INTERNET NEWS

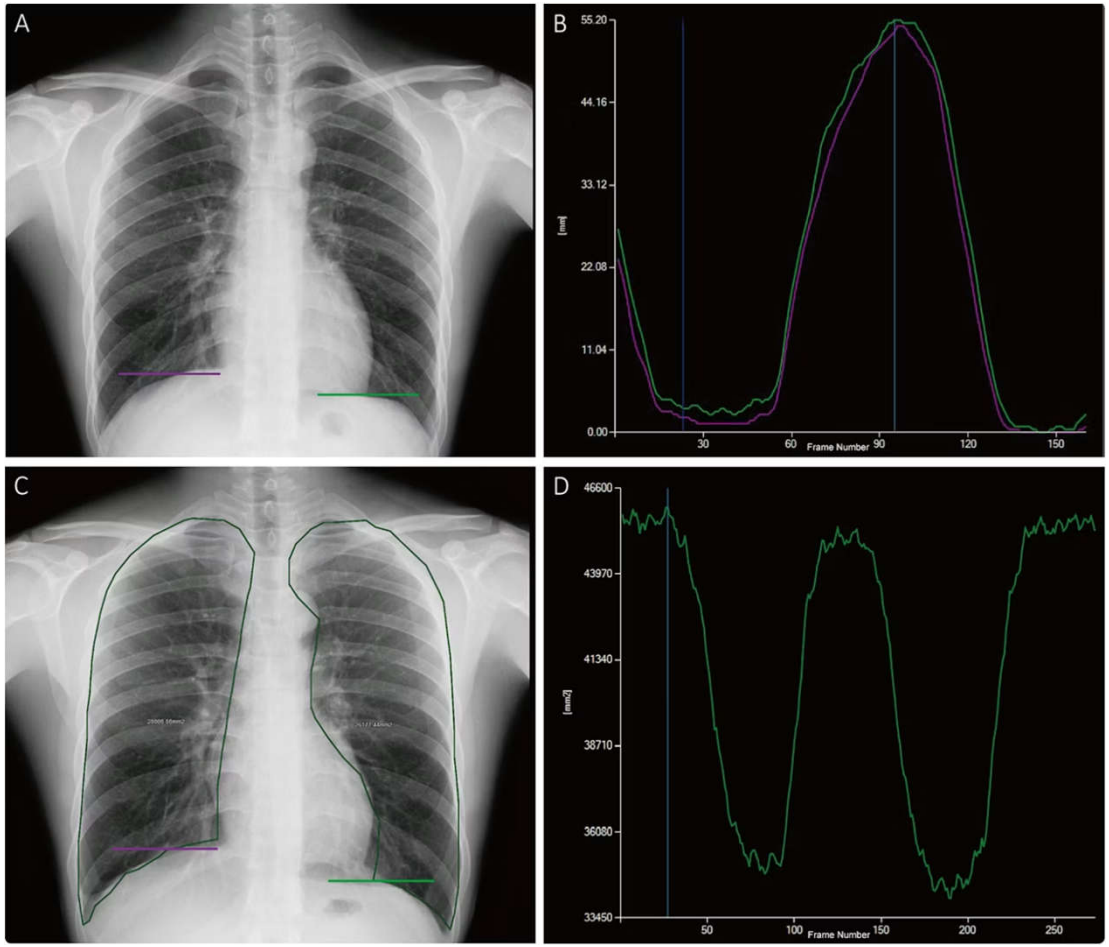
BS Nguyễn Văn Công

CLINICAL NEWS | DIGITAL X-RAY

Dynamic chest radiography effective for diagnosing COPD

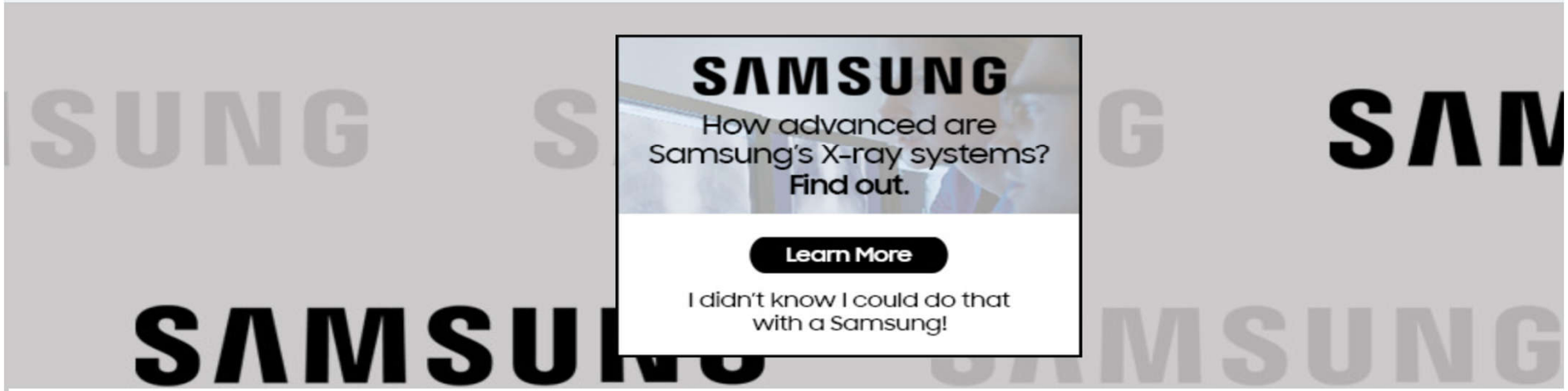
Will Morton
Dec 16, 2025

- Dynamic chest radiography (DCR) can serve as a simpler alternative to pulmonary function tests for diagnosing chronic obstructive pulmonary disease (COPD), according to a study published December 16 in *Radiology*.
- The finding is from a prospective trial in 553 patients with and without COPD, with DCR showing strong correlations with standard spirometry measurements, noted first author Dong Yu, MD, of Southern Medical University in Guangzhou, China, and colleagues.
- "DCR represents an efficacious alternative approach to standard pulmonary function tests (PFTs) for COPD screening that simultaneously captures lung function and chest imaging," the group wrote.
- Current diagnostic methods for COPD mainly rely on PFTs such as spirometers. These devices require a high degree of cooperation between physicians and patients, which limits their widespread use, according to the authors. They also carry a risk of aerosol transmission, which was reflected by their limited use during the COVID-19 pandemic, Yu and colleagues added.
- Conversely, diaphragmatic motion captured by DCR has been shown previously to correlate with spirometry's ratio of forced expiratory volume in 1 second (FEV1) to forced vital capacity (FVC) (FEV1/FVC). Projected lung area (PLA) acquired by DCR and the rate of change in PLA (ΔPLA) has also shown a good correlation with FEV1. However, these results have not yet been systematically verified in prospective studies, the authors noted.
- To that end, the researchers recruited 553 participants (median age, 60) for a trial conducted at their hospital between November 2022 and July 2024: 191 participants had COPD and 362 served as healthy controls. Participants underwent PFT tests and DCR within one week of enrollment. The researchers then analyzed correlations between DCR parameters and evaluated DCR's diagnostic performance with an area under the receiver operating curve (AUC) analysis.



Tracking and quantitative analysis of diaphragmatic motion and projected lung area (PLA) at dynamic chest radiography (DCR) in a 55-year-old healthy man during deep breathing. (A) Posteroanterior radiograph with purple and green lines indicating the right and left lateral diaphragm apices, respectively. (B) Graph of diaphragmatic motion (in millimeters; y-axis) over time (i.e., frame number; x-axis). The software tracked the position of the diaphragm apex at DCR to obtain these amplitude-time plots of