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Approach to Choosing Hardware for use in Global Health

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World Federation for Ultrasound in Medicine and Biology

WFUMB helps bring sustainable ultrasound programs to the underserved areas of the world to improve global healthcare through collaboration, communication, and education.

AFSUMB	Asian Federation for Ultrasound in Medicine and Biology
AIUM	American Institute of Ultrasound in Medicine
ASUM	Australasian Society for Ultrasound in Medicine
EFSUMB	European Federation for Ultrasound in Medicine and Biology
FLAUS	Federation of Latin American Ultrasound Societies
MASU	Mediterranean and African Society of Ultrasound

6	Member organizations
93	Countries
52,925	Individual members

WFUMB runs 13 Centers of Education

Bangladesh Society of Ultrasonography (BSU), Bangladesh, established in 2004
Uganda Association of Sonography (UGASON), Uganda, established in 2004
Sociedad Venezolana de Ultrasonido en Medicina (AVUM), Venezuela, established in 2005
Romanian Society of Ultrasound in Medicine and Biology, Romania, established in 2007
Indonesian Society of Ultrasound in Medicine, Indonesia, established in 2011
Kenya Society of Ultrasound in Medicine and Biology (KESUMB), Kenya, established in 2013
Mongolian Society of Diagnostic Ultrasound (MSDU), Mongolia, established in 2013
Nigerian Society of Ultrasound Practitioner (NSUP), Nigeria, established in 2013
Societe Togolaise D'Ultrasonographie Medicale, Togo, established in 2013
Ethiopian Ultrasound Society, Ethiopia, established in 2014
Sociedad Paraguaya de Ecografia, Paraguay, established in 2015
Khartoum, Sudan, established in 2017
Chisinau, Moldava, established in 2017

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Approach to Choosing Hardware for use in Global Health

Goals

- Discuss an approach to choosing ultrasound hardware for use in global health
- Describe potential challenges that should be considered when choosing an ultrasound system
- Ask the right key questions when making ultrasound hardware purchases that will lead to sustainable outcomes

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Disclosures

- No relevant disclosures
- Specific vendors/brands will not be discussed
- Detailed features/accessories will not be discussed
- Reference RSNA 2017 survey of over 2400 radiologists and vendors from low resource countries based on the World Bank list (with permission)

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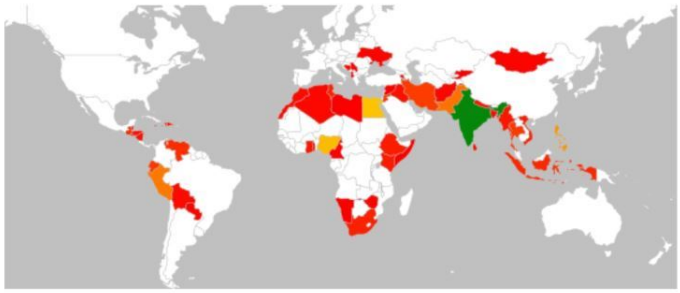
Survey Respondents from these Countries



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Survey Respondents from These Countries

- Afghanistan
- Albania
- Algeria
- Armenia
- Bangladesh
- Belize
- Bolivia
- Bosnia and Herzegovina
- Cameroon
- Dominican Republic
- Ecuador
- Egypt
- El Salvador
- Ethiopia
- Ghana
- Guatemala
- Haiti
- Honduras
- India
- Indonesia
- Iran
- Iraq
- Jamaica
- Jordan
- Kenya
- Kyrgyzstan
- Libya
- Macedonia, Former Yugoslav Rep. of
- Mongolia
- Morocco
- Myanmar
- Namibia
- Nepal
- Nicaragua
- Nigeria
- Pakistan
- Palestinian Territories
- Paraguay
- Peru
- Philippines
- Serbia
- Somalia
- South Africa
- Sri Lanka
- Syria
- Thailand
- Togo
- Tunisia
- Ukraine
- Venezuela
- Vietnam
- Zimbabwe

