ASEAN Movement in Radiology

A pulse check on environmental sustainability awareness in Asia-Oceania

Evelyn Lai Ming Ho, M.B.B.S., M.Med.[(1)]
Danny Hing Yan Cho, M.B.B.S., F.R.C.R.[(2)]
Chamaree Chuapetcharasopon, M.D., M.B.A.[(3)]
Noriyuki Tomiyama, M.D., Ph.D.[(4)]
From [(1)]Imaging Department, ParkCity Medical Centre Kuala Lumpur, Malaysia,
[(2)]Department of Diagnostic & Interventional Radiology, Kwong Wah Hospital, Hong Kong SAR,
[(3)]MedPark Hospital, Bangkok, Thailand,
[(4)]Department of Diagnostic and Interventional Radiology, Graduate School of Medicine, Osaka University, Osaka, Japan.
Address correspondence to E.L.M.H. (e-mail: evelynlmho@gmail.com)

Received 9 July 2025; accepted 8 August 2025
doi:10.46475/asean-jr.v26i3.967

Keywords: AOSR, Asia-Oceania, Green radiology, Sustainability.

Introduction

The Asian Oceanian Society of Radiology (AOSR; https://theaosr.org) is primarily a federation with 24 regional society members and a small number of individual members globally. AOSR is diverse from many aspects and includes two of the most populous regions in the world, India and China and includes members from countries ranging from Oman to Tonga. The society members are from lower-middle; upper-middle and high-income countries/regions. Some of the AOSR objectives are steps that ultimately improve public healthcare including enhancing the quality and techniques of radiological procedures among our members. In 2021, the AOSR added value-based radiology (VBR) [1] and by 2024, sustainable radiology to its agenda.

THE ASEAN JOURNAL OF RADIOLOGY
ISSN 2672-9393

Sustainable radiology—also known as eco-radiology or green radiology—seeks to reduce the ecological footprint of radiology departments whilst optimizing efficiency. This approach aims to minimize the environmental impact of radiological technologies and procedures, aligning with broader sustainable healthcare initiatives [2]. Imaging services, particularly radiology, are considered major contributors to the ecological footprint due to their high energy-consuming devices [3] and generated waste especially, though not exclusively, by interventional procedures [4].

Lower- and upper-middle-income regions/countries (LMICs) have none to low density of high-energy consumption modalities, such as computed tomography (CT) [5] and magnetic resonance imaging (MRI) scanners [6], let alone advanced interventional radiology services that most high-income economies have [7]. Basic diagnostic services such as radiography and ultrasound have significantly lower greenhouse gas (GHG) emissions [3]. Therefore, the ecological footprint of LMICs is expected to be lower. However, the environmental impact of radiology, no matter how small, does contribute to negative consequences on the climate, which disproportionately impacts lower-resource regions of the world [1]. Therefore, environmental sustainability is not the problem of high-income regions only.

Overuse or inappropriate imaging occurs globally even in lower-middle income countries/regions [8,9]. Travel for imaging, especially when unnecessary can be a significant burden on patients, particularly those who must walk for days to reach a medical centre, and may also contribute to environmental impact if the travel involves vehicles running on petrol. In addition to the ecological footprint, inappropriate imaging is contributing to higher costs for care [10] and straining the workforce shortage with its untoward consequences of moral distress to burnout [11].

AOSR's Pulse Check

The AOSR has since 2021 held a presidents' round table chat with its society members which is also open to the few individual members. These are conducted online, but it has been challenging to find a time that cater for most of its

members. Instead, a short questionnaire with open-ended questions was circulated to the society secretariats and the 6 individual members in the middle of July 2024. The AOSR enquired about the presence of sustainability programs, policies in the department or hospitals, needs and challenges in relation to sustainability as well as whether their radiological society had taken any steps to promote sustainability.

17 of the 24 (71%) AOSR society members (either president or authorized delegate) and 3 of the 6 individual members responded. Each response represented a different country/region. These represented 7 lower-middle, 6 upper-middle and 7 high-income economies (World Bank Gross National Income, 2023): Australia, China, Chinese Taipei, Fiji, Hong Kong SAR, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Oman, Pakistan, Philippines, South Korea, Thailand, Tonga, Uzbekistan, Vietnam and "North America" (1 individual member).

