Global attention to Antimicrobial Resistance (AMR) and Climate Change (CC) in the era of Social Media

The puzzle

Among many other problems, the world is facing two enormous existential problems: climate change (CC) and antimicrobial resistance (AMR). After decades of warnings from experts, the public and policymakers are finally paying attention to the threat of CC; but the threat of AMR, which is just as consequential, remains largely unnoticed. While multiple global surveys rank CC as one of the top global challenges of our time (Raunio, 2002; Ipsos, 2020; Unesco, 2021; University of Oxford, 2021), AMR is nowhere to be found in such surveys; it does not even make it to the top 10 on any of them.

It is puzzling to see how a problem that is already killing more than 1.2 million people annually and estimated to be causing billions of US dollars of losses to the global economy has yet to even make the top-10 list of global challenges (O'Neill, 2016; Laxminarayan, 2022).

The research question

How can we explain the differences in global attention between Antimicrobial Resistance (AMR) and Climate Change (CC) through social media?

The most similar case comparison

- *They are both future threats with consequences already being felt*
  - *AMR is one of the leading slow-burning and complex global health crises of our time, posing an imminent existential threat to humanity (Baekkeskov et al., 2020; Engström, 2021; Harring & Krockow, 2021).*
  - *AMR already kills more than 1.2 million people globally every year, and that pace shows no sign of slowing down (Laxminarayan, 2022)*
  - *Many of the changes observed currently with CC (e.g., rising sea levels) will take decades of extensive action at different levels to stabilize, and we might never be able to reverse these impacts (IPCC, 2021). Global temperature is expected to rise 1.5 degrees Celsius over the next 20 years. If serious action is not taken, the temperature could rise above 2 degrees Celsius. This could cause extensive damage to our planet, potentially challenging the very existence of humanity.*
- *They are both transboundary crises suffer from the tragedy of the common posing social dilemma*
  - *The benefits from using fossil fuels and antibiotics—some of the main factors that cause the CC and AMR problem— are beneficial at the local and individual levels while the costs are incurred at the global level (Hollis & Maybarduk, 2015; Harring & Krockow, 2021). Burning fossil fuels is beneficial for individuals and companies, as it provides easy and comfortable transport for travelers and goods, and thereby also massive profits for private companies. So the use of fossil fuel can be considered rational at local levels. Conversely, these local actions cause greater problems and costs at the societal level, as the increase in greenhouse gases causes an increase in global warming that individuals often do not recognize. Similarly, the use of antibiotics for individuals (often as part of a quick fix for a minor ailment for which antibiotics may not even be necessary), the extensive use of antibiotics in intensive animal farming and elsewhere are contributing to the increase of AMR that potentially harm us at the collective level, while possibly benefiting the individuals (Denyer Willis & Chandler, 2019; Baekkeskov et al., 2020). Similar to the use of fossil fuels, many such actions may seem rational at the individual or local level but can cause catastrophic results at the global level (Halpern & Law, 2010; Shankar, 2016; Harring & Krockow, 2021)*
- *Super Wicked problems*
  - *Benefits are local and costs are global*
  - *Those causing the problem also provide a solution*
  - *Multiple value systems complicate response*

Theoretical framework: The tripartite dimensions of social media attention

- The origins of attention
  - organization origins
  - digital individual entrepreneurs

- Nature of communication
  - Emotional or scientific nature

- Nature of communities
  - Affective and polarized communities
  - Expert driven

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Twitter modularity class comparisons