diaphragmatic motion (right lung, purple; left lung, green). The dark blue line corresponds to the frame representing the end of inspiration; the light blue line corresponds to the frame representing the end of expiration. (C) Posteroanterior radiograph shows the PLA (outline), which is the area surrounded by the medial edge of the ribs, the diaphragm, and the edge of the mediastinum. (D) Graph of PLA (in millimeters squared; y-axis) over time (i.e., frame number; x-axis). The software automatically tracked the boundaries of the lung fields and obtained the time-varying curves of the bilateral lung field areas. The blue line corresponds to the frame representing the end of inspiration.

- According to the analysis, bilateral (right and left lung) ΔPLA during deep breathing on DCR correlated well with FEV1 percent predicted ($r = 0.65$; $p < 0.001$) and FEV1/FVC ($r = 0.638$; $P < 0.001$). In addition, the researchers developed a machine learning nomogram based on three DCR features, which performed well on an internal test set from 57 participants with COPD and 108 controls (AUC, 0.82), the researchers reported.
- “A DCR-based nomogram demonstrated robust diagnostic performance in identifying COPD, suggesting that DCR represents an efficacious alternative approach to standard PFTs for COPD screening,” the group wrote.
- Ultimately, as DCR technology becomes more feasible, it may prove to be particularly valuable in scenarios where standard PFTs are unavailable or contraindicated, such as in primary care, during pandemics, or in patients who are bedridden, the researchers concluded.
- In an accompanying editorial, Hiroto Hatabu, MD, PhD, of the University of Pennsylvania; Shoji Kudoh, MD, PhD, of Nippon Medical School in Tokyo; and Gyorgy Frendl, MD, PhD, of Harvard Medical School in Cambridge, MA, wrote that the clinical use of DCR over standard PFTs would represent a major advancement in screening for and diagnosis and management of pulmonary diseases.
- “To our knowledge, no major breakthroughs in point-of-care chest imaging have been reported in the past quarter century,” they wrote.
- However, the authors’ conclusion is derived from a single-center trial, and "external validation using independent multicenter cohorts is necessary to confirm the findings in broader populations,” they noted.
- “Furthermore, the subclassification of COPD (mild, moderate, and severe categories) is of great interest to clinicians for decision-making and management of COPD," Hatabu, Kudoh, and Frendl concluded. "Assessing whether DCR is also valuable for such subclassification would have been useful and will have to be studied in the future."

