

Portable Ultrasound

TO IMAGE UTERINE CONTENTS AND FETAL SIZE AND POSITION

Condition

Ultrasound can be a helpful diagnostic for many conditions including placenta previa, abruption, incomplete abortion, causes of bleeding, multiple gestations, ectopic pregnancies, cephalopelvic disproportion, and obtaining gestational age. Additional applications include diagnosing intrauterine growth restriction, short cervix, stillbirths and congenital anomalies.

Mechanism of Action

Ultrasound devices transmit sound waves via a transducer at 2-18 MHz (hundreds of times greater than the limit of human hearing) and create an image based on the reflected waves received by the same transducer. The strength of the reflected wave depends principally on the difference in density between adjacent structures inside the body. The more dissimilar the tissues, the more reflective their boundary will be. Images are typically 2D “slices” but more recent devices present 3D images and animations. Doppler ultrasound can also be used to measure blood flow. Devices require a coupling gel on the surface of the body, and most come with probes of different shapes suited to imaging different anatomy.

Current use in high-resource settings

Universal coverage is common in many developed countries, although substantial debate persists on the utility of routine screening. A Cochrane review of eight studies randomizing 27,024 women found that routine ultrasound after 24 weeks gestation does not improve outcomes of pregnancy. Selective screening of high risk mothers, on the other hand, is generally agreed to save lives. In all settings, clinical relevance is highly dependent on the operator’s skill and timing of the screening.

Application in low-resource settings

Ultrasound use is less common in the developing world, but available in urban centers. The use of ultrasound for fetal sexing (leading to selective abortion) is a serious issue in several emerging markets, including India, where fetal sexing by ultrasound is illegal and punishable with prison time.

REPRESENTATIVE DEVICES

MAKE	MODEL	PRICE*	TECH	STATUS	NOTES
GE	Vscan	\$10,000	2D+Doppler	Marketed	Fully featured, small package
Sonosite	Nanomaxx	\$5,000	2D+Doppler	Marketed	Largest market share in portable
Signostics	Signos	\$4,000	2D Still	Marketed	Still images only, small package
Healthpower	WED-3100	\$3,500	2D+Doppler	Marketed	Chinese copy of Sonosite

* Prices are approximated. Actual pricing can, and will vary by marketplace and market conditions.

DIAGNOSTIC



PREVENTION DIAGNOSTIC TREATMENT



Representative Product

ULTRASOUND COVERS A BROAD SPECTRUM OF CONDITIONS.

CHARACTERISTICS OF REPRESENTATIVE PRODUCT (NANNOMAXX)

	TECHNOLOGY CHARACTERISTICS	OPERATIONAL PARAMETERS	POTENTIAL OPPORTUNITIES FOR IMPROVEMENT
SKILLS REQUIRED	Intended end user	Sonographer, physician	Training in the operation and interpretation of ultrasound images remains a hurdle for efficacy. Separation of operators and interpreters could lower this hurdle.
	Training required	Weeks	
	Time required per use	Minutes	
ENVIRONMENT / INFRASTRUCTURE	Power required	<4 hrs operation/charge	Modern, portable ultrasound units are already efficient, lightweight, durable, and in some cases are water resistant and designed for outdoor use. Theft, however, remains a concern for a portable, high value device.
	Waste collection	Batteries	
	Complementary technologies required	Coupling gel	
	Temperature and storage	None (gel should not be stored at extreme temperatures)	
	Maintenance	Battery replacement every 1-2 years	
COST	Device Cost (Approx)	\$3,500-\$10,000	Cost remains a major barrier to uptake and use.
	Cost/course (Approx)	<\$1	
OTHER	Portability	<5 kg	Regulatory control of ultrasound for fetal sexing can trigger administrative burden. In India, for example, ultrasound machines are often kept in locked rooms, and a user log must document each mother's visit.
	Regulatory		
	Efficacy	Highly dependent both on user skill and timing of screening	

Additional devices required for impact: Various, including comprehensive emergency obstetric care

Sources: WHO Technology Summary - GMDN #40761 General Purpose ultrasound imaging system, UMDNS #15976 Scanning Systems, ultrasonic, general-purpose.

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