

Peer Review File

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Reviewer A:

Thank you for your helpful comments on our manuscript. We have incorporated each piece of feedback as listed below and are appreciative of how your feedback has helped to improve the quality of our manuscript.

Comment 1: Further information on the central air conditioning unit and its efficiency would be helpful. Could the unit be programmed for better cooling on the upper floors, or was this an old system.

Reply 1: Thank you for this comment. We have reached out to the facility's maintenance crew and managers, but they were unable to provide us with more details. We have added this more explicitly to our limitations.

Comments 2 and 3: Also, understanding of shading of the of the building on the ground floor would also be of interest. Did greenery help lower temperatures there?

Similarly, was there any shading on the windows externally on the upper floors? These details would be helpful to design engineers.

Reply 2: We added information about tree cover surrounding the building sourced from satellite imaging from the same month and year as the extreme heat event. We have also updated figure 1 to show the layout of all the floors so the relationship between sensor location and shading from trees can be better understood.

Reviewer B:

Thank you for your insightful feedback which has allowed us to improve the quality of our manuscript. We have addressed each comment one by one below and described how they were incorporated into our manuscript.

Comment 1: Can you provide a brief description/definition that you are using for EHEs (based on relative or absolute temperatures, intensity or duration)?

Reply 1: Thank you for this comment. We have now added this description to the methods. This event was defined as an EHE by a previous study because absolute temperatures were elevated considerably outside of seasonal norms, with temperature anomalies of 16-20°C above seasonal norms. These EHE dates also coincided with significant excess mortality across BC including nearly 600 heat related deaths and were used in previous studies to define the EHE period.

Comment 2: You may also want to mention risk factors for healthcare workers (e.g., physical exertion, clothing, age).

Reply 2: This was an excellent point. We have reframed the introduction so that it includes the risks associated with healthcare workers as well as patients.

Comment 3: Do the Egg sensors have a documented accuracy range for temperature?

Reply 3: We added the accuracy and operational range for the temperature sensor to Methods.

Comment 4: Instead of stating “nearby”, can you provide the distance from the weather station to the hospital?

Reply 4: The proximity of the weather station to the facility (less than four kilometers) was added to the Methods.

Comment 5: (RESULTS): A summary data table would be helpful to complement Figure 1. It is difficult to visually compare the separate time series plots and a table could also include measures of variation. I expected a statistical test of differences between locations (ANOVA); however, I understand that this may not fit with the “Brief Reports” format.

Reply 5: This is an excellent suggestion to make our data easier to understand. We added a table (Table 1.1) which includes the mean temperature, standard deviation, and temperature range recorded by each sensor over the EHE as well as the sensor location and the date/time of the maximum temperature. We have also added statistical tests (t-tests and ANOVA) to the results, as suggested, to show whether mean temperatures were statistically different.

Comment 6: You could also describe whether there are existing standards or requirements for temperature conditions in hospitals for occupational health or healthcare practices.

Reply 6: To supplement the general health guidelines for safe indoor temperatures we had already included, we added the ASHRAE standards for indoor temperatures in healthcare settings to the discussion.

Comments 7 and 8, on limitations: I would maybe not include the first limitation (using secondary data); these temperature data hold up well on their own for the purpose of this report.

With the third limitation, you could also note if you did not have information on the air conditioning/ventilation controls.

Reply 7/8: We removed the first limitation as suggested and added a limitation describing how we did not have access to information on the buildings HVAC systems.

Comment 9:

Somewhere in the report, you may want to describe the role of humidity on heat stress and the potential use of indices such as UTCI or WBGT. There could be a note on whether relative humidity was excessive during this EHE.

Reply 9: Thank you for this insight. The mean daily humidity at the nearby weather station was 42-67% during the EHE. This is within or slightly lower than the normal for June in this region - the average daily humidity 1971-2000 in this city was 84% at 6pm and was 64% at 3pm. In light of this, we chose to focus on only temperature for this very short study. However, if the editor/reviewer feel that its worth including an explanation for why did not look at humidity in this brief report, we are open to adding this information.

Reviewer C:

Thank you for your detailed feedback. We have carefully incorporated each comment into our manuscript and greatly appreciate the improvements that we have been able to make as a result.

Comment 1: The objectives should be clarified in the Introduction, as it is not clear until later on in the manuscript that the sensor measurements were compared to a nearby monitoring station. Thus, the objectives should be clarified as: Assessing the temperature variation within the hospital, indoor and outdoor temperature variation within the hospital setting, and differences in the sensor and monitoring station measurements.

Reply 1: This is an excellent point. We have added a three-pronged description of our objectives to the end of the introduction to clearly communicate each of the three objectives you highlighted in this comment.

Comment 2: The motivation for this study should also be more clear in the Introduction. Why was this study conducted? Was it due to the interest in this specific setting or population, is there a gap in the literature regarding the assessment of temperature variability, etc.?

