commentary

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Decarbonisation of the Health Sector: A Commentary by EASAC and FEAM

Summary

The increasingly ambitious decarbonisation targets of the European Union require integrated action across all sectors to monitor and reduce carbon footprints. The health-care sector has rarely been included in discussions about public policy decarbonisation yet it contributes about 5% to total emissions. Moreover, mitigation measures within health systems can also bring local and near-term benefits to health, for example through greener hospitals, improved patient diets and new models of care (including digital health). Primary care systems can also contribute significantly to decarbonisation efforts both within primary care itself and by reducing/replacing demand for hospital services (secondary and tertiary care), alleviating pressures on supply chains, and informing and supporting patients and the wider community in sustainable lifestyles.

The sector itself is already taking significant steps to decarbonise, for example through action to reduce greenhouse gas (GHG) emissions during construction and running of hospitals and associated transportation. Furthermore, as a high proportion of the health-care sector's contribution to GHGs derives from carbon embedded in the supply chain, there are also considerable opportunities for sustainable public procurement, for example to provide sustainable and healthy diets for patients. Systems change in the sector requires institutions to adopt a culture that values sustainability, tracks carbon footprints and shares good practice for change at local, national and international levels.

These sectoral ambitions to tackle climate change should also drive coordinated policy action at the EU level, for example building on current initiatives by the European Commission for sustainable public procurement and the pharmaceutical strategy. The recently announced aspirations for the European Health Union provide further impetus for action to promote sustainability, health and equity but require alignment with other policy priorities, in particular for the circular economy, bioeconomy, digital health, construction (Renovation Wave), Farm to Fork strategy, the European Green Deal, post-COVID-19 recovery, as well as with the collective international action on Sustainable Development Goals and Paris Agreement targets.

It is increasingly important that policy-makers work with the health sector in developing climate change mitigation and adaptation actions. These must now include action to ensure that the health sector itself achieves ambitious decarbonisation targets as part of an integrated strategy for all sectors and all the EU, and beyond.

1 Introduction

The climate is changing, primarily because of the increasing emission of greenhouse gases (GHGs) attributable to human activity. The European Union (EU) has been at the forefront of international efforts to reduce GHG emissions, and decarbonisation objectives are becoming increasingly ambitious. The target for 2030 was recently agreed (EU Summit Communique, 11 December 2020) to be a 55% reduction in net GHG emissions (compared with the level in 1990) in pursuit of the pledge to be climate-neutral by 2050, in line with Paris Agreement objectives. However, there is much more to be done to deliver transformative change (EASAC, 2020a).

Previous EASAC work (2019a) has examined how climate change is already adversely affecting human health and how impacts will increase in the future, yet emphasises that rapid and decisive action to cut GHG emissions could greatly reduce the risks to health.

The health-care sector itself is rarely included in decarbonisation public policy discussions even though the sector's current carbon footprint is equivalent to 4–6% of global net emissions (Bi & Hansen, 2018; Health Care Without Harm, 2019a; Lentzen *et al.*, 2020; Salas *et al.*, 2020; Watts *et al.*, 2021). Nonetheless, there is momentum within the health- and social-care sectors for hospitals and other organisations to measure and publish their carbon footprint together with their plans for reducing it to net-zero as rapidly as possible (Smith *et al.*, 2020). While progressive goals for this sector cannot be considered in isolation from other sectors (whose attainment of negative emissions might provide temporary compensation), and efforts to reduce GHGs must not occur at the expense of health quality or equity, the health sector has lagged many other sectors in reducing its carbon footprint (Salas *et al.*, 2020) and should now play a more prominent part in integrated strategies for decarbonisation. Mitigating the health-care footprint requires interventions both to the health-care system and to the factors driving demand: that is, strategies to reduce the incidence and severity of disease, thereby decreasing the amount and intensity of care received, while matching the supply of health services to demand (MacNeill *et al.*, 2021).

The EASAC work on climate change and health (2019a) emphasised the importance of both adaptation and mitigation for climate-smart health. Adaptation in the health-care sector to climate change that cannot be prevented, and well-designed mitigation actions to prevent dangerous climate change, can both bring benefits for health. In this commentary, EASAC and FEAM now focus on the co-benefits to climate if the health-care sector is managed well, by decarbonisation of the sector at local, national and EU levels. Prioritising mitigation within the health sector will also bring local and near-term benefits to health, for example through greener hospitals, improved diets and new models of care, as discussed in this commentary.

