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The Role of Nurses in Integrating Planetary Health and Sustainable Practice Principles into Everyday Clinical Decision-Making and Unit-Level Protocols: A Narrative Review

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Abstract

Nurses constitute the largest health workforce and make or shape most day-to-day decisions about medications, supplies, procedures, patient education, and discharge, which together determine much of health care's environmental footprint. This narrative review synthesises literature published between 2017 and 2024 on the role of nurses in integrating planetary health and sustainable practice principles into everyday clinical decision-making and unit-level protocols. Evidence indicates that nurses can contribute through prevention and self-management support, reduction of low-value care, medication and inhaler choices, antimicrobial stewardship, waste minimisation, and leadership of unit-based quality improvement. However, evidence on nurse-led interventions remains limited, and barriers include time pressure, workforce strain, uneven education, and competing safety priorities. We propose a multilevel framework linking individual decision-making, unit protocols, organisational governance, and system policy, and outline education, practice, policy, and research priorities for embedding sustainability as a dimension of quality.

Keywords: planetary health; nursing; sustainable healthcare; clinical decision-making; unit-level protocols.

Introduction

Planetary health, the study and practice of safeguarding human health through attention to the integrity of Earth's natural systems, has emerged as a unifying frame for the health consequences of climate change, biodiversity loss, and pollution (Myers, 2017). The evidence of harm is now extensive. Successive Lancet Countdown reports document rising heat-related health risks, shifting patterns of infectious disease, and growing threats to health systems themselves (Romanello et al., 2021, 2022, 2023; Watts et al., 2021), and clinicians have been urged to treat climate action as a core professional responsibility rather than a peripheral concern (Haines & Ebi, 2019).

Health care is not only a casualty of environmental change but also a contributor to it. A global assessment estimated that health care accounts for a measurable share of worldwide greenhouse gas emissions, air pollutants, and other environmental burdens (Lenzen et al., 2020). National studies have produced comparable findings for Australia, England, and the United States (Eckelman et al., 2020; Malik et al., 2018; Tennison et al., 2021), and international comparisons show wide variation in health care carbon footprints that is only partly explained by national wealth (Pichler et al., 2019). Industry analyses attribute much of the footprint to energy use, the supply chain, and the pharmaceuticals, devices, and consumables used in everyday care (Karliner et

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al., 2019), and commentators have called for coordinated reductions in pollution from the sector (Sherman et al., 2019). Because these emissions arise from clinical decisions as much as from buildings and transport, clinicians are positioned to influence them.

Nurses are the largest professional group in health care and are present at nearly every point where resources are chosen and used. At the bedside and in community settings they administer and monitor medications, select dressings and devices, decide how and when to escalate care, educate patients about self-management, coordinate discharge, and manage unit supplies and waste. The nursing profession has been called upon to embrace planetary health as a matter of professional ethics and practice (Kurth, 2017), to act as advocates and educators on climate change (Leffers & Butterfield, 2018; Nicholas & Breakey, 2017), and to contribute to preparedness and mitigation as articulated in international position statements (International Council of Nurses [ICN], 2018). Pathways towards net zero health care likewise depend on changes in clinical practice, not only on decarbonising energy (Salas et al., 2020).

Despite this, the literature on sustainable health care has concentrated on surgery, anaesthesia, procurement, and estate management, and the specific contribution of nurses to everyday decisions and unit protocols is dispersed across disciplines and often described implicitly. This narrative review therefore addresses three questions: (a) How can planetary health and sustainable practice principles be translated into the everyday clinical decisions that nurses make? (b) How can these principles be embedded in unit-level protocols, and what evidence supports doing so? (c) What enablers and barriers shape nurses' capacity to lead this integration? The review concludes with a multilevel framework and recommendations for practice, education, policy, and research.

2. Review Approach and Key Concepts

This article is a narrative review, an approach suited to synthesising heterogeneous evidence, clarifying concepts, and building conceptual frameworks where a systematic or meta-analytic design is not feasible. The review was not preregistered and did not follow a systematic-review protocol, so it does not claim exhaustive coverage. Literature published between 2017 and 2024 was selected purposively from peer-reviewed journal articles, systematic and narrative reviews, and major international position or technical reports addressing (a) planetary health and the environmental footprint of health care, (b) sustainable clinical practice and quality improvement, (c) nurses' roles, attitudes, and education in relation to climate and sustainability, and (d) decision-making and implementation in clinical settings. Because few studies evaluate nurse-led sustainability interventions directly, evidence from medicine, anaesthesia, surgery, and pharmacy was drawn upon where the underlying decisions are shared with nursing practice, and these extrapolations are flagged.

