

Setting the Stage for Preventive Radiology

Leander Maerkisch; Benedikt Schneider; Christian Wiedemeyer, MD, CMO

Consider 57-year-old Elise (anonymized), who recently received a diagnosis of advanced osteoporosis after suffering an unexpected fracture, despite having undergone several other recent radiological exams for unrelated conditions.

This real patient case prompts a critical question: Could those prior scans have resulted in a much earlier diagnosis? Quite possibly. With the emergence of “opportunistic AI screening,” radiologists may have a potentially powerful way to detect hidden health conditions within otherwise routine scans before they progress to more advanced stages.

Understanding Opportunistic AI Screening

At its core, opportunistic AI screening transforms standard medical imaging scans into proactive health checks. Unlike condition-specific screening exams, such as annual mammograms, this approach leverages AI to analyze more routine images for early signs of osteoporosis,

Affiliations: Mr Schneider is co-founder and chief executive officer; Mr Maerkisch is co-founder and chief product officer; and Dr Wiedemeyer is chief marketing officer of Floy, based in Munich, Germany.

cardiovascular issues, cancer, and other medical conditions.¹

The Silent Threat of Asymptomatic Conditions

In the US alone, over 50 million people are at risk for preventable conditions like osteoporotic fractures,² many of which are underdiagnosed.³ This endangers individual health outcomes⁴ and also significantly burdens the healthcare system with resource-intensive and expensive later-stage care.⁵

While they remain valuable tools, traditional screening programs often fail to achieve their full potential because of low participation rates.⁶ For instance, only 4.5% of those eligible for lung cancer screening in the US actually avail themselves of this opportunity.⁷ The economic burden of underdiagnosed conditions runs into the billions of dollars,⁸ underscoring the need for more effective ways to catch them early.

Turning Routine Scans into Comprehensive Health Insights

Every year, more than 120 million CT and MRI scans offer a detailed glimpse into the human body.^{9,10} Yet

their diagnostic potential is often confined to the specific reason(s) for which they are requested.¹ For instance, an abdominal CT scan can not only answer the primary question facing the clinician, but it can also potentially offer quantitative assessment of bone mineral density, calcification in large arteries, body composition, and liver volume/attenuation.¹

This wealth of unused data represents a missed opportunity for early disease detection. Opportunistic screening seeks to fill this gap by analyzing these scans for additional imaging-based biomarkers. However, expecting already overburdened radiologists to undertake these extra, time-intensive measurements is unrealistic.¹¹

Providing a Scalable Solution with AI

What if AI could step in to help assess the images for potential signs of disease beyond those for which a given imaging exam is requested? Enter opportunistic AI screening.

Opportunistic screening leverages AI to analyze large volumes of scans for imaging-based biomarkers with minimal impact on radiologist workload. In the case of osteoporosis, AI can perform precise 3D segmenta-

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tion of the trabecular bone structures, calculate the bone mineral density, and compare the results with reference population data to provide equivalent scoring to dual X-ray absorptiometry (DEXA) scanning.¹²

Several companies are at the forefront of this shift towards what could be considered “preventive radiology.” By developing AI-based medical devices capable of detecting aneurysms in T2 MRI scans and assessing bone density in CT scans, companies like HeartLungAI (Los Angeles, California), VirtuOst (Berkeley, California), and Floy (Munich, Germany) are aiming toward transforming “routine” scans into holistic health assessments at the point of care. Such scans may thus be used as a baseline for future comparison and more nuanced risk stratification at follow-up exams.

Driving Down Costs and Unlocking New Use Cases

The advantages of opportunistic screening extend beyond improving individual care. Already showing early success in Europe, the approach also presents the US with a model to help extend healthcare access to underserved populations while also reducing

the resource-intensive and costly impacts of later-stage disease treatment.¹³

Embracing the Future of Preventive Imaging

By transforming standard imaging studies into a powerful tool for comprehensive health assessment, opportunistic AI screening has the potential to deliver actionable insights earlier in the disease process without additional, costly examinations. In doing so, it can help pave the way to a future of precision medicine where treatment can be tailored to the unique needs of each patient, and cases like Elise’s become a thing of the past.

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