About a third of respondents had sustainability programs in their department whilst 40% reported their hospital/medical centres had some policies whilst 25% were not aware if there were such policies. 15% and 20% reported programs were in the planning phase at the radiology department and hospital level respectively. At the radiological society level, 65% had either promoted or taken steps on sustainability.

About 2/3 of our respondents felt there was a need for sustainability guidelines and policies for waste reduction, more diligent stock keeping, better energy efficiency, going paperless, inappropriate imaging/procedures reduction, procurement of equipment such as low-helium scanners and more effective financial reporting and governance. There were also funding, access to innovation and infrastructure needs for 27% of the respondents. Use of radiology equipment to the maximum was considered a drawback as one could not purchase new equipment with eco-friendly features.

The challenges cited were a lack of awareness (one respondent mentioned this was the first time hearing about sustainability in radiology); insufficient training for staff on sustainable practices; lack of interest or buy-in regarding sustainabili-

THE ASEAN JOURNAL OF RADIOLOGY
ISSN 2672-9393

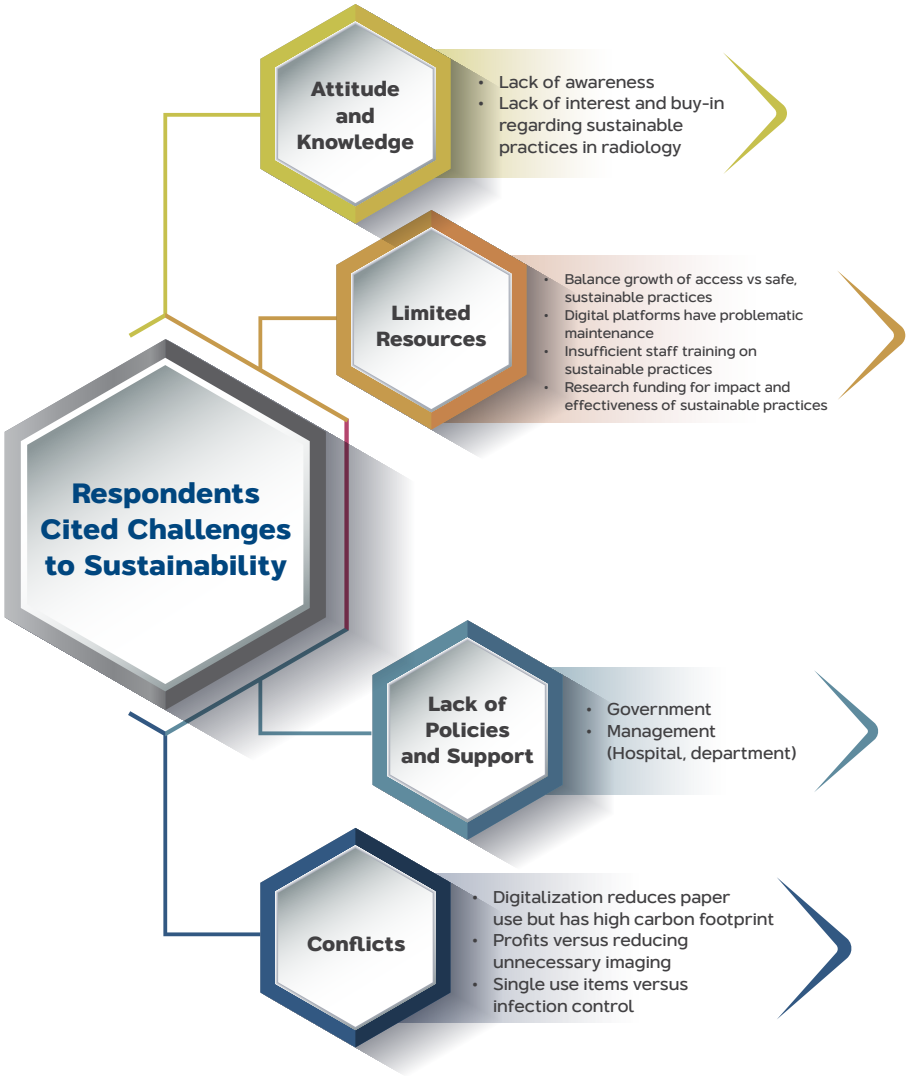
ty; balancing limited resources with growth and safe practices; ensuring adequate patient care and medicolegal concerns; digitalisation and artificial intelligence (AI) also had a high carbon footprint; balancing waste reduction with the use of single-use items for infection control purposes. In private centres, the tension between profit and avoiding unnecessary imaging was also noted. In addition, there was a lack of government and management support and problematic maintenance of digital platforms. Slow progress in sustainable initiatives were considered discouraging. Finally, there was a lack of data and research on whether specific steps taken were effective as well as the need to explore intelligent solutions to reduce energy consumption and GHG emissions.

