

The role of Temperature on the Spread of COVID-19 worldwide and urgent Solutions

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Abstract

This study explored whether the global temperature had any role in the spread and vulnerability to COVID-19 and how that knowledge can be used to arrest the fast spreading disease. It highlighted that for transmitting the virus, global temperature played an important role and a moderately cool environment was the most favourable state. Whereas, the risk from the virus was reduced significantly for warm places and countries. Based on the temperature of March and April, various degree of vulnerability was identified and countries were specified. The maximum reported case, as well as death, was noted when the temperature was in the range of around 275°K(2°C) to 290°K(17°C). Countries like the USA, UK, Italy and Spain belonged to this category. The vulnerability was moderate when the temperature was less than around 275°K(2°C) e.g., Russia, parts of Canada and a few Scandinavian countries. For temperature 300°K(27°C) and above, a significantly lesser degree of vulnerability was noted. Countries from South Asian Association for Regional Cooperation, South East Asia, the African continent and Australia fell in that category. This work discussed that based on the variability of temperature, countries can switch from one vulnerability state to another. That influence of temperature on the virus and results of previous clinical trials with similar viruses provided a useful insight that regulating the level of temperature can offer remarkable results to arrest and stop the outbreak. Based on that knowledge, some urgent and simple solutions are proposed, which are practically without side effects and very cost-effective too.

Solutions : General Measures

- **Using Sauna facilities:** Usually hotels, gyms, leisure centres contain existing Sauna facilities. Also, mobile and Caravan Sauna facilities can be thought of in future. After Sauna, if surfaces in public places are touched, hand washing is advisable.