Four concepts structure the synthesis. Planetary health refers to the health of human civilisation and the natural systems on which it depends (Myers, 2017). Sustainable practice denotes the delivery of care that meets present needs while minimising environmental harm and preserving the capacity to deliver care in future; in a quality-improvement frame it can be expressed as sustainable value, the health outcome achieved relative to the environmental, social, and financial costs of achieving it (Mortimer et al., 2018b). Clinical decision-making refers to the processes by which nurses assess, interpret, choose, and act in response to patient needs. Unit-level protocols are the written or customary procedures, order sets, checklists, and routines through which a ward, clinic, or community team standardises care. The review is organised conceptually, moving from foundations to decisions, protocols, enablers and barriers, and finally to integration.

3. Conceptual Foundations: Sustainability as a Dimension of Nursing Practice and Quality

Integrating planetary health into nursing begins with recognising that it is continuous with, rather than additional to, the profession's traditional concerns. Nurses have long attended to the environment as a determinant of health, and contemporary scholars argue that this orientation extends naturally to the planetary scale (Kalogirou et al., 2020). Nurses interviewed in a Canadian study recognised climate change as relevant to health and nursing, but often described uncertainty about how to translate that recognition into practice (Kalogirou et al., 2020). This gap between awareness and action is central to the challenge: the profession's ethical commitments are clear, but practical guidance at the level of everyday decisions is less so.

A widely used bridge is the sustainable value framework developed within the quality-improvement movement. It reframes sustainability as an integral component of quality rather than a competing priority, and it identifies four principles that reduce environmental impact while maintaining or improving outcomes: prevention of disease and its progression, empowerment of patients to participate in their own care, streamlined and lean service delivery, and the substitution of lower-carbon alternatives (Mortimer et al., 2018b). Pencheon (2018) similarly argues that sustainable health systems are built by aligning clinical practice, management, and policy around reduced demand for care, reduced waste, and resilience. These principles translate readily into nursing language and activity (Table 1), which supports the argument that planetary health integration is a matter of reorienting existing nursing work rather than creating entirely new tasks.

Table 1. Principles of sustainable clinical practice and their translation into nursing decisions

Principle	Meaning for nursing practice	Illustrative nursing decisions and protocols	Illustrative sources
Prevention and health promotion	Reducing the incidence and progression of illness and thereby the demand for resource-intensive care	Vaccination, falls and pressure injury prevention, early identification of deterioration	Haines & Ebi (2019); Mortimer et al. (2018b)
Patient empowerment and self-management	Supporting patients to manage conditions and participate in decisions, reducing avoidable contacts and admissions	Inhaler technique teaching, self-management plans, shared decision-making conversations	Elwyn et al. (2017); Wilkinson et al. (2019)
Lean service delivery	Eliminating low-value care, duplication, and waste while protecting safety	Avoiding unnecessary tests and observations, right-sizing stock, reducing medication waste	Brownlee et al. (2017); Verkerk et al. (2018)
Low-carbon alternatives	Substituting products and processes with lower environmental impact where clinically equivalent	Lower-warming-potential inhalers, reusable items, reduced single-use packaging	Rizan et al. (2021); Thiel et al. (2018); Wilkinson et al. (2019)

4. Planetary Health in Nurses' Everyday Clinical Decision-Making

4.1 Nursing decisions as sites of environmental leverage

Nurses' decision-making is shaped by individual knowledge and experience, the characteristics of the task, and the organisational context in which it occurs, as integrative evidence on decision-making in nursing practice indicates (Nibbelink & Brewer, 2018). This has two implications for planetary health. First, because decisions are made continually and often rapidly, even small shifts in default choices can aggregate into meaningful reductions in resource use across a unit or organisation. Second, because decisions are shaped by context, individual motivation will not suffice unless supply systems, protocols, and culture make the sustainable option the easy and safe option. Sustainability considerations are best understood as an additional lens applied after patient safety and clinical need have been established, not as a competing criterion that overrides them. Figure 1 illustrates how this lens can be incorporated into a routine decision sequence.