Some of the activities by radiological societies were as follows. At congresses, there was usage of eco-friendly badges and non-disposable tumblers, a no-plastic bag policy, reduction of hardcopies through electronic publications and presentations and working with vendors to go green in booth construction. Other activities included planning dedicated workshops to set up a national standard operating procedure in collaboration with the ministry of health. They also conducted continuous medical education and activities on sustainability throughout the radiology community and promoting the use of electronic logbooks for examinations and training. Specifically, one society was actively promoting optimization of imaging protocols to reduce unnecessary repeat scans/examinations, (thereby lowering energy consumption and patient radiation doses) and awareness on environmental pollution through proper handling of medical/radiology waste and use of recyclable materials.

AOSR: Where Are We?

As expected there was a diversity of awareness and knowledge on sustainable radiology practices amongst our AOSR members - from zero awareness to conducting research to ensure measures taken had a desirable impact or to explore solutions to reduce the ecological footprint. The needs and challenges were not entirely new and not limited to sustainable radiology. One interesting comment was related to the medicolegal implications of using an appropriate but lower GHG emission imaging modality instead of a perceived “better” but higher GHG

emission imaging modality. Non-radiologist referring physicians and public perception should to be taken into account and acted upon with education, if the medical imaging community is to make strides in the area of appropriate use. Paradoxically, whilst some felt a drawback was the need to use their equipment to the maximum capacity because of lack of funds, maximising and extending the lifespan of equipment is actually one of the tenets for sustainable equipment ownership. Having upgradeable components is important but ultimately, it is to reduce the need for new equipment.



THE ASEAN JOURNAL OF RADIOLOGY
ISSN 2672-9393

Conclusion

There is an obvious need to continue to raise awareness, educate all stakeholders in the medical community and also reassure the public that appropriate and sustainable radiology does not short-change or lower the standard of care. Data compilation and research should be encouraged even though there are already publications on radiology's GHG emissions and strategies to develop sustainable practices, many from high-income regions. To this end, international exchange of knowledge and experience would ensure AOSR members do not 'start from scratch' or 'reinvent the wheel'. However, it is vital to ensure solutions are tailored to each country/region's need as the resources and other factors such as political and socioeconomic conditions are varied. Developing cooperation with various agencies such as the environmental protection agency is a gradual process. Even if a government or hospital management policy or directive does not exist, everyone can start practicing sustainable radiology. It can be as simple as turning off computers when not in use!

Following this pulse check, the AOSR formally established a sustainability working group in September 2024 and also collaborated with the society host of the Asian Oceanian Congress of Radiology (AOCR2025, January 2025) to initiate a track in sustainability.

Conflicts of Interest and Source of Funding:
The authors are current or past officers of the Asian Oceanian Society of Radiology: past president (Evelyn Lai Ming Ho), president-elect (Danny Hing Yan Cho), president (Chamaree Chuapetcharasopon) and immediate past president (Noriyuki Tomiyama) at the time of this writing. Otherwise, all authors have no conflicts of interest to declare.

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ISSN 2672-9393

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