- **Portable Convector Room Heater:** Stay close to a convector room heater and inhale hot air at least two times a day for around half an hour each time (keeping comfort level). It would be very useful at the initial stages of the disease.
- **Disinfect any place using High Temperature:** Before start of office, school or business, temperature of premises may be kept very high, (say, 60°C) for half an hour. For airports, train and bus, the same method of disinfecting could be thought of. *Optimum temperature and duration can be tested easily.* For any external object or material, disinfecting using high temperature could be a useful solution.
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Why: The virus is very sensitive to **Temperature**. It mainly enters through the **Nose** (WHO). Testing is done with swabs from the nasal cavity and the back of the **Mouth**.

Important: Only even Convector Room Heater and Hot Salt Water gargle, Hot Drinks can serve the main purpose.

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- Economy and mental health suffered tremendously.
- No proven cure for the disease is found yet.
- Popular known methods to treat disease are Plasma therapy, Vaccine development, Medication etc. But those are not yet comprehensively tested. In addition, time consuming and with potential side effects.
- With that **Emergency Situation** in mind some **Urgent, Simple Solutions** were proposed on **17th March (Roy, 2020a)** purely based on **Science**.
- These are without side effects, no funding required, no vested interest, can be practiced in own home.

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This family of viruses is very sensitive to Temperature.

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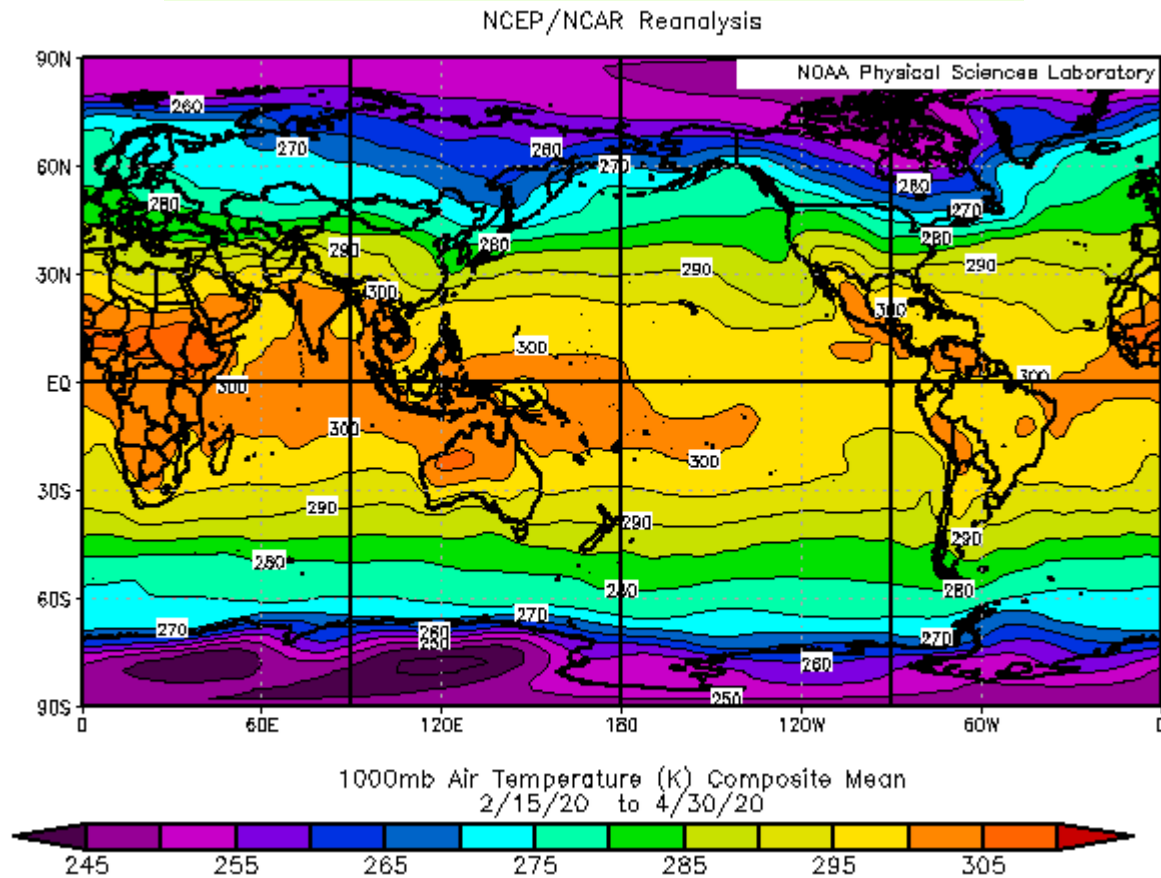
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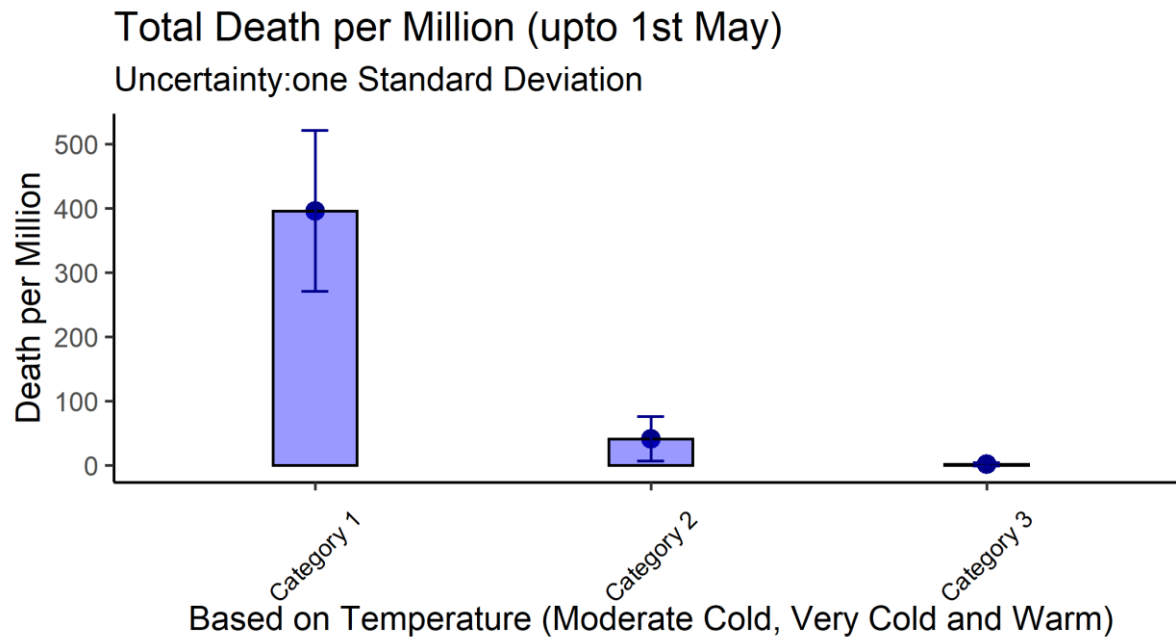
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- Countries with **very cold temperature** [$< 275^{\circ}\text{K}(2^{\circ}\text{C})$] were moderately affected in March-April (e.g. Canada, Russia, Scandinavian countries).