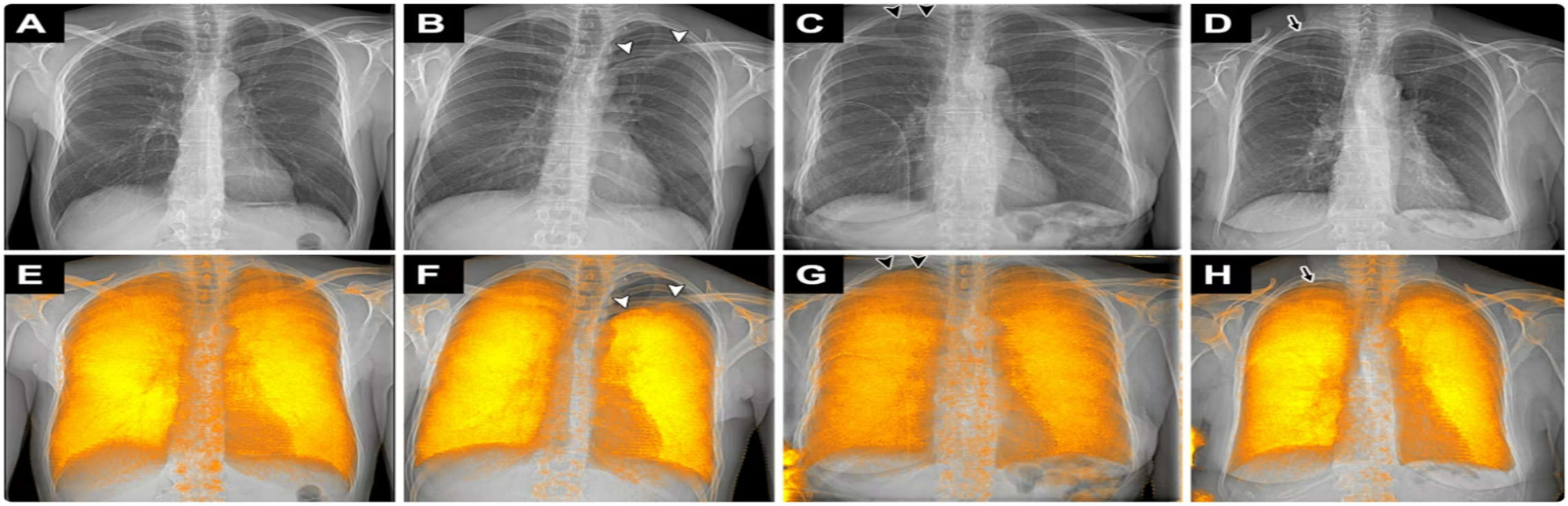


CLINICAL NEWS | DIGITAL X-RAY

Dark-field radiography improves detection of pneumothorax

Will Morton
Dec 18, 2025

- Adding dark-field radiography to conventional chest radiography can improve pneumothorax detection, as well as substantially reduce reading times, according to a study published December 18 in *Radiology: Cardiothoracic Imaging*.
- The finding is from a prospective experiment in 100 patients with and without pneumothorax, with dark-field radiography enhancing diagnostic confidence for radiologists without a loss of sensitivity and specificity, noted lead author Florian Gassert, MD, of the Technical University of Munich (TUM) in Germany, and colleagues.
- "Dark-field imaging may enhance the detection of pneumothoraces that could be missed with conventional radiographs alone," the group wrote.
- Pneumothorax, or collapsed lung, poses a significant diagnostic challenge in clinical practice, and if left untreated, may rapidly progress to life-threatening respiratory failure, the authors explained. Chest radiography is widely used to detect the condition for its accessibility, low cost, and relatively low radiation dose, yet its sensitivity is limited, especially where signs may be obscured by overlying anatomic structures such as the ribs or heart, they noted.
- Conversely, dark-field radiography is an emerging experimental technology that captures ultrasmall-angle x-ray scattering at interfaces between air and tissue in alveoli in the lungs. The technique is based on modifying an existing x-ray scanner with interferometers and enables the simultaneous acquisition of attenuation and dark-field images. In previous studies, it has shown promise in detecting pulmonary conditions that affect alveolar structure, such as emphysema, fibrosis, and COVID-19 pneumonia.
- To further evaluate a prototype they developed, the group at TUM recruited 36 individuals with clinically confirmed pneumothorax and 64 healthy controls. Between March 2022 and September 2023, participants underwent imaging, with attenuation-based and dark-field images acquired.
- Five readers with varying levels of experience in clinical radiology and in dark-field imaging assessed the attenuation-only radiographs and then, after a four-week interval, assessed dark-field overlay images. During the second session, readers were able to toggle the overlayed dark-field signal on and off, allowing them to switch between the overlay and the pure attenuation image.



Examples of attenuation-based conventional radiographs (A-D) without and (E-H) with dark-field overlay in a (A, E) 49-year-old male participant without pneumothorax and (B-D, F-G) three participants with pneumothorax. The participants with pneumothorax included (B, F) a 32-year-old male participant with left-sided apical, pronounced pneumothorax (arrowheads), (C, G) a 72-year-old female participant with a small right-sided apical pneumothorax (arrowheads) in whom thoracic drainage has already been inserted on the right side, and (D, H) a 75-year-old female participant with a small right-sided apical pneumothorax (arrow), in whom the pneumothorax is even more obvious on the radiograph with dark-field overlay (arrowheads). (C, G) In the 72-year-old female participant, the pneumothorax line is hard to recognize on the conventional radiograph without overlay (due to overlay of ribs); it appears to be easier to recognize on the image with the dark-field overlay due to the signal loss in that area. (D, H) In the 75-year-old participant, the small pneumothorax is difficult to recognize on both the image without overlay (D) due to ribs in that area, and the image with dark-field overlay (H) due to an ill-defined margin of the dark-field signal combined with residual beam-hardening-induced dark-field signal from the ribs. In G, the dark-field signal in the lower left corner is due to an attached band-aid.

Key findings included the following:

- Dark-field chest radiographs demonstrated clear signal loss in collapsed lung regions of participants with pneumothorax.
- Sensitivity for pneumothorax detection was 84.2% with conventional radiography and 87.4% with dark-field chest radiography ($p = 0.61$).
- The addition of dark-field imaging reduced median reading time by 60%, from 30.8 seconds to 10.3 seconds ($p < 0.001$).

“Dark-field chest radiography substantially reduced reading time without compromising sensitivity for pneumothorax detection compared with conventional radiography in clinical practice,” the group wrote.

Although the improvement in sensitivity with the addition of the dark-field image overlays was modest, the technique’s ability to accelerate the diagnostic process without compromising accuracy supports its potential integration into routine clinical workflows, the group wrote.

Ultimately, the technology is still in the prototype stage and without defined commercial costs and is being developed as a complementary tool for specific indications rather than a replacement for standard attenuation-based images, the researchers added. The results of this study warrant further investigation, they concluded.

CLINICAL NEWS | WOMENS IMAGING

Ultrasound-guided cryoablation treats most larger breast tumors

Amerigo Allegretto
Dec 30, 2025

- Ultrasound-guided cryoablation is safe, effective, and well tolerated by patients with breast cancer, according to results published December 22 in *Clinical Breast Cancer*.
- Researchers led by Jacopo Cucchiari, MD, from Careggi University Hospital in Florence, Italy, found that cryoablation led to high complete ablation rates for larger tumors (15 mm or greater), and women reported less anxiety and better quality of life compared with conventional surgery.
- "The procedure allows rapid recovery, without major complications in elderly patients," Cucchiari and colleagues wrote.
- With growing interest in less-invasive treatment strategies for breast cancer, cryoablation has emerged as a potentially favorable option. Prior research suggests cryoablation can effectively treat many small breast tumors while also maintaining a high safety profile.
- These studies focused on early-stage, low-grade invasive ductal carcinoma hormone receptor-positive and HER2-negative cancers, with a tumor size less than 15 mm. The researchers noted a lack of data on the efficacy and safety in patients with other subtypes of low-grade breast cancers.
- The Cucchiari team investigated the safety and efficacy of cryoablation for treating breast cancer tumor subtypes 12 months after treatment.
- The single-center prospective study included 36 women with an average age of 84.5 years with 39 biopsy-proven breast tumors. The women underwent cryoablation between 2021 and 2023. The 39 tumors included the following subtypes: luminal A, luminal B, invasive ductal carcinoma (IDC), and IDC plus ductal carcinoma in situ. Of the total women, 28 underwent contrast-enhanced mammography (CEM) for tumor staging.

