Fwd: Scientific Reports: Decision on your manuscript

Stefano Schiavon <schiavon@berkeley.edu>   Thu, Nov 30, 2023 at 11:54 AM
To: Arfa Aijazi <arfa@berkeley.edu>

I know you already go it but I am forwarding in case there are additional info here.
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---------- Forwarded message ---------
From: **Scientific Reports** <srep@nature.com>
Date: Wed, Nov 29, 2023 at 9:02 PM
Subject: Scientific Reports: Decision on your manuscript
To: <schiavon@berkeley.edu>

Ref: Submission ID e98d6fb2-1591-4c72-9bb7-c56f1cb1baba

Dear Dr Schiavon,

Re: "Passive and low-energy strategies to improve sleep thermal comfort and energy resiliency during heat waves and cold snaps"

We are pleased to let you know that your manuscript has now passed through the review stage and is ready for revision. Many manuscripts require a round of revisions, so this is a normal but important stage of the editorial process.

Editor comments
Dear authors

Please follow the reviewers' comments. The paper needs some minor changes.

To ensure the Editor and Reviewers will be able to recommend that your revised manuscript is accepted, please pay careful attention to each of the comments that have been pasted underneath this email. This way we can avoid future rounds of clarifications and revisions, moving swiftly to a decision.

Once you have addressed each comment and completed each step listed below, the revised submission and final file can be uploaded via the link below.

If you completed the initial submission, please log in using the same email address. If you did not complete the initial submission, please discuss with the submitting author, who will be able to access the link and resubmit.

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You can visit https://researcher.nature.com/your-submissions to track progress of this or any other submissions you might have.

CHECKLIST FOR SUBMITTING YOUR REVISION

1. Please upload a point-by-point response to the comments, including a description of any additional experiments that were carried out and a detailed rebuttal of any criticisms or requested revisions that you disagreed with. This must be uploaded as a 'Point-by-point response to reviewers' file.

You'll find a handy one-page PDF on how to respond to reviewers' comments here:

2. Please highlight all the amends on your manuscript or indicate them by using tracked changes.

3. Check the format for revised manuscripts in our submission guidelines, making sure you pay particular attention to the figure resolution requirements:

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To support the continuity of the peer review process, we recommend returning your manuscript to us within 14 days. If you think you will need additional time, please let us know and we will aim to respond within 48 hours.

Kind regards,

Dionysia Kolokotsa
Editorial Board Member
Scientific Reports

Reviewer Comments:

Reviewer 1
The work presents an excellent comparison of selected measures to improve thermal comfort while sleeping, a highly topical subject considering weather events worldwide and climate change prospects. The work presented is thorough and rigorous, abiding by best practices in the field and subject to common limitations (mainly the need to estimate unobserved performance inside residential settings in an area where subjective perception can be important and difficult to attain). Nevertheless, these limitations are acknowledged, and reasonable estimates are provided in all instances.

The work is recommended for publication following consideration of main comments, which exclusively relate to wording and discussions and not to core findings of estimated effects.

Main comments:
1. About "We applied our experimentally measured heating and cooling effects to two historical case studies: the 2015 Pakistan heat wave and the 2021 Texas power crisis.". In both cases, heating and cooling effects have been estimated based on extrapolation from laboratory conditions (there referred to as 'experimentally measured'). These sentences, although technically correct, could reflect more closely that the study provides "extrapolated estimates of effects". In the previous, 'estimates' reflect that different individuals would heat or cool differently to what has been shown in laboratory conditions with this manikin, and 'extrapolated' covers application via queried datasets for the case study in Pakistan and modelling for the one in the US.
2. The presentation of findings might imply that reductions in heat or cold exposure through presented measures represents untapped potential in general. That may be the case for some of the US population (indeed, reference 27 in the discussion refers to New York alone, something the Discussion should acknowledge explicitly). One of the two case studies is in Pakistan, which may lead readers to apply the reasoning of untapped potential to that setting as well. It should be signposted that some of these adaptations are routinely adopted in many countries, if not the vast majority. This is particularly relevant in settings where there is no heating or AC access due to lack of equipment or

economic reasons, which may better represent a significant part of the population in the world. Last sentence of the abstract reflects this as it mentions HVAC systems, but it is advisable to stress this in the Discussion (e.g., in the first sentence of the second paragraph, reference 27). From a public health guidelines point of view, the distinction between already realised effect versus untapped potential is important, particularly when interpreting outcomes of past heat waves and cold snaps.