- **Warm countries** and places [$>300^{\circ}\text{K}(27^{\circ}\text{C})$] were likely to be **less vulnerable**. e.g., SAARC, South East Asian countries, African continents and Australia.
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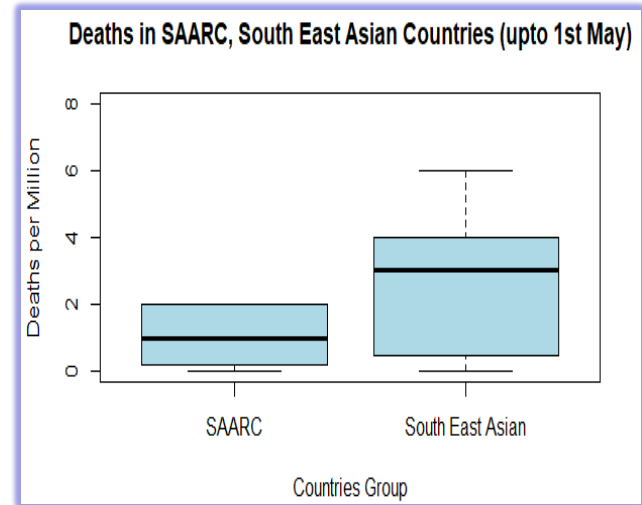
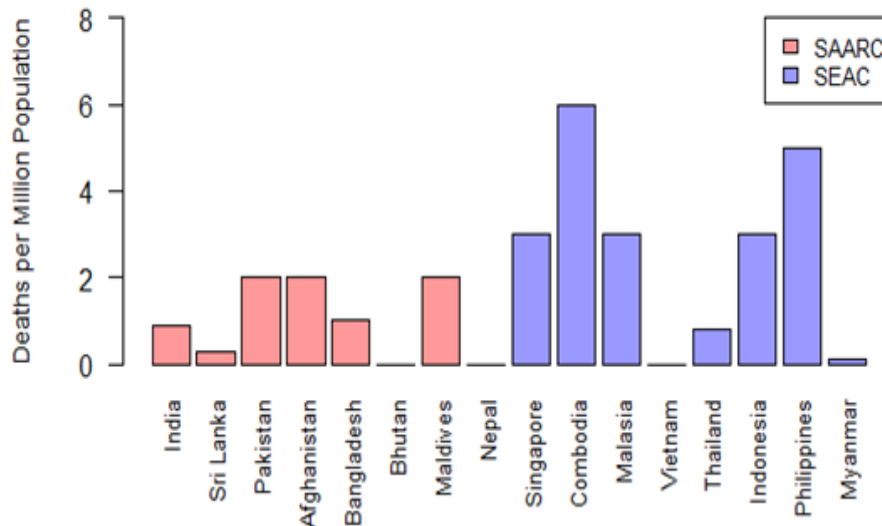
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Death in SAARC, South East Asian countries (upto 1st of May)



