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PERSPECTIVES

Training without Harm: Rethinking Ethics, Simulation and the Evolving Future of Medical Education in West Africa

Nkechi Oluwakemi Dike[1], Jonathan Kajjimu[2,3], Maame-Boatemaa Amissah-Arthur[4]

[1]Department of Medical Education & I.T., School of Medical Sciences, University of Cape Coast, Cape Coast, Ghana; [2]Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda; [3]Sparkman Center for Global Health, School of Public Health, The University of Alabama at Birmingham, Birmingham, AL, USA; [4]Rheumatology Unit, Internal Medicine Department, Accra College of Medicine, Accra, Ghana

Correspondence: Nkechi Oluwakemi Dike, Department of Medical Education & I.T., School of Medical Sciences, University of Cape Coast, Cape Coast, Ghana, Email n.o.dike@uccsms.edu.gh

Abstract: As global healthcare systems evolve, medical training must advance not only in content but also in its moral responsibility to the learners, patients, and society. This perspective paper examines how well-intentioned training systems can inadvertently cause harm and argues for reframing medical education around applied expressions of the classical bioethics principles of safety, equity, and future readiness. Beyond traditional concerns such as consent and confidentiality, it highlights the structural dimensions of ethics: training equity, learner safety, and institutional accountability. Drawing on global and regional evidence, simulation-based medical education is presented not merely as a pedagogical innovation but as an ethical imperative that improves performance, reduces procedural errors, and enhances learner confidence. Drawing on these concerns, the paper introduces the SAFE Training Framework - Safety, Alignment, Faculty development, and Evaluation - as a practical model for embedding ethics into medical education. The conceptual framework emphasizes four essential anchors: ensuring Safety for learners and patients, Aligning training with ethical and contextual values, empowering Faculty through development and support, and Evaluating competence through authentic, future-oriented assessment. This framework, targeted at medical educators, training institutions, policymakers, and accrediting bodies responsible for shaping health-workforce quality and patient safety, can inform curriculum design and accreditation standards for medical education in Low- and Middle-Income countries. The discussion also addresses emerging challenges in the age of artificial intelligence, calling for balance between innovation and integrity in assessment. Strengthening health systems in West Africa and beyond will require more than moral intent; it demands practical, ethically grounded approaches to capacity building across every stage of medical training.

Keywords: medical education, medical ethics, simulation-based education, West Africa, patient safety, artificial intelligence

Introduction

Ethics in medicine has traditionally been understood as the framework guiding the clinical relationship between the patient and physician, and typically grounded in the principles of beneficence, non-maleficence, autonomy, and justice.[1] What is less examined, however, is whether the educational systems that train future physicians embody these same principles.

The processes by which medical students, residents, and practicing professionals are trained carry profound ethical implications that extend beyond the classroom and clinic, ultimately influencing patient safety, equity in healthcare delivery, and the resilience of health systems.[2] This oversight is particularly striking in low- and middle-income countries (LMICs), including West Africa, where constrained resources, uneven supervision, and limited infrastructure can make the training process itself a source of potential harm.[3,4] The West African region faces significant health workforce shortages, with physician-to-population ratios falling far below WHO recommendations.[5,6] Training institutions are often underfunded and overstretched, producing graduates under constrained conditions where equitable exposure, supervision, and structured learning cannot always be guaranteed.[3,7] Framing medical education as an ethical act emphasizes that the

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design and delivery of training are as morally significant as clinical practice itself.[7,8] As medical education evolves globally toward competency-based frameworks, simulation, and digital learning, West African institutions must also ask whether their training systems reflect the ethical imperative of preparing safe, capable, and future-ready professionals.[9]

Building on this evidence, we offer a perspective on capacity building, grounded in ethics, as a cornerstone for medical education reform in the West African region. In such contexts, a patient may inadvertently become the first "practice subject" for an underprepared learner. Also, learners in urban and better-resourced postings gain richer training experiences than rural or under-resourced ones. These raise difficult, yet fundamental ethical questions about the conditions of our medical education. Is it ethical for patients to serve as the first practice ground for unprepared learners? Can training be considered fair when students posted to well-resourced urban hospitals receive richer exposure than those assigned to rural facilities? And can we truly claim to "do no harm" if we accept training models that compromise both patient safety and learner development? These questions position ethics not simply as a set of rules, but as a responsibility for educators and institutions, because our training directly influences who becomes competent, who is entrusted with responsibility, and how safe healthcare systems ultimately are.

