# Data Sharing and Information Platforms in Crisis Response and Preparedness: Exploring the Role of Open Data Sharing Platforms and Collective Intelligence in COVID-19 Response Efforts, and Preparedness for Future Pandemics



ANGELA ODUOR LUNGATI, Executive Director, Ushahidi Inc

COVID-19 has wreaked unprecedented havoc in the world. Response efforts have also made huge evident gaps in preparedness and governments around the world's capacity to respond to a health crisis of this magnitude adequately. As a result, local communities have taken matters into their own hands and turned to technology platforms to coordinate mutual aid efforts, shed light on response gaps, and hold governments accountable. This paper explores the role of open data sharing platforms and collective intelligence in COVID-19 response efforts by studying two examples of community-led initiatives from Spain and Japan. Frena La Curva (Spain) and Safecast (Japan) utilized the Ushahidi platform, an open-source technology tool born out of Kenya's post-election violence that has been widely used in over 160 countries for crisis response since its inception in 2008. Research reports have been warning of pandemic breakouts for decades. However, the response to COVID-19 was inadequate, with healthcare systems buckling under the pressure of the spread of the disease.

Moreover, existing social protection programs could not shield citizens despite having experienced similar economic impacts in the years that have passed. Data hugging and suppression of information regarding the pandemic outbreak led to significant delays in measures being put in place to curb the spread of COVID-19. This paper proposes that governments would benefit from leveraging open data and technology platforms to engage with ordinary citizens and eliminate data blind spots in the design of social protection programs. It also posits that we need to invest in interoperable data exchange systems to increase the speed of response and learning. Finally, it also proposes the need for internet freedom and access as a critical tool for preparedness by enabling the free flow of information.

CCS Concepts: • **Human-centered computing** → **Accessibility systems and tools**; • **Information systems** → **Open source software**; **Social networking sites**; • **General and reference** → **Reliability**; • **Information systems** → **Data exchange**;

Additional Key Words and Phrases: Open source software, citizen engagement, open data, internet freedom, collective intelligence, information sharing, crowdsourcing, mapping

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Author's address: A. O. Lungati, 1st Floor Bishop Magua Center, George Padmore Lane, Ngong Road, Nairobi, Kenya; email: angela@ushahidi.com.


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## 1 INTRODUCTION

The World Health Organisation declared COVID-19 a global pandemic on March 11th, 2020, months after it's detection in Wuhan, located in China's Hubei Province. By this time, there were 118,000 cases in 114 countries, with a death toll of 4,291.[1] Fears of increased transmission and the inability of healthcare systems to manage caseloads abounded, given that the number of cases outside China had quickly surpassed those within China. As governments around the world confirmed more patients, they instituted restrictive measures to curb the spread and encourage social distancing, e.g., lockdowns, closures of schools, pubs and other recreational sports, and closing down of international borders.

Several problems became apparent. **There were substantial informational gaps**. Scientists and health officials were making slow progress in understanding the effects of COVID-19 but were yet to give conclusive answers on who was most at risk, and how to treat those affected. It was challenging to keep track of infection hotspots, both for citizens and governments. Citizens and health officials struggled to get access to PPEs. There was little to no engagement with ordinary citizens to provide insight into how COVID-19 was spreading, and near total reliance on a top-down flow of information from governments and health officials to ordinary citizens. And of course, in the vacuum of credible information. misinformation thrived, giving rise to the COVID-19 infodemic. **While lockdowns may have been effective in slowing down the spread of the disease, they had far-reaching social and economic effects on citizens**. People lost their livelihoods. Vulnerable and high-risk communities were unable to get access to information and critical resources. **Most of all, most governments around the world had limited capacity to respond to a crisis at this scale.** Healthcare systems were unable to respond to increased demand for testing services, and there were limited resources to handle critical cases in ICUs. Existing social protection programs have proven to be inadequate in shielding citizens, especially the most vulnerable communities, from the effects of this pandemic.