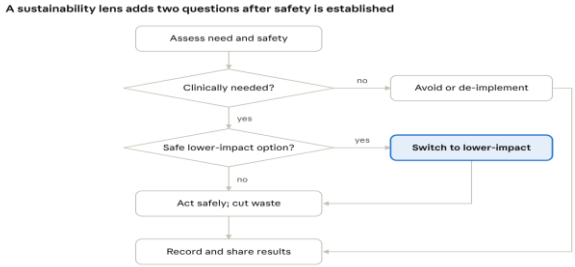

Figure 1. A sustainability lens within the routine nursing decision sequence at the bedside and in community practice.

4.2 Prevention, self-management, and shared decisions

The most environmentally effective care is often the care that is not needed, and nurses contribute to avoiding demand through prevention, early recognition of deterioration, health education, and support for self-management. Where patients can manage conditions confidently at home, travel, admissions, and consumables fall, and quality of life often improves. Shared decision-making supports this orientation: the three-talk model of team talk, option talk, and decision talk offers a structure in which clinicians and patients explore options, including watchful waiting or non-pharmacological approaches, and arrive at choices consistent with patient preferences (Elwyn et al., 2017). Nurses are well placed to lead the option and decision conversations in many settings, and sustainability can be introduced where relevant, for example by discussing the value of not starting a treatment that offers little benefit.

4.3 Reducing low-value care

A large body of evidence demonstrates overuse of medical services worldwide, with substantial harm to patients and waste of resources (Brownlee et al., 2017). A typology of low-value care offers three complementary responses, to limit, lean, or listen, depending on whether the service should be stopped, delivered more efficiently, or replaced by better alignment with patient needs (Verkerk et al., 2018). Nurses encounter low-value care in routine practice, including frequent observations without clinical indication, repeated blood tests, unnecessary urinary catheters, and over-ordering of supplies. Because reducing low-value care improves safety and experience as well as footprint, it is among the most defensible entry points for nurse-led sustainability work, though evidence specific to nursing-led de-implementation remains limited.

4.4 Medicines, inhalers, and antimicrobial stewardship

Medicines contribute substantially to health care emissions and to environmental pollution, and nurses are central to their safe and appropriate use. Inhaler selection illustrates the potential: modelling in the United Kingdom suggested that switching suitable patients from high-propellant metered-dose inhalers to lower-global-warming-potential alternatives could

reduce emissions at modest cost (Wilkinson et al., 2019). Nurses who teach inhaler technique, review respiratory medicines, and support patient choice can facilitate such changes, provided clinical suitability and patient preference are respected. Antimicrobial stewardship offers a parallel example. An integrative review identified roles for staff nurses in stewardship, including accurate specimen collection, medication histories, assessment of symptoms, and patient education (Monsees et al., 2017), and these activities reduce unnecessary antimicrobial use, with benefits for resistance as well as environmental burden. Similar logic applies to reducing medication waste through accurate ordering, timely review, and attention to unused stock.

4.5 Procedures, supplies, and waste

Perioperative and procedural settings have been studied most intensively. Carbon footprinting of operating theatres in three health systems showed that anaesthetic gases, energy use, and supplies were major contributors (MacNeill et al., 2017), and a systematic review of the carbon footprint of surgical operations found wide variation between procedures and settings (Rizan et al., 2020). Narrative syntheses have catalogued interventions including reducing unnecessary single-use items, rationalising instrument sets, switching off equipment, and choosing lower-impact anaesthetic agents (McGain et al., 2020; Wyssusek et al., 2019), and strategies for laparoscopic surgery emphasise reducing disposable devices and optimising energy use (Thiel et al., 2018). Many of these decisions involve perioperative, theatre, and recovery nurses who open supplies, set up rooms, and manage waste. Beyond theatres, waste streams in hospitals differ markedly in their carbon intensity, which means that correct segregation of clinical and general waste has environmental as well as financial consequences (Rizan et al., 2021). Nurses who understand these differences can make everyday choices, such as opening items only when needed and segregating waste accurately, that reduce impact without compromising infection prevention.

