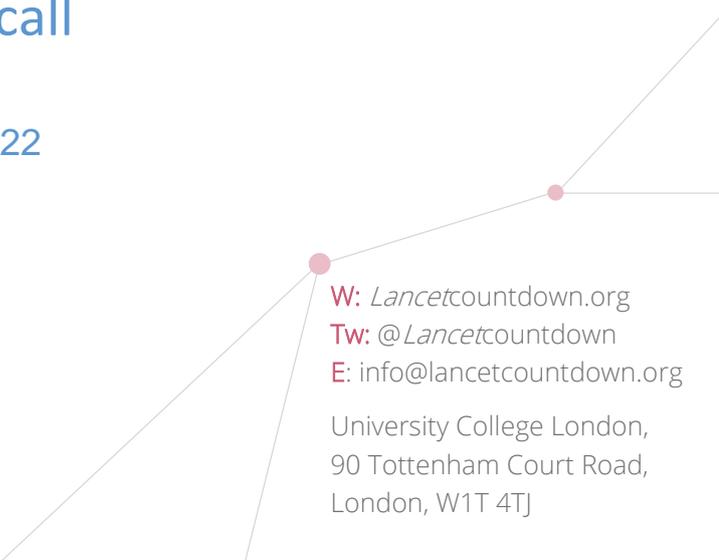


# The *Lancet* Countdown: tracking progress on health and climate change



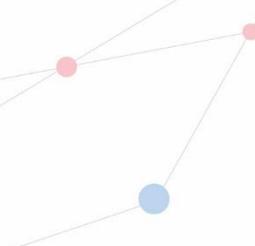
Submission to the UNFCCC Global Stocktake first technical call

February 2022



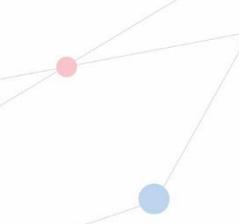
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## Health, climate change, and the UNFCCC Global Stocktake

The preamble of the Paris Agreement states that, when acting on climate change, countries should respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity. It is therefore essential that, in delivering the ambitions of the Paris Agreement, the health of all populations is protected from climate hazards, that climate action maximises health benefits, and that the health needs of vulnerable populations are being taken into consideration and protected.

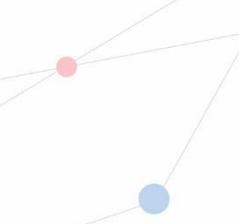
With increased intensity and frequency of extreme weather events, risks to food and water security, intensifying extremes of heat and shifts in the environmental suitability for infectious disease transmission, climate change is threatening all the pillars of good health through multidimensional and intersecting pathways. Noting this, the 2009 UCL-*Lancet* Commission on climate change and health concluded that climate change is “the biggest global health threat of the 21<sup>st</sup> century”.<sup>1</sup> The health implications of climate change also have profound implications for intergenerational equity, with children born today facing a future of climate-related health impacts.<sup>2</sup>

A UCL-*Lancet Countdown* is pleased to respond to the guiding questions from SBSTA for the first Global Stocktake (GST) (reproduced in Annex I), putting particular emphasis on the health implications of collective progress towards meeting the Paris Agreement commitments. It highlights how the indicators measured in the *Lancet Countdown* can monitor progress towards reducing health impacts and risks of climate change, as well as progress towards adaptation and mitigation actions that can deliver health benefits to present and future populations. In summary, accelerated action on adaptation and mitigation are essential to prevent the worst health impacts from climate change. Importantly, mitigation could also deliver significant health co-benefits from cleaner air, more plant-based diets, more active lifestyles, and healthier and more liveable cities, representing the “biggest global health opportunity of the century”.<sup>3</sup> This transition would simultaneously reduce health and emergency service demands, making the associated economic savings outweigh the cost of climate action.<sup>4</sup>

In taking stock of “progress towards achieving the purpose and long-term goals of the Paris Agreement, as well as opportunities for enhanced action and support to achieve its purpose and goals”, the global stocktake (GST) must therefore capture progress towards reducing health risks and impacts of climate change, as well as progress towards climate action that can deliver health benefits to present and future populations. This will be critical for Parties to update and enhance their actions and support in agreement with overall goals of the Paris Agreement.