## 2 USING OPEN SOURCE TECHNOLOGY PLATFORMS FOR RESPONSE

Local communities sprang into action, seeking open technology platforms to collect data, relying on collective intelligence to provide insights into the pervasiveness of COVID-19. They were able to create visibility into where to access critical resources and services, fill informational gaps for official response, and hold governments accountable for any shortcomings in responding to the pandemic.

A Maasai elder in Kenya mobilized people in his community to protect themselves and others from COVID-19 by setting up handwashing stations in his makeshift village, stopped interactions between family members and also stopped movement out of the village, except for those who needed to take their cattle to graze.[2]

In Uganda, Olivier Nkunzurwanda and his team at the Refugee Innovation Centre in Rwamwanja Refugee Settlement have mobilized people to go door to door and provide information about COVID-19 and protection mechanisms to families. They are also distributing songs and videos about how to prevent the spread of COVID-19 via WhatsApp groups.[3]

The urban poor in Dhaka, Bangladesh were hardest hit by lockdowns imposed by their government in March 2020. They had to employ strategies such as reducing their diet to a single meal a day, changing jobs to be mobile food vendors, or breaking lockdown rules. Despite the hardship they faced, these urban poor demonstrated spontaneous acts of mutual aid by sharing food, distributing food packages and lending money to each other.[4]

Ushahidi is a non-profit technology company that aims to ensure that everyone has equal access to technology resources and the skills they need to fight for social justice in their communities. We:-

[1] https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020.
[2] https://www.afro.who.int/news/kenyan-communities-taking-lead-curbing-covid-19-spread.
[3] https://www.dotrust.org/africa-youth-covid-19/.
[4] https://www.iied.org/how-dhakas-urban-poor-are-dealing-covid-19.

(1) Build open source technology tools that make it easy to understand and respond to critical events quickly. These tools raise the voices of marginalised groups, who tend to be left out of meaningful conversations and help those that serve them to respond better and make decisions that are fully representative of their needs.
(2) Build capacity in marginalised communities to leverage technology for social change through training, strategic support and facilitating collaborations with communities of practice through community engagement.

Ushahidi was founded in response to the post-election violence in Kenya in 2008. Ushahidi, "testimony" in Swahili, was created to answer the question, "what's happening on the ground, and how can we help people keep each other safe?". High tribal tensions marked the Kenyan elections in 2007, so when results were announced, they were contested, resulting in violence breaking out across the country.

From that initial deployment in Kenya, Ushahidi has in the last 12 years, grown to be used over 200,000 times, in 160+ countries, gathering 50+ million reports in four main categories of social impact:-

- **Crisis response:** helping to coordinate humanitarian response efforts.
- **Human Rights Protection:** helping to create awareness about human rights violations worldwide, empowering victims to share reports of their experiences anonymously, and assisting activists in advocating for the protection of human rights.
- **Good governance:** helping to hold duty bearers to account and uphold the integrity of elections and democracies around the world.
- **Environmental Justice:** supporting fair treatment and meaningful involvement of all people in developing, implementing and enforcing environmental laws.

Ushahidi has become an essential tool used by individuals, advocacy groups, grassroots, and development organisations on the frontlines of promoting social justice in the world: from assisting in relief efforts after earthquakes in Haiti and Nepal to supporting COVID-19 recovery and response efforts, from helping citizens ensure fair electoral outcomes in the US, Kenya, and Nigeria to reporting corruption in Indonesia, from publishing news from Iranian protests in 2018 to documenting police brutality in Portland during Black Lives Matter protests, from fighting the spread of HIV/AIDS in East Africa to helping women tackle sexual violence in Egypt.

With Ushahidi having been used in nearly every global crisis since its inception in 2008, it made sense that communities around the world reached out to utilise a platform that would empower them to be a part of the solution.[5] Overall, communities have deployed Ushahidi over 1,800 times in the last year, across 130 countries Figure 1.