While action is accelerating at the institutional and national levels, EU policy-makers also need to take more account of the opportunities and challenges for decarbonisation in the health-care sector. A coordinated and coherent EU framework for tackling climate change must incorporate environmentally sustainable health-care practices that protect and promote current and future well-being of patients, employees, communities and the planet (Health Care Without Harm, 2019b).

2 How does the health-care sector contribute to GHG emissions?

The health-care sector – whose mission is protecting and promoting health – makes a major contribution to the climate crisis and, therefore, has an important role in resolving it (Health Care Without Harm, 2019a; Pichler *et al.*, 2019). In addition to the major emissions (carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, perfluorocarbons and hydrofluorocarbons), the health-care sector also contributes to other environmental threats to human health, for example by air, land and water pollution (Health Care Without Harm, 2019b; Lentzen *et al.*, 2020). Although only GHGs are considered in this commentary, it is notable that health-care sustainability science is an emerging field (Sherman *et al.*, 2020) with increasing demand for research to inform policy and practice. There are opportunities to improve medical waste management (Hutchins and White, 2009), in particular recycling of single-use personal protective equipment and other waste[1], with benefits both for reducing pollution and saving on embedded carbon in disposable items. Globally, about 130 billion face masks and 65 billion gloves were estimated to have been used every month during the COVID-19 pandemic (Zhang *et al.*, 2021), exemplifying the scale of the challenges for developing alternative materials and recycling.

There is increasing interest worldwide about the health-care sector's contributing to GHG emissions and, thereby, damaging health (see, for example, the World Bank

[1] In 2020 the European Commission introduced an implementing regulation (EU 2020/1207) about common specifications for the reprocessing of single-use devices, with advice on steps in the reprocessing cycle, validation and audit, traceability and incident reporting: https://eur-lex.europa.eu/eli/reg_imlp/2020/1207/oj. See also the work of Health Care Without Harm to audit, raise awareness and support innovation to reduce/replace plastic products and packaging: https://noharm-europe.org/issues/europe/towards-plastic-free-healthcare-europe.

(2017); and in the USA, Eckelman and Sherman (2018) and Eckelman *et al.* (2020a)). Data on EU Member States *per capita* GHG emissions associated with health care, and their variation as a function of time, affluence and the proportion of national economic output spent on health care, have been presented in the *Lancet* Countdown initiative (Watts *et al.*, 2019, 2021) although detailed interpretation of associations is complicated by methodological uncertainties (Weisz *et al.*, 2020; Eckelman *et al.*, 2020b). In plotting *per capita* GHG emissions from the health-care sector (in 2015) against health outcomes (in 2015) as measured by the Healthcare Access and Quality Index, there was a clear positive relationship between the two variables until emissions reached 400 kilograms of carbon dioxide equivalents per person (Watts *et al.*, 2021). After this point (a level exceeded by most of Europe), countries achieved very similar Healthcare Access and Quality levels with vastly different emissions profiles, '*suggesting that much of health care can achieve high-quality patient outcomes with considerably reduced emissions*'. This may also reflect the relative effects of national policies on the social and environmental determinants of health through policies in a range of sectors.

Although differing in scale, each country's health-care sector directly and indirectly releases GHGs, when delivering care and procuring products, services and technologies from a carbon-intensive supply chain. Detailed analysis (Health Care Without Harm, 2019a; Salas *et al.*, 2020) estimated that emissions emanating directly from health-care facilities and health-care-owned vehicles constituted approximately 17% of the sector's worldwide footprint. Indirect emissions from purchased energy sources, such as electricity, constituted another 12%. Most of the emissions, 71%, were derived from carbon embodied in the health-care supply chain, through the production, transport and disposal of goods and services such as food, pharmaceuticals, medical devices and other hospital equipment. Approximately one-quarter of all health-care emissions are generated outside the country where the health care is delivered.

3 What can the health sector do for itself to decarbonise?

Case studies of national public health systems and commercial providers have been reviewed by Salas *et al.* (2020). NHS England has pioneered ambitious plans at a national scale, with a goal for net-zero carbon by 2040 for emissions that the NHS can directly control and by 2045 for emissions that they can influence[2]. Moreover, the NHS assessment and plan covers patient/visitor travel and NHS services and medicines used at home, categories that may not be covered by assessments elsewhere (Salas *et al.*, 2020). Other country-level initiatives include a government-funded project in Germany[3] for hospital and rehabilitation facilities, setting climate protection targets and supporting action on energy measures, transport, procurement and food supply.