5. Embedding Planetary Health in Unit-Level Protocols

5.1 Why protocols matter

Individual decisions are constrained by defaults, stock layouts, order sets, and local custom, so durable change generally requires altering the protocols and routines through which units standardise care. Protocols convert individual good intentions into collective practice, and they reduce reliance on the moral effort of individual nurses at moments of high workload. A systematic review of the carbon footprint of healthcare settings synthesised studies across hospital, primary, and community care and underscored the need for setting-specific mitigation strategies informed by local hotspots (Rodríguez-Jiménez et al., 2023). Units therefore benefit from beginning with an understanding of where their own impacts arise, whether in medicines, consumables, waste, energy, or travel, before choosing which protocols to redesign.

5.2 Sustainability within quality improvement

Quality-improvement methods provide a familiar vehicle for nurse-led change. A method for measuring impact within quality-improvement projects proposes that teams routinely record environmental impact, such as carbon, alongside financial and social impact so that improvements are assessed against sustainable value rather than cost alone (Mortimer et al., 2018a). This approach is attractive for nursing units because it uses existing improvement cycles, such as plan–do–study–act, and because many sustainability gains coincide with patient benefit or cost reduction. Examples of protocol domains that can be targeted are summarised in Table 2. Most are supported by evidence on the clinical or environmental effect of the underlying decision, rather than by trials of nurse-led protocol change itself, a distinction that should temper expectations about effect sizes.

Table 2. Examples of unit-level protocol domains, nursing roles, and expected benefits

Protocol domain	Illustrative protocol change	Nursing role	Expected benefit	Illustrative sources
Respiratory care	Routine review of inhaler type and technique at asthma and COPD contacts	Inhaler teaching, medicines review, eliciting patient preference	Lower propellant emissions with maintained disease control	Wilkinson et al. (2019)
Antimicrobial stewardship	Prompts for appropriate cultures, documented indications, and timely review	Specimen collection, medication histories, escalation of concerns	Reduced unnecessary antimicrobial use	Monsees et al. (2017)
Observations and testing	Matching observation frequency and test requests to clinical risk	Risk assessment; questioning routine low-value tasks	Fewer consumables and less nursing time on low-value tasks	Brownlee et al. (2017); Verkerk et al. (2018)
Procedural supplies	Rationalised packs and open-on-demand supply of single-use items	Set-up, supply selection, stock management	Reduced waste, emissions, and cost	MacNeill et al. (2017); Thiel et al. (2018);

				Wyssusek et al. (2019)
Waste segregation	Clear signage, training, and periodic audit of waste streams	Segregation and unit audit	Lower treatment emissions and cost	Rizan et al. (2021)
Energy and equipment	Switch-off routines for idle equipment and lighting	Unit routines and local champions	Reduced energy use	McGain et al. (2020); Wyssusek et al. (2019)

5.3 Implementation: moving from pilot to routine

Protocol change fails less often for lack of evidence than for lack of attention to implementation. The updated Consolidated Framework for Implementation Research directs attention to characteristics of the innovation, the outer setting, the inner setting, the individuals involved, and the implementation process (Damschroder et al., 2022), all of which are relevant to sustainability work. Characteristics of the innovation include its perceived safety and compatibility with existing workflows; inner-setting factors include leadership support, resources, and culture; and individual factors include nurses' knowledge and beliefs. Practical implications follow. Changes that do not threaten patient safety, save time, and are visibly supported by leaders are more likely to be adopted, and engaging frontline nurses in co-designing protocols, rather than imposing them, supports ownership. Nurse champions, regular feedback on measured results, and integration into audit and governance cycles can help to sustain change. Figure 2 summarises a pragmatic improvement cycle for unit-level protocols.

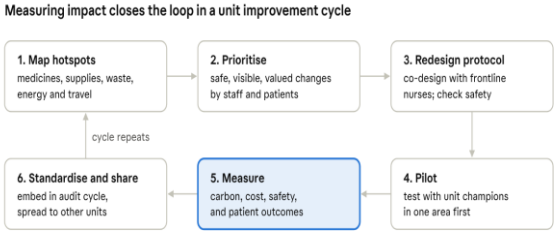

Figure 2. An improvement cycle for embedding sustainability in unit-level nursing protocols.