Ethics of Medical Training Beyond Bioethics

The ethical dimensions of training extend beyond the conventional focus on confidentiality, consent, and professional conduct. Ethics must also encompass structural justice, that is, ensuring that learning environments are equitable, safe, and adequately resourced.[10] In traditional apprenticeship-style models, the pathway of observation, supervised practice, and independent execution is intended to safeguard both patient and learner.[11] Yet in many resource-limited settings, supervision is inadequate, patient loads are overwhelming, and students may be compelled to learn procedures under pressure and without adequate preparation.[12,13]

Educational models that expose patients to the first attempts of inexperienced trainees raise questions about non-maleficence. Systems that provide richer opportunities to some learners based solely on placement, challenge justice.

This model risks harm on multiple fronts. Patients may receive substandard care from inexperienced trainees; learners may experience psychological stress, moral injury, or burnout in environments that normalize learning under pressure without adequate preparation, and health systems may perpetuate inequities when access to supervised practice varies widely across institutions or regions.[12] A 2021 WHO report estimated that unsafe care in low- and middle-income countries results in over 134 million adverse events annually, with up to 2.6 million deaths each year, many attributable to systemic training and supervision gaps.[14] This global picture is mirrored in the sub-Saharan African context. In Ghana, a national cross-sectional study of 27 hospitals revealed significant weaknesses in patient-safety surveillance, policy, and staff training systems despite generally good institutional safety scores.[15] Another study from a tertiary emergency department reported medication error rates of approximately 27%, much of it linked to heavy workloads and inadequate supervision.[16] Similar studies across the region have shown that patient harm frequently stems not only from shortages of resources but from gaps in structured supervision, competency assurance, and the culture of learning itself.[17] These data reinforce that unsafe care is often an educational problem before it becomes a clinical one, making ethical reform in training both a moral and a systems-level necessity.

When poorly designed training contributes to preventable harm, medical education itself becomes an ethical failure. Framing training as an ethical act reframes these statistics not as inevitable, but as preventable consequences of neglected educational reform.

The challenge is deepened by inequity in learning opportunities. A student rotating through a busy tertiary hospital in a city may gain broad exposure, while a peer in a rural post might see far less. The result is uneven competence and public skepticism about fairness in training.[18–20] Achieving justice in education therefore calls for deliberate design to ensure comparable opportunities across different settings.

Viewing training itself as an ethical duty broadens the scope of medical education. Institutions become more than conveyors of knowledge; they are stewards of justice, equity, and safety. This mindset is essential for producing graduates who are not only skilled but also confident and socially accountable.

Simulation as an Ethical Imperative

Simulation-based medical education (SBME) directly addresses these concerns by offering learners structured opportunities to practice technical and non-technical skills without risking patient safety. By shifting first attempts away from patients and into controlled environments, simulation protects patients, standardizes exposure, and allows learners to practice until competence is achieved.[21,22] Some meta-analyses have shown that medical simulation enhances clinical competence; improves teamwork, confidence and retention; and reduces procedural errors.[22–24] Furthermore, one of these studies demonstrated that simulation-based training with deliberate practice improves learner outcomes and performance by 20–30% compared to traditional methods, while also reducing procedural errors by up to 38%.[23] In West Africa where uneven clinical exposure is a reality, simulation can ensure that all learners encounter core clinical scenarios, bridging the gap between theory and practice.

The ethical justification for simulation is threefold. First, it aligns with non-maleficence, as patients are not used as the first site of practice for unskilled learners. Second, it promotes justice, since standardized scenarios create equal learning opportunities regardless of placement or patient volume. Third, it supports beneficence, as learners gain confidence and competence in environments designed to facilitate safe failure, constructive feedback, and reflective learning.[25,26]

Beyond technical skills, simulation develops non-technical competencies such as teamwork, communication, empathy, leadership, and situational awareness, skills strongly correlated with patient safety.[27–29]

Importantly, simulation need not be too expensive. In sub-Saharan Africa, programs have leveraged low- and medium-fidelity approaches, including task trainers, peer-led sessions, and adapted Objective Structured Clinical Examination (OSCE) rooms, to achieve meaningful outcomes.[30–32] This demonstrates that simulation can be scaled ethically and sustainably, functioning as an educational infrastructure that operationalizes the principle of "do no harm".

Simulation also lends itself to teaching areas that bedside training often overlooks. High-fidelity crisis scenarios strengthen resilience under pressure,[33] while inter-professional sessions encourage teamwork across disciplines.[34] Such competencies are indispensable in emergency medicine, trauma, and public health crises, situations frequently encountered and all too familiar in West Africa.