Working Group	Indicator		
Climate Change Impacts, Exposure, and Vulnerability	1.1: Health and Heat	1.1.1: Vulnerability to Extremes of Heat	
		1.1.2: Exposure of Vulnerable Populations to Heatwaves	
		1.1.3: Heat and Physical Activity	
		1.1.4: Change in Labour Capacity	
		1.1.5: Heat and Sentiment	
		1.1.6: Heat-Related Mortality	
	1.2: Health and Extreme Weather Events	1.2.1: Wildfires	
		1.2.2: Drought	
		1.2.3: Lethality of Extreme Weather Events	
	1.3: Climate-Sensitive Infectious Diseases	1.3.1: Climate Suitability for Infectious Disease Transmission	
1.3.2: Vulnerability to Mosquito-Borne Diseases			
1.4: Food Security and Undernutrition	1.4.1: Terrestrial Food Security and Undernutrition		
	1.4.2: Marine Food Security and Undernutrition		
1.5: Migration, Displacement and Rising Sea Levels			
Adaptation, Planning, and Resilience for Health	2.1: Adaptation Planning and Assessment	2.1.1: National Adaptation Plans for Health	
		2.1.2: National Assessments of Climate Change Impacts, Vulnerability, and Adaptation for Health	
		2.1.3: City-Level Climate Change Risk Assessments	
	2.2: Climate Information Services for Health		
	2.3: Adaptation Delivery and Implementation	2.3.1: Detection, Preparedness and Response to Health Emergencies	
		2.3.2: Air Conditioning: Benefits and Harms	
2.3.3: Urban Green Space			
2.4: Health Adaptation-Related Global Funding and Financial Transactions			
Mitigation Actions and Health Co-Benefits	3.1: Energy System and Health		
	3.2: Clean Household Energy		
	3.3: Premature Mortality from Ambient Air Pollution by Sector		
	3.4: Sustainable and Healthy Transport		
	3.5: Food, Agriculture, and Health	3.5.1: Emissions from Agricultural Production and Consumption	
		3.5.2: Diet and Health Co-Benefits	
3.6: Mitigation in the Healthcare Sector			
Economics and Finance	4.1: The Economic Impact of Climate Change and its Mitigation	4.1.1: Economic Losses due to Climate-Related Extreme Events	
		4.1.2: Costs of Heat-Related Mortality	
		4.1.3: Loss of Earnings from Heat-Related Labour Capacity Reduction	
		4.1.4: Costs of the Health Impacts of Air Pollution	
	4.2: The Economics of the Transition to Zero-Carbon Economies	4.2.1: Coal and Clean Energy Investment	
		4.2.2: Employment in Low-Carbon and High-Carbon Industries	
		4.2.3: Funds Divested from Fossil Fuels	
		4.2.4: Net Value of Fossil Fuel Subsidies and Carbon Prices	
		4.2.5: Production- and Consumption-Based Attribution of CO <sub>2</sub> and PM <sub>2.5</sub> Emissions	
Public and Political Engagement	5.1: Media Coverage of Health and Climate Change		
	5.2: Individual Engagement in Health and Climate Change		
	5.3: Coverage of Health and Climate Change in Scientific Journals		
	5.4: Government Engagement in Health and Climate Change		
	5.5: Corporate Sector Engagement in Health and Climate Change		

Table 1. Indicators of the 2021 report of the *Lancet* Countdown



## The *Lancet* Countdown indicators: Taking stock of the health implications of implementing the Paris Agreement

The *Lancet* Countdown: Tracking Progress on Health and Climate Change is an international research collaboration that brings together over 120 leading experts and researchers from 43 academic institutions and UN agencies across the globe. Using the best available science, it produces over 40 indicators that monitor the health impacts of climate change and the health benefits of the global response, with retrospective data and annual updates (Table 1). Its purpose is identify progress against delivering the ambitions of the Paris Agreement, particularly as they pertain to human health and wellbeing.

Whenever appropriate and feasible, these indicators are stratified into human development index (HDI) country groups, as defined for 2019 by the United Nations Development Programme.<sup>5</sup> This submission describes the evidence from the 2021 Report of the *Lancet* Countdown relevant to the first Global Stocktake.

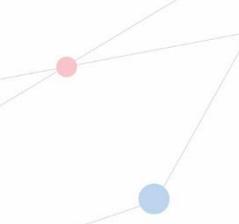
### Mitigation

The current global average warming of 1.2°C above pre-industrial times is already affecting the health of populations around the world.<sup>6</sup> Accelerated climate mitigation is essential to avoid the most extreme impacts of climate change, and protect right to health. In addition, mitigation efforts have the potential to deliver immediate health benefits through cleaner air, healthier diets, more active lifestyles, and safer cities – also contributing, if adequately delivered, to reducing health inequities. Prioritising health benefits in climate mitigation therefore offers a major opportunity to deliver the ambitions of promoting the right to health, and support the goals of equity, sustainable development and poverty eradication, as laid out in the preamble of the Paris Agreement, and its article 4.1. Taking stock of the delivery of climate mitigation and its associated health co-benefits can help not only tailor mitigation efforts to maximise health gains, but also enhance public and political support for climate action. It is therefore important, in monitoring mitigation progress, the GST takes health dimensions of mitigation into account.

This following section provides evidence against the guiding questions 1 through 5 provided by the SBSTA for the first GST (Annex I), with specific focus on health implications of current progress. Drawing on the indicators from the 2021 *Lancet* Countdown report,<sup>6</sup> evidence provided:

- Monitors collective progress and ambition in implementing mitigation efforts (*In response to question 1*)
- Assesses the adequacy and effectiveness of mitigation efforts in reducing the health risks and impacts of climate change, promoting equity, sustainable development, and poverty eradication (*In response to question 4*)
- Explores the further actions that are required, as well as, wherever suitable, the barriers, challenges and opportunities for further climate mitigation (*In response to question 5*)
- Assesses the implications of these measures in protecting the right to health, and in fulfilling Parties' obligations towards of vulnerable people and gender equity (*In response to question 19*).

The relevant guiding questions that each section provides evidence for, are marked as relevant in the text below.