6. Enablers and Barriers to Nurse-Led Integration

6.1 Attitudes, knowledge, and education

Nurses generally recognise the relevance of climate change to health, but knowledge and confidence in acting on it vary. Qualitative work indicates that nurses see a place for sustainability in practice but often lack concrete guidance and organisational support (Kalogirou et al., 2020), and a multinational survey of health professionals found widespread perception that climate change harms patients' health and that their professions have a role in responding (Kotcher et al., 2021). A multisite study of nursing students reported generally positive attitudes towards climate change and sustainability, alongside variation in perceived preparedness (Álvarez-Nieto et al., 2022), which suggests that interest is a resource education can build upon. Consensus guidance on planetary health and education for sustainable healthcare recommends integrating these topics across curricula, linking them to clinical learning outcomes rather than treating them as stand-alone content (Shaw et al., 2021), and educators have described practical approaches to embedding sustainability in clinical education (Walpole et al., 2019).

6.2 Organisational and workforce barriers

Barriers are largely structural. Time pressure and competing priorities make it difficult for nurses to consider additional criteria, and in many units infection prevention and safety norms, appropriately, take precedence over environmental concerns; where evidence of equivalence is lacking, nurses may default to the established, more resource-intensive option. Workforce strain compounds these constraints: global analyses document exhaustion, attrition, and shortages that limit capacity for improvement work (Buchan et al., 2022). Nurses may also experience climate-related distress, and while concern can motivate engagement, it can also overwhelm when individual capacity to act is small (Clayton, 2021). Leadership and governance are therefore critical enablers. Health-system strategies for sustainability and pathways to net zero depend on organisational commitment, measurement, and accountability (Pencheon, 2018; Salas et al., 2020), without which nurse-led initiatives risk being fragile and dependent on individual enthusiasts.

6.3 Safety, equity, and unintended consequences

Sustainable practice must never be pursued at the expense of safety or equity. Reducing single-use items, for instance, requires validated reprocessing and robust infection prevention, and reducing testing must not delay diagnosis. Equity warrants particular attention because climate change threatens the achievement of universal health coverage and is likely to widen existing disparities (Salas & Jha, 2019). Changes that shift burdens to patients, such as reducing visits without ensuring access to self-management resources, risk disadvantaging people with lower health literacy or fewer resources. Nurses' proximity to patients and communities positions them to detect such effects early and to advocate for adjustments, which makes their involvement in protocol design a safeguard as well as a driver.

7. Integrative Synthesis: A Multilevel Framework

The literature reviewed suggests that nurses' contribution to planetary health operates simultaneously at four interdependent levels, summarised in Figure 3. At the individual level, nurses apply a sustainability lens to routine decisions, supported by knowledge, shared decision-making skills, and professional values (Elwyn et al., 2017; Kurth, 2017; Nibbelink & Brewer, 2018). At the unit level, protocols, defaults, and champions convert these decisions into shared practice, using quality-improvement and implementation methods (Damschroder et al., 2022; Mortimer et al., 2018a). At the organisational level, governance, procurement, infrastructure, and measurement create the conditions under which unit changes can be sustained (Pencheon, 2018). At the system level, policy, regulation, education standards, and professional bodies set expectations and incentives (ICN, 2018; Salas et al., 2020).

The levels reinforce one another. Nurses who see their local changes recognised and measured are more likely to continue; units that demonstrate benefits offer evidence for organisational investment; and system-level policy legitimises and resources the work. Conversely, a failure at any level, such as the absence of safe alternatives in procurement or the absence of protected time, can neutralise efforts at the others. The framework is conceptual and has not been empirically tested, and it should be treated as a basis for hypotheses and for planning rather than as a validated model.

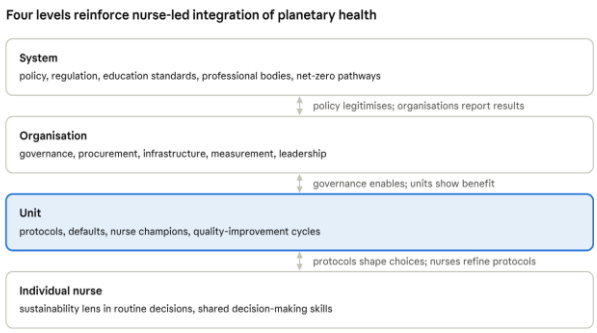

Figure 3. A multilevel framework for nurse-led integration of planetary health into clinical decision-making and protocols.