- The group reported completed ablation rates of 100% for breast tumors 15 mm or smaller and 84.6% for tumors larger than 15 mm, respectively. And no procedure-related unexpected adverse events occurred in the women, it added.
- The investigators also reported higher complete ablation rates for luminal A (100%) compared with luminal B (88.9%) tumors and for Ki67 ≤ 20% (100%) compared with Ki67 >20% (80%). However, these differences did not achieve statistical significance.
- For measuring pain, patients reported a median decrease of one unit on visual analogue scale (VAS) scoring at six months after cryoablation ($p = 0.009$). This remained consistent at 12 months post cryoablation ($p = 0.003$).
- Using multiple questionnaires completed by patients, the researchers found improvements in depression, anxiety, physical functioning, and limitations due to physical and emotional problems.
- The results add to growing evidence supporting cryoablation as a "valuable and effective treatment option for early breast cancer, especially in elderly patients with comorbidities," the study authors wrote.
- They added that further randomized trials and long-term studies are needed and that the results highlight CEM's efficacy in evaluating cryoablation by showing concordance enhancement and histology.

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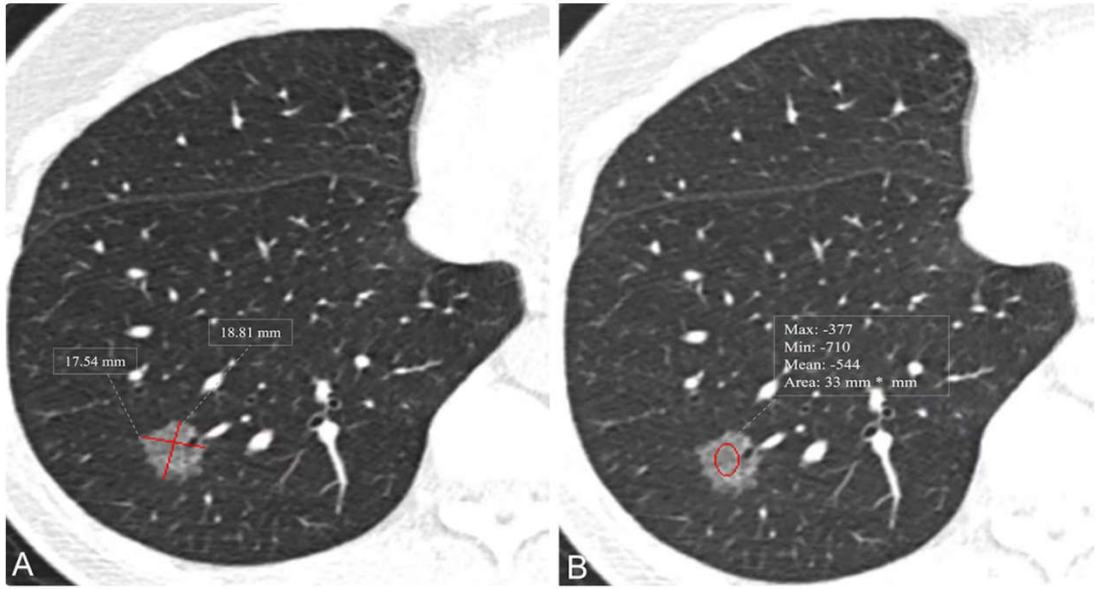
CLINICAL NEWS | CT

CT-based model assesses lung lesions from nonsolid nodules

Amerigo Allegretto
Dec 23, 2025

- A radiologic ternary classification model achieved “excellent” diagnostic performance in differentiating lung lesions on CT images, according to findings published December 23 in *Radiology*.
- The model differentiated preinvasive lesions from minimally invasive adenocarcinoma and invasive adenocarcinoma in nonsolid nodules detected on CT images, wrote a team led by Qi Wan, MD, PhD, from the First Affiliated Hospital of Guangzhou Medical University in Guangdong, China.
- “Incorporating CT attenuation and morphologic features improved model performance in predicting nonsolid nodule pathologic invasiveness compared with using diameter alone,” Wan and co-authors wrote.
- Persistent nonsolid nodules present on CT images. While these nodules have slow growth patterns, they have a higher chance of malignancy compared with solid nodules. Estimating the extent of invasiveness for nonsolid nodules may affect clinical management for lung cancer patients.
- Prior research suggests that radiologic features on CT, such as nodule size, attenuation, vessel changes, or presence of reticulation, could predict tumor invasiveness of nonsolid nodules. Wan and colleagues developed a radiologic ternary classification model for differentiating among lesions from nonsolid nodules.



CT images show measurement of nodule size and mean CT attenuation in a 52-year-old woman. Transverse lung-window CT images were obtained without administration of contrast material. This lesion was pathologically proven to be an invasive adenocarcinoma. (A) Nodule size was measured by taking the mean of the maximum length and maximum width, defined as perpendicular to the length on the same axial image showing the maximum area of the nodule. The red lines indicate the length and width and measure 17.5 mm and 18.8 mm, respectively. (B) Nodule CT attenuation was measured by placing three regions of interest within the nodule covering two-thirds of the largest area while avoiding vessels and bronchioles. The red circle indicates CT attenuation and measures -544 HU.

The final analysis included retrospective data from 1,683 patients with a median age of 53 who had 2,125 nonsolid nodules. The patients had pathologically confirmed lung adenocarcinoma and suspicious malignant nonsolid nodules measuring 3 mm to 30 mm on preoperative CT scans between 2012 and 2024.

Partial proportional odds model analysis showed that the independent radiologic factors for predicting pathologic invasiveness included average diameter, the presence of intranodular vessels, and average CT attenuation, among others.

