



# HEALTH AND CLIMATE AT COP21 AND BEYOND

THE GLOBAL  
CLIMATE & HEALTH  
ALLIANCE



## ACKNOWLEDGMENTS

Written by Isobel Braithwaite (GCHA).

Thanks to Nick Watts (GCHA), Erica Parker (GCHA), Linda Rudolph (Public Health Institute), Yassen Tcholakov (McGill University Health Center), Fiona Armstrong (Climate and Health Alliance), James Smith and Christian Teriete (Global Call for Climate Action) for detailed comments and suggestions.

## KEY RECOMMENDATIONS

As COP21 begins in Paris, we call on governments to:

- Adopt a strong, universal and ambitious global climate agreement in which the protection and promotion of health is a central principle.
- Commit to include an evaluation of health benefits and risks associated with the emissions reductions trajectory in each nation's Intended Nationally Determined Commitments (INDCs).
- Meet the commitment of USD \$100 billion in annual climate finance pledged by high-income countries.
- Work towards a fair loss and damage mechanism within the Paris Agreement.
- Act at a national level to protect health and increase mitigation ambition by urgently phasing out coal from their energy systems alongside other mitigation measures beneficial to health.
- Integrate consideration of the health impacts of climate mitigation and adaptation options into all national climate planning processes.
- Phase out fossil fuel subsidies and instead use this public money to accelerate the transition to renewable energy and protect and promote health

## INTRODUCTION

2015 is a pivotal year in the world's response to climate change, and therefore for the future of human health. The UN climate talks in Paris this December (COP21) mark a key juncture in the work of the UNFCCC (UN Framework Convention on Climate Change), the international political process set up to tackle climate change. The purpose of this document is to provide health professionals, policy-makers, UNFCCC negotiators and members of the public with an introduction to why COP21 is important for health, and how public health evidence can strengthen national and international climate policy.

If successful, the Paris climate talks could signal the beginning of a rapid decarbonisation of the world's economy. It will be attended by world leaders including Barack Obama, Xi Jinping and Narendra Modi, and the

aim of the talks is to reach an overarching agreement on climate change, something negotiators have been working towards for over two decades. As such, this represents an unparalleled chance for the health community to ensure that governments fully recognise the major health threats climate change poses, and the immense health opportunities offered by concerted climate action.

Health professionals from every continent have been speaking out on the major health risks posed by climate change and the significant benefits of urgent action for several years, both at international meetings and in national policy fora. Now, they are mobilising their networks for the Paris talks, including through advocacy initiatives such as the World Health Organization's 'Call To Action on Climate Change and Health'<sup>1</sup>



and the 'Our Climate, Our Health' umbrella campaign led by the Global Climate and Health Alliance and its member organizations.

In recent years, the strength of the relationship between climate change and health has become clearer, with new research further elucidating the complex influences of climatic variation on health and disease, as well as the specific vulnerabilities of certain population groups, such as young children.<sup>2</sup> As described in depth elsewhere,<sup>3,4</sup> the health problems expected to increase due to climate change are diverse, ranging from direct threats such as heat stress and extreme weather-related injuries to indirect ones such as malnutrition, infectious

disease and worsening poverty (see figure 1). Climate change threatens many fundamental determinants of health, from clean air, food and water security, to safe shelter and secure livelihoods. It affects not only physical but also psychological health and wellbeing, in potentially profound ways.<sup>5</sup> What is worse, these impacts fall disproportionately on those who are most vulnerable – and least responsible – for the emissions that cause climate change. Nevertheless, wealthier populations are still vulnerable to these impacts, from heat-waves and worsening air pollution, to growing threats from global economic insecurity, population displacement and, potentially, conflict.

