
Closing the Cancer Imaging Gap with Pragmatic Innovation



Cancer imaging underpins detection, staging, treatment planning and follow-up, yet access remains starkly unequal across regions. A recent study published in *Radiology: Imaging Cancer* showed that low- and middle-income countries face higher fatality rates despite carrying most of the disability-adjusted life years. At the same time, high-income countries concentrate equipment, workforce and health spending.

Fundamental modalities such as radiography and ultrasound can meet the bulk of needs in resource-limited settings, but billions still lack access. Advanced modalities including CT, MRI and PET/CT improve outcomes and efficiency, although their deployment is constrained by cost, infrastructure and trained personnel. Emerging approaches focus on fit-for-purpose technologies, workforce development, financing models and regional networks to deliver equitable, sustainable imaging that aligns with local capacity and clinical priorities.

Must Read: [Expanding MRI Access with Mid-Field and 1.5-T Systems](#)

Unequal Access Undermines Cancer Outcomes

The availability of imaging is tightly linked to survival, yet supply and skills remain uneven. Data shows sharp differences in equipment density, with CT scanners per million people falling from an average of 38.8 in high-income settings to 4.3 in low- to middle-income countries and only 0.7 in low-income countries. Workforce disparities mirror these gaps: high-income countries average 93 radiologists per million people compared with one per million in low-income countries. Even where hardware exists, diagnostic quality depends on reliable power, consumables, PACS support, skilled technologists and subspecialised radiologists, which are frequently lacking. The result is underuse of oncologic imaging, late diagnosis, interpretive variability and limited access to interventional services that could improve outcomes and reduce downstream costs.

These inequities persist across the cancer pathway. Following diagnosis, imaging guides response assessment and surveillance, but benefits vary by region depending on the relative scale-up of treatment and imaging. Survival gains are greatest when investments reflect local bottlenecks, whether surgical capacity for breast cancer in low-resource settings or access to targeted therapies in upper-middle and high-income contexts. Socioeconomic barriers compound these structural issues, with disadvantaged groups more likely to be imaged in under-resourced facilities, experience lower image quality and present at later stages. Without targeted strategies, the convergence of equipment scarcity, workforce shortages and social determinants sustains outcome gaps.

Pragmatic Technologies to Extend Diagnostic Reach

Prioritising affordable, resource-appropriate modalities offers the fastest relief. The World Health Organization estimates that radiography and ultrasound can meet most imaging needs in resource-limited settings, yet 3.2 billion people in low- and middle-income countries lack access. Handheld ultrasound devices with long-life batteries, smartphone interfaces, remote review and integrated artificial intelligence have improved care for a majority of patients in pilot regions, while local gel substitutes reduce consumable costs. Ultrasound's suitability for younger women with dense breasts supports its role as a primary screening tool where mammography is impractical, with automated breast ultrasound improving reproducibility and throughput.

Addressing MRI scarcity requires rethinking field strength and cost drivers. Development of sub-1 T systems, including 0.5 T platforms that balance performance and affordability, leverages advances in magnet design and deep learning reconstruction to offset lower signal-to-noise ratios. Ultra-low-field devices offer targeted, low-cost use cases, while home-grown 1.5 T efforts aim to lower price points. Successful MRI deployment depends on financing mechanisms, training, digitisation and streamlined protocols as much as on hardware.

CT remains central to staging and surveillance. New stationary, motion-free designs reduce maintenance, ease transport and simplify assembly by eliminating moving gantry parts, improving suitability for constrained environments. In lung cancer, where low-dose CT screening lowers mortality, mobile CT and community checks can mitigate geographic barriers, while repurposing older scanners with low-cost reconstruction software extends functionality without major capital outlay. PET/CT influences management decisively and can reduce futile procedures, but access is limited by tracer supply chains and expertise. Generator-produced tracers enable on-site preparation without cyclotrons, and cross-training nuclear medicine and radiology staff helps alleviate workforce constraints. As theranostics expands, ensuring equitable access becomes an added challenge for systems already stretched.

Building Capacity Through Policy, Funding and Training

Sustainable imaging access depends on policy alignment, financing and skills. Managed equipment services and leasing shift expenditure from capital to operations, pairing procurement with maintenance and training over long horizons. Development banks, overseas assistance and domestic public-private contributions can anchor diagnostic infrastructure, provided investments explicitly link imaging to accessible treatment to avoid diagnostic bottlenecks.

Regional centre of reference models offer a practical path when nationwide hardware parity is unrealistic. By concentrating equipment, service contracts, spare parts, software updates and subspecialty expertise in hubs connected to peripheral sites, these networks deliver an essential radiology package—radiography, ultrasound, mammography and image-guided biopsy—while building workforce capacity through standard curricula, fellowships and second-opinion pathways. Programmes that seed interventional radiology training demonstrate how structured collaboration can transform services within a few years, with tele-mentoring and teach-the-teachers approaches multiplying local impact. Incorporating interventional pain management into care pathways addresses a critical quality-of-life need in settings where late presentation is common and systemic analgesia access is limited.

Artificial intelligence can amplify scarce expertise across detection, triage and longitudinal assessment, from refining BI-RADS assessments to automating prostate MRI workflows and enhancing pulmonary nodule detection. Its value in follow-up includes volumetric tracking and noninvasive risk stratification. Realising this potential requires diverse datasets, interpretable models, dependable infrastructure and clinician uptake. In low-resource environments, these prerequisites are not guaranteed, so AI adoption must proceed in step with data quality, connectivity and training to avoid widening disparities.

Equitable cancer outcomes depend on timely, high-quality imaging matched to treatment capacity. Progress will come from pragmatic technologies that fit local constraints, financing models that guarantee lifecycle support, hub-and-spoke networks that spread expertise and training pipelines that strengthen the workforce. Where appropriate, AI can extend reach, provided foundations of data, infrastructure and trust are in place. By aligning investments with regional needs and prioritising essential modalities alongside advanced capabilities, health systems can close the imaging gap and deliver more consistent cancer care irrespective of geography.

Source: [Radiology: Imaging Cancer](#)

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