Independent radiologic factors tied to pathologic invasiveness	
Independent radiologic factor	Odds ratio (OR)
Average diameter (preinvasive lesion vs. minimally invasive adenocarcinoma)	1.3
Average diameter (minimally invasive adenocarcinoma vs. invasive adenocarcinoma)	1.5
One intraodular vessel	2.2
Two intranodular vessels	3.1
More than two intranodular vessels	25.2
Average CT attenuation	1.5

Other radiologic factors included heterogeneous density (OR, 2.5), spiculation (OR, 1.7), lobulation (OR, 1.5), pleural retraction (OR, 1.4), bubble lucency (OR, 1.8), and air bronchogram (OR, 1.7).

The radiologic ternary classification model developed by the investigators achieved an excellent overall diagnostic performance with a C index of 0.92. Using average diameter alone yielded a C index of 0.86, while adding average CT attenuation to the average size improved performance with a C index of 0.89 (both $p < 0.001$ compared with ternary model).

They called for future research to focus on multi-institutional studies with external validation and prospective clinical trial with long-term follow-up data, adding that this approach should be applied to a screening population of non-Asian cohorts and that AI could help further improve predictive performance.

Despite the results, this approach communicates probability rather than certainty, according to an editorial written by Yuki Arita, MD, PhD, from Keio University in Tokyo, Japan, and Steven Schalekamp, MD, PhD, from the Radboud University Medical Center in Nijmegen, the Netherlands.

Arita and Schalekamp wrote that this CT-based framework should inform but not dictate individualized care. They also cautioned that treating model-derived categories as automatic triggers for intervention "risks overdiagnosis and unnecessary biopsy or resection."

"Until models such as the one in this study are prospectively validated and locally calibrated, they are best used as decision-support tools that sharpen judgment, promote consistency, and keep our focus on the biologic outcomes that matter most to patients," the editorial authors wrote.

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CLINICAL NEWS | MRI

MRI reveals how statins reduce vessel wall inflammation

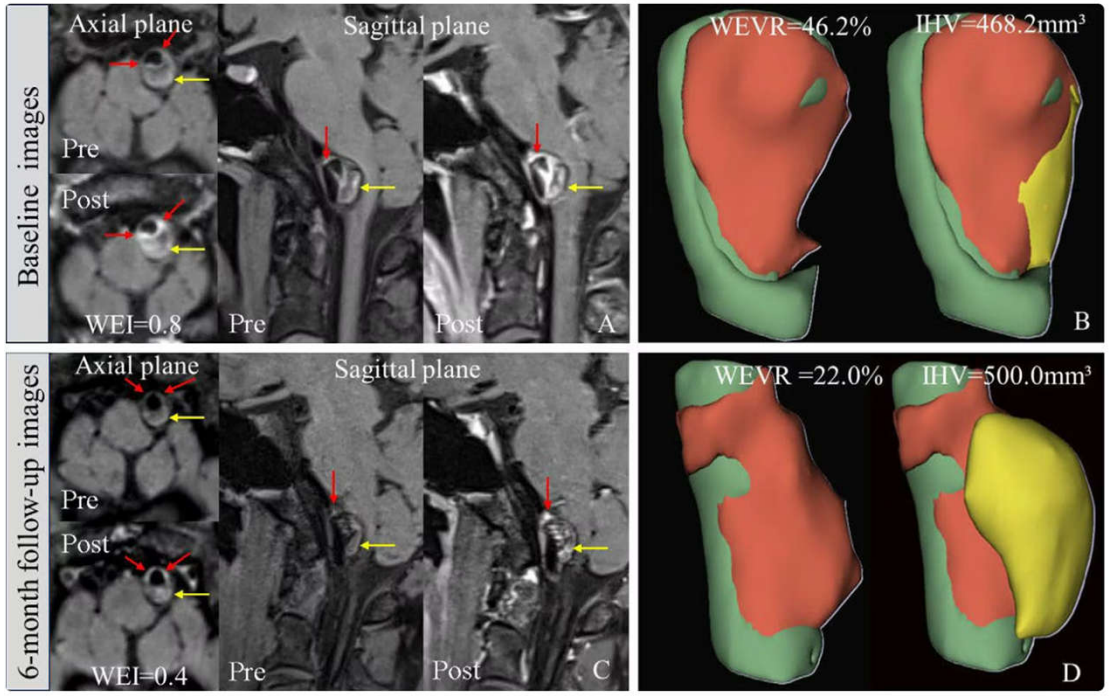
Kate Madden Yee

Dec 23, 2025

- Statin use decreases vertebrobasilar dissecting aneurysms (VBDA) wall enhancement identified on vessel wall (VW) MRI scans, researchers have found.
- The findings offer further evidence that statins reduce stroke risk, wrote a team led by Yisen Zhang, MD, of Beijing Tiantan Hospital and Beijing Neurosurgical Institute at Capital Medical University in China.
- "Among patients with unruptured vertebrobasilar dissecting aneurysms, statins reduced aneurysm wall enhancement, reduced the levels of circulating inflammatory biomarkers, and stabilized intramural hematomas," the group noted.
- VBDAs are significant causes of stroke, and aneurysm wall enhancement at the vessel wall, as identified on MRI, is a marker of inflammation that suggests vulnerability to VBDAs. Although previous research has shown that statins may reduce inflammation in intracranial saccular aneurysms, their effect on VBDAs has been unclear.
- Zhang and colleagues conducted a study that evaluated the effect of a six-month atorvastatin treatment on VBDA wall enhancement as seen on vessel wall MRI scans. The research included 40 participants with unruptured VBDAs between July 2021 and January 2023. Patients were randomized one-to-one into a daily 20 mg atorvastatin group and a control group; all underwent VW MRI at the study start and at six-month follow-up. The primary outcome was any change in aneurysm wall enhancement measured by the quantitative wall enhancement index, or WEI (which evaluates rupture risk of intracranial aneurysms), and three-dimensional wall enhancement volume rate, or WEVR (which evaluates the growth and instability of intracranial or aortic aneurysms). Secondary outcomes were changes in aneurysm size or structure and any inflammation-related biomarkers.