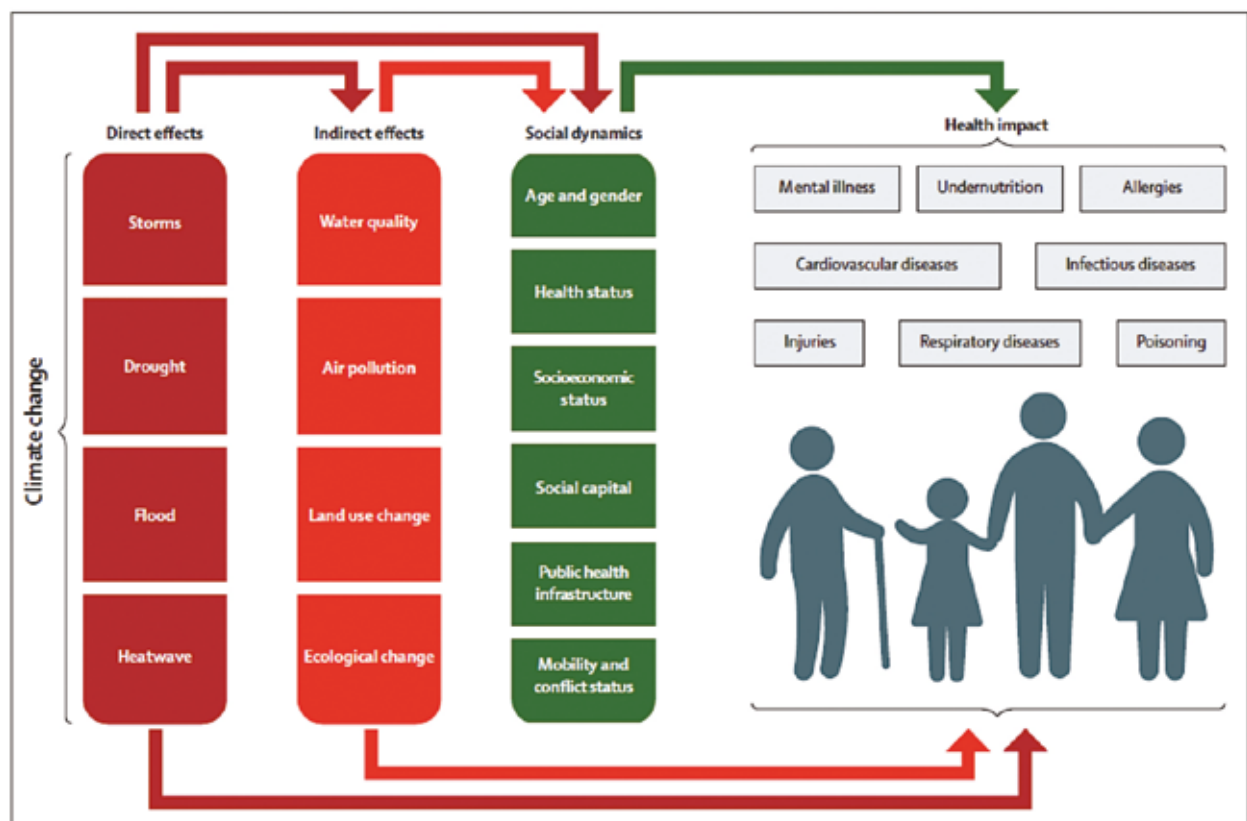


Figure 1: Direct and indirect pathways through which climate change affects health and wellbeing, from Watts et al. (2015)

The physical science of climate change has also progressed, and according to the Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report,<sup>6</sup> the planet is headed towards 2°C of warming by 2050 and

over 4°C by 2100, relative to pre-industrial temperatures, if we remain on a business-as-usual trajectory, such as the IPCC's high-emissions (RCP 8.5) scenario.<sup>7</sup> Of particular concern, the 2014 IPCC Working Group II report



EGELANTIERS  
GRACHTCENTRUM

also found that existing climate variation and extreme events demonstrate both the current impacts of climatic stresses and the extent of existing vulnerabilities, a conclusion which applies equally to health-related exposures as to natural systems. The report identified several health-relevant 'limits to adaptation', in areas such as occupational heat exposure and crop growing temperatures, which further underline the importance of urgent mitigation alongside adaptation and resilience measures.

However, there is an important silver lining: a new report, published in *The Lancet* – one of the world's most influential medical journals – earlier in 2015 concluded that "tackling climate change could become the greatest global health opportunity of the 21st century".<sup>9</sup> This is because of the tangible and short-term health gains to be had from policies such as transitioning to renewable energy generation, promoting a shift towards active transport, sustainable agriculture and improving home insulation.

