



# Environmental Sustainability of Air Travel for Conferences: A Commentary

## The Carbon Footprint of Conferences

Alex Leclerc<sup>1</sup>, San Ahn<sup>1,2</sup>, Husein Moloo<sup>1,2,3</sup>

<sup>1</sup>Faculty of Medicine, University of Ottawa, Ottawa, Canada; <sup>2</sup>Department of Surgery, The Ottawa Hospital, Ottawa, Canada; <sup>3</sup>Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Canada

**Date Submitted:** February 22, 2023

**Date Accepted:** March 03, 2024

**Date Published:** June 04, 2024

DOI : <https://doi.org/10.18192/UOJM.V13i2.6605>

### ABSTRACT

Conferences are important to share ideas and meet with colleagues. Due to the large number of attendees who fly in to participate in conferences, the carbon footprint is significant. As healthcare workers, it is important to evaluate how we contribute to the climate crisis. In this commentary the environmental impact of air travel to conferences is discussed and potential options to mitigate this.

### RÉSUMÉ

Les conférences sont importantes pour partager des idées et rencontrer des collègues. En raison du grand nombre de participants qui prennent l'avion pour participer aux conférences, l'empreinte carbone est non négligeable. En tant que professionnels de la santé, il est important de se pencher sur la manière dont nous contribuons à la crise climatique. Ce commentaire traite de l'impact environnemental des voyages en avion pour se rendre à des conférences et des options potentielles pour atténuer cet impact.

As medical professionals and healthcare advocates, we have a social responsibility to promote individual and population-level health, which follows CanMEDS, a framework developed by the Royal College of Physicians and Surgeons of Canada. CanMEDS identifies the qualities physicians require to respond to the population's healthcare demands.<sup>1</sup> Minimizing greenhouse gas emissions is imperative to avoid the most catastrophic effects of the climate crisis. Ironically, the healthcare industry is a major contributor to pollution emissions and has been estimated to contribute about 4.6 % of greenhouse gas emissions in Canada.<sup>2</sup> As a result, there has been a call to action to declare climate change a public health emergency.<sup>3</sup>

Within healthcare, international medical conferences are a significant source of emissions.<sup>4</sup> This includes greenhouse gas emissions associated with air travel, which contribute to around 4% of the global carbon budget and is estimated to be one of the most polluting methods of transport.<sup>5</sup> One single international flight produces 3000kg of CO<sub>2</sub>, which is more than what a citizen of a Western country, or ten people living in economically developing nations produce on average in a year.<sup>4</sup> Several studies have measured the carbon footprint of air travel to annual meetings, estimating up to 40 million kg of CO<sub>2</sub> equivalents for larger international conferences.<sup>6-9</sup> Such a large conference is comparable to the greenhouse gases emitted by approximately 270 UK citizens in a year.<sup>10</sup> The negative environmental effects of medical conferences have been studied for several years<sup>11</sup> Some international medical organizations, such as The Cochrane Collaboration, have begun to implement emission-reducing changes to their annual conferences. In their 2006 meeting in Dublin, for instance, the group used video conference to stage key speakers from Papua New Guinea, Tunisia, and Uganda.<sup>11</sup>

It is also important to acknowledge that in-person conferences generate waste, including posters, food wrappers, giveaways, marketing, etc. In

their 2021 article, Uhrin et al used the estimations of MeetGreen, a sustainable event agency, to calculate that one single conference of 500-1000 attendees could create as much as 1900 kg of waste per day, with almost half of it going to landfills.<sup>12,13</sup> An example of mitigating this was the sixth annual international debris conference, which had a zero-waste initiative. To accomplish this, they took multiple actions like encouraging attendees to bring reusable cups and avoid in-room services (toiletries) as well as a conference app to remind participants of nearby recycling and compost bins. For their 725 attendees, they were able to divert 80,572 items and 7430 lbs. of waste from the landfill. That is only waste that could be targeted, which did not include water usage within the hotel, food wrappers before/after the conference and non-recyclable waste.<sup>12</sup>

