

# Planetary Health and Radiology: Strategy for a Thriving Future

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In recent years, understanding climate change has become essential for health care professionals of all types, including radiologists. The connection between climate change and human health is undeniable, with rising temperatures, extreme weather events, air pollution, and environmental degradation directly impacting public health. In radiology, we are well positioned to observe and address these changes. This article explores the concept of planetary health, its relevance to the medical field, and actionable steps that radiology can take to benefit the health of our patients, communities, and planet.

## Climate Change and Health

Climate change poses significant threats to human health. Greenhouse gases cause climate change, predominantly from the burning

of fossil fuels. According to the World Health Organization, climate change is humanity's single biggest health threat.<sup>1</sup> Due to malnutrition, malaria, diarrhea, and heat stress, it is expected to cause 250,000 additional deaths per year between 2030 and 2050.<sup>2</sup> Furthermore, 3.6 billion people already live in areas highly susceptible to climate change.<sup>2</sup> The Lancet Countdown on Health and Climate Change<sup>3</sup> reports that extreme weather events, such as hurricanes and heat waves, have increased in frequency and intensity, leading to higher rates of respiratory and cardiovascular diseases. Additionally, air pollution, exacerbated by climate change, is responsible for 7 million premature deaths annually. Climate change is a threat multiplier.<sup>4</sup> It interacts in complex ways with other earth systems, impacting all dimensions of human health.

## What Is Planetary Health?

Planetary health is an emerging field that focuses on the interconnections among human health, all other species living within the biosphere, and biophysical processes across the planet. While

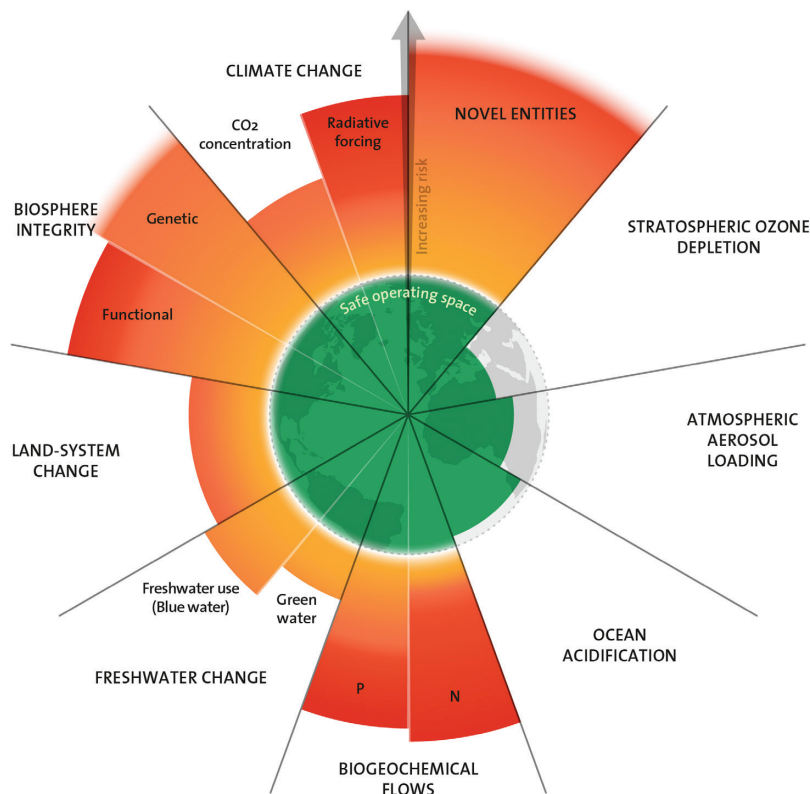
global health focuses on human health on a global scale, planetary health focuses on the health of humans as it is impacted by planetary-scale environmental changes. Humans are 1 of 9 million diverse species whose health and well-being are interconnected. Planetary health, thus, emphasizes ecological and environmental determinants of health, integrated with social determinants of health. The well-being of humans and other species depends upon earth's natural systems.<sup>5</sup>