Case studies at the institutional level, for example for hospital construction, employee travel and supply chain interventions, are also available (Salas *et al.*, 2020) and the Health Care Without Harm platform[4] provides a mechanism for describing and sharing good practice derived from institutional case studies. Drawing on these sources and other literature (e.g. Watts *et al.*, 2019), EASAC and FEAM advise that the priorities for action in Europe include the following.

3.1 Systems change

Systems change in the health-care sector requires institutions adopting a culture that values sustainability, with the introduction of mechanisms for tracking and reporting carbon footprints and financial incentives, with collaboration and sharing of good practice at local, national and international levels. One example of systemic change is provided in the recent initiative of Niort Hospital, France (Humbert, 2020).

'*Health investment and policy must be retooled to support decarbonisation*' (Health Care Without Harm, 2019b): overcoming present barriers to systems change in the health sector requires leadership and training, standard-setting and transparency in motivating change (Salas *et al.*, 2020). It also requires both acting on the present evidence and filling gaps in the knowledge base. Among the latter requirements are further clarification and quantification of emissions in the sector; validation of approaches to reduce the carbon footprint of the supply chain; quantifying the benefits of low-carbon innovation; and improving the evidence base to support change management. Generating and using knowledge also requires knowledge exchange but a traditional model of knowledge exchange – the medical conference – must be rethought. Medical conferences are designed to help improve health outcomes yet they contribute substantially to global warming. This paradox cannot continue (Zotova *et al.*, 2020) and options for running carbon-neutral conference events need further elaboration and implementation. The successful experience of organising virtual meetings during the COVID-19 pandemic indicates that at least some of the traditional large conferences in-person can be replaced.

[2] www.england.nhs.uk/greenernhs.
[3] https://www.klik-krankenhaus.de/das-projekt/projektbeschreibung.
[4] www.noharm.org/content/global/about.

3.2 Greening the health-care estate

3.2.1 Primary care

In some countries, such as the UK, up to 90% of patient contacts take place outside hospitals in general practice (primary care) settings[5]. Primary-care systems in Europe have a core role in population health (Kringos *et al.*, 2013) and can make a significant contribution to reducing the carbon emissions of the health-care system overall (Xie *et al.*, 2018). In many countries, family doctors and primary-care teams are the gatekeepers to more specialised services, reducing unnecessary demands on hospitals, providing early detection of potentially serious diseases, prescribing pharmaceuticals for chronic conditions and providing advice on healthy behaviours, monitoring progress and supporting behaviour change. They have unparalleled knowledge of their patients' health and living circumstances, having a potentially pivotal role in promoting 'low carbon' healthy behaviours and reducing unnecessary prescribing.

Thus, primary care has a key role in decarbonisation efforts both within primary-care systems themselves (Nichols and Richardson, 2011) and in reducing/replacing demand for hospital-based services (secondary and tertiary care), alleviating pressure on supply chains, and informing and supporting patients and the wider community in efforts towards sustainability.

3.2.2 Secondary and tertiary care

GHG emissions from the construction and operation of the sector's buildings and the transport involved for their access are major considerations. EASAC (2019b) has assessed the strategic principles for decarbonisation of road transport more generally (including related infrastructure and human behaviour) and of existing/new buildings and their heating (EASAC, 2021). The general framework for an efficient transition to renewable energy in the EU, as part of the transformative agenda, has also been discussed in previous EASAC publications (e.g. EASAC, 2020a). Specific issues of energy provision for hospitals (e.g. energy generation on-site or from district heating networks in urban areas) have been discussed in detail elsewhere[6]. Generally, hospitals need lots of electricity for air conditioning and cooling, and, at the same time, lots of heating for hot water and space heating. It may be possible to couple hospital demands with excess heat supplies from industry or biogas produced by anaerobic digestion of wastes from the food industry. Heat pumps may also become increasingly important in the hospital sector because these can be used to supply both heating and cooling.

