

Seven Pillars for a Community-Led AI-POCUS Future – A WINFOCUS Manifesto

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ABSTRACT

The rapid integration of Artificial Intelligence (AI) into Point-of-Care Ultrasound (POCUS) represents a transformative shift, offering the potential to democratize diagnostic expertise while simultaneously presenting significant risks regarding clinical validation, workforce preparedness, and health equity. Informed by a recent global survey indicating that while 81% of practitioners are optimistic about AI, major concerns remain regarding training and evidence gaps, the World Interactive Network Focused On Critical Ultrasound (WINFOCUS) proposes a unified strategic framework. This manifesto outlines seven foundational pillars, in no particular order of priority, to guide the ethical and effective adoption of AI-augmented POCUS (Figure 1): (1) earning trust through rigorous, prospective evidence; (2) building an AI-literate workforce through evolved curricula; (3) championing global equity to prevent widening health disparities; (4) ensuring algorithmic transparency and accountability; (5) designing for seamless human-AI collaboration; (6) establishing a sustainable, privacy-centric data infrastructure; and (7) committing to continuous, patient-centered evaluation. We present this roadmap as a global call to action for clinicians, researchers, and industry partners to collectively shape a future where technology amplifies clinical wisdom and improves patient outcomes.

Key words: Artificial intelligence, POCUS, Machine-learning, Ultrasound



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For the past two decades, we, as a community, have achieved something remarkable. Together, we moved ultrasound from the confines of the radiology department to the patient's bedside, empowering clinicians across various specialties to make faster, more informed decisions. The World Interactive Network Focused On Critical UltraSound (WINFOCUS) was born of this collective spirit, a network built to champion education, standardization, and global access to ultrasound. Today, we face a new challenge, one driven by the quiet and powerful force of artificial intelligence (AI). This isn't a conversation for tomorrow; the age of AI-augmented POCUS is here, and it calls for unified action.

The promise of AI in our field is considerable. Unlike retrospective imaging (CT/MRI), POCUS is defined by real-time operator dependency, probe-patient interaction, and context-driven interpretation at the bedside. This requires a unique AI framework that accounts for variability in acoustic windows and the traditionally short training-to-practice pathway. There are now systems that can help capture a diagnostic-quality cardiac image, automatically calculate an ejection fraction and other 2D and Doppler measures, and quantify lung artifacts with consistency (1, 2). These are no longer just ideas in a research lab; they are regulatory body approved tools entering our clinical spaces, with early studies showing impressive sensitivity and specificity in

certain clinical applications, often exceeding 80-95% for key diagnostic tasks (3, 4). The potential to further democratize POCUS, enhance our diagnostic accuracy, and improve patient outcomes on a global scale is immense. But we all know that great potential comes with great responsibility. If we, the POCUS community, don't come together to guide this evolution, we risk having it led for us, with consequences we may not have intended for our patients or our profession.

A recent global survey of over 1,100 of our fellow POCUS practitioners, conducted by WINFOCUS leadership and published in this journal, showed that over 81% of us are optimistic about integrating AI in our daily practice (5). But this optimism is grounded in realism; the same survey identified that our biggest concerns aren't about the technology itself, but about our collective preparedness. The top two perceived barriers to AI adoption were Training and Education (27.1%) and the need for robust Clinical Validation and Evidence (17.5%) (5).

This feedback provides a clear direction for our community. In this statement, we propose a vision for our path forward, built upon seven foundational pillars. We offer these not as a top-down directive, but as a starting point for a global conversation—our shared roadmap for navigating the AI era with purpose and unity (Figure 1).

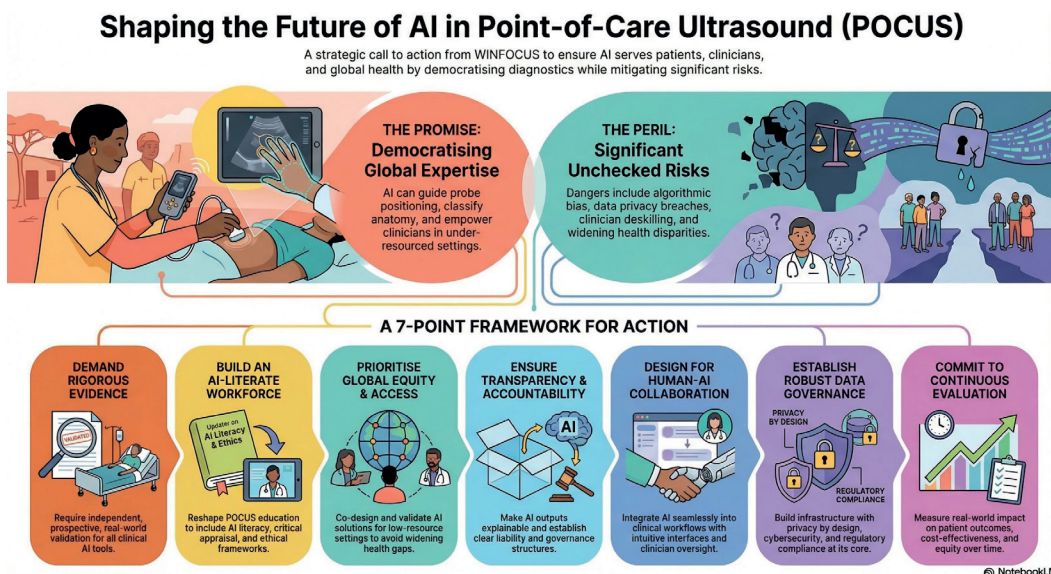


Figure 1. Shaping the future of AI in Point-of-Care Ultrasound (POCUS).