Not only do such measures help tackle the epidemic of obesity and non-communicable diseases (NCDs) being seen worldwide, they also cut emissions and can dramatically reduce health care spending. For example, implementing a targeted set of measures to

address Short Lived Climate Pollutants (SLCPs) could save approximately 2.4 million lives a year by 2050, and reduce warming by about 0.5°C.<sup>10</sup> This dimension of the climate and health nexus, which emphasises the health benefits of responding to climate change, has particular potential to help strengthen climate ambition in countries worldwide, by helping to build public support for 'win-win' sustainable development policies.

Communicating the need to act on climate change from a health perspective has been found to increase engagement with the issue, and offers a promising route to building political will for action on climate change. Many health care systems and facilities are also leading by example through reducing their own emissions, and finding that they are managing to reduce costs and improve the quality of care in the process.<sup>11</sup> This is why the health sector's engagement with climate and sustainable development policy is so vital, and must continue to grow in order to help policy-makers and the public understand the health implications of the climate choices we make today: to hold governments accountable to the commitments made this year, and to ensure that they continue to increase their mitigation ambition.

**This may be the most important health agreement of the century, an opportunity not only to reduce climate change and its consequences, but to promote actions that can yield large and immediate health benefits, and reduce costs to health systems and communities.**

Dr. Margaret Chan, World Health Organization Director General, speaking about COP21 at the launch of the WHO Call To Action<sup>1</sup>





## COP21 AND THE UNFCCC PROCESS: WHAT SHOULD WE EXPECT?

As we head towards COP21 in Paris, civil society is looking to world governments to negotiate a universal climate treaty to come into force in 2020 (under Workstream 1 of the ADP\*), as well as a roadmap to increase levels of ambition during the next five years (Workstream 2).<sup>12</sup> Much has changed in terms of climate politics since the Copenhagen talks in 2009, the last time the world tried to agree on a universal response to climate

change. On the one hand, there has been a number of impressive developments in terms of national climate ambition and concrete sustainable development policies adopted in many parts of the world; and public concern about the threat posed by climate change is very high.<sup>13</sup> It has become increasingly clear that the coal sector is in decline,<sup>14</sup> whilst renewables are rapidly decreasing in price.

Investments are also undergoing a major transition: to date, institutions and individuals representing \$2.6 trillion in assets have committed to end their investments in fossil fuel companies; an exponential growth from \$50 billion in late 2014.<sup>15</sup>

It is also clear that there is already an ongoing transition from polluting to clean fuels: until now, this has been driven primarily by citizens, communities, businesses and investors concerned about the threats posed by climate impacts, and motivated by the benefits of change. These efforts are already bringing us to a tipping point: clean energy choices are booming, whilst coal is in decline and other fossil fuels' social licence is being eroded. Growing awareness of the health risks and opportunities associated with climate change has helped to catalyse these shifts. There is a need to further accelerate and scale up this transition to avoid dangerous climate change, but this is supported by the scientific evidence, economic momentum and public opinion across a wide range of sectors. Many governments are now recognising that they have a mandate to act and are helping to scale the transformation, including through their INDCs, and *a strong global deal is the next key step in driving the transition to a safer, fairer and healthier future.*

NATURE OF INDCS ANALYSED	PREMATURE DEATHS PREVENTED / YEAR BY 2030 FROM EXCESSIVE AMBIENT EXPOSURE TO FINE PARTICULATE MATTER		
	EU	US	CHINA
Current INDCs	6,000 deaths	7,000 deaths	100,000 deaths
INDCs aligned with a 2°C-compatible emissions trajectory	40,000 deaths	20,000 deaths	1.1 million deaths

*Table 1: Avoided premature deaths which could be achieved per annum by 2030 through current INDCs and more ambitious INDCs aligned with a 2°C compatible trajectory, resulting from excessive ambient exposure to fine particulate matter. Source: Day et al., (2015)<sup>16</sup>*

\* ADP: the Ad-hoc Working Group on the Durban Platform for Enhanced Action is a platform within the UNFCCC which facilitates negotiations on the development of 'a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties'.