Faculty Development and Institutional Responsibility

The ethical responsibility of training extends beyond learners and patients to faculty and institutions themselves. Faculty serve as ethical gatekeepers, yet many teach as they were taught - through apprenticeship and repetition, rather than as today's learners need to learn.[35] Therefore, faculty development is ethically critical. Without faculty development, simulation and innovative pedagogies risk being poorly implemented or sidelined. Studies have shown that well-designed programs improve teaching effectiveness, enhance learner outcomes, and foster cultures of reflective practice.[35–37] For example, effective simulation requires skilled facilitation, effectively structured debriefing, and alignment with curricular goals, and a solid grasp of assessment principles.[38,39] These are competencies that must be cultivated through deliberate faculty training.

In practice, faculty development often begins modestly but with meaningful impact. Short courses in simulation facilitation, debriefing, and assessment, sometimes delivered through regional workshops, professional colleges, or international partnerships have enabled small groups of faculties to introduce structured simulation and reflective teaching into their home institutions. Even where resources are limited, these trained educators frequently become local champions, adapting what they have learned to their own contexts and gradually shifting how trainees are taught and supervised. This pattern illustrates how faculty development functions as the true engine of ethical training reform; without skilled educators, even the best-designed curricula cannot protect learners or patients.

Institutions must also embrace responsibility for embedding ethics into curriculum and assessment. When supervision is uneven, faculty unsupported, or assessment standards inconsistent, institutions themselves contribute to ethical lapses. Embedding ethics within curricula, faculty policy, assessment and accreditation processes is therefore vital for lasting reform.[9,40] This includes aligning outcomes with societal needs, ensuring equitable access to quality training, and preparing graduates for challenges such as misinformation, telemedicine, and AI-supported decision-making. Ethical education cannot be left to chance or to the goodwill of individual faculty; it must be institutionalized as a standard of practice.

Continuous Professional Development and Professional Safety

Ethical responsibility in training does not end at graduation. Physicians and healthcare workers require continuous upskilling and re-skilling to remain competent in an ever-changing medical landscape.[7] In-service training programs, continuous professional development (CPD) workshops, and online learning platforms play a critical role in sustaining competence,[41] yet for many in West Africa, opportunities for CPD remain fragmented, irregular, concentrated in urban centers, or inaccessible to rural practitioners.[42] Hence, the ethical challenge is one of access as well as content. Simulation-based CPD offers an ethical solution, enabling practicing clinicians to refresh critical skills without exposing patients to risk.[43]

Brief, targeted in-situ simulation sessions can help refresh time-critical skills such as resuscitation, sepsis care, and obstetric emergencies - areas where mistakes carry grave consequences.[44] For rural clinicians, low-fidelity simulation packages can bring practical, context-sensitive training within reach, and can significantly improve competence and satisfaction in practitioners.[45]

Practical models for delivering CPD in resource-constrained settings include mobile simulation units that bring training to district hospitals, periodic in-situ simulation sessions embedded within routine clinical work, and tele-mentorship programs that link rural clinicians to specialist support. Regional training hubs shared across institutions can also reduce duplication of cost while expanding reach. To sustain these models, CPD must be embedded within existing regulatory and financing structures. Professional councils and ministries of health can mandate regular CPD through licensure and revalidation requirements, while public health budgets, donor-supported programs, and employer contributions can be aligned to support training as a patient-safety investment rather than a discretionary expense.

When lifelong learning and CPD is guided by ethics, it ensures that practicing clinicians remain accountable to their patients, their profession, and the wider community.

Future Readiness in Medical Training and the Role of Artificial Intelligence (AI)

Technology and artificial intelligence (AI) are reshaping both healthcare and education.[46] The rapid integration of artificial intelligence into healthcare poses new ethical dilemmas for medical education and ethical training must adapt.[47] Students are increasingly using AI tools to prepare for OSCEs, generate clinical summaries, and practice reasoning through virtual simulations.

While these technologies offer opportunities for enhanced learning, they raise questions about fairness, academic integrity, and traditional assessment validity.[48–51]

Studies show that large language models (LLM) can perform at or near pass thresholds on standardized medical examinations, but their reasoning remains opaque and inconsistent.[52] This creates new challenges for assessments based mainly on recall or case write-ups.

If students rely heavily on AI for diagnostic reasoning, are examinations still measuring competence or merely recall, or are we simply evaluating the prompts they provide to an algorithm?