The health-care sector is transportation-intensive and air pollution impacts may unfortunately be concentrated near hospital facilities. Proposed solutions[4] include placing new facilities near to public transport, optimising energy efficiency of the hospital fleet, encouraging healthier modes of transport and modifying models of care (see later). Hospital buildings are also among the most intensive users of energy (Bi and Hansen, 2018). There is an important agenda to retrofit existing health-care buildings with adequate insulation and ventilation to reduce energy requirements, improve temperature and humidity control, provide more daylight and minimise the build-up of harmful pollutants in tightly sealed buildings. Hospitals may also have specific requirements associated with their 24-hour operation and high levels of air conditioning (see Wilkinson *et al.* (2009) for a discussion of public health benefits of sustainable buildings more generally). Integrating adaptation and mitigation in the health-care sector is an important goal, for example ensuring that buildings do not overheat in hot weather while minimising energy use for air conditioning. This may be achieved by measures such as 'cool roofs' and passive ventilation. The health-care sector in many regions is in the midst of a construction boom and there are opportunities for near carbon-neutral buildings, and for restoring natural habitats, reducing heat island impacts and adopting other guidelines for healthy buildings (see European examples[4] and Sala *et al.*, 2016).

Building climate resilient and environmentally sustainable health-care facilities will not only contribute to decarbonisation but can also improve efficient functioning with benefits both to patients and to health-care workers (see Corvalen *et al.*, 2020).

3.3 Sustainable procurement: a case study on the food supply chain

Sustainable procurement is a term that covers green and social/ethical considerations in purchasing practice. The focus in this commentary is on reducing GHGs but sustainable procurement is also important in other respects, for example in terms of water use, disposal of toxic material, and the impact on human rights of those workers in lower income countries who are involved in production. The European Commission's strategy on public procurement (European Commission, 2017) provides a helpful stimulus to developing partnerships with

[5] According to the latest OECD (Organisation for Economic Co-operation and Development) estimates (2018), primary care accounted for about 14% of all health-care spending across OECD countries in 2014. This expenditure (depending on the definition of scope) can be compared with other major components of health-care expenditure such as pharmaceuticals (17%) and hospital in-patient treatment (25%). About 40% of this calculated primary care expenditure is attributable to general practitioner/nurse visits. See 'Spending on primary care: first estimates': http://www.oecd.org/health/health-data.htm.

[6] See, for example, Global Green and Healthy Hospitals: www.greenhospitals.net.

public authorities and other stakeholders to ensure wider uptake of green and social procurement criteria, including for electrical and electronic equipment in the health-care sector and for food and catering services.

A review of sustainable procurement studies (Gamba and Hernandez Olivan, 2019), including those aiming to reduce carbon dioxide, identifies several initiatives on sustainable food procurement in European health care. Nutrition status in hospitals has long been a challenge: despite significant commitment to developing and deploying European hospital guidelines on undernutrition status and monitoring (Beck *et al.*, 2001), there is continuing poor adherence to good nutrition advice in health-care settings (Khalatbari-Soltani and Marques-Vidal, 2018). The twin objectives for sustainability and nutrition need careful balancing but it is feasible to pursue objectives both for sustainable agriculture and for improved health by adjusting dietary provision. For example, hospitals, like other public institutions, should take account of the evidence base for health benefits by reducing excess red meat consumption (and, thereby, lowering GHG emissions from livestock farming) and increasing plant-based diets, particularly if locally sourced (see EASAC (2017, 2019a) and Willett *et al.* (2019) for further discussion and Jarmul *et al.* (2020) for a systematic review on the environmental footprints and health effects of 'sustainable diets'). There are continuing challenges in evaluating the environmental footprints of locally produced versus imported food, requiring life-cycle assessments (Sala *et al.*, 2017).

Access to sustainable and healthy diets while in hospital – the teachable moment – can help to foster longer-term consumer dietary change. Practical advice for hospitals is provided by Hernandez Olivan (2020). Further evaluation of key issues for environmental sustainability of the hospital food supply chain is made in a recent systematic review of the literature (Carino *et al.*, 2020); and another recent systematic review focuses on the importance of improving knowledge and skills of health professionals (see Guillaumie *et al.*, 2020). A major, continuing, challenge for sustainable and healthy food supplies in the sector is the imperative to decrease current high levels of food waste (see, for example, Williams and Walton, 2011; Strotmann *et al.*, 2017) by clarifying and implementing workable intervention measures.