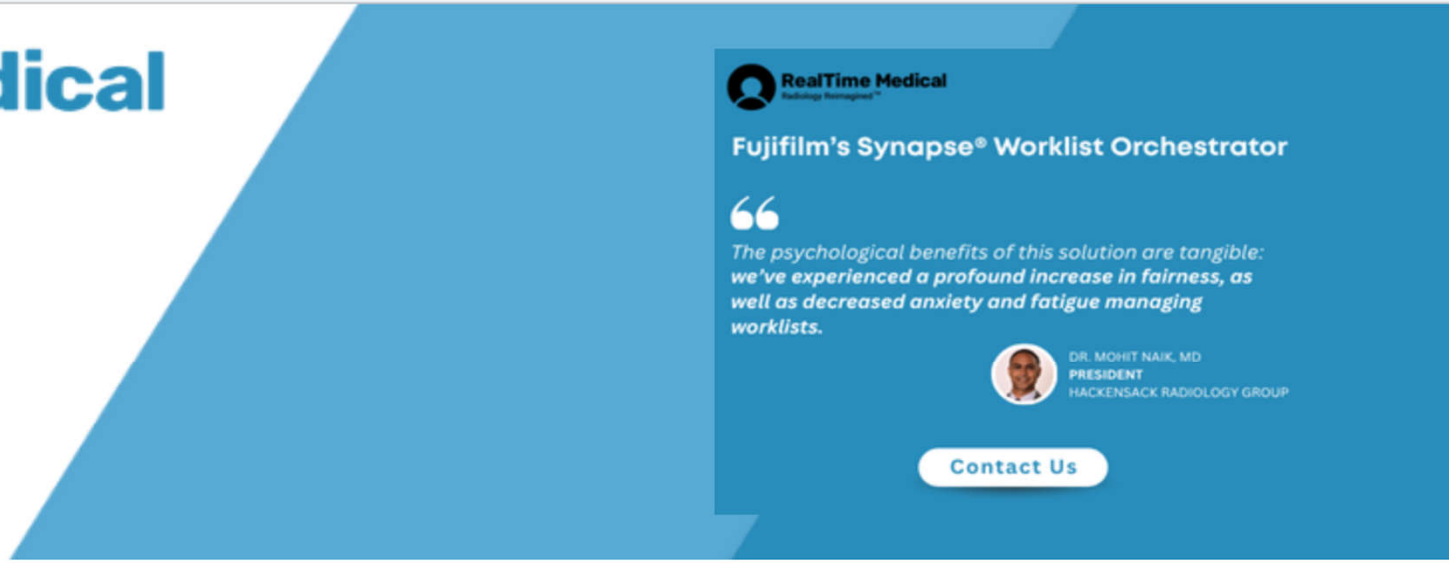
The investigators reported the following:

- In the statin group, both the WEI and WEVR of the aneurysm wall decreased at six months MR imaging compared with those measures at baseline.
- Between baseline and follow-up, the change in WEI was -0.3 in the statin group and 0.1 in the control group ($p < 0.001$), while the change in WEVR was -15.1% in the statin group and 5.3% in the control group ($p < 0.001$).
- Circulating plasma levels of C-reactive protein, tumor necrosis factor alpha, interleukin-6, and interleukin-1 beta all decreased in the atorvastatin group compared with the control group (all $p < 0.05$).
- The atorvastatin group also showed slowed progression of intramural hematoma (304 mm^3 compared with 100.3 mm^3 in the control group; $p = 0.006$).



Typical statin case presentation. Images were obtained in a 35-year-old woman with a left vertebral artery dissection aneurysm who presented with headache. (A, C) Vessel wall MRI scans show aneurysm wall enhancement. (B, D) Panels show three-dimensional postprocessed images derived from contrast-enhanced T1-weighted MRI scans, illustrating the wall enhancement volume ratio (WEVR) and intramural hematoma volume (IHV) calculated using 3D Slicer (version 5.0.3; Slicer Community, www.slicer.org). (A) Precontrast and postcontrast images in the axial and sagittal planes at baseline MRI show aneurysm wall enhancement, with a wall enhancement index (WEI) of 0.8. (B) Image shows the WEVR and intramural IHV at baseline (WEVR = 46.2%; IHV = 468.2 mm^3). (C) Precontrast and postcontrast images in the axial and sagittal planes at the 6-month follow-up show aneurysm wall enhancement, with a WEI of 0.4. (D) Image obtained at the 6-month follow-up (WEVR = 22%; IHV = 500 mm3). The yellow arrows in A and C indicate the intracranial hematoma, and the red arrows indicate wall enhancement. Red areas in B and D show the enhanced wall, green areas highlight the nonenhanced wall, and yellow areas highlight the IHV.

In an accompanying commentary, Bahram Mohajer, MD, of the University of Pennsylvania in Philadelphia, and Victoria Chernyak, MD, of Columbia University Irving Medical Center in New York, noted that the "most important question that remains is whether reduced VW enhancement translates into clinically meaningful benefit." They urged more research, writing that, "if validated, biomarkers at VW MRI could become a central tool in personalized VBDA management, helping to identify patients with biologically active aneurysms who may benefit from medical therapy, guiding longitudinal surveillance intervals, and informing the timing of endovascular intervention."



CLINICAL NEWS | WOMENS IMAGING | BREAST

CompuMed

Kate Madden Yee

Nov 6, 2005

OsteoGram measures bone mineral density from hand x-rays.

At the RSNA show, bone densitometry and medical informatics firm CompuMed of Los Angeles will feature OsteoGram, its standalone, software-based medical image processing system that allows healthcare providers to screen, diagnose, and monitor osteoporosis using images from analog or digital x-ray equipment.

OsteoGram measures bone mineral density from hand x-rays.

OsteoGram comes in a few configurations: one for CR and mammography, and one for CAD and mammography. Both have been cleared by the FDA, and CompuMed expects to begin marketing them in the first quarter of 2006. Also at the show, CompuMed will feature its OsteoGram DICOM for CR/DR version 1.3 automated software system, as well as its OsteoGram DICOM for PACS.

In February, the company announced that it had linked OsteoGram to digital mammography equipment so that the system can be used as an accessory tool or integrated into a digital workstation, allowing women to be tested for osteoporosis at the same time as their CR or DR exam, or annual mammogram. In September, CompuMed received the European CE Mark for OsteoGram.