## Progress in energy sector mitigation and health co-benefits

Fossil fuel combustion within the energy system contributes to 65% of all global greenhouse gas emissions.<sup>7</sup> The burning of fossil fuels also contributes to air pollution, which is a major cause of morbidity and mortality from cardiovascular disease, respiratory disease, lung cancer, pneumonia, adverse health outcomes and neurological disease.<sup>8</sup> Shifting away from fossil fuels in the transport sector can contribute to promoting active travel (e.g.: walking or cycling), and encourage urban re-design towards cities that are centred around local communities.

This section describes data from the indicators of the *Lancet* Countdown 2021 report,<sup>6</sup> which monitor collective progress in mitigation within the energy sector, and the health co-benefits from that transition.

### Indicator 3.1: energy system and health

Drawing on data from the International Energy Agency and processing it according to HDI country groupings, this indicator monitors progress in three aspects of the energy system decarbonisation: carbon intensity of the energy system; use of coal; and energy generation from renewable sources.

#### Carbon intensity of the energy system

From 2014 to 2018, the carbon intensity of the global energy system has seen an annual average decline of just 0.6%, falling to 56.0 tCO<sub>2</sub>e/TJ (excluding land use emissions). This insufficient progress also reveals differences between countries: very high HDI countries have reduced the carbon intensity of their energy systems since 1970, and the carbon intensity of the high HDI country group peaked in 2013, and has been falling since. However, the intensity of the energy system of low and medium HDI country groups has been continuously growing since the 70s. This reflects global inequities in countries' adoption of healthier, less polluting, newer technologies for energy production, with lower HDI countries still relying on health-harming fossil fuel burning for their economic growth. [**question 1**]

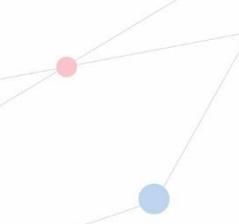
#### Coal phase-out

Coal is not only the single largest source of global carbon emissions, but it is also a major contributor to air pollution.<sup>9</sup> Monitoring coal use is therefore of critical importance from a health perspective. Delays in coal phase out have profound impact on the health of populations living close to coal-burning facilities, therefore contributing to increasing global health inequities and vulnerabilities.

Data from the IEA shows that the global share of energy generated from coal has remained practically unchanged since 1990, and was 37.3% in 2018. Global coal use for all activities fell 1.2% in 2019, including a fall of 13.4% in the USA and 21% in Europe. China is by far the country with the highest total primary energy supply from coal. However, while China's usage grew by 1.1% in 2019, the share of electricity generated from coal in China fell from 77.8% in 2011, to 65.3% in 2018. These data however expose more rapid and firm action is required to phase out coal use, both to reduce greenhouse gas emissions, as well as to protect human populations from the health harms of air pollution [**question 1**].

#### Energy generation from renewable sources

The global share of electricity generated from renewable wind and solar energy reached 7.2% in 2018, with an annual average increase of 17% between 2013 and 2018. In the very high HDI country group, the share of electricity generated from these sources showed sustained growth since 1990, reaching 9.5% in 2019. In the high HDI country group, this figure reached 7.3% that same year. However, the share in medium and low HDI country groups was just 6.5% and 1.4% respectively, exposing global inequalities in access and utilisation of healthy, low-carbon technologies [**question 1**].



### Indicator 3.2: clean household energy

The use of fuels that contribute to air pollution in the household sector is a major health threat to home dwellers. Culturally gendered roles for heating, cooking and lighting tasks, also result in gender inequities in the health impacts from the use of dirty fuels in domestic sector.

Drawing on the WHO's household energy database, the 2021 *Lancet* Countdown report reveals that domestic energy use is still dominated by biofuels in the low HDI country group.<sup>6</sup> In this group, primary reliance on clean fuels and technologies for cooking was only 12% in 2019. This figure goes down to 5% in rural households of this HDI group – a very slight increase from 2% in 2000. The use of clean cooking fuels and technologies has risen more rapidly in homes in the medium and high HDI country groups than in low HDI countries, and the share of solid biofuel use has fallen more rapidly. Yet, the use of solid biofuels remains at 54% in rural households in the high HDI group and 39% in the medium HDI group [*question 1*].

Estimates indicate that exposure to household air pollution is roughly 40% higher for women than for men.<sup>10</sup> In many places, women are also at higher risk injuries and violence through their role in collecting and using these fuels.<sup>11</sup> For Parties are to respect and promote the right to health, and gender equality as mandated in the Paris Agreement's preamble, the transition of fuel use in the domestic sector must take health and gender considerations into account. Monitoring this transition within the global stocktake is therefore of outmost importance [*question 19*].

### Indicator 3.3: mortality from ambient air pollution by sector

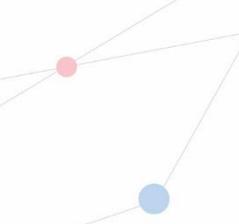
A major co-benefit of phasing out fossil fuels is related to the health benefits from the immediate reduction in fossil fuel-derived air pollution. Monitoring the health gains from this transition is therefore important to allow countries to identify and maximise the health gains from climate action, therefore promoting and protecting the right to health, and reducing inequities and health vulnerabilities.