Countries' national mitigation commitments in themselves have clear, demonstrable health and economic benefits. For example, the EU, US and China (alongside many others) have all publicly committed to significantly reducing their emissions relative to business-as-usual by 2030. What's more, analyses of these plans have found that they will collectively prevent millions of premature deaths over the coming decades, as well as creating many thousands of green jobs (see Table 1). There is an understanding by governments that INDCs and other current commitments must be the starting point for the evolution of climate policy over the coming decades, rather than the end goal. Meeting even a two-degree target will require emissions reductions to increase over time. *Therefore, countries must ensure a reliable and efficient mechanism for reviewing and increasing ambition and mitigation targets over time, after 2020. This must include short, regular review periods, with a built-in 'non-backsliding mechanism' to prevent governments from reneging on their promises to their populations and the world.*

On the other hand, the impacts of extreme weather on our health and economies are becoming increasingly severe, with climate-related migration, and potentially conflict, already being seen.<sup>17</sup> Additionally, global emissions are continuing to rise – albeit less rapidly – so that in 2014 we surpassed 400 parts per million of atmospheric carbon dioxide for the first time in human history. This is why the World Health Organization, backed by health professionals from around the world, is calling for health to have a central place at the table during the Paris Climate Talks, and for 'a strong and effective climate agreement that will save lives, both now and in the future'.<sup>18</sup> *It is also why it is vitally important that health considerations are built into the future of the UNFCCC as a central principle, including in relation to maximizing the health co-benefits of mitigation measures and incorporating public health knowledge in adaptation planning and evaluation.*

Despite the worsening impacts of climate change already being seen, there are many reasons to be optimistic about the upcoming climate talks: over 150 countries worldwide have now submitted INDCs (Intended Nationally

Determined Contributions) to the UNFCCC in advance of the Paris talks, which cumulatively are projected to result in warming of approximately 2.7°C by 2100, if fully implemented.<sup>19</sup> Whilst not sufficient to meet the two-degree threshold previously agreed upon by governments, this nevertheless represents a considerable improvement on a business-as-usual approach and earlier commitments. *However, it remains far from what is required to stay within the 1.5°C limit considered a safer threshold by many scientists and demanded by over 100 of the most climate vulnerable countries.*<sup>20</sup>

One frequently discussed issue is that of which 'long-term goal' countries should set: 2°C above pre-industrial temperatures as currently agreed, 1.5°C, a more ambitious goal supported by over 100 nations, including the most climate vulnerable, or a goal focused on complete decarbonization by a particular date. We know that even limited degrees of warming pose a risk to health, which increases in magnitude as temperatures rise; and that the health of the world's poorest people, including the inhabitants of many small island states and low-lying areas, is most at risk. Hence, there is a clear health and equity case for supporting a 1.5°C goal. At the same time, at present we remain far even from a 2° pathway (ie. one with a 50% chance of staying below 2°C of warming), and scientists are divided on whether staying below 1.5° is now even possible.<sup>21</sup> Whilst a balance has to be found between the science and politics of climate change, *from a public health perspective, it should be emphasised that no level of warming is entirely safe for human wellbeing.*

"Loss and Damage" has emerged as a central theme from recent climate change negotiations. At its heart, this entails (mostly financial) transfers to low- and middle-income countries as a form of indemnity against climate change impacts that cannot be avoided or adapted to. The UNFCCC's Conference of the Parties has designated the "Warsaw Mechanism" to manage these discussions and this process. *Over the next 12 months, the Executive Committee of the mechanism has a unique opportunity to incorporate the health impacts of climate change – and the substantial associated financial losses– in to its work in this area.* Not only will this ensure more equitable restitution for low- and middle-income countries, but it will also help stimulate bodies such as the

UNFCCC's SBSTA (Subsidiary Body for Scientific and Technological Advice) to drive research and a greater understanding of the full extent of the health damages that result from climate change. With regard to climate finance, high-income countries have collectively agreed to provide USD \$100 billion per year from 2020, through the Green Climate Fund, to support the mitigation and adaptation efforts of low- and middle-income countries. As yet, there is little clarity on precisely where these funds will come from, and on the balance of their use for mitigation and adaptation interventions.<sup>22</sup> It is important these funds represent new and additional financial transfers from high-income countries, and that they are used to strengthen sustainable development with a focus on maximising the synergies that exist

between mitigation and adaptation. Crucially, *the Green Climate Fund must be used to protect the health of vulnerable populations by providing finance explicitly for health system strengthening, and by targeting the social determinants of health in order to strengthen community resilience.*