3.4 Innovative models of care

Reduction of the carbon footprint may be an additional positive consequence of introducing new models of health care, improving disease prevention and chronic disease management, and, thereby, reducing numbers of hospital patients (see Bi and Hansen, 2018; Lentzen *et al.*, 2020). It would also be a positive consequence of reducing over-treatment and over-prescribing practices (Salas *et al.*, 2020). Action to improve health in the community, for example healthy diets, physical exercise and access to green spaces, will in turn help to reduce the carbon emissions of health care. One estimate suggested that increasing the walking and cycling of urban populations in England and Wales to the levels of the population of Copenhagen could avert the equivalent of about €25 billion costs to the UK's National Health Service over a period of 20 years, increasing over time. These would result from reductions in the burden of non-communicable diseases related to physical inactivity including coronary heart disease, stroke, diabetes and some types of cancer (Jarrett *et al.*, 2012).

The introduction of innovative technologies is vital as a strong enabler of climate action in the health-care sector (Ebi *et al.*, 2018), for example in support of telemedicine (the use of information and communication technologies to provide health services across distance, time or other barriers). Telemedicine can help to reduce hospital-associated transportation demands, it has been used in many different clinical disciplines and, in general, demonstrates high patient satisfaction and acceptance (Holmner *et al.*, 2014). It is more suited to some specialties than others, depending for example on the need for physical examination and imaging. However, any audit of telemedicine must count not only those GHGs avoided by reducing travel but also those carbon costs associated with manufacturing, use and disposal of telemedicine equipment. Using a life-cycle inventory approach, telemedicine is confirmed to be a useful carbon reduction strategy, but to fulfil its potential it must be regarded as an essential component of routine health-care activities and not viewed only as a service for those who lack access because of geography or other constraints (Holmner *et al.*, 2014). It may be that the recent increase in telemedicine during the COVID-19 pandemic (Smith *et al.*, 2020; Webster, 2020) will set new standards for routine care. Particular caution will, however, be needed to avoid increasing inequities of access to care by those lacking Internet access at home or with language and other difficulties that make telemedicine impractical.

4 Transformational change: what can the EU do for the health sector?

The sectoral, institutional, approaches described above are of great importance but it is also essential to examine opportunities for more coherence and coordination between institutions, countries and regions. As mentioned previously, the European Commission provides guidance for public procurement and has taken a more active role during the COVID-19 pandemic[7], for example in joint procurement of personal protective equipment

[7] https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/overview-commissions-response_en.

and vaccines and in forming a common reserve of medical equipment. But there is much more to do in sustainable public procurement policy (Health Care Without Harm, 2019b).

Health is a devolved responsibility in the EU, with core roles for Member States in many of the strategic and operational issues associated with health-care delivery. The EU has a supporting competence in health policy, in particular for cross-border health threats and, as health policy is closely aligned with research policy, in the pooling of research resources. The EU has an established role as a natural laboratory in supporting Member States in their researching, sharing and implementing good practice towards widespread adoption of sustainability—and this could be extended to the health sector. FEAM has previously called for stronger public health powers and better coordination of health research in the EU (details in FEAM (2020a)).

The EU has considerable interest in reducing health inequalities between Member States (EPRS, 2020). As observed previously, the health-care system itself can make only a limited contribution to improving health and preventing illness (Smith *et al.*, 2020): health also depends on environmental and social factors. The EU can usefully support policies and specific actions that promote health, not simply health care, for example facilitating active transport, healthy diets and reducing inequalities[8]. The recent assessment from the EPRS (2020) observes that more effective action on health at the EU level to include reduction of health inequalities within and between Member States could lead to a potential gain for the EU economy of up to €70 billion per year. The health dimension can be built into other EU policies, for example increasing the use of cohesion policy instruments[9] and structural funds to support projects that improve health infrastructure and training (see also FEAM (2020b), in particular with regard to the issues for reducing inequality as well as promoting sustainability). Because GHG emissions produce consequences not limited by borders, it is important for EU policy also to consider implications for, and support actions by, its neighbours. This may be particularly pertinent for EU candidate countries in the accession process in the Western Balkans, a region with significant concerns about GHGs and air pollutants (Banja *et al.*, 2020).

With the State of the Union address in September 2020, the European Commission has expressed its greater ambition for the health sector. By strengthening of the health mandate, the concept of the European Health Union is being developed '*in which all EU countries prepare and respond together to health crises, medical supplies are available, affordable and innovative, and countries work together to improve prevention, treatment and aftercare for disease such as cancer.*'[10] This emerging policy framework is relevant for decarbonisation of the EU health sector in several ways. EASAC and FEAM emphasise the following opportunities.