Modelling from the *Lancet* Countdown estimates that the level of exposure to anthropogenic fine particulate matter pollution (PM<sub>2.5</sub>) in 2019 contributed to 3.3 million deaths annually; 1.1 million of which were directly related attributable to fossil fuel combustion.<sup>6</sup> Deaths attributable to coal combustion decreased from 620 000 in 2015 to 507 000 in 2019, primarily driven by the reduction of coal for residential heating and other air quality control measures.

Importantly, the differential exposure to air pollution in different HDI country groups reflects the inequalities across climate action to date. Medium and high HDI country groups are those with the highest mortality rates attributable to PM<sub>2.5</sub> exposure (60 deaths per 100 000; and 65 deaths per 100 000, respectively). Due to lower industrial activity and younger populations, the estimated mortality rate is lower in the low HDI country group, at 34 deaths per 100 000 inhabitants. In the very high HDI country group, thanks to cleaner fuel use and better air quality control, the attributable deaths are estimated at 40 deaths per 100 000 inhabitants. These data expose that current mitigation efforts are not being adequate nor effective not only towards climate mitigation, but also towards achieving equity and protecting the right to health [*questions 4 and 19*].

### Indicator 3.4: sustainable and healthy road transport

Decarbonising road travel is not only essential for climate change mitigation, but has also the potential of delivering benefits to the physical and social determinants of health by promoting more active lifestyles, safer roads, more affordable and equitable travel options, and community-centred urban redesign.<sup>12</sup> Because of its potential to promote and protect the right to health, reduce inequities, and improve wellbeing, it is important that the GST takes stock of the health implications of actions to decarbonise the transport sector.



Drawing on data from the IEA, the *Lancet* Countdown reports that, between 2017 and 2018, the use of electricity for road transport reached 15%, and that the number of electric vehicles in the world reached a new peak of 7.2 million cars in 2019. Despite this progress, road travel still contributed to almost 18% of global CO<sub>2</sub> emissions in 2019, and the use of fossil fuels for road transport increased by 0.7% between 2017 and 2018. Electricity still makes up only 0.27% of the energy used for road transport, and electric vehicles represent only 1% of the world's vehicle fleet.<sup>6</sup> These data expose insufficient progress towards decarbonisation of road travel [**question 1**].

Transitioning to electric travel can only reduce fossil fuel related emissions if the electrical grid is simultaneously decarbonised. However, as indicator 3.1 shows, little progress has been made towards decarbonising the global electrical grid. Furthermore, both the building of electric vehicles and the required electric charging infrastructure contribute to direct and indirect greenhouse gas emission, reflecting the ineffectiveness of road travel electrification as a sole means for achieving mitigation in the transport sector. At 2019 levels, the transport sector is estimated to have contributed to over 471 000 deaths annually due to PM<sub>2.5</sub> exposure, up by 3.7% from 2015 levels (indicator 3.3). These figures expose the insufficient and inadequate efforts to decarbonise the transport sector, and the health gains that could arise from accelerated action [**question 4**].

Modal shift towards public transport or active modes of travel (cycling, walking, etc), are effective towards achieving mitigation goals, and can also contribute towards the Paris Agreement ambition of promoting equity, sustainable development and poverty eradication. Moreover, by enhancing physical activity, they can also deliver major co-benefits to health and wellbeing. However, monitoring changes in travel mode and urban redesign still remains challenging, and therefore represents a major limitation towards exposing, promoting and readjusting ambitions. It is important that active travel interventions are prioritised, and that global systems are implemented to enable monitoring and promotion of the health gains of this transition. [**questions 5 and 19**].

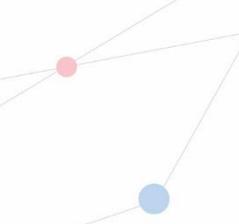
#### Indicator 4.2.4: net value of fossil fuel subsidies and carbon prices

Fossil fuel subsidies generate financial incentives for fossil fuel burning, representing a major barrier to reducing carbon emissions. On the contrary, carbon price instruments can help reflect the negative externalities of fossil fuel use, and encourage shifts to a low-carbon economy.<sup>13</sup> The *Lancet* Countdown draws on metrics from the IEA, the Organisation for Economic Co-operation and Development, and the World Bank, to monitor net-economy-wide average carbon prices and revenues

Of the 84 countries analysed, which are responsible for 92% of global CO<sub>2</sub> emissions, 42 countries had a carbon pricing mechanism in place. However, due to simultaneous implementation of fossil fuel subsidies, 65 (77%) had net-negative carbon prices. Together, these countries provided a net total of 489 real 2020 billion US\$ in subsidies to fossil fuels. In 9 countries (10%), the funds allocated to fossil fuel subsidies exceeded their total national health budget. Carefully redirecting fossil fuel subsidy spending towards health and wellbeing services, while protecting the health and livelihoods of populations vulnerable to energy costs, could deliver net benefits to vulnerable populations, and strengthen the social determinants of health<sup>14,15</sup> [**question 5**].