Most importantly, we need an international climate agreement with health at its centre and which can deliver the increasing levels of ambition needed to protect health through 2020 and beyond. Health professionals everywhere will be on the frontlines in relation to the impacts of climate change, and are joining together at COP21 to *send a clear message to governments that a strong climate agreement is also a vital global health agreement.*





## NATIONAL POLICIES FOR CLIMATE AND HEALTH: MOVING TOWARDS IMPLEMENTATION

An international agreement on climate change in Paris is clearly an important step in building trust and momentum for concerted global action. However, much is already happening to reduce emissions, and so protect health, at local, national and regional levels. Not all are framed as 'climate policies'; in China for example, growing awareness of the significant health impacts of outdoor air pollution have proved to be a strong factor driving plans to move away from coal, with Beijing deciding to end coal use in the city by 2020. In the United States, economic evaluation of the health-related savings associated with reduced morbidity and mortality from air pollution was a key driver in the development of the US EPA's Clean Power Plan.<sup>23</sup> *A public health perspective on the benefits of climate solutions has a key role to play in engaging people in issues related to climate change and in driving more ambitious climate policy.*

There remains a long way to go to ensure that countries have adequately integrated health into their national climate change plans. According to a recent World Federation of Public Health Professionals' Associations (WFPHA) survey of public health professionals from 35 countries, there is a widespread lack of preparedness for the health impacts of climate change, and a number of important knowledge gaps.<sup>24</sup> In this survey, the majority of respondent countries (77.1%) had no comprehensive identification of health risks of climate change projections for their citizens, and 65.7% had done little towards identifying vulnerable populations and infrastructure. As recommended by the WFPHA's report, *countries must work to build capacity to address the local health risks posed by climate change, assess health benefits of mitigation options, and to develop, implement and evaluate health-focused interventions through an integrated, multi-sectoral approach.*

Health systems and health professionals in many countries are already responding to the climate challenge, taking coordinated action to reduce their climate vulnerability, cut their own emissions and promote sustainable public policy. The 2020 Health Care Climate Challenge many health systems to scale up their ambition on tackling climate change.<sup>25</sup> Sustainable healthcare has the potential to deliver substantial emissions reductions, since health sector expenditure constitutes approximately 10% of global GDP, and a considerable proportion of global emissions.<sup>26,27</sup> *Health systems and professionals must continue to reduce their own contribution to climate change and to reduce their vulnerability in order to lead by example and to continue to provide high-quality healthcare into the future.*

Considering mitigation, several sectors are essential to achieving successful emissions reductions, as climate change is a complex and cross-cutting issue. Chief amongst these are the energy, transport, building and agriculture sectors, in relation to policy questions such as phasing out coal and transitioning to renewable energy, improving home insulation, encouraging active travel (walking and cycling) rather than car use and promoting sustainable, restorative agriculture. *In particular, a rapid phase-out of coal is an important 'win-win' policy option to reduce emissions, save lives and reduce the pressures facing healthcare systems from chronic diseases.*

Around the world, it is clear that cities are playing an increasingly important role in climate change mitigation, with many already implementing ambitious plans to reduce their emissions and make it easier for their inhabitants to live healthily and sustainably. Many are also sharing their knowledge and experiences through international platforms such as the C40 Cities Initiative and ICLEI - Local Governments for Sustainability, which together include over a thousand cities. With their fast-growing populations, cities are

likely to continue to increase in importance for climate action over the coming decades. However, informal urban settlements such as slums can also magnify the climate-related risks their inhabitants face. *Governments should*

*support a transition to cities that promote healthy, sustainable lifestyles, and negotiators in Paris must work to ensure that low-income cities can access adequate support to protect the health of their most vulnerable citizens.*

## CONCLUSIONS

Health is central to addressing climate change fairly and effectively. The climate solutions the global community adopts in 2015 must address the ethical challenges posed by climate change in an equitable way that takes into account the social determinants of health. Foremost among these are considerations of intergenerational equity, and the fact that the people who are most vulnerable to the impacts of climate change are often least responsible. It is essential that governments address these inequities, for example through fair climate finance, working to close the emissions gap and by developing equitable mechanisms to address loss and damage. It is also important that they ensure that national climate policies and programmes – for both mitigation and adaptation – do not exacerbate inequalities or further exacerbate the health problems faced by disadvantaged groups.