Pillar 1: Earning our trust through rigorous evidence

The foundation of any medical innovation is evidence we can all trust. While AI tools multiply, their validation remains fragmented and inconsistent. Too often, we see systems promoted based on internal data or marketing enthusiasm rather than the rigorous, independent, multi-center prospective validation the medical profession demands (6). Let's agree to a higher standard. We should ask that every AI system proposed for clinical use should be subject to the same rigor of study design as other device, software, or pharmaceutical innovations (7) and demonstrates its value through transparent, peer-reviewed evidence that is open to our community's scrutiny. An algorithm that works in a lab also needs to be shown to result in a real, positive difference for our patients in real-world settings. Validation must move beyond "internal data" to include performance assessments across different machine presets, body habitus, and operator skill levels.

Pillar 2: Building our workforce for tomorrow, together

Education is at the heart of WINFOCUS, and the survey responses have indicated this to be the top priority. The training models that have brought us this far need to continually evolve. We need to build a new, competency-based curriculum that fosters deep "AI literacy." AI will redefine, not just support, POCUS competence. This means creating a community of clinicians who can critically appraise AI-generated data (AI supervision), understand its limitations, and, most importantly, trust in their own fundamental sonographic skills to recognise when the algorithm is wrong, complementing rather than disrupting the clinical-sonographic reasoning. It also means supporting our educators, giving them the tools and training they need to guide the next generation. Without this reframing, there is a risk of deskilling and mis-skilling - where clinicians can operate AI-enabled devices without understanding ultrasound physics, artifacts, or anatomical limitations. This would undermine the very foundations of POCUS.

Pillar 3: Championing equity and global access

Perhaps the greatest promise of AI-augmented POCUS is its potential to democratize expertise, especially in the communities we serve in low- and middle-income countries (LMICs). An AI system that guides a nurse or community health worker in a rural clinic could be transformative (8). Yet, this promise will only be realized through intentional action. If we are not careful, AI could widen, not close, the global health gap. Tools trained in tertiary centres may fail silently in resource-limited settings due to differences in pathology prevalence and hardware performance. We commit to co-designing and validating tools *with* our colleagues in LMICs, respecting data sovereignty, and advocating for affordable, sustainable models. The true measure of this technology's success will be its ability to improve care for everyone, everywhere.

Pillar 4: Making AI comprehensible and accountable

The "black box" nature of AI is a real concern for all of us. When an AI system flags a finding, we should be able to prioritize human oversight over AI findings.

Accountability frameworks must also reflect the unique characteristics of bedside ultrasound. When AI-driven guidance influences probe placement or diagnostic interpretation in real time, responsibility cannot be reduced to post-hoc liability discussions. The POCUS community should actively participate in defining shared accountability models that recognize the dynamic interaction between sonologist, AI system, and clinical context, rather than defaulting to simplistic clinician-versus-algorithm narratives (9).

Pillar 5: Designing for real-world practice and collaboration

POCUS findings are immediately integrated with physical exam, laboratory data, and clinical context. AI outputs must be presented in a way that facilitates this synthesis, not as isolated findings. Furthermore,

POCUS practitioners often work in suboptimal scanning conditions—uncooperative patients, limited positioning options, time pressure. Hence, AI systems must be robust to these real-world constraints, whilst also assisting in workflow and documentation. An algorithm with perfect accuracy has little value if it disrupts our workflow or is difficult and time-consuming to use. The optimal model we should strive for is true human-AI integration, where our clinical judgment is enhanced by the computational power of AI in the forms of human-AI augmentation and human-AI synergy (10). Research already shows that these hybrid teams outperform either humans or AI alone (11). We need to work with our industry partners to build tools that are designed for the reality of our work.

Pillar 6: Building a sustainable and trustworthy infrastructure

AI systems are data systems - patient privacy and data security are paramount. As a community, we must insist on “privacy by design” and rigorous compliance with regulations like GDPR and HIPAA. This also means having open conversations with our patients about how their ultrasound data is used, ensuring we have their explicit and informed consent. Building and maintaining this trustworthy digital infrastructure is not just an IT issue—it is a core professional responsibility for all of us in the AI era.

Pillar 7: Measuring what matters to our patients and systems

Finally, we must commit to continuous evaluation. The promise of innovation must translate to real, measurable benefits. For any AI tool we adopt, we should be asking the important questions. Is it actually improving patient outcomes? Is it making our health systems more efficient and cost-effective? Is it helping to reduce burnout, or adding to it? Are its benefits being distributed equitably? Through PoCUS-AI continuous Quality Assurance processes, we should focus on these key performance indicators, and ensure that we are not just adopting new technology for its own

sake, but because it truly serves our goal of providing better care for our patients.

A Request to our community

The actions we take now to integrate AI into POCUS will shape our field for decades. WINFOCUS has been at the forefront of establishing POCUS standards, competency frameworks, and global education networks. We now have the responsibility to shape how AI integrates into this ecosystem. We are ready to serve as a hub for this work, but this is a mission that requires the collective will and wisdom of our entire global family. We issue this call to action to every practitioner, educator, researcher, and industry partner: Join us. Let’s build this future together, based on these seven pillars, where the augmented sonographer is the global standard, where technology serves clinical wisdom, and where AI-augmented POCUS becomes a powerful engine for health equity and clinical excellence for all.

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