identified; therefore, no conclusions can be drawn about the diagnostic accuracy of portable ultrasound devices for obstetrical or prenatal assessment in rural or remote settings, or for the effect of a 'remote virtual mentor' on diagnostic accuracy.

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APPENDIX 1: Selection of Included Studies