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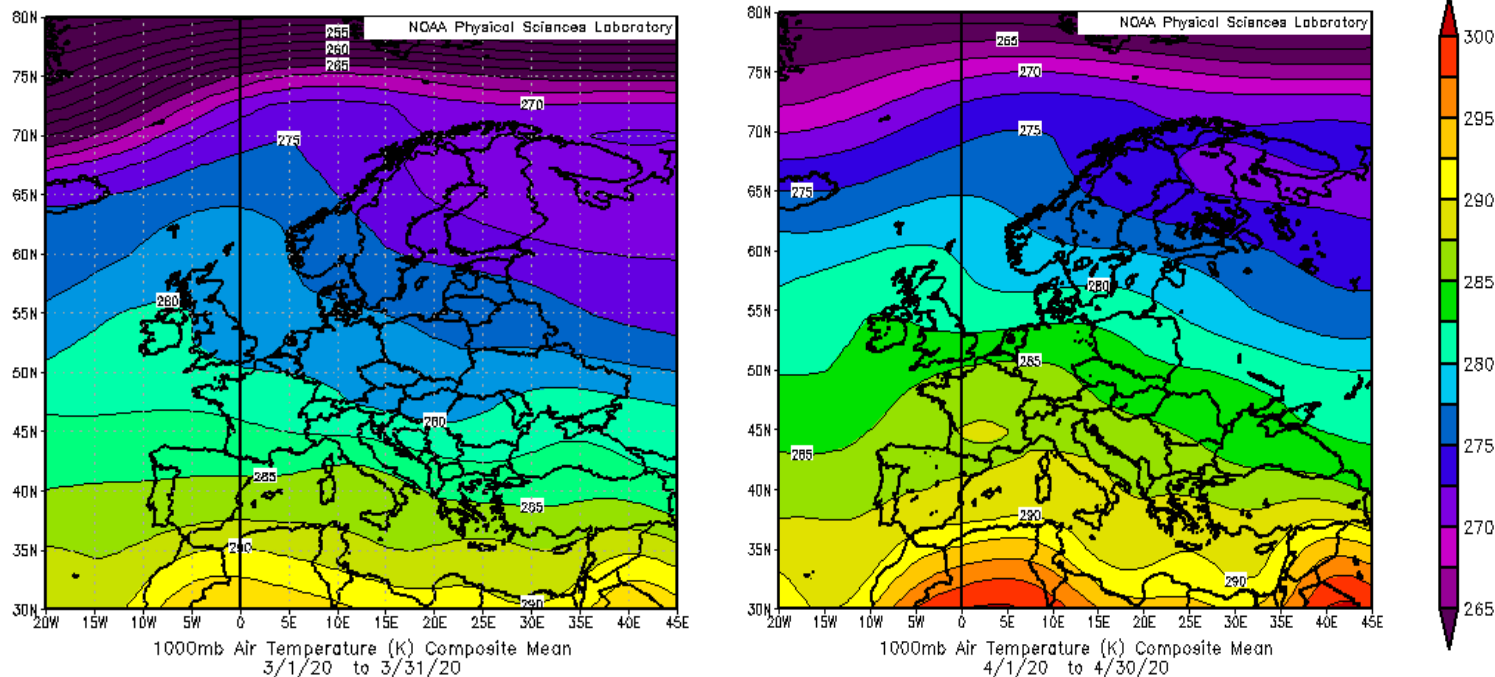
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Because of large populations, India was one of the highest ranked during August, in overall counts of total Deaths, as well as total Cases.