8. Implications for Practice, Education, Policy, and Research

8.1 Clinical practice and unit management

Nurses and unit managers can begin by mapping local hotspots in medicines, consumables, waste, and energy, then selecting a small number of protocol changes that are safe, visible, and valued by patients and staff (Rodríguez-Jiménez et al., 2023). Embedding two simple prompts in routine decisions, namely whether an intervention is needed and whether a lower-impact equivalent exists, can operationalise the sustainability lens without adding substantial burden (Figure 1). Improvement projects should record environmental impact alongside cost and clinical outcomes so that sustainable value can be demonstrated (Mortimer et al., 2018a, 2018b). Nurse champions, regular feedback, and inclusion of sustainability metrics in unit dashboards support persistence, while patient-facing conversations about avoiding unnecessary treatment and supporting self-management align environmental goals with patient-centred care (Elwyn et al., 2017).

8.2 Education and professional development

Undergraduate and postgraduate curricula should integrate planetary health and sustainable practice into clinical learning, assessment, and placement experiences rather than isolating them as optional content (Shaw et al., 2021; Walpole et al., 2019). Given students' generally positive attitudes (Álvarez-Nieto et al., 2022), education can build on existing motivation by providing practical competencies, such as interpreting footprint information, applying low-value-care frameworks, and leading small-scale improvement projects. Continuing professional development for practising nurses should address the same competencies, with particular support for those in community, perioperative, and medicines-intensive roles. Professional bodies can reinforce this agenda through standards and position statements (ICN, 2018; Kurth, 2017).

8.3 Policy, leadership, and governance

Nursing leaders should be represented in sustainability governance at organisational and system levels, because decisions about procurement, protocols, and measurement directly shape what nurses can do at the bedside (Pencheon, 2018). Health systems pursuing net zero should recognise clinical practice change, including that led by nurses, as a core pathway alongside energy and estate measures (Salas et al., 2020). Procurement policies that make safe, lower-impact products available and easy to choose are an essential enabler. Workforce policies that protect staffing and wellbeing are inseparable from this agenda, since improvement capacity depends on a workforce that is not overwhelmed (Buchan et al., 2022). Equity impact assessments should accompany sustainability initiatives to avoid shifting burdens to disadvantaged groups (Salas & Jha, 2019).

8.4 Research priorities

The evidence base needs studies that directly evaluate nurse-led sustainability interventions, using designs that capture clinical, environmental, economic, and equity outcomes together. Implementation research guided by established frameworks can clarify which strategies make changes stick (Damschroder et al., 2022). Priorities include evaluating nurse-led de-implementation of low-value routines, testing prompts and defaults for medicines and supply decisions, developing nursing-sensitive environmental indicators, and studying community, long-term care, and low-resource settings where evidence is thinnest.

Research on how climate concern shapes nurses' engagement and wellbeing would also inform support strategies (Clayton, 2021; Kotcher et al., 2021).

9. Limitations

This review has several limitations. As a narrative review it did not apply a systematic search strategy, formal quality appraisal, or duplicate screening, so the selection of literature may reflect the authors' judgement and the sources available. Much of the evidence on sustainable clinical decisions derives from surgery, anaesthesia, and pharmacy in high-income settings and is extrapolated to nursing practice; direct evaluations of nurse-led interventions are scarce. Footprint estimates vary by method and boundary, which limits comparability across studies. Finally, the proposed framework is conceptual and has not been tested empirically.

10. Conclusion

Nurses are strategically placed to integrate planetary health into health care because they make, shape, and implement many of the everyday decisions that drive resource use. The evidence reviewed suggests that the greatest opportunities lie in prevention and self-management support, reduction of low-value care, appropriate medicines use, waste and supply decisions, and unit protocols that make sustainable options the default. Realising this potential requires a multilevel response: education that builds competence and confidence, unit-level improvement methods that measure sustainable value, organisational governance that enables and rewards change, and system policies that fund and legitimise the work. Because direct evidence on nurse-led interventions is still emerging, rigorous evaluation should accompany implementation. Done well, integrating sustainability into nursing decisions and protocols can improve quality and safety while reducing the environmental harm that ultimately undermines health.

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