#### Progress on food system decarbonisation and health implications

The IPCC estimates that the global food system contributes to 21–37% of all greenhouse gas emissions.<sup>16</sup> Decarbonisation in the food sector is therefore essential for Paris Agreement ambitions to be met. However, Parties must ensure, as per the preamble of Paris Agreement and its article 2.1(b), that food security is not put at risk as a result of that transition. If prioritising the health of world populations, food system decarbonisation



has the potential to deliver major health gains through healthier, plant-forward diets. This section exposes the findings of the 2021 report of the *Lancet* Countdown on progress on decarbonisation of the agricultural system, and the health implications of current progress.<sup>6</sup>

### Indicator 3.5.1: emissions from agricultural production and consumption

Using models developed by the *Lancet* Countdown, this indicator estimates that emissions from the agricultural sector have increased by 20% since the year 2000, from 4.7 GtCO<sub>2e</sub> in 2000, to 5.6 GtCO<sub>2e</sub> in 2018. Emissions from cattle products contributed to 52% of all emissions from agricultural products in 2018, and progress in reducing these emissions has been insufficient, at only two percentage points since 2000. These data reflect the inadequate and ineffective efforts made to date in reducing emissions from the agricultural sector [**question 1**].

The global contribution to emissions from food consumption also reveal inequalities between countries: per-capita emissions from the consumption of agricultural products are 39% higher in the very high HDI country group than in the high HDI group, and 41% higher than in the low HDI group; differences mostly attributable to the high per-capita consumption of beef products. While the very high HDI country group has made the most progress in reducing per-capita emissions from cattle products (down by 17% from 817kgCO<sub>2e</sub> per capita in 2000 to 676 kgCO<sub>2e</sub> per capita in 2018), this group is also the one that contributes the most to greenhouse gas emissions from the agricultural sector, and 68% of its total emissions come from cattle products. These results reflect the slow progress towards decarbonisation, and the current failure in achieving the goals laid out in article 4.1 of the Paris Agreement [**question 1**].

### Indicator 3.5.2: diet and health co-benefits

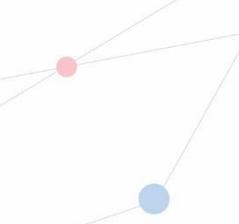
In order to meet the ambitions of the Paris Agreement, global food systems must decarbonise. However, the preamble of the Paris Agreement also recognises the fundamental priority of safeguarding food security and ending hunger. Transitions to low-carbon diets hold an enormous potential to deliver improved health and nutrition from increased consumption of plant-based products, and reduced consumption of red meat. It is therefore essential that the GST monitors the health impact the low-carbon transition in the food sector.

Using epidemiological models, the *Lancet* Countdown estimates that between 2017 and 2018, deaths due to excess red meat consumption rose by 1.8%, to 842 000 deaths globally. The high and very high HDI country groups consume four to seven times more red meat than the low and medium HDI groups, and mortality associated with excess red meat consumption is almost nine times greater in the very high HDI country group (19 deaths per 100 000 people) than in the low HDI group (2 deaths per 100 000 people). These deaths reflect the human costs of the delay in agricultural decarbonisation, and could be prevented through the transition towards low-carbon, balanced and plant-forward diets [**questions 1 and 19**].

Further efforts are needed to promote the transition to low-carbon, plant-forward diets, that can deliver the simultaneous benefits of improved health, and reduced carbon emissions [**question 5**].

## Progress in decarbonisation of the health-care sector

The health sector is essential in ensuring health is protected in the face of climate change. However, it is also contributing to the problem, through health sector-associated greenhouse gas emissions. With the demand for care expected to go up as the health impacts of climate change intensify, health sector emissions are set to continue to rise, further contributing to climate change and its associated health impacts. In complying with their duty to “first, do no harm”, health systems must therefore rapidly decarbonise.



### Indicator 3.6: health-care sector emissions

Modelling from the *Lancet* Countdown estimates that the health sector contributes to 4.9% of global greenhouse gas emissions. This represents an increase of 5.2% since 2017, reflecting ineffective and inadequate mitigation action in this sector [**question 1**].

Findings show that health-care emissions are positively associated with HDI levels (which include metrics of life expectancy), mostly through health spending, but this association is lost after 400 kg CO<sub>2</sub> per capita, showing an increase in the carbon intensity of health care provision that does not contribute to improved quality of care. This exposes an immediate opportunity for reducing healthcare sector emissions without compromising on the quality of healthcare provision [**question 5**].

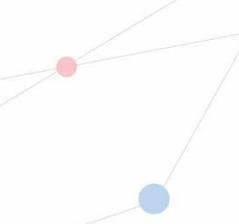
Health systems around the world, acknowledging the health harms of greenhouse gas emissions, are committing to decarbonise their sector. Following the Net Zero commitments of the NHS in England,<sup>17</sup> in November 2021 45 national health systems committed to delivering more sustainable and low-carbon health systems, and 14 have set a target date to reach net zero carbon emissions on or before 2050.<sup>18</sup> In taking stock of this progress, it is important to regularly monitor changes in healthcare sector emissions, and the health implications of this transition [**question 3**].