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South American countries, like Brazil turned warm to cooler in June, while Canada and Russia from very cold to moderate cold.

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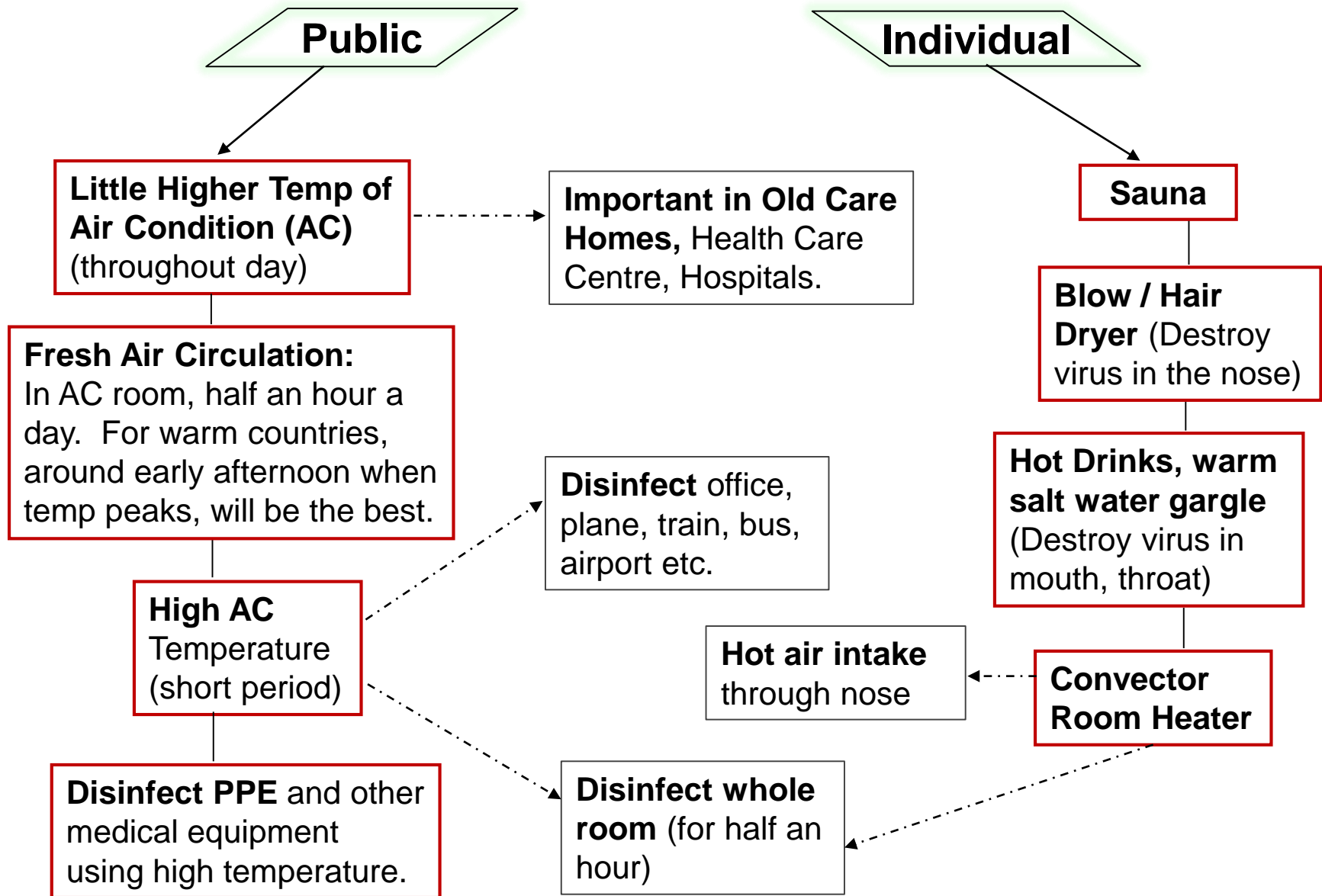
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Additional Points:

- **Water Shortage:** Whether frequent Hand Washing can be replaced by sensor-based hand dryer (normally found in washroom), temp controlled.