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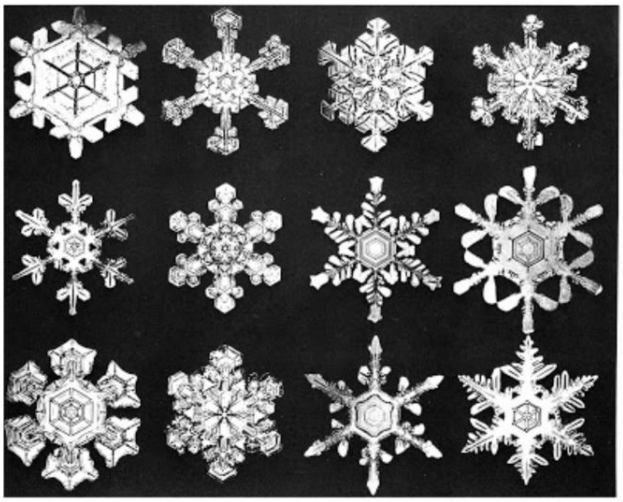

Snowflakebentley.com

Basic Approach: Key Questions

- Determine what you need
  - What is the purpose
  - How will it be used
  - Who will use it
  - When is it needed and for how long
  - Where and under what conditions will it be used
  - Size and portability
  - Features
  - How will it be delivered
  - Who will buy it
  - Budget

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What is the Purpose?

- Type of Practice
  - Diagnostic vs. interventional/procedural guidance
  - Hospital-based, clinic, private practice, community outreach
  - Emergency, Inpatients, Outpatients
  - Focused Clinical Decision Making vs. Consultative
  - On-site vs. Telemedicine
  - Teaching
  - Research
- Often a combination!

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Focused Clinical Decision Making

- Point of Care Ultrasound
  - Done at the bedside as adjunct to physical exam by a primary practitioner or designee
    - Clarify certain findings
    - Assess conditions in the context of acute or emergency care
    - Image guidance for procedures related to the above
  - Well-defined purpose, focused on presence or absence of a limited number of specific findings (Binary decision)
  - Quickly performed: findings are easily recognizable, exam is easily learned

https://car.ca/wp-content/uploads/CAR-Position-Statement-on-the-Use-of-Point-of-Care-Ultrasound.pdf

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Consultation

- Consultative Ultrasound
  - Comprehensive or limited systematic review of normal vs. disordered anatomy, function or dysfunction
  - Procedural guidance
  - Done at the request of another provider or specialist
- In global health settings, not uncommon to see a need for both focused and consultative - using one system!
  - Paucity of trained specialists
    - Task shifting
  - Few health care workers on site that may be responsible for broad range of care

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Who is the Patient?

- Patient population characteristics
  - Adults, Pediatrics (NICU, older kids)
- The clinical conditions that are expected to be seen most will determine transducer selection
  - Ob/Gyn
  - Trauma
  - Cardiac
  - General abdomen/renal
  - Abdominal emergencies
  - Infection
  - Musculoskeletal
  - Small Parts
  - Ocular

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What are the User Considerations?

- Who is qualified to scan?
- Country policy (who is allowed to scan and at what 'level' of Facility)
- Professional background and work experience
  - Doctors
  - Radiographers/Sonographers
  - Nurses, midwives or clinical officers
  - Other
- History of training in ultrasound
  - Baseline fundamentals
  - Hands-on
    - Formal training
    - On the job training or observational
  - Competency assessment: certificate, diploma or degree?
- Level of comfort
- Level of enthusiasm

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Where and Under What Conditions?