## Adaptation

Climate change threatens to undermine the last 50 years of gains in public health,<sup>1</sup> with more frequent and intense heatwaves and other extreme weather events, increased environmental suitability for infectious disease transmission, threats to food and water security, mental ill health, and exacerbated inequities.<sup>6</sup> Climate adaptation must therefore protect human health from these hazards in order to protect the right to health, and meet the “*global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change*”, as established in the preamble and article 7.1 of the Paris Agreement

The *Lancet Countdown* indicators monitor the progress, efficacy and effectiveness of interventions to protect human health in a changing climate. The indicators described in subsequent paragraphs provide evidence relevant to guiding questions 6 to 10, and question 19, as provided by the SBSTA for the first GST (Annex 1), with a specific focus on their health implications. They:

- Monitor progress in the implementation and ambition of measures that build resilience, adaptive capacity, and reduce vulnerability to the adverse *health* impacts of climate change (*response to question 6*); and particularly exposing efforts made by low HDI countries (*response to question 7*)
- Assess adequacy and effectiveness of adaptation efforts in increasing adaptive capacity and resilience for health (*response to question 9*)
- Identify further required actions, as well as wherever suitable, the barriers, challenges and opportunities for further climate adaptation for health (*response to question 10*).
- In focusing on the implications of these measures for the right to health, as well as identifying considerations of vulnerable people and gender equity, the indicators also provide evidence *in response to question 19*.



## Progress in assessing risks, and developing adaptation ambition and plans for health

For adaptation interventions to be adequate and effective in achieving the goals defined in the preamble and Articles 2.1(b) and 7.1 of the Paris Agreement, they must be underpinned by a thorough assessment of climate change risks, including those to human health. This section describes data from *Lancet* Countdown indicators which monitor collective progress in climate change risk assessments, and in the development and implementation of adaptation plans for health.

### Indicator 2.1.1: National Adaptation Plans for health

This indicator draws on data from the 2021 WHO Health and Climate Change Global Survey, in which 91 governments reported on the development of national health and climate change plans and strategies, and the barriers to implementation.

The survey results show that only 47 (52%) of 91 countries reported having a national health and climate change strategy or plan in place. This is a similar proportion to what was reported in 2018, showing little progress in adaptation planning for health between those years. Concerningly, less than a quarter of the responding countries reported high or very high levels of implementation of these plans. [**question 6**].

Insufficient finance was identified as the main barrier to implementation of the national adaptation plans by 31 (69%) of the 45 countries that responded to this question, and 10 (25%) reported absence of funding to address the priorities set out in their strategies and plans. Other barriers to implementation identified were insufficient human resource capacity (24 countries), and insufficient research, technologies, or tools (20 countries) [**question 10**].

An analysis of consideration of gender in National Adaptation Plans (NAPs) submitted to the UNFCCC revealed that only 4 of the 19 NAPs considered gender in health adaptation actions. Even in cases where gender equality was mentioned, NAPs did not demonstrate mainstreaming of gender issues [**question 19**].

### Indicator 2.1.2: National assessments of climate change impacts, vulnerability, and adaptation for health

Drawing on data from the 2021 WHO Health and Climate Change Global Survey, this indicator monitors national evaluations of climate change-related health risks and vulnerabilities. Only 45 (49%) of 91 countries reported having carried out a climate change and health vulnerability and adaptation assessment, and just 17 (56%) of 43 countries reported that the findings strongly informed the development of health policies and programmes. Only 8 (19%) reported that the assessment findings strongly influenced the allocation of human and financial resources, again stressing the lack of resource allocation as a key barrier for the implementation of adequate and effective adaptation plans for health [**questions 6 and 9**].

Most countries specifically considered vulnerable and underserved groups, including children, women, older adults, workers, rural and urban populations, people living in poverty, and, to a lesser extent, Indigenous groups, migrant populations, displaced populations, persons with disabilities, and people in vulnerable situations and the right to development, as well as gender equality. However, the comprehensiveness of these assessments varied, exposing the need for more rigorous and systematic risk and vulnerability assessments [**questions 10 and 19**].

### Indicator 2.1.3: City-level climate change risk assessments

The risks of climate change manifest themselves locally, with over half of the world population living in urban environments. Cities have a central role in protecting populations from health risks of climate change.<sup>19</sup> It is therefore important that Parties promote city efforts to identify and reduce the health risks of climate change. This indicator reports on data collected by the CDP's 2020 survey of global cities, to identify and monitor efforts made by cities identifying climate change risks to health.

In 2020, 546 (81%) of 670 respondent cities reported that they had completed, or were currently undertaking, climate change risk assessments. Of 491 cities that responded in both 2019 and 2020 to this question, 45 (9%) more reported having completed a climate change risk assessment in 2020. 308 (62%) of 495 respondents considered their city faces climate change-related risks to public health or health systems, with 169 (55%) of 308 reporting heat-related illness is a major concern [question 6].

Cities identified older adults (reported by 213 [69%] cities), children and youth (180 [58%]), and people in low-income households (170 [55%]), as the most vulnerable groups, and 94 cities (31%) identified women as vulnerable to climate-related health impacts [question 19].

Cities voluntarily report to the CDP, and the vast majority of responding cities belong to countries with a high or very high HDI. The lack of city-level risk assessments can be a major barrier to the development and implementation of adequate and effective health adaptation efforts. Nations must therefore develop processes and policies to ensure cities systematically perform adequate and effective climate change risk assessments, and that these underpin the development and implementation of local adaptation measures [question 10].