4.1 Medicines innovation

The European Commission's recent pharmaceutical strategy (European Commission, 2020a) is welcome in its focus on reducing GHGs and can capitalise on current EU responsibilities for good manufacturing practice and the circular economy. Companies in the pharmaceutical sector are already introducing policies to reduce carbon dioxide[11] and these can make a significant contribution to decarbonising the health-care supply chain. The scientific community has an important responsibility to assist manufacturing companies pursue sustainability—deterring 'greenwashing' and helping to develop metrics for change and criteria for transformational business models. Opportunities for science to work with business to find constructive ways towards more sustainable futures are discussed in other recent EASAC work (EASAC, 2020a).

The proposed inception of the EU Health Emergency Preparedness and Response Authority under the aegis of the European Health Union, with a role to channel public funding to companies and universities developing promising drug and vaccine candidates, can also be regarded as a further potential opportunity to adopt sustainability criteria in medicines innovation; as can the European Health Union aim to support coordination and streamlining of clinical trials across the EU.

4.2 Digital health

Telemedicine has potential to provide health care while concomitantly reducing GHG emissions. There is also rapid growth in the use of personal telehealth devices, for example smart phones and other connected

[8] For example by fair and well-functioning labour markets and other social protection measures, covered in the European Pillar of Social rights; see further discussion on https://eurohealthnet.eu. The report by the Institute of Health Equity (2020) focuses on the synergy between actions that mitigate climate change and reduce health inequalities.

[9] See https://ec.europa.eu/regional_policy/en/2021_2027/.

[10] See https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life/european-health-union_en. See also Communication from the Commission COM/2020/724 final, "Building a European Health Union: reinforcing the EU's resilience for cross-border health threats", November 2020 (European Commission, 2020b); and "State of the Union Address by President von der Leyen at the European Parliament Plenary".

[11] See EFPIA White Paper on Climate Change with examples of company actions: https://www.efpia.eu/media/554662/white-paper-climate-change.pdf.

(wearable) devices, potentially providing relevant data for health and well-being. There is much to be done to assess the health value of novel approaches but, again, it is important to take a life-cycle approach to calculate the ecological consequences of all digital health technologies (Chevance *et al.*, 2020). The European Institute of Innovation and Technology Health is addressing various EU-wide initiatives on artificial intelligence and health: the potential to reduce GHGs should become an important criterion in assessing their contribution to transform health care. Furthermore, the European Commission's digital health strategy[12] is designed to improve access to care, and the quality of that care, as well as to increase the overall efficiency of the health sector, but it makes no mention of the importance of decarbonisation associated with delivering digital health. This omission needs to be rectified during further development of the strategy.

4.3 Food systems

The role of the health-care sector (and other public procurement) in improving intakes of healthy, sustainable food and inculcating longer-term healthy dietary choices should be recognised in current discussion of the EU's objectives for the Farm to Fork strategy[13]. Policy for sustainable, healthy, food systems necessitates coupling reduction in GHGs (and other negative environmental impacts) from agriculture with dietary changes that will, for example, reduce obesity prevalence and risk of non-communicable diseases and lower all-cause mortality (EASAC 2019a; Haines and Scheelbeek, 2020). The accumulating evidence indicates that climate change targets of 1.5° and 2°C cannot be attained without rapid and ambitious changes to food systems (Clark *et al.*, 2020). The Farm to Fork strategy plans for the transition of EU agriculture, becoming the global standard for sustainability through strengthening EU efforts to tackle climate change, protect the environment and preserve biodiversity. There are challenges in doing all this[14] without reducing food production or exporting the negative environmental consequences (unsustainable practices) to other countries, but the scientific opportunities are considerable (see EASAC (2017) and IAP (2018) for further discussion of the European and global contexts). The reform of the Common Agricultural Policy must also now be aligned with the new thinking in the Farm to Fork strategy, in particular to ensure Common Agricultural Policy incentives deliver quantifiable improvements to ecosystem services and to health.

4.4 Integrating the health sector into other EU policy development

The health sector must be included in the broader efforts to tackle climate change as part of the EU's Green Deal and other policy initiatives. As observed in the introduction, the health sector is often not perceived as a necessary part of the collective efforts to mitigate GHG emissions. One recent example of this omission is provided by the draft Climate Roadmap of the European Investment Bank Group (EIB, 2020): the sector is not discussed despite the strong evidence that health is both a critical impact of climate change and a component of social equity, two key attributes underpinning the objectives of the EIB, and despite the relevance of the sector for investment in sustainable economic activities as defined in the EU Taxonomy Regulation (Council of the European Union (2020), currently in discussion following a public consultation).