- **Plastic Disposal:** Personal Protective Equipment (PPE) are single use. World is already under stress due to problems of disposing Plastic. If PPE can be disinfected using heat-based solutions and reused. It can be tested in laboratory and could prove very beneficial.
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- **Very Warm Countries:** Some countries reached temperature more than 40°C in July-August. In that uncomfortable temperature, people use more AC. That low temperature in confined space can increase transmission.

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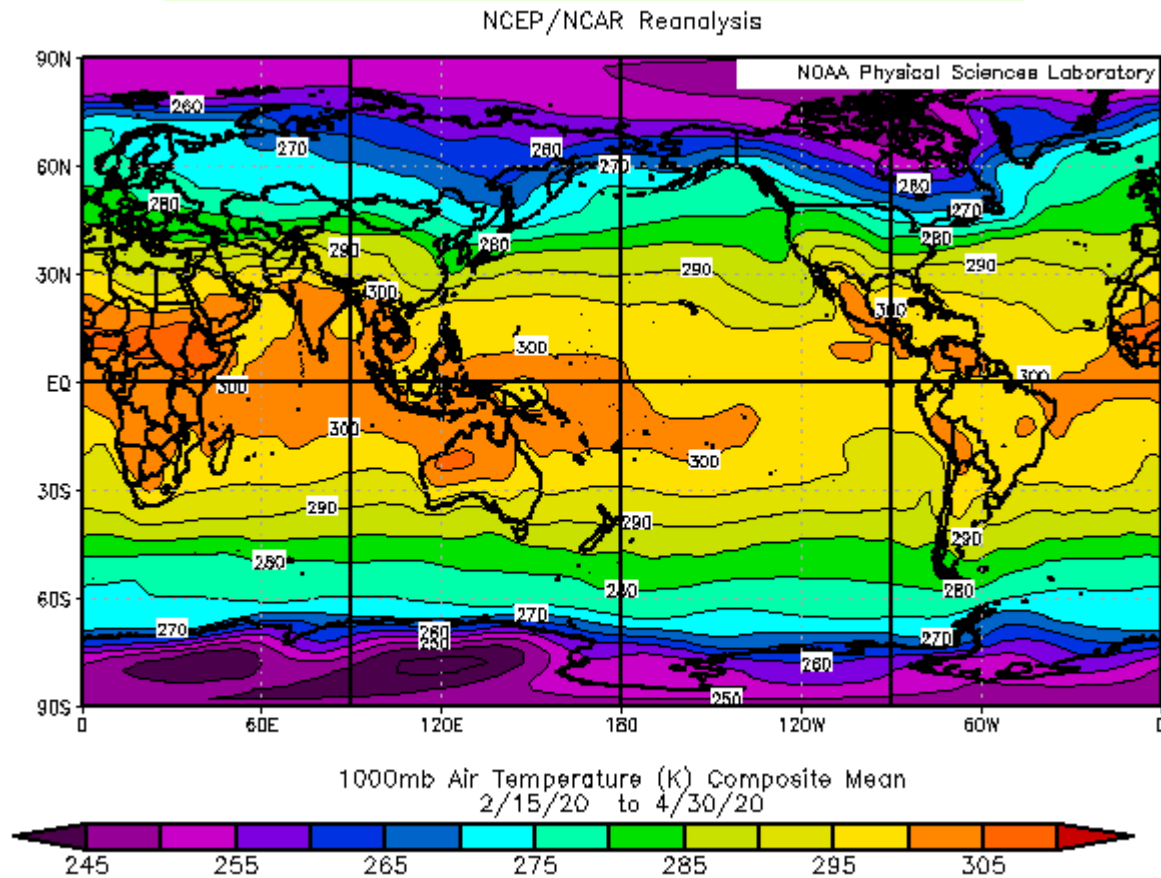
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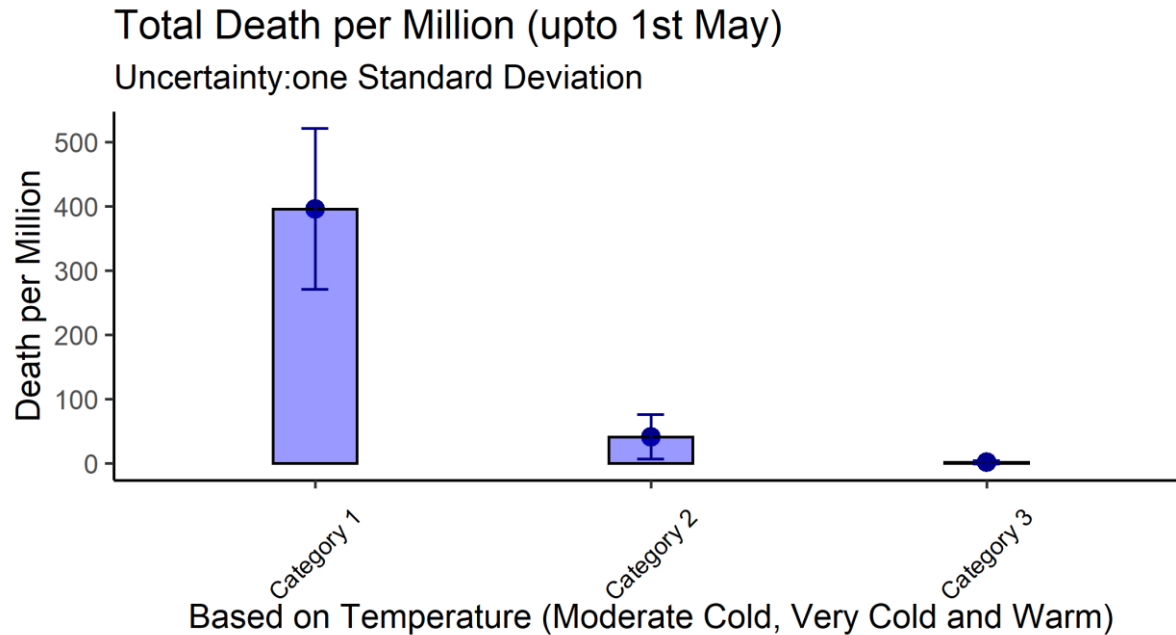