3. About the three last sentences of the abstract and their counterparts in the discussion. The work does not present (a) data on peak loads or references to that end from an energy systems point of view, nor (b) reviews current advice in public-health guidelines. About (a), it would be advisable to show how peak loads in energy systems do take place during sleep time during these events (which may be different for cold snaps and heat waves). Then it would be useful to see how the novel quantification in this work is translated into estimated power savings. About (b), the use of "starting point" warrants a reflection on how these practices are widely ignored in relevant settings (several of the strategies here studied are already leveraged by dwellers, like a more spread sleeping posture with suitable clothing whenever possible under warm conditions).

The following are minor comments for authors consideration that may help readers of this work, at their discretion:
1. Although clear from 'dry heat loss thermal manikin' on 'Approach', it would be helpful to stress at that point that measured cooling effects would be conservative (already addressed in 'Discussion'), given widespread readership of the journal.
2. A note might expand on the role of light bed clothing may have on drying and diffusing sweat or whether it would always be advisable to remove bedding.
3. The study reports a minor role of surface area contact with mattress. A note might clarify if the same role would be expected in practice (thermal manikin is reported to weight 18kg, adults would be expected to weight 3-4 times more, and firmness of bed support decreases over time).
4. At times it seems the work addresses the energy-profligate use of heating and air conditioning alone, not necessarily ventilation (HVAC is the popular acronym, but it seems ventilation still holds as principles would be the same as for the fans used in the study, and to help extract heat whenever possible in hot events). This could also consider noise ratings by fans in these categories and whether such noise ratings would noticeably affect sleep quality (it is anticipated that they would not, but would be helpful to report this explicitly in methods).
5. "Passive and low-energy strategies can reduce the sleep time heat or cold exposure by as much as 90%.". It would be advisable to report the range observed to depict findings more closely (69-91%).

Reviewer 2
Thank you for a much-needed paper in an area that is sure to be a major issue in the future, there is a need to further support the use of energy efficient systems that reduce our reliance on energy intensive AC and do so in innovative ways. The paper to me appears to be technically sound and the claims seem reasonable, I have a few clarifications that I think need to be made prior to publication:

1.   Can you explain what is actually meant by low energy? Is there a metric used to define this in the work, it would be great if context was added around the energy related aspect of the work. Evidently some of the measures require limited grid supplied electrical energy, and others do, is there an energy cost that can be described in the work to contextualise the two orders of magnitude difference your mention?
2.   Could you clarify the supposed uncertainty in your model for the readers to provide context as to the validity of simulation results?
3.   Is the heating and cooling effect figure in Figure 1 in relation to the lab testing or the simulation work? This could be better explained in the text so it is clear that the simulation work is in the second figure (better to be clear I think). Its relatively small, and the format of the paper doesn't help a little (I am assuming is part of the journal format that leads to methods described later in the paper can you correct if this is the case?)
4.   The baseline is an important part of your work as this forms the basis for explaining the difference between solutions or improvements as a result of solutions. This could be better explained than it currently is particularly in relation to the simulation results. Can you explain more about the model inputs or testing conditions for the baseline? Is this a low energy building with an improved thermal fabric, is the building statistically representative of residential buildings that are typical to a specific region. Is the building fabric, thermal mass, etc accounted for? Is this purely in cases where natural ventilation is not possible?
5.   Did you consider any constraints and how they might effect the adoption of the strategies you refer to? For example you note that the ceiling fan in isolation on a high setting is very effective. Is there any consideration for noise and how this might effect sleep? On this matter, can some explanation be made as to the relationship between sleep quality and temperature. Are there any correlations that can reflect the likely improvement in sleep quality that could be seen?
6.   I agree that more subsidies should be offered for these low-cost systems and I also appreciate the recognition of the fact that the work focuses on sensible or dry or heat differences. It would be good to contextualise your work with other work on the use of PCM, stack ventilation, natural ventilation or other passive systems. There are limitations for

the use of NV in this case, but it the readers would benefit from a bit more discussion in relation to other work.