"Silent Spring" revisited: Implications for Breast Cancer Care

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Eighteen months before her death from metastatic breast cancer, the scientist Rachel Carson published the book " Silent Spring" [1] [**Figure 1**]. The books title stemmed from the lack of bird song heralding spring, a consequence of biodiversity loss related to human activity. The book marked the dawn of the Anthropocene Era – one in which our activities are substantially altering the earth's surface, atmosphere, oceans, and systems of nutrient recycling [2]. Before her death, one million copies of the book were sold, and President John F Kennedy launched a presidential commission. The book along with "The Origin of the Species", "Uncle Tom's Cabin" and "Das Kapital" is considered to be one of four books that have changed history [1].

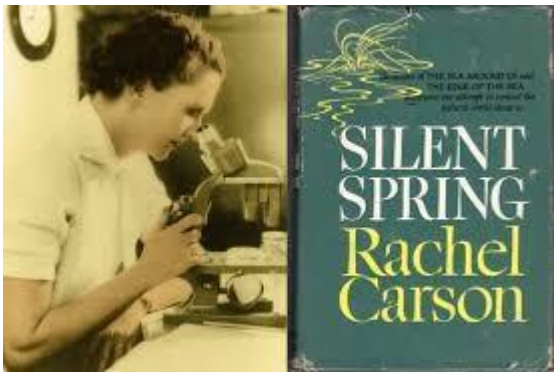


Figure 1: Silent Spring by Rachel Carson

Seven decades later the biodiversity crisis identified by Rachel Carson has become interlinked with climate change and pollution in a Triple Planetary Crisis [3,4,5] . The losses she documented have magnified. Since 1980, one in six bird species have been lost [6]. Globally nearly half of all bird species are in decline. Described by some as a global health emergency [7], economic losses from climate change have been estimated at $23 trillion due to premature mortality, healthcare expenditure and healthcare related work loss [7]. In the past two decades alone, climate change weather events have caused over 570,000 deaths [8]. They have also compromised cancer care delivery, with as yet unquantified impacts on cancer outcomes [10,11]

For patients with breast cancer this time period has also witnessed significant improvements in cancer care, and consequently life expectancy and quality of survival [12,13,14]. These developments would have transformed Rachel Carson's life. Paradoxically, these improved breast cancer outcomes have occurred at great environmental cost [15,16]. Healthcare is a major polluter responsible for more than 5% of all global emissions and accounting for 4.4% of greenhouse gases, 2.8% of particulate matter emissions, and 3.4% of nitrogen oxides. This carbon footprint is equivalent to that of 514 coal fired power plants. The Lancet Commission has estimated that healthcare emissions globally account for 4 million disability adjusted life years (DALYs) [17] This translates into 20% of the DALYs arising from breast cancer deaths in 2021 globally [18]. DALYs from United States (US) healthcare are both equivalent to the annual DALYs from colorectal cancer there [19]. A 77% increase in breast cancer cases worldwide is predicted between now and 2050 [20]. If we continue healthcare as usual, emissions from how we practice could triple by then [21]. It is also evident that care for these patients will become more challenging with projected increases in the frequency and intensity of extreme weather events [22,23,24,25,26] . These impacts will be greatest in low and middle income countries who have contributed least to the Triple Planetary Crisis, but through climate injustice already bear a disproportionate burden of the impacts [27,28,29,30].

As clinicians we wonder about how we can reconcile our duty of care to patients with our duty of care to the planet [31]? Would less patient care translate into less planetary trauma ? What are the ethical dilemmas that stem from this intersection [32]? How much difference can one clinician make ? Addressing the issue of climate change seems to be “like trying to catch a lion with a mousetrap”. In this context, the article by Mac and colleagues published in the journal resonated with us [33]. The authors conducted a scoping review of the literature, of the Cochrane Register of Controlled Trials and of the Cochrane Database of Systemic Reviews related to breast cancer and environmental impacts up to July 2025. Thirty six articles (dating from 1999 onwards) of 6772 identified were included for review; 19 of these were published in the last two years, suggesting growing momentum in this space. The majority of studies focused on breast cancer treatments, with one each focusing on screening and pathology and three on research. The authors identified five key themes regarding the environmental impact of how we treat breast cancer. These included green house gas emissions associated with radiation therapy and those associated with travel for care, the ecotoxic effects of drugs and metabolites, surgery as a source of greenhouse gas emissions and plastic waste, and the unsustainable use of resources for drug manufacture. Crucially they focus on using this evaluation to provide recommendations for improving sustainability in breast cancer care.