Reply 2: We have included information about why this study was conducted to the introduction. First, we noted directly that there is limited published information on the effects of extreme heat events on temperatures inside of healthcare facilities. We also describe how healthcare facilities are of special interest as they are more likely to contain individuals who are more susceptible to the impacts of extreme heat.

Comment 3: Providing more information about the climate in Vancouver would be helpful (like the seasonal norms in the area).

Reply 3: We have added some information about the historic climate to the beginning of the Methods.

Comment 4: More details should be provided about the sensor locations. For instance, how were these 9 sensor locations selected? Were they placed in a shaded area, or were they in direct sunlight? Were they all facing in the same direction? Why were sensors not placed on the 1st, 2nd, or 3rd floors, and how was the one patient room selected? Do we know if there was variation in the rooms on a given floor? A full map or blueprint of where the sensors were placed would be helpful, as Figure 2 only shows the fourth floor.

Reply 4: We improved the map to better show the layout and placement of sensors on all floors. Unfortunately, we do not have more information about exposure to sunlight etc. as these sensors were placed during a previous study and that information was not recorded. We clarified this in the limitations.

Comment 5: How frequently did the monitoring station measure temperature, and what was the distance between this hospital and the station?

Reply 5: We added information about distance to the facility (less than four kilometers) and frequency of data reporting (once an hour) to the Methods.

Comment 6: The Methods section should describe the statistical methods that were used and the measures that were compared.

Reply 6: We added a section “2.4 Descriptive statistics” to the Methods which describes our statistical methods and what comparisons we made.

Comment 7: How were daytime measurements defined (e.g., what time cutoffs were used?) This should be mentioned in the Methods.

Reply 7: We removed comparisons between daytime and nighttime means from the text and instead focused on capturing the full extent of daily variability with daily min which occurs at night, the daily max which occurs during the day, and the overall mean. This information, including the date/time of the daily min/max are given in the new Table 1.1.

Comment 8: The results describe the temperature variation between floors in section 3.2; however, which sensor logged the maximum temperature on the fourth floor? Was it all of the sensors on the floor driving this difference, or specific ones on the floor? And were the temperatures from the sensors averaged by floor for the provided descriptive statistics, despite there only being two or three sensors for each of the basement, ground floor, and fourth floor? I think these questions would be clarified with a table of the descriptive statistics assessed (for example, the range, mean, minimum, and maximum values for each sensor as well as the monitoring station).

Reply 8: This is a very important point to clarify—thank you for raising it. As you indicated, we added a table (Table 1.1) with the mean values, standard deviation, and total range for each sensor so that all the values can be seen and compared at once. We also were more diligent about adding mean, min, and max values throughout the Results and we were careful to explain where we were referring to one or more sensors. To clarify, when we report temperatures averaged across sensors we have broken up the results into three sections. In the first section we compare the temperatures averaged across all indoor sensors to all outdoor sensors. In the second section we compare the temperatures averaged across all sensors on the same floor. In the third section we finally compare the temperatures between each sensor on the same floor. In the first two sections we now report the mean across all the sensors in each specified area as well as the min and max recorded at any of the sensors.

Comment 9: Section 3.3 should describe both the maximum and average values, as the previous sections have done for consistency

Reply 9: We corrected this oversight by adding maximum and average values for each individual sensor to Table 1.1 and were careful about describing the minimum and maximums in the text as described in our previous reply to comment 8.

Comment 10: The authors should take caution in their interpretation of these findings. The statement for instance in lines 165-168 is overly broad in scope, as this study focused on one setting only and did not assess differences between different settings. Thus, the statement describing that 'these results suggest that different buildings... experience different temperatures' should be modified.

Reply 10: We have changed this statement to focus on the differences between rooms in this healthcare facility, as that is what this study focused on, and not between buildings.

Comment 11: Lines 171-180: Should also mention that the amount of time subjected to the exposure matters as well.

Reply 11: We have added this information to the discussion as suggested.

Comment 12: Line 181: The health risks of indoor temperature should be described, as they have begun to be established in the last few years

Reply 12: We have added a sentence describing the known health risks associated with high indoor temperatures in the discussion.

Comment 13: Limited generalizeability should be described in the Limitations section, since only one hospital was assessed in this study, and we do not know if other hospital contexts have this level of temperature variability or not.

Reply 13: We added this point about generalizability to the limitations section as suggested.

Comment 14: The Discussion section should be concluded with what the research implications are and what future studies can do to assess temperature variability in different contexts.

Reply 14: Thank you for pointing this out. We now include a paragraph specifically about the implications of this work for healthcare facilities in the discussion right before the limitations. We also include a statement in the limitations calling for the need for future research that compares temperatures in more locations in the same building and between multiple locations.