### Indicator 2.2: Climate information services for health

Meteorological data and forecasts are essential to the early identification of climate-related threats to health, the development of early warnings, and timely unrolling of emergency responses.

Using data reported to the WMO, this indicator shows that 86 national meteorological and hydrological services reported providing climate services to the health sector. 50% of very high HDI countries also reported that they were co-designing, or providing tailored climate information services or products, compared with 36% of low HDI countries [question 6].

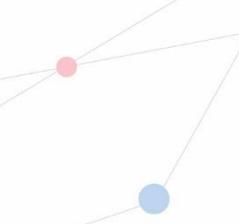
### Implementation of climate adaptation actions for health

Tracking the implementation of adaptation measures is essential to take stock of progress towards protecting populations from the impacts of climate change. However, adaptation measures must be tailored to address local needs, operate through and within local socioeconomic systems, and target locally-defined vulnerable populations. This presents challenges in comparing and monitoring implementation of adaptation measures at a global scale, and available data is mostly self-reported.

With rising temperatures putting human health at risk, interventions that minimise exposure to extreme heat are an essential component of climate change adaptation. This section draws on data from two indicators from the 2021 report of the *Lancet* Countdown,<sup>6</sup> which explore the implementation of two main tools to reduce heat exposure: air conditioning units, and urban green space.

### Indicator 2.3.2: Air conditioning: benefits and harms

With the rising global temperatures, the health impacts of extreme heat exposure are also on the rise.<sup>6</sup> Heat adaptation therefore requires the implementation of cooling tools and strategies. Drawing on data from the



IEA, this indicator reports that the percentage of global households with air conditioning grew from 21% to 33% between 2000 and 2019 [question 6].

A modelled estimate suggests that this use of air conditioning would have prevented roughly 195 400 heat-related deaths globally among people aged 65 years and older in 2019.<sup>6</sup> However, although air conditioning is an effective indoor cooling technology, its use is also leading to considerable harms to health and the environment. Between 2000 and 2019, CO<sub>2</sub> emissions from air conditioning use grew by 61%, from 640Mt to 1032Mt globally.<sup>6</sup> Moreover, the *Lancet* Countdown estimates that, in 2019, PM<sub>2.5</sub> air pollution derived from the generation of electricity for air conditioning contributed to an estimated 21 000 deaths globally.<sup>6</sup> In addition to this, air conditioning units release waste heat, intensifying the urban heat island effect, and therefore further contributing to adverse health outcomes from urban heat exposure [question 9].

The dependency on air conditioning as an adaptation to extreme heat is also exacerbating inequities, as 770 million people around the world have no access to electricity.<sup>20</sup> Energy poverty remains a problem even in high and very high HDI countries, with estimates suggesting that around 19.2% of dwellings in the EU were not comfortably cool during the summer – a figure that rises to 26.3% in the case of income poor dwellings.<sup>21</sup> Tracking these data is important as the increased incidence of extreme heat puts home dwellers at increased risk of heat-related adverse health outcomes. These data also expose the trade-offs in using air conditioning use as an adaptation measure [question 9].

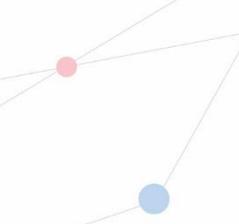
Sustainable cooling interventions need to be urgently implemented. Cool roofs, for example, are an effective and low-cost way of lowering indoor temperatures, and reduce heat in urban centres. Simulations by Macintyre *et. al.* estimated that the introduction of cool roofs in the city of Birmingham, UK, could reduce maximum daytime air temperatures by 0.5°C on average, and up to 3°C during heatwaves.<sup>22</sup> This model estimated that cool roofs could reduce heat-related mortality due to the urban heat island effect by about 18% during a summer season and by around 23% during heatwaves,<sup>22</sup> with bigger cooling effects expected in hotter cities. Further unrolling of these sustainable cooling solutions can therefore offer major benefits to health, in the face of a warming world [question 10].

### Indicator 2.3.3: Urban green space

Urban green spaces offer local cooling benefits and can contribute to reducing urban heat island effects. They also offer the benefits of carbon sequestration. Exposure to green space provides benefits to human health, with reduced overall mortality, improved cardiovascular outcomes, reduced exposure to air pollution, and improved mental health.<sup>23,24</sup> They are effective tools for climate adaptation that can, if carefully planned and developed, offer major health and environmental benefits.

Using the satellite-based normalised difference vegetation index (NDVI), the *Lancet* Countdown estimates that, in urban centres with more than 500 000 inhabitants, the average population-weighted peak NDVI increased from 0.26 to 0.32 (23%) between 2010 and 2020, a level of greenness considered “low” in the 2021 report of the *Lancet* Countdown.<sup>6</sup> Only 27% of urban centres had a moderate or higher level of greenness (defined as an NDVI ≥0.40) in 2020<sup>6</sup> [question 6].

Importantly, there are also global inequities in the availability of urban green spaces, with 39% of urban centres in the very high HDI country group having levels of greenness considered “moderate or higher” (mean NDVI 0.34) in 2020, compared with 17% in the low HDI country group (mean NDVI 0.27)<sup>6</sup> [question 7].