To better prepare learners, future-ready assessments must therefore evolve to test judgment, adaptability, and ethical decision-making. Simulation offers a strong platform for this shift. Simulation with unfolding case scenarios, and reflective assessments involving AI-based interactions may provide more authentic measures of competence in this context.[51,53] Cases that weave in AI-generated data can push students to critically appraise algorithmic suggestions, weighing them against clinical realities and patient priorities.[54] Embedding AI literacy into curricula will ensure graduates are not only technically proficient in its adaptation, but also provides ethical guardrails in using these tools with discernment rather than dependency.[55]

As medical training continues to evolve alongside artificial intelligence and digital transformation, the ethical foundation of education must remain its anchor. To ensure that innovation strengthens rather than erodes the moral fabric of medicine, institutions require a structured, practical approach for embedding ethics into all levels of training.

Drawing from the ethical principles and educational insights discussed throughout this paper, we propose the SAFE training framework - a practical model designed to embed ethics into the design and delivery of medical education. The conceptual framework emphasizes four key elements: Safety, Alignment, Faculty development, and Evaluation; each representing a bridge between ethical intent and educational practice. While several competency-based, patient-safety,

and professionalism frameworks exist in medical education, few explicitly integrate ethical responsibility into the structural design of training systems. The SAFE framework is proposed in this paper as a synthesis that brings these dimensions together in a coherent, ethics-driven model.

Integrating Ethics into Training: The SAFE Framework for Reform

Integrating ethics into the fabric of medical training is not an abstract need today, but a practical necessity. The SAFE framework offers a way to bring this vision to life through four guiding anchors: Safety, Alignment, Faculty development, and Evaluation (see Figure 1). Together, they provide a coherent structure for designing, implementing, and sustaining ethical medical education across undergraduate, postgraduate, and continuing professional levels.

Safety begins with the recognition that patients should never be the first site of a learner's trial. Ethical training safeguards both learner and patient through structured preparation, supervision, and staged autonomy. Embedding simulation before clinical exposure, using skills labs to rehearse core procedures, and setting clear standards for supervised practice, all ensure that learning occurs without harm. When students know they can fail safely before entering real clinical settings, both competence and confidence grow.

Alignment calls for curricula that reflect ethical values and real-world relevance. Educational outcomes should be grounded in the health needs of local communities, not only global templates. A curriculum guided by justice intentionally creates equal learning opportunities across rural and urban settings. Aligning ethics also means making values such as respect, empathy, integrity, and accountability explicit within learning objectives, treating them as competencies that are as measurable and essential as any clinical skill.

Faculty are the human link between policy and practice. Every educator models what ethical learning looks like in action. Faculty development programs must therefore extend beyond teaching techniques to cultivate reflective educators who can facilitate, debrief, and mentor with empathy and fairness. When institutions invest in training their trainers, they foster an ethical culture that sustains itself over time. Faculty should be recognized and rewarded not only for scholarship and clinical work but for cultivating safe, supportive learning environments.