Health must also be linked to policies to promote the circular economy and the bioeconomy, both of which aim to reduce GHG emissions and provide a more sustainable economic model than current high-impact consumption patterns. WHO Europe (2018) has shown how circular economy policies must take into account the benefits and risks to health to maximise its potential. Likewise, bioeconomy policies should not only stimulate innovation but also minimise trade-offs such as adverse effects on food production or indigenous groups in other regions (Haines, 2021). There may also be opportunities in using the 'One Health' approach to increase sustainability of both human and animal health sectors.

The health sector must play its part across diverse policy areas at both national and EU levels (EASAC, 2019a; Health Care Without Harm, 2019b), in line with the Paris Agreement and collective work on the Sustainable Development Goals. In 2021, there are opportunities to acknowledge the importance of the health sector in the EU updated strategy on climate change adaptation and in the EU policy instruments to extend the target sectors to deliver additional GHG emission reductions[15]. The European Green Deal is a major opportunity for health improvement (Haines and Scheelbeek, 2020) but should encompass change in the health-care sector as well as in the energy, housing, transport and food sectors to reduce emissions of carbon dioxide. The recent European Commission Communication on renovating buildings (European Commission, 2020c) notes that action on

[12] See https://ec.europa.eu/health/ehealth/home_en. The strategy comprises three pillars: secure data access and sharing; connecting and sharing health data for research, faster diagnosis and improved health; strengthening citizen empowerment and individual care through digital services.
[13] See https://ec.europa.eu/food/farm2fork_en.
[14] For example, to clarify ambiguities in food sustainability, to resolve discrepancies between policy objectives and specific legal actions proposed, the vulnerable institutional embedding within the European Commission and limited coordination with Member States (Schebesta and Candel, 2020).
[15] The European Commission's future climate and energy package is described at https://ec.europa.eu/clima/policies/strategies/2020_en.

public and privately-owned social infrastructure such as hospitals and other health-care facilities can spearhead the renovating strategy with immediately visible co-benefits. Nonetheless, supporting decarbonisation action more broadly in the health-care sector requires greater ambition by the EU, because of the current disconnect between health policy, decided by Member States, and other policies across the energy, agricultural and environmental domains that are often better harmonised at EU level. Moreover, the European Green Deal assumes even greater importance now, for a sustainable recovery after the COVID-19 pandemic; not only in accelerating progress towards a low-carbon recovery (Belesova *et al.*, 2020) and addressing the global climate emergency in a fair way, but also in increasing societal resilience to future disruptions (EASAC, 2020b; Smith *et al.*, 2020).

5 Conclusions

One of the key requirements for overcoming the barriers to transformative change is leadership by the health sector. In an unparalleled example of health community mobilisation, 40 million health professionals from 90 countries urged G20 leaders to put health at the centre of their economic recovery packages post-COVID-19.[16] Health professionals can be champions of change (WHO Europe, 2017) and should lead by example, to mitigate emissions throughout the health-care sector, complementing their many actions in the community to advise on how climate change risks health and how to adopt sustainable, healthy lifestyles (Xie *et al.*, 2018). In addition to contributing to tackling climate change, well-managed health-care sector decarbonisation can itself bring local, near-term health benefits. To re-emphasise a fundamental point from the introduction, efforts to reduce GHGs must not be at the expense of health quality and equity. Thus, decarbonisation in the health-care sector should be part of an integrated approach across sectors. While the health-care sector can contribute to and accelerate progress by demand for decarbonisation in its supply chains, this requires such inputs to be available at a sufficient scale and within the available budget, making an integrated approach even more essential.

It is now very timely to bring these issues to the attention of EU policy-makers. In addition to the multiple EU policy initiatives described above, there are opportunities for wider international action in 2021 in consequence of Europe hosting the United Nations Framework Convention on Climate Change COP26, G7 and G20 events. COP26 promises to be a very important occasion for accelerating commitment to the Paris Agreement targets in which all sectors must play their part for equitable action worldwide. It is increasingly important that those in the health sector help policy-makers to understand the core role of this sector in adaptation to and mitigation of climate change. The collective responsibility includes action to ensure that the health sector itself achieves ambitious decarbonisation targets.

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