Our planet also depends on more than a safe climate. Thriving biodiversity, clean water and air, regenerated and intact landscapes, and stable ocean systems are also vital. Recognizing this, in 2009 an international team of scientists proposed 9 key "planetary boundaries" that regulate the stability and resilience of the earth (Figure 1). The 9 processes contain boundary conditions for humans to thrive safely. In 2023, each of the 9 boundaries were assessed, and 6 were already crossed.<sup>6</sup> It is time for radiology to recognize that the health of our patients relies on the environmental health of the

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**Figure 1.** Planetary boundaries. Licensed under CC BY-NC-ND 3.0 (credit: Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al<sup>6</sup>).



communities they live in, as well as that of the entire planet.

This planetary perspective has been called by Gardels<sup>7</sup> and others the third great decentering of humans in scientific thought. The Copernican Revolution, which displaced the earth from the center of the universe, was the first decentering, while the second was Darwin's theory of evolution, which placed humans within the continuum of life. Planetary health shifts our focus from human-centric to a more holistic view that situates human health within, and dependent upon, stable and thriving natural systems (Figure 2).

### Planetary Health in Medicine

Several organizations are at the forefront of promoting planetary health. The Planetary Health Alliance

(PHA) is a consortium of more than 450 universities, nongovernmental organizations, and research institutes from more than 75 countries that works to advance the field through research, education, and policy advocacy. Johns Hopkins University, University of Vermont, and more than roughly 50 other universities around the world have established planetary health institutes. Because the growth of new scientific disciplines requires peer-reviewed research, scientific journals on planetary health have been introduced, with *The Lancet Planetary Health* publishing the highest impact journal.<sup>8</sup>

Likewise, education is necessary to expand knowledge of planetary health within medicine. Medical students have developed a metric-based tool, the Planetary Health Report Card,<sup>9</sup> to showcase and improve such content within health professional schools. More than

150 schools of medicine, dentistry, nursing, occupational therapy, pharmacy, and physiotherapy from across 18 nations now participate.

### Specific Actions for Radiology

In radiology, planetary health is taking on greater prominence, with educational and research sessions at international radiology meetings; the generation of sustainability committees and task forces within radiology societies; and an increasing number of publications. A recent review article by Mckee et al<sup>10</sup> includes strategies for radiology to address planetary health. The year 2024 marked a turning point in our field: A PubMed search revealed that more than 10 manuscripts address the topic of planetary health and radiology.

Radiologists, scientists, technologists, administrators, trainees, and industry partners of all types can play a key role in promoting planetary health through the following actions:

- 1. Reduce energy consumption and unnecessary imaging:** Radiology departments are energy intensive. Implementing energy-efficient practices, such as using energy-saving modes on scanners and optimizing imaging protocols, reduce energy consumption. However, the greenest radiology is to avoid imaging that is not needed. Reducing unnecessary imaging benefits patients, helps overworked and understaffed radiology departments, and lowers carbon emissions.
- 2. Minimize waste:** Proper disposal and recycling of materials can help decrease environmental impact and benefit operations. For instance, transitioning from single- to multidose vials of iodinated contrast agents

**Figure 2.** Planetary thinking represents the third sequential decentering of humans in scientific thought, following the Copernican Revolution and Darwinian evolution. Art co-created by Reed A. Omary, MD, MS, and artificial intelligence.



markedly reduces plastic waste and costs.<sup>11</sup>

3. **Advocate for sustainable supply chains:** Radiology departments can lead their hospitals in seeking to reduce single-use plastics and promote the use of environmentally friendly products. Such changes may also lower expenses.
4. **Educate:** Radiologists can educate colleagues, patients, and their local communities about the health impacts of environmental change and the importance of planetary health. Options for this include lectures, publications, speaking with patients, and community engagement programs.

5. **Conduct research:** Researching the health impacts of environmental waste and the benefits of sustainable practices will contribute to the growing body of knowledge on planetary health.

## Conclusion

The health of our planet is linked to human health. In radiology — and the rest of medicine — we have a responsibility to address this connection. By developing a planetary health mindset, we can benefit the patients we see today, as well as the patients we will see in the future.

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