

Dear Dr. Carroll,

I hope this email finds you well. Thank you for sending us your paper and giving us the chance to consider your work. We sent it out for external peer review and Kamran Abbasi and I also discussed it.

Unfortunately, we do not consider it suitable for publication in its present form. However, if you are able to amend it in the light of our and the reviewers' comments, we would be happy to consider it again.

The editors' and reviewers' comments are at the end of this letter.

We hope that you will be willing to revise your manuscript and submit it within 1 week, by Wednesday 13 January. When submitting your revised manuscript please provide a point by point response to our comments and those of the reviewers.

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We hope you will find the comments useful. Please don't hesitate to contact me should you have any questions.

Best wishes,  
Rachael

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**Editors' comments:**

- The paper is clearly written paper however it reads long at 1600 words over the word count. We ask that you keep the revised manuscript within the word count of 1800-2000 words.
- The paper would benefit from a shorter introduction. It currently takes 870 words (3.5 pages) to get to the section on global viral surveillance.
- Please give less emphasis to GVP as it is preferred authors do not evaluate their own projects. Please also reduce the number of descriptive examples. For an analysis article the arguments for and against a global surveillance system are more important - and then what it might do.

**Reviewers' comments:**

**Reviewer: 1**

#### Comments:

This paper advocates the use of global viral surveillance networks for the prevention of future pandemics.

Although this is a valid suggestion, there are several comments to this paper:

Page 3, Line 49: That statement that most pandemic viruses have a zoonotic origin is true, but it should also be mentioned that the persistence of these viruses in animal reservoirs is far from being clear. We do not know the main reservoir species for many of these zoonotic viruses.

Page 5 Line 3: The statement that a multi-sector perspective is needed for future surveillance has already been stated in 2012 by the Worldbank and should be cited (World Bank, 2012. People, pathogens and our planet: Volume 2: The economics of one health. Report No. 69145-GLB, 50.).

An integrated surveillance system spanning from wildlife to domestic animals and humans is not new and has been published and should be cited: i.e. Paternoster, G., Babo Martins, S., Mattivi, A., Cagarelli, R., Angelini, P., Bellini, R., Santi, A., Galletti, G., Pupella, S., Marano, G., Copello, F., Rushton, J., Stark, K.D.C., Tamba, M., 2017. Economics of One Health: Costs and benefits of integrated West Nile virus surveillance in Emilia-Romagna. PLoS One 12, e0188156 or Zinsstag, J., Crump, L., Schelling, E., Hattendorf, J., Maidane, Y.O., Ali, K.O., Muhummed, A., Umer, A.A., Aliyi, F., Nooh, F., Abdikadir, M.I., Ali, S.M., Hartinger, S., Mausezahl, D., de White, M.B.G., Cordon-Rosales, C., Castillo, D.A., McCracken, J., Abakar, F., Cercamondi, C., Emmenegger, S., Maier, E., Karanja, S., Bolon, I., de Castaneda, R.R., Bonfoh, B., Tschopp, R., Probst-Hensch, N., Cisse, G., 2018. Climate change and One Health. FEMS microbiology letters 365.

Zinsstag, J., Utzinger, J., Probst-Hensch, N., Shan, L., Zhou, X.N., 2020. Towards integrated surveillance-response systems for the prevention of future pandemics. Infectious diseases of poverty 9, 140.

Page 5 line 28: The citation of Jones uses superscript, while other other citations are in brackets. The citations should be uniform.

Page 13, line 23: I disagree, consider the reference of Paternoster above for integrated West Nile Virus surveillance.

Page 15 Line 6: The authors should mention the International Health Regulations (IHR 2005) that more and more report on One Health surveillance.

General comment: We surely welcome support for integrated surveillance systems including wildlife, domestic animals and humans and an overall viral watchlist is useful. But this will not prevent zoonotic

transmission if there is not a massive improvement of the biosecurity and humane standards of livestock production, transport and marketing. worldwide. This has been stated already in 2005 in the framework of the H5N1 HPAI outbreak and should be cited (Zinsstag, J., Schelling, E., Wyss, K., Mahamat, M.B., 2005. Potential of cooperation between human and animal health to strengthen health systems. Lancet 366, 2142-2145).