The COVID-19 pandemic catalyzed the shift to virtual conferences, at least temporarily, and demonstrated significantly reduced greenhouse gas emissions. For instance, the 2020 virtual meeting of the European Astronomical Society was associated with 99.97% reduced emissions compared to its 2019 face-to-face meeting.<sup>14</sup> Another study found similar comparisons with less than 0.1% emissions with virtual conferences.<sup>4</sup> The virtual format has also been noted to be positively perceived by physicians in some studies. For example, Kim et al. surveyed 279 delegates in 2020 at the 40th annual meeting of the Korean Society of Nephrology and found 50% preferred the virtual format compared to only 33% who preferred the in-person format.<sup>15</sup> Another survey of 330 urologists in 2020 reported 17.9% and 11.5% preferred the virtual and face-to-face format, respectively.<sup>16</sup> Medical students at McMaster University also perceived improved overall accessibility with the virtual format (financially and geographically) in a 2021 study comparing a student-led internal medicine conference held in 2019 and a subsequent virtual conference held in 2020.<sup>17</sup>

Additionally, converting to the virtual format led to increased attendance as the annual meeting of the European Geosciences Union accommodated 26000 individuals in 2020 compared to its average of 16000 attendees.<sup>4</sup> Despite the numerous benefits and significant reductions in greenhouse gas emissions evidenced by the virtual conference setting, medical organizations are reverting to the in-person format as the COVID-19 pandemic social restrictions are being lifted. However, the pandemic has provided a unique opportunity to demonstrate that virtual conferences are a feasible option.<sup>4</sup>

In 2016, Doctors Nathans and Sterling emphasized the responsibility of the scientific community to reduce greenhouse gas emissions.<sup>18</sup> In their paper, they highlight numerous ideas to reduce the carbon footprint of conferences. For example, according to them, larger research meetings could alternate every 2 years with multiple local ones.<sup>18</sup> This would reduce international and national flights.<sup>18</sup> They also mention that committee members and seminar speakers could be picked according to the distance they have to travel.<sup>18</sup>

Regarding air travel specifically, the David Suzuki Foundation noted 5 major ways to reduce carbon footprint: fly economy, take direct flights, take daytime flights, choose airlines carefully and offset flights.<sup>19</sup> Daytime flights produce less greenhouse gas emissions because heat gets trapped due to contrails (clouds produced by the planes) at night, while during the day sunlight is reflected.<sup>19</sup> Some airlines have taken additional steps to be more eco-friendly (like a full passenger load and efficient planes).<sup>19</sup> Offsetting flight is the concept of buying credit for emissions reduction projects to compensate for your own emissions.<sup>19</sup> The National Geographic also proposed several ways to reduce carbon emissions related to travel. An example includes eating like a local which reduces food waste supports the economy by encouraging regional farmers and reducing the distance food has to travel.<sup>20</sup> Another suggestion is using a green search engine. Skyscanner and Gloop are two examples that search for more

eco-friendly flights and hotels, allowing users to filter results based on carbon emissions.<sup>20</sup> All these sustainable strategies could potentially be employed by physicians and students as well as researchers for conferences where in-person attendance is required.

In summary, healthcare conferences have many benefits, including the improvement of medicine through collaboration and dissemination of newfound knowledge, discussions, and technology. However, the current paper details the significant carbon footprint associated with air travel to these conferences and strategies to mitigate it. Virtual format of conferences confer several advantages including increased attendance, accessibility for students' and physicians' preferences, and most importantly, exceptional reductions in air travel-related greenhouse gas emissions, compared to the in-person format. These findings call for changes to conferences and should be encouraged amongst physicians and students, as they align with the health advocate role and the objectives of the CanMEDS framework, as well as with one of the core tenets of being a healthcare professional: to do no harm.<sup>1</sup>