Antimicrobial Resistance (AMR)
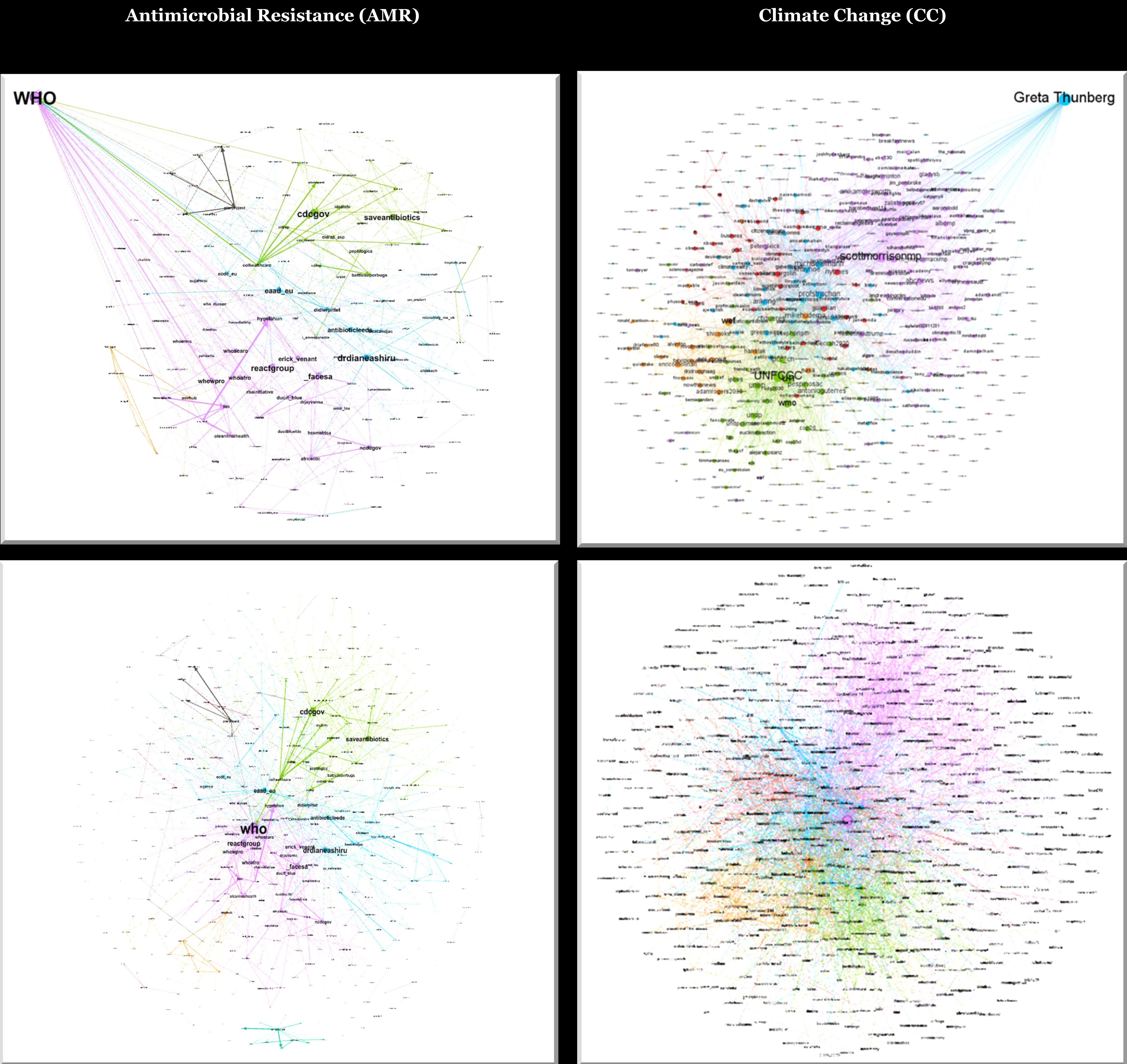
Climate Change (CC)

Observations

- More than 3.5 million tweets have engaged in Climate Change debate, whereas only 71 thousand tweets have engaged with the topic of antimicrobial resistance (AMR).
- 34 thousand users engage with AMR
- Over 1 million users engage in CC
- average overall tweets per source is 126.84 for AMR and 594.95 for CC
- thirty-seven (37) different communities were identified within the CC
- thirteen (13) communities were identified within the AMR
- The two largest modularity classes or communities of CC are mostly general public and individuals and the third largest community is mostly constructed of organizations
- On the contrary, the largest community on AMR is mainly constructed of organizations, and almost no community was identified to be formed by ordinary individuals
- The most influential nodes in the two networks identified as World Health Organization (WHO) in the AMR network, which is the most mentioned node with 4808 mentions and Greta Thunberg with 18073 mentions is the most mentioned node within the CC network

Data collection

- Two years of real time data collection through T-CAT application process interface (API) from **twitter** (Streaming API)
- Keywords (hashtags):
  - #ClimateChange, #GlobalWarming
  - #antimicrobialresistance #antibioticresistance #amr

Methods

- Case-oriented most similar comparative research strategy
- Mixed Methods
  - Qualitative and quantitative
- Sequential exploratory and explanatory strategies

Analysis

- Clustering coefficient or modularity tests
- Network Centrality tests
  - Degree centrality
- Content analysis
- Visual analysis

Attention generation on twitter

[Fox KTVU, 2019]