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**Reviewer: 2**

#### Comments:

The authors have written about the need for global viral surveillance. It's a timely topic, but I do think the authors need to tighten their arguments. They continually talk about predicting viral emergence, but provide zero evidence that it is even possible. (They also do not acknowledge in the paper that we are a long way from being able to predict viral emergence). Further, the article feels like it's been cut and pasted too many times. It doesn't have much flow, with lack of specifics in important places and too specific in others.

1. Throughout the paper the authors conflate infectious disease surveillance with the ability to predict which viruses emerge from the animal kingdom. Infectious disease surveillance is currently event based (page 13) and needs to be able to identify when something odd is happening that could lead to an epidemic or even pandemic. The global virome project, while commendable, may or may not lead to the ability to predict pathogen emergence. I am concerned that the authors are claiming that simply cataloguing and monitoring pathogens in the animal kingdom will somehow prevent the next pandemic. It can certainly help us create tools like the diagnostics mentioned in page 15, but until we are able to predict emergence or how a pathogen might spread after it emerges then it's simply a catalogue. It will be nice to name the pathogen raging in the pandemic, but in reality we won't know what pathogen it is until somebody sequences it, i.e. after event-based infectious disease surveillance has identified that something is wrong.
2. I recommend revising the second sentence in the first paragraph. We already have a good understanding of viral hotspot locations, as well as species that are particularly problematic. I also think we had great warning, with the virus's genome sequenced in 2019 before it spread widely. The ideas presented in this sentence need more nuance. I suggest the authors break this sentence down into two separate thoughts, one being how much more interconnected the global population is and the other being how new infectious diseases can emerge and spread.
3. In the second paragraph, first line I suggest changing "first pandemic" to "first emerging pathogen".
4. In the second paragraph I suggest changing "All these epidemic and pandemic viruses jumped from wild animals", to "All these emergent viruses jumped from transmission in non-human animals to transmission among humans". Influenza particularly can emerge from domesticated animals, and camels likely served as a more important reservoir host than bats for MERS.
5. Second paragraph needs some change on "once they have made the inter-species jump...". It's not accurate that they tend to persist and evolve in the human systems. Most emergent pathogens actually don't establish themselves for human transmission, including many the authors list in this paragraph. I suggest striking this sentence.
6. On page four, the last paragraph the authors introduce the "upgrading of the health security apparatus". Can the authors give a bit more introduction to this – what is the upgrading of the health security apparatus? It seems to me that it was a lot of talk about this, but we actually became worse with increasing nationalistic tendencies in the US and Europe.
7. Beginning of page 5, the authors state that "Key is building a global surveillance system spanning... to identify geographic "hot spots". Here the authors present this idea as if we don't already know where these hotspots are. The authors need to revise this paragraph to present what is already known about viral emergency hot spots.
8. Same paragraph as comment six, but last sentence. Current efforts in the US and Europe were largely ineffective, but Asia and Australia did amazingly well. I suggest striking this sentence, or at least revising so that it acknowledges that the current tools we have were highly effective when applied well.
9. Last paragraph on page six, beginning of page 7. The authors talk about the power to "prevent, detect, and respond" after a global viral surveillance atlas is created. I don't really know how that will

work. We can document viruses in the wild, but we still have no clues why viruses emerge and begin transmitting in humans. Will the global atlas help that? The authors need to talk about what is possible specifically, and how an atlas would actually help.

10. Beginning of page 9, end of paragraph that started on page 8. The idea of strengthening the health system in viral hotspots is idealistic for sure, but these are the same spots that are still struggling with tuberculosis and malaria. Can the authors talk concretely about what a global surveillance network would actually take? How are we going to get multiplex diagnostics to these hotspots when we cannot even get malaria rapid diagnostic tests? I would love the authors to theorize on the operationalization of their envisioned surveillance network.

11. I enjoyed the section on GISRS. Can the authors maybe give more detail on how GISRS does or does not overlap with viral hotspots.

12. Last paragraph (page 16) the authors need to acknowledge domesticated animals' role in pathogen emergence.

Additional Questions:

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