What are the implications for clinicians from this scoping review ? Firstly travel matters, and reducing patient travel either through mobile screening units, virtual assessments, or shortened treatment schedules has significant impacts on carbon emissions. In a study of 102 patients receiving a year of adjuvant traztusumab patient travel led to 10.1 million kg of carbon emissions resulting in 4.6 excess deaths worldwide and 8.1 DALYs [34]. The benefits of telemedicine are evident in medical oncology appointments where 1.5kg of carbon emissions were observed per round trip [35]. Secondly, energy curation matters. This is evident when the sustainability impacts of machine off-times in radiation and surgery are measured. Thirdly, rethinking how we work such as using total intravenous anaesthesia to eliminate anaesthetic gas use, and using intraoperative radiotherapy to eliminate travel has planetary health benefits. Fourthly, lifecycle analysis as performed in the studies analysed in the review can identify touch points for sustainability improvements in patient assessment, manufacture, procurement, treatment and waste management. In 2024 integrating similar touch points has been used to develop a decarbonising guide to bladder cancer care in the United Kingdom [36]. Finally, sustainability awareness is increasing.

Critically Mac et al highlight gaps in our current assessments. These include the need to quantify emissions associated with the upstream and downstream processes of treatments. They emphasise the need for a greater understanding of the human health and socioeconomic impacts of the environmental waste including carcinogenic micro-plastic waste produced by breast cancer care [37,38,39]. Significantly, no study assessed the increasing environmental impacts of artificial intelligence [40,41,42,43,44]. Their findings are tumour agnostic, and they are also disease agnostic. Similar scoping exercises in lung or colorectal cancer care would reveal overlapping touch points with breast cancer care. Consequently, actions based on their findings offer the possibility of cascading into other disciplines, magnifying their impacts.

How can the breast cancer treating community build on this scoping review to reduce the environmental impact of how we work ? Integrating the challenges of our new environmental reality in **Table 1** we have listed clinically relevant action points. These include climate adaption measures to address the challenges of providing cancer care with extreme weather events [45], to reflective prescribing [31], toolkit integration [reviewed in 46,47], leveraging clinical research [48], education [49], and advocacy [3,50].

Integrating Climate Awareness in Breast Cancer Care

Intervention	Rationale	References
Climate adaption	Reduce the impact of extreme weather events on care	45, 46
Promote screening & prevention	Reduce cancer burden and associated treatment	47
Adapt sustainability tool kits	Easy to implement, free to access, evidence based guidelines for sustainable care	46, 47
Reduce patient travel burden	Travel to care is a major source of healthcare emissions	31, 35, 36
Practice reflective prescribing	Deprescribing/formulation substitution can reduce emissions and plastic waste	31
Reduce plastic waste	Plastics pollute the environment and use fossil fuels as a seed material	31, 38, 39, 46
Leverage clinical trials	Optimisation strategies developed through trials offer less care without compromising outcomes	47, 48
Integrate planetary health in education	Education sets the basis for behaviour in later life	49
Promote lifestyle and exercise medicine	Planetary health diets reduce carbon emission and are associated with reduced cancer mortality	31
Advocacy	Many persons fundamentally support climate awareness, but advocacy can put the topic higher on the priority list	3, 50

Table 1: Integrating climate awareness into breast cancer care

Seven decades ago Rachel Carson presciently wrote " we stand now where two roads diverge but unlike the roads in Robert Frost's familiar poem, they are not equally fair. The road we are travelling on is deceptively easy .. but at its end lies disaster". She subsequently outlined a second road " less travelled by others but one that offers our only chance to reach a destination that assures the preservation of our earth". Since those words were written, breast cancer outcomes have been transformed through multi-disciplinary care, screening and treatment advances, and will be further transformed in the lifetime of those reading this editorial. They were catalysed (as many transformative movements such as the Civil Rights movement, gender equality, the abolition of slavery) by small groups of committed individuals such as the six men and one woman who established the American Society of Clinical Oncology in 1964 [51]. Rachel Carson died that year, a year when cancer also seemed an insurmountable problem. Since then cancer outcomes have improved as we become fluent in the languages of patient partners, bio-informatics, artificial intelligence and real world databases. As a community, we also need to become fluent in the language of planetary health in our continued focus of improving patient outcomes. The paper by Mac et al summarises the available literature to enable us to take the path that Rachel Carson has directed us to, and from which our patients and our planet will benefit greatly.

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