## Loss and damage

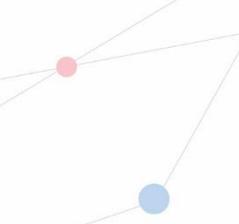
Climate change is already leading to losses of human life and impacts on health, across all geographies and populations.<sup>6</sup> In order to inform the implementation of efficient and effective measures to avert, minimise and address the human aspects of loss and damage, both the impacts and the health risks of climate change must be closely monitored. The subsequent paragraphs describe the efforts made by the *Lancet* Countdown to capture the risks and impacts of climate change to human health, and the needs for improved monitoring, in response to **question 17** provided by the SBSTA for the first GST (Annex I)

Section 1 of the *Lancet* Countdown tracks the changing and emerging health risks and impacts of climate change. Its indicators capture the risks to health from the rising temperatures, extreme weather events, from changes in the environmental suitability for infectious disease transmission, from climate threats to food and water security, and from the rising sea levels. These indicators are developed with in a tiered approach: the first tier uses environmental and climatological data to monitor trends in climate change-related health hazards; the second tier overlays environmental and climatological data with human demographics and epidemiological data, in order to estimate exposure and vulnerabilities to those hazards; and the third tier captures health burden, either by modelling expected impacts, or by attributing observed health outcomes to the changing climate hazards. This tiered approach enables the *Lancet* Countdown to optimise the available data to produce a comprehensive assessment of the multidimensional health risks and impacts of climate change.

However, the lack of surveillance and sharing of morbidity and mortality data is a major limitation to fully capturing the health impacts of climate change, which is critical to inform the deployment of effective measures to avert, minimise and address loss and damage. In addressing this, the *Lancet* Countdown works with local and international governmental organisations to support and foster their adoption, development and sharing of its standardised and comparable metrics, to monitor the health dimension of climate change. Following the incorporation of *Lancet* Countdown metrics onto the European Climate and Health Observatory<sup>25</sup> and their adoption by the Italian Istituto Superiore di Sanità,<sup>26</sup> the *Lancet* Countdown is currently working with other international and national organisations, to further promote the development of standardised surveillance systems [**question 17**].

## Additional information

A full description of the 44 indicators of the *Lancet* Countdown can be found in its latest report, available for free from *The Lancet*, [following this link](#). An updated report will be published in October 2022. The data of the indicators of the *Lancet* Countdown are also made available in the collaboration's [data visualisation platform](#), where they can be explored at higher temporal and geographical resolution including, wherever possible, at a country level. For more information on the collaboration's work and data, please contact [info@lancetcountdown.org](mailto:info@lancetcountdown.org).



## Annex I: guiding questions from SBSTA for the first Global Stocktake addressed in this report

**Question 1.** What is the collective progress in terms of the current implementation of, and ambition in, mitigation actions towards achieving the goals defined in Articles 2.1(a)1 and 4.12 of the Paris Agreement?

**Question 3.** What efforts are being undertaken to plan, implement and accelerate mitigation action towards achieving the goals defined in Articles 2.1(a) and 4.1 of the Paris Agreement?

**Question 4.** How adequate and effective are the current mitigation efforts and support provided for mitigation action towards achieving Articles 2.1(a) and 4.1 of the Paris Agreement?

**Question 5.** In order achieve the goals defined in Articles 2.1(a) and 4.1 of the Paris Agreement:

- a) What further action is required?
- b) What are the barriers and challenges, and how can they be addressed at national, regional and international levels?
- c) What are the opportunities, good practices, lessons learned and success stories?

**Question 6.** What is the collective progress in terms of the current implementation of, and ambition in, adaptation actions towards achieving the goals defined in Articles 2.1(b) and 7.1 of the Paris Agreement?

**Question 7.** With a view to recognizing the adaptation efforts of developing country Parties, what efforts have been undertaken by these Parties towards achieving the goals defined in Articles 2.1(b) and 7.1 of the Paris Agreement, and what existing work can be built upon to facilitate the recognition of those efforts?

**Question 8.** How can the implementation of adaptation action towards achieving the goals defined in Articles 2.1(b) and 7.1 of the Paris Agreement be enhanced, taking into account the adaptation communication referred to in paragraph 10 of the Paris Agreement?

**Question 9.** How adequate and effective are the current adaptation efforts and the support provided for adaptation towards achieving the goals defined in Articles 2.1(b) and 7.1 of the Paris Agreement?

**Question 10.** In order to achieve the goals defined in Articles 2.1(b) and 7.1 of the Paris Agreement:

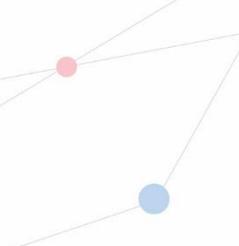
- a) What further action is required?
- b) What are the barriers and challenges, and how can they be overcome at national, regional and international levels?
- c) What are the opportunities, good practices, lessons learned and success stories?

**Question 17.** What is the collective progress in terms of the current implementation of, and ambition in, efforts made to enhance understanding, action and support towards averting, minimizing and addressing loss and damage associated with the adverse effects of climate change? What further action is required to strengthen these efforts?

**Question 19.** How is climate action respecting, promoting and considering Parties' respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity?

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