OsteoGram®

Bone Density Measurement Software

for DICOM Compliant Systems

The OsteoGram® software works in combination with any standard or digital x-ray equipment to support osteoporosis screening, diagnosis and therapy monitoring.

While breast cancer is a substantial financial burden ($6 billion) on the U.S. healthcare system, the cost of osteoporosis is considerably more ($16 billion)!

Osteoporosis - an underdiagnosed and undertreated silent disease

One out of every two women over the age of 50 will experience an osteoporosis-related fracture in her lifetime. Yet many women do not realize that they are at risk for osteoporosis until they suffer the debilitating consequences.

Improve patient care in your facility by providing quality bone density testing

The NOF and IOF recommend testing bone density for early detection as well as monitoring the treatment of osteoporosis. Recent regulations (e.g., HEDIS 2004) are addressing health care quality issues as a performance measure for health plan accreditation. Osteoporosis management is a new priority.

The National Osteoporosis Foundation (NOF), www.nof.org
International Osteoporosis Foundation (IOF), www.osteofound.org
The Health Plan Employer Data and Information Set (HEDIS), www.ncqa.org/Programs/HEDIS

Eliminate redundant hardware

Workstation consolidation is a recent trend that allows you to increase the utilization of your equipment. Providing quality osteoporosis patient care does not require the acquisition of dedicated equipment, computers, space and staff. The OsteoGram is installed on your existing imaging workstation.

Obtaining the OsteoGram software is a wise financial decision

The combination of digital radiology equipment and OsteoGram software is a convenient and cost effective means of improving utilization. The reimbursement revenue of bone density testing may significantly offset the cost of your digital x-ray equipment.

OsteoGram technology will have applications beyond osteoporosis

The patented* OsteoGram technology will be applied to a suite of value-added applications, such as arthritis, vertebral fractures and scoliosis. Today's OsteoGram is the beginning of a series of sound investments for tomorrow's patient care.

CompuMed™

OsteoGram®

Bone Density Measurement Software

for DICOM Compliant Systems

OsteoGram is backed with clinical studies where more than 130,000 tests were performed

- FDA cleared to screen, diagnose and monitor therapy for osteoporosis
- Fully automated analysis requiring no expertise
- Uses the Radiographic Absorbtiometry (RA) technology with negligible radiation
- High correlation to DXA (r=0.87)
- Excellent correlation to Ash Weight (r=0.98) ensures accuracy
- Less than 1% precision error allowing monitoring bone density changes over time
- Highly predictive of overall fracture risk
- T-score and Z-score reports for effective detection and diagnosis of osteoporosis

The OsteoGram system provides the diagnostic accuracy of a DXA scan with the convenience and ease of a standard in-office x-ray procedure.

BMD Method Comparison

Method	Precision (Error)	Accuracy (Error)	Total Time (Minutes)	Special Training
OsteoGram	<1%	4-5%	3 (includes x-ray)	No
DXA Central	1-2%	4-8%	15	Yes
DXA Peripheral	<1-2%	4-6%	7	Yes
Ultrasound	1-10%	Undefined	3	No

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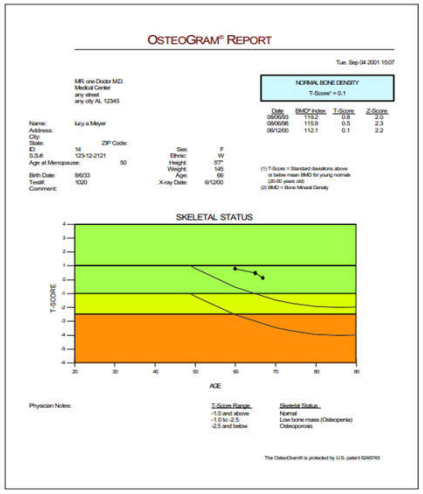

The OsteoGram system determines bone mineral mass and bone volume from radiographic scan data. The bone mineral density is calculated and compared to normal healthy bone generating both T-score and Z-score on a printed graphic report for patient management.

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This article is part of the Research Topic

Emerging Fast Medical Imaging Techniques in Radiology

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Classifying abnormalities in chest radiographs from Vietnam using deep learning for early detection of cardiopulmonary diseases

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Classifying abnormalities in chest radiographs from Vietnam using deep learning for early detection of cardiopulmonary diseases

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Introduction: Vietnam still faces a high burden of infectious diseases compared with developed countries, and improving its health and sanitation environment is essential for addressing both infectious and non-communicable diseases. Chest radiography is key for early detection of cardiopulmonary diseases. Artificial Intelligence (AI) research on detecting cardiopulmonary diseases from chest radiographs has advanced; however, no AI development studies have used Vietnamese data, despite its high burden of both disease types, for early detection. Therefore, we aimed to develop an AI model to classify normal and abnormal images using a Vietnamese chest radiograph dataset.

Methods: We retrospectively analyzed 12,827 normal and 4,644 abnormal cases from two Vietnamese institutions. Features were derived from principal component analysis and extracted using Vision Transformer and EfficientnetV2. We performed binary classification of normal and abnormal images using Light Gradient Boosting Machine with 5-fold cross-validation.

Results: The model achieved an F1-score of 0.668, sensitivity of 0.596, specificity of 0.931, accuracy of 0.842, and AUC of 0.897. Subgroup evaluation revealed high accuracy in both infectious and non-communicable cases, as well as in urgent cases.

Conclusion: We developed an AI system that classifies normal and abnormal chest radiographs with high clinical accuracy using Vietnamese data.