### **Conflicts of Interest Disclosure:**

All authors declare that they have no conflicts of interest

## REFERENCES

1. CanMEDS Role: Health Advocate : The Royal College of Physicians and Surgeons of Canada. Available from: <https://www.royalcollege.ca/rcsite/canmeds/framework/canmeds-role-health-advocate-e>. Accessed September 27, 2022.
2. Watts N, Amann M, Arnell N, Ayeb-Karlsson S, Belesova K, Boykoff M, Byass P, Cai W, Campbell-Lendrum D, Capstick S, Chambers J, Dalin C, Daly M, Dasandi N, Davies M, Drummond P, Dubrow R, Ebi KL, Eckelman M, Ekins P, Escobar LE, Fernandez Montoya L, Georgeson L, Graham H, Hagggar P, Hamilton I, Hartinger S, Hess J, Kelman I, Kieseewetter G, Kjellstrom T, Kniveton D, Lemke B, Liu Y, Lott M, Lowe R, Sewe MO, Martinez-Urtaza J, Maslin M, McAlister L, McGushin A, Jankin Mikhaylov S, Milner J, Moradi-Lakeh M, Morrissey K, Murray K, Munzert S, Nilsson M, Neville T, Oreszczyn T, Owfi F, Pearman O, Pencheon D, Phung D, Pye S, Quinn R, Rabbaniha M, Robinson E, Rocklöv J, Semenza JC, Sherman J, Shumake-Guillemot J, Tabatabaei M, Taylor J, Trinanes J, Wilkinson P, Costello A, Gong P, Montgomery H. The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. *The Lancet* [Internet]. 2019 Nov 16 [cited 2023 May 26];394(10211):1836–78. Available from: <http://www.thelancet.com/article/S0140673619325966/fulltext>
3. Harmer A, Eder B, Gepp S, et al. WHO should declare climate change a public health emergency. *BMJ*. 2020;m797.
4. Klöwer M, Hopkins D, Allen M, et al. An analysis of ways to decarbonize conference travel after COVID-19. *Nature*. 2020;583:356–359.
5. Klöwer M, Allen MR, Lee DS, Proud SR, Gallagher L, Skowron A. Quantifying aviation's contribution to global warming. *Environmental Research Letters* [Internet]. 2021 Nov 4 [cited 2023 Jan 3];16(10):104027. Available from: <https://iopscience.iop.org/article/10.1088/1748-9326/ac286e>
6. Bousema T, Selvaraj P, Djimde AA, et al. Reducing the Carbon Footprint of Academic Conferences: The Example of the American Society of Tropical Medicine and Hygiene. *Am J Trop Med Hyg*. 2020;103:1758–1761.
7. Yakar D, Kwee TC. Carbon footprint of the RSNA annual meeting. *Eur J Radiol*. 2020;125:108869.
8. Milford K, Rickard M, Chua M, et al. Medical conferences in the era of environmental conscientiousness and a global health crisis: The carbon footprint of presenter flights to pre-COVID pediatric urology conferences and a consideration of future options. *J Pediatr Surg*. 2021; 56:1312–1316.
9. Wortzel JR, Stashevsky A, Wortzel JD, et al. Estimation of the Carbon Footprint Associated With Attendees of the American Psychiatric Association Annual Meeting. *JAMA Netw Open*. 2021;4:e2035641.
10. Jäckle S. The Carbon Footprint of Travelling to International Academic Conferences and Options to Minimise It. *Academic Flying and the Means of Communication* [Internet]. 2022 [cited 2023 May 26];19–52. Available from: [https://link.springer.com/chapter/10.1007/978-981-16-4911-0\\_2](https://link.springer.com/chapter/10.1007/978-981-16-4911-0_2)
11. Roberts I, Godlee F. Reducing the carbon footprint of medical conferences. *BMJ*. 2007;334:324–325.
12. Uhrin A v., Laverty AL, Fox D, Herring CE, Kehoe C, Lashaw S, Lippiatt SM. Walking the talk: The responsibility of the scientific community for mitigating conference-generated waste. *Mar Pollut Bull*. 2021 Feb 1;163:111968.
13. Corporate Sustainability Policy & Report – MeetGreen [Internet]. [cited 2023 May 26]. Available from: <https://meetgreen.com/about-meetgreen/corporate-sustainability-policy-report/>
14. Burtscher L, Barret D, Borkar AP, et al. The carbon footprint of large astronomy meetings. *Nat Astron*. 2020;4:823–825.
15. Kim K-J, Kim SR, Lee J, et al. Virtual conference participant's perceptions of its effectiveness and future projections. *BMC Med Educ*. 2022;22:10.
16. Wang M, Liao B, Jian Z, et al. Participation in Virtual Urology Conferences During the COVID-19 Pandemic: Cross-sectional Survey Study. *J Med Internet Res*. 2021;23:e24369.
17. Chan A, Cao A, Kim L, Gui S, Ahuja M, Kamhawry R, Latchupatula L. Comparison of perceived educational value of an in-person versus virtual medical conference. *Canadian Medical Education Journal / Revue canadienne de l'éducation médicale* [Internet]. 2021 May 28 [cited 2023 May 26];12(4):65–9. Available from: <https://id.erudit.org/iderudit/1082651ar>
18. Nathans J, Sterling P. How scientists can reduce their carbon footprint. *eLife*. 2016;5:e15928.
19. Air travel and climate change - David Suzuki Foundation Available from: <https://david Suzuki.org/living-green/air-travel-climate-change/>. Accessed September 27, 2022.
20. 10 ways you can reduce carbon emissions when you travel. *National Geographic* Available from: <https://www.nationalgeographic.co.uk/travel/2020/03/10-ways-you-can-reduce-carbon-emissions-when-you-travel>. Accessed September 27, 2022.