The major health benefits of climate action offer an opportunity to re-frame it in a way that resonates with people and the day-to-day issues

they care about most, since health is valued highly in every society. For health concerns to be properly integrated in national responses to climate change, it must be prioritised by governments, as well as through international policy mechanisms. There is a need for increased support to build capacity, particularly in the most vulnerable countries, as well as increased financial and technical support for these countries to properly integrate potential health risks and co-benefits into both mitigation and adaptation plans.

COP21 represents a critical juncture for work to protect and promote health in the face of climate change. At the same time, the changes that are needed to protect the future of our patients and communities, and put an agreement at Paris into practice, will need to happen primarily at the national level. Health professionals, and the global health community more broadly, have a vital role to play in ensuring the progress on climate change we need to protect and promote health worldwide.

**Humanity has the ingenuity and capacity to convert this challenge of climate change into a unique opportunity to transform global society into an inclusive and compassionate one. Today's energy choices, fossil fuels or renewables, determine whether our children thrive or endure erratic weather, heat, disasters, food and water shortages. If we care, we'll choose wisely.**

Dr Liz Hanna, President, Climate and Health Alliance (Australia)







## RECOMMENDATIONS

As COP21 begins in Paris, we call on governments to:

- Adopt a strong, universal and ambitious global climate agreement in which the protection and promotion of health is a central principle. This must secure a long-term pathway to limiting global temperature rise to below 2°C, and maintain provide a credible mechanism to raise global mitigation ambitions post-2020.
- Commit to include an evaluation of health benefits and risks associated with the emissions reductions trajectory in each nation's Intended Nationally Determined Commitments.
- Meet the commitment of USD \$100 billion in annual climate finance pledged by high-income countries. This is a pre-condition for a successful response to climate change and is essential to protect the health and wellbeing of populations around the world. Any such finance must be separate from current development budgets, take the form of grants rather than loans, and take into account countries' health-related adaptation needs.
- Develop a fair loss and damage mechanism within the Paris Agreement to ensure equitable restitution for low- and middle-income countries, including consideration of how health-related impacts should be incorporated.
- Act at a national level to protect health and increase mitigation ambition by urgently phasing out coal from their energy systems alongside other mitigation measures beneficial to health, such as investing in home insulation for people in fuel poverty and ambitious policies to increase active transport.
- Integrate consideration of health impacts of climate mitigation and adaptation options into all national climate planning processes, for example through Health Impact Assessments (HIAs) or health lens analysis, including consideration of the specific needs of vulnerable populations.
- Phase out fossil fuel subsidies, and in the case of high-income countries to do so completely by 2020, and instead use this public money to accelerate a transition to renewable energy, protect health from climate change and support vulnerable nations in adaptation.