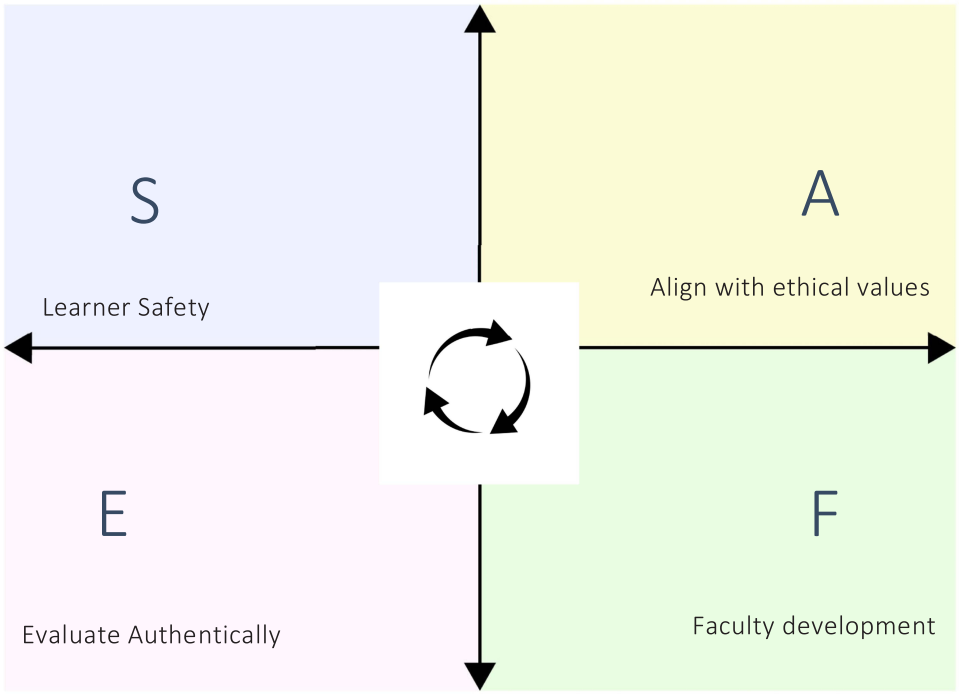

Figure 1 The SAFE Framework The SAFE Training Framework is a simple guide: S — Start with student safety, A — Align learning with ethical values, F — Facilitate with trained educators (faculty), E — Evaluate through authentic, future-ready methods. This is a call to design training that is not only effective, but also ethical, equitable, and sustainable.

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Evaluation closes the loop by assessing what truly matters. Ethical assessment moves beyond recall of facts to evaluate judgment, professionalism, and moral reasoning. Simulation-based assessments and workplace evaluations reveal how learners make decisions under uncertainty; moments where ethical integrity is most visible. As AI becomes part of training, evaluation must also ensure that technological innovation enhances learning rather than replaces human reasoning.

Together, these four principles, Safety, Alignment, Faculty, and Evaluation, offer a roadmap that connects ethics to action. By embedding them into curricula, supervision, and assessment, institutions can develop clinicians who are not only skilled but conscientious, confident, and compassionate. Training, when guided by these principles, becomes more than technical preparation, it becomes a moral commitment to protect patients, empower learners, and uphold the integrity of the profession.

Implementation Challenges and Emerging Opportunities

While the ethical case for reform is compelling, translating these ideals into daily practice demands persistence, creativity, and contextual awareness. Implementing ethical, simulation-enhanced, and competency-based training in West Africa is not without challenge. Institutions must navigate financial limitations, competing priorities, and cultural hesitation toward new pedagogical models. Faculty shortages and heavy service and workloads often make innovation feel secondary to survival. Yet, these constraints do not negate progress, they define the context within which it must occur.

Encouragingly, these barriers coexist with meaningful opportunities. Across the region, a new generation of educators is emerging who are motivated, resourceful, and open to innovation. Digital infrastructure is expanding, regional collaborations are strengthening, and global attention on health workforce development continues to grow. These shifts create fertile ground for ethical and educational reform that is both sustainable and home-grown.

Reform does not need to happen all at once to be significant. Phased, context-specific implementation beginning with pilot programs, faculty champions, and inter-institutional partnerships, can demonstrate early wins and build institutional trust. As outcomes become visible, momentum and ownership will naturally follow. Local creativity, adaptability, and problem-solving have long sustained West African medical education. These can now be harnessed to embed ethics, safety, and innovation into the very design of training.

The region's readiness for reform may not be uniform, but it is undeniable. The opportunity will require that we ride the tide of the evolving education and technology landscape, by taking immediate practical actions, tracking measurable progress, and incremental improvements. With deliberate investment, shared learning, and policy support, West Africa can transform its training systems in ways that are ethical, equitable, and future-ready.

Conclusion

Medical training that overlooks ethics risks undermining both patient safety and public trust. Embedding these principles into the design of curricula and institutional culture brings medical education closer to an ethical, equitable, and future-ready mo one that truly embodies the principle of "training without harm".

As a next step, the SAFE framework can be piloted within a teaching hospital or training institution by mapping existing curricula, supervision structures, and assessments against its four principles. Initial implementation could include introducing simulation before high-risk clinical tasks, training a core group of faculties in facilitation and debriefing, and using structured assessments to evaluate not only technical performance but ethical decision-making and professionalism. Findings from such pilots can then inform institutional policy, accreditation standards, and wider regional adoption.

Simulation offers the pathway for safer and fairer learning; faculty development ensures effective implementation; continuous professional learning sustains competence; and ethical assessment supported by thoughtful integration of technology, secures accountability. The call to action is simple yet profound: medical education must not only advance but do so with conscience. By embracing ethical innovation through the SAFE framework, West Africa has the opportunity not just to follow global trends but to define them through curriculum design, accreditation and institutional policies, ultimately, producing physicians who are as ethically grounded as they are clinically capable.

Disclosure

The authors report no conflicts of interest in this work.

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