KEYWORDS

chest radiographs, artificial intelligence, vision transformer, infectious diseases, cardiopulmonary diseases

TP. Hồ Chí Minh, ngày 26 tháng 12 năm 2025

BÁO CÁO TÓM TẮT NỘI DUNG HỌP

V/v: Hợp tác nghiên cứu AI giữa Medic và các Đại học Nhật Bản
Kính gửi: Bác sĩ Phan Thanh Hải – Tổng Giám đốc Hệ thống Medic
Vào chiều ngày 26/12/2025, tại hội trường Medic, đại diện phía Medic bao gồm BS. Công, BS. Linh và Mr. Lộc đã có buổi làm việc với đoàn chuyên gia từ các Đại học Nhật Bản. Buổi họp nhằm đánh giá kết quả hợp tác giai đoạn vừa qua và thống nhất định hướng triển khai các dự án mới.
Dưới đây là nội dung tóm tắt các điểm chính của buổi làm việc:

1. Ghi nhận thành quả giai đoạn trước

Các đối tác Nhật Bản gửi lời cảm ơn chân thành tới Ban lãnh đạo và đội ngũ Medic về sự hỗ trợ chuyên môn hiệu quả trong thời gian qua. Thành quả nổi bật nhất là công trình nghiên cứu về AI trong chẩn đoán tim phổi đã chính thức được công bố quốc tế vào tháng 11/2025.

2. Đề xuất 03 dự án nghiên cứu mới

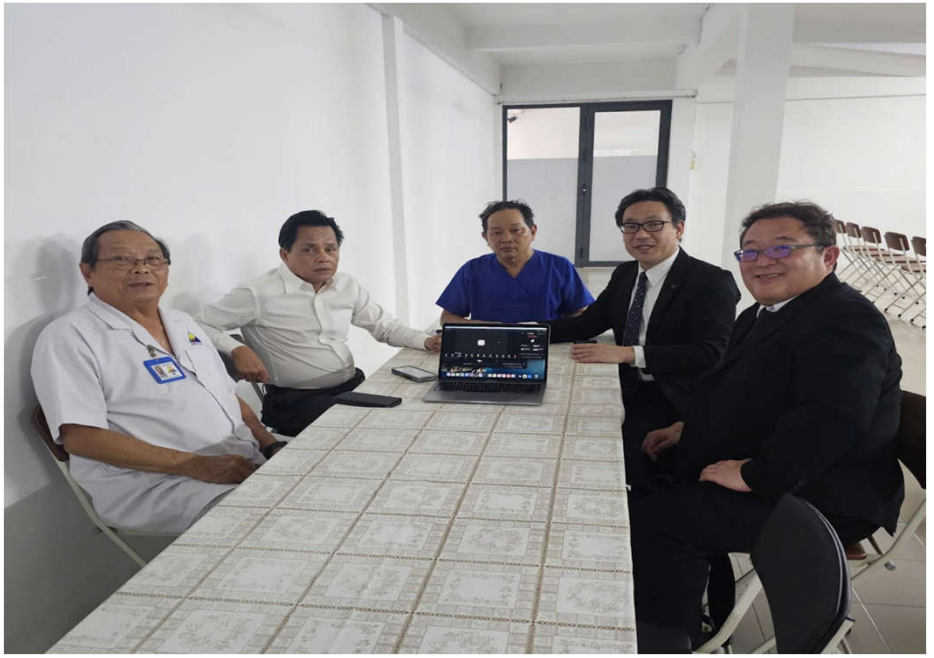
Trên nền tảng tin cậy lẫn nhau, hai bên đã thống nhất đề xuất 03 dự án trọng điểm:

- **Dự án 1: Nghiên cứu AI chẩn đoán bệnh Lao (TB) và bệnh lý phổi**
  - **Đối tác:** Đại học Niigata (Đại diện: Dr. Naoki Kodama).
  - **Nội dung:** Sử dụng dữ liệu bệnh nhân đã có chẩn đoán xác định Lao (kết quả xét nghiệm MTB/RIF Xpert và/hoặc soi đàm tìm AFB dương) để huấn luyện AI.
  - **Mở rộng:** Nghiên cứu thêm các bệnh lý phổi khác ngoài nhóm tim mạch dựa trên kho dữ liệu hiện có và dữ liệu mới.
- **Dự án 2: AI xác định dung tích phổi từ hình ảnh X-quang**
  - **Đối tác:** Đại học Y tế Fujita (Đại diện: GS. Satoshi Kasai).
  - **Nội dung:** Ứng dụng AI để tính toán dung tích phổi trực tiếp từ phim X-quang phổi thẳng.
  - **Thẩm định:** Kết quả của AI sẽ được đối chiếu với các chỉ số đo thực tế từ khí phế ký (spirometry) tại Medic để thẩm định độ chính xác.
- **Dự án 3: AI tầm soát loãng xương từ hình ảnh X-quang phổi**
  - **Đối tác:** Đại học Y tế Fujita (Đại diện: GS. Satoshi Kasai).
  - **Nội dung:** Phát triển thuật toán AI phân tích hình ảnh **X-quang phổi** (thay vì cột sống hay cổ xương đùi) để dự đoán mật độ xương và chẩn đoán loãng xương. Phương pháp này giúp tận dụng tối đa dữ liệu từ các ca chụp X-quang phổi định kỳ để tầm soát sớm cho bệnh nhân.

3. Đánh giá tính khả thi và Lộ trình thực hiện

- **Về chuyên môn:** BS. Linh và BS. Công xác nhận Medic hoàn toàn đáp ứng được các yêu cầu về nguồn dữ liệu và hạ tầng kỹ thuật. Các dự án được đánh giá có tính khả thi cao và mang lại giá trị ứng dụng lâm sàng lớn.
- **Kế hoạch triển khai:**
  - **Tháng 01/2026:** Sau khi nhận ý kiến chỉ đạo từ Bác sĩ Hải, phía Nhật Bản sẽ hoàn thiện đề cương (Proposal) để xin quỹ tài trợ từ Chính phủ Nhật Bản.
  - **Tháng 03/2026:** Dự kiến chính thức bắt đầu triển khai.
- **Thủ tục:** Hai bên sẽ tiến hành ký kết biên bản ghi nhớ (MOU) và mô tả quy trình làm việc chi tiết, kế thừa mô hình vận hành hiệu quả từ các dự án trước.

Kính trình Bác sĩ Hải xem xét và cho ý kiến chỉ đạo để chúng em có cơ sở phản hồi và phối hợp với phía đối tác Nhật Bản thực hiện các bước tiếp theo.
Trân trọng cảm ơn Bác sĩ Hải.
Người báo cáo
(Đã ký)
Thái Văn Lộc



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