## REFERENCES

1. WHO Call To Action (2015) <http://www.who.int/globalchange/globalcampaign/cop21/en/>
2. Paulson, J. A., Ahdoot, S., Baum, C. R., Bole, A., Brumberg, H. L., Campbell, C. C., ... & Trasande, L. (2015). Global Climate Change and Children's Health. *Pediatrics*, 136(5), 992-997.
3. IPCC, 2014a: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1132 pp.
4. Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., ... & Patterson, C. (2009). Managing the health effects of climate change: lancet and University College London Institute for Global Health Commission. *The Lancet*, 373(9676), 1693-1733.
5. Berry, H. L., Bowen, K., & Kjellstrom, T. (2010). Climate change and mental health: a causal pathways framework. *International Journal of Public Health*, 55(2), 123-132.
6. IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. doi:10.1017/CBO9781107415324.
7. Riahi K, Grübler A, Nakicenovic N (2007). Scenarios of long-term socio-economic and environmental development under climate stabilization. *Technol Forecast Soc Chang* 74:887-935.
8. King, D., Schrag, D., Dadi, Z., Ye, Q., & Ghosh, A. (2015). Climate change – a risk assessment. Available at <http://www.csap.cam.ac.uk/projects/climate-change-risk-assessment/>
9. Watts, N., Adger, W. N., Agnolucci, P., Blackstock, J., Byass, P., Cai, W., ... & Costello, A. (2015). Health and climate change: policy responses to protect public health. *The Lancet*, 386(10006), 1861-1914.
10. Shindell D, et al. Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security. *Science*. 2012;335 (183).
11. Schroeder, K., Thompson, T., Frith, K., & Pencheon, D. (2012). Sustainable healthcare. John Wiley & Sons.
12. United Nations Framework Convention on Climate Change. Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) <http://unfccc.int/bodies/body/6645.php>
13. Lee, T. M., Markowitz, E. M., Howe, P. D., Ko, C. Y., & Leiserowitz, A. A. (2015). Predictors of public climate change awareness and risk perception around the world. *Nature Climate Change*, 5(11), 1014-1020.
14. Webb, R. (2015). Coal relegated to the back burner: More countries look to natural gas for electricity generation.
15. Arabella Advisors (2015). Measuring the Growth of the Global Fossil Fuel Divestment and Clean Energy Investment Movement. Available at <http://www.arabellaadvisors.com/wp-content/uploads/2015/09/Measuring-the-Growth-of-the-Divestment-Movement.pdf>
16. Day T, Höhne N, Gonzales S (2015) Assessing the missed benefits of countries' national contributions: Quantifying potential co-benefits <http://newclimate.org/2015/03/27/indc-cobenefits/>
17. Campbell, B., & Goddard, L. (2015). CCAFS: Climate change, food security and the refugee crisis: connecting the dots to avoid future tragedy.
18. World's Top Doctor Urges 'Strong' Paris Climate Deal – Environment News Service <http://ens-newswire.com/2015/10/08/worlds-top-doctor-urges-strong-paris-climate-deal/>.
19. Climate Action Tracker (2015). INDCs lower projected warming to 2.7°C: significant progress but still above 2°C. Accessible at <http://climateactiontracker.org/news/224/INDCs-lower-projected-warming-to-2.7c-significant-progress-but-still-above-2c-.html>.
20. Climate Vulnerable Forum. (2015) The Manila Communiqué. <http://www.thecvf.org/wp-content/uploads/2015/11/THE-MANILA-COMMUNIQUE3.pdf>.
21. Rogelj J, Luderer G, Pietzcker RC, Kriegler E, Schaeffer M, Krey V, Riahi K. (2015). Energy system transformations for limiting end-of-century warming to below 1.5°C. *Nature Climate Change*. 21 May 2015. DOI: 10.1038/NCLIMATE2572.
22. Neil Bird, ODI: Fair share: climate finance to vulnerable countries. <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9164.pdf>.
23. <http://www3.epa.gov/airquality/cpp/fs-cpp-overview.pdf>.
24. World Federation of Public Health Associations (WFPHA). (2015). Climate Change and Health Policy Assessment Project Report: A Global Survey 2015. WFPHA. Accessed online at [http://www.wfpha.org/images/news/WFPHA-Global-Climate-Health-Policy-Survey\\_FINAL.pdf](http://www.wfpha.org/images/news/WFPHA-Global-Climate-Health-Policy-Survey_FINAL.pdf).
25. Health Care Without Harm (2015). 2020 Health Care Climate Challenge <http://greenhospitals.net/en/2020hcccpledge/>.
26. World Bank (2015). Health expenditure, total (% of GDP). Accessed at <http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS/countries?display=graph>
27. World Health Organization (WHO). (2010). Healthy Hospitals, Healthy Planet, Healthy people: Addressing climate change in health care settings: Discussion Draft. In Healthy Hospitals, Healthy Planet, Healthy people: Addressing climate change in health care settings: Discussion Draft. World Health Organization (WHO): Health Care Without Harm.

THE GLOBAL  
CLIMATE & HEALTH  
ALLIANCE