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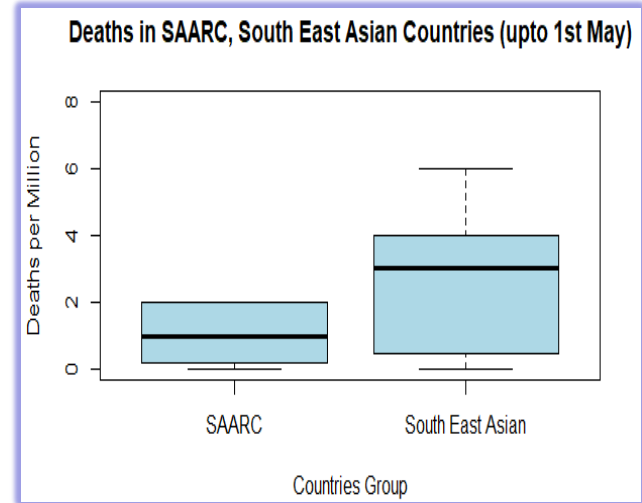
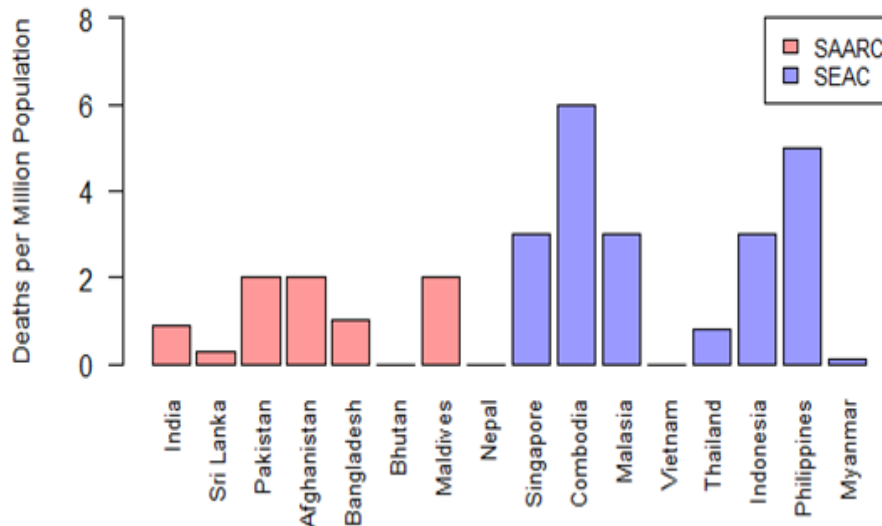
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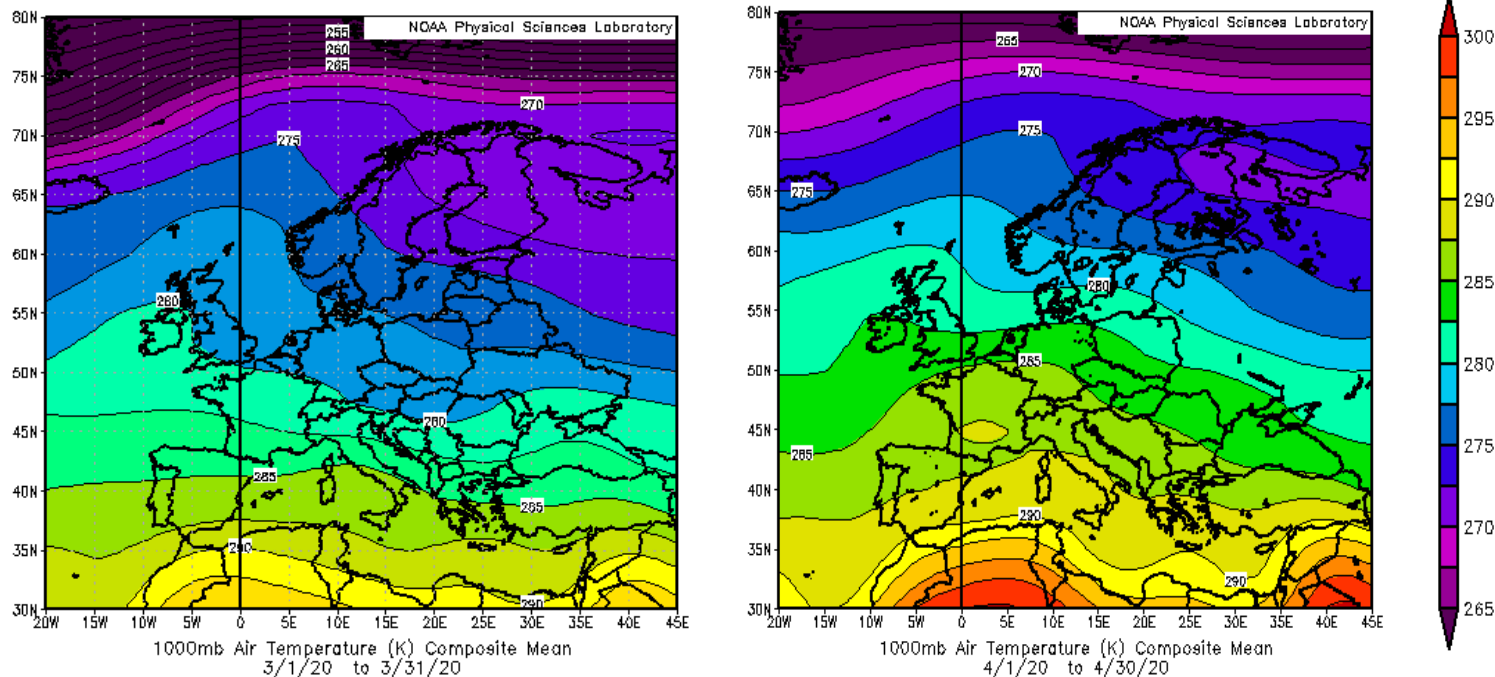
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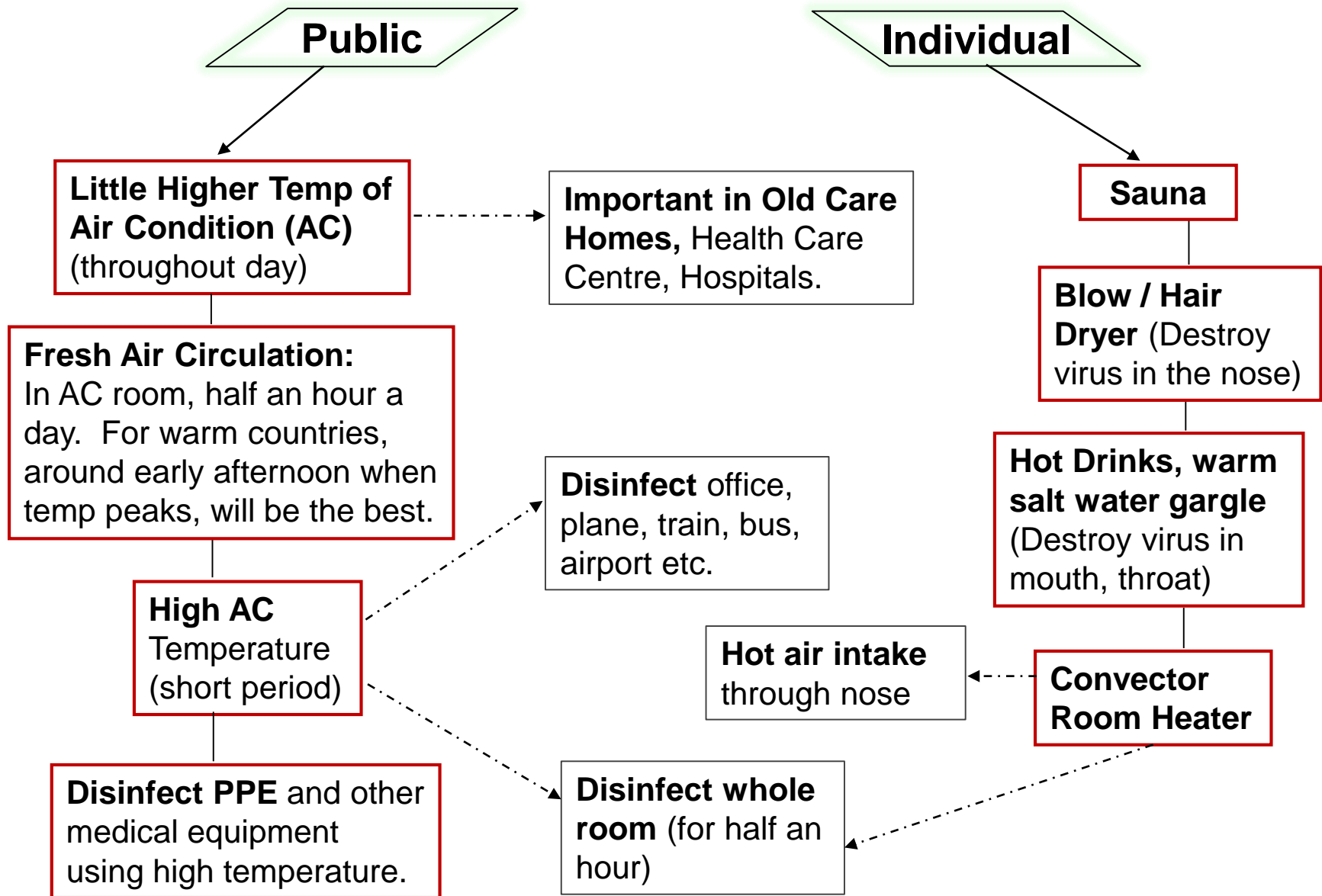
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Thank You