- Consider "Unique" local factors
  - Consistent Power Source
    - Problem with 90% of hardware installations
  - Climate
  - Environment
  - Stable Network
    - Problem with 90% of installations
  - Supply chain consumables
    - Gel
    - Cleaner/disinfectants
    - As needed: gloves, sterile gel, probe covers
    - Hand washing
    - Communication: data, airtime
    - Limited or inadequate diagnostic viewing hardware

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Ultrasound Systems

- Form Factors
  - Full-sized
  - Compact cart-based
  - Compact, portable or luggable laptop
  - Hand-carried or hand-held
  - Pocket-carried
  - Miniaturized:
    - Wearable Patch
    - Chip
- Machines sold only outside of the USA/Europe
  - Check with local distributors
  - May not have government agency approval

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Logistics

- Who is buying (internal vs. external)
  - Hospital Administrators, Government (Ministry of Health), Academic or Teaching Institution, Private Hospital, NGO, Individual Doctors, Community Co-op, Research Primary Investigator, Consortium
- What is the timeline expectation
  - Long gestation – local orders can take up to 2 years and equipment is obsolete when it arrives!
  - Geographic distance
  - Spare parts
    - Consider extra for swap out
- How will the system get in the country
  - Direct from Vendor, Regional or Local Distributor, Shipped, Hand Carried, Purchased in-country

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Who is Selling in the Global Market?

- Sales
  - Only 25% of sales are direct from vendor
    - 50% through distributors
    - 25% through 3rd party vendors
  - Challenge:
    - 50% of all applications and training performed by the vendor
- Warranty
  - 100% included on hardware purchases
  - 90% included of software purchases
  - Challenge:
    - Hardware warranty often starts at invoicing and will have partially or completely expired by the time the equipment is installed

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Budget?

- Initial costs are a major concern for consumers and often take priority over quality and long-term cost of ownership
  - New equipment is expensive
  - High taxes and custom duties
  - Hard to purchase in USD
  - Local funds flow is challenging and slow
  - All of the costs of ownership must be considered

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New, Used, Refurbished, Donated?

- Most institutions (69%) do not accept donated equipment
  - 95% consumers think risks of donated equipment outweigh the cost savings
  - 10% countries have national policies on donated equipment
  - Commoditization and lower costs are making new equipment competitive
- Most donated devices do not have service warranties, installation or applications support
  - End-of-life vs. End-of-Support
  - No user manual
  - No qualified service
  - No spare parts or inadequate parts (one transducer)

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Service Contracts

- Service Contracts
  - 86% of hardware vendors and 91 % of software vendors offer service contracts on new purchases
  - Most service contracts are 1-2 years, getting longer for hand-carried and smaller devices
  - Customers do not purchase service contracts or install updates
    - For hardware 40% of the time
    - For software 20% of the time
    - Reasons: cost, education, local support availability
- Who performs service?
  - Vendor 42%
  - Vendor-trained distributor 46%
  - Third party 12%

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The "No Service Contract" Vicious Cycle

- Service Contract Challenges:
  - Customers do not appreciate benefits of service contracts
  - Customers can not afford service contracts
  - Customers are willing to (or have to) risk equipment failure
  - Vendors have challenges finding & training engineers
  - 3rd party vendors have low-skill engineers

- Equipment is thought to be unreliable
- Vendors are perceived as offering limited service

→ Fewer service contracts are sold

- Service & parts are less available
- Customers use incorrect consumables
- Customers fail to maintain proper operating conditions/ get upgrades

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Suggestions for Consumers

- Determine the budget and secure financing
  - Factor in all costs including service contract, upgrades, delivery, customs, inspections, taxes, etc.
  - Buy based on purchase price not monthly payments
  - Economies of scale (including training!) – consider buying in bulk
- Answer the key questions
- Research using your answers as your guide and compare at least two options
  - Knowledge is power
  - Internet
- Get recommendations, if possible
- Online price quotes vs. in-person
  - Negotiate price and terms
- Test-drive
- Read the paperwork before signing
- Stay up to date on technology

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Suggestions for Vendors

- Vendors who sell for global markets should:
  - Offer all-inclusive coverage with parts and service built into purchase price
    - Begin service contract at first use
    - Shared risk offerings
  - Ensure there is accountability with the local distributors
  - Develop simpler, longer lasting technologies
    - Make spare parts and service more accessible
    - ? Green solutions
  - Invest in train the trainer programs
    - Collaborate on centers of education and service training centers of excellence e.g. with WFUMB

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Thank you!

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