## 2.1 Case Study: Connecting Spanish Citizens with Critical Resources During Lockdown

By the time Spanish authorities imposed a lockdown on March 14th, all 50 provinces in the country had reported confirmed cases. By March 25th, their death toll had surpassed that of mainland China, at 3,434 people, coming second to Italy's.[6] On April 2nd, Spain recorded 950 COVID-19 deaths in 24 hours, the highest recorded by any country at that time in a single day.[7]

On March 12th, 2020, a team from the Open Government Laboratory - Government of Aragon (LAAAB) started FLC( Frena La Curva) to organize and channel the wave of solidarity spreading out through the country. Groups of volunteers, entrepreneurs, activists and social organisations then joined the effort to map public services around citizens using the Ushahidi platform to flatten the curve (frena la curva) Figure 2.

[5] https://ushahidi.com/covid.
[6] https://www.scmp.com/news/world/europe/article/3076802/coronavirus-latest-italys-virus-toll-shoots-back-doctors-see-hope.
[7] https://www.businessinsider.com/coronavirus-spain-950-deaths-one-day-most-of-any-country-2020-4?IR=T.

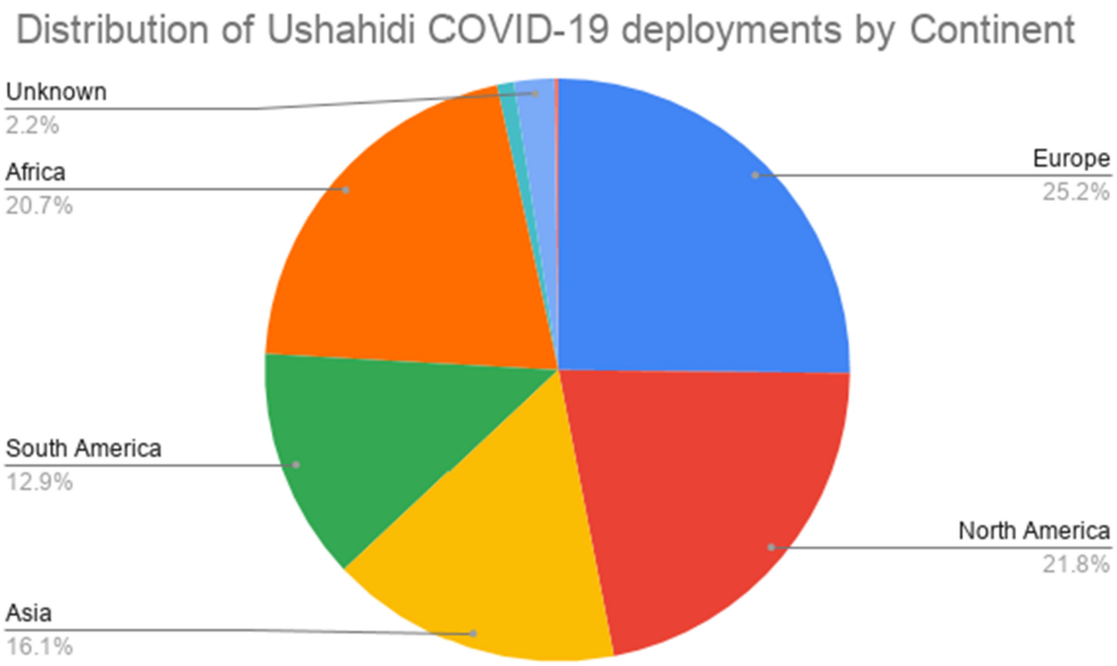


Fig. 1. Distribution of Ushahidi COVID-19 deployments by continent, May 7th, 2021.

The project initially began as a carefully crafted forum where dozens of volunteers collected online resources, curated information and ideas to provide critical resources to the general public. It eventually evolved into a map to connect people who needed help with volunteers. The idea was to connect the most vulnerable in society, such as the homeless, the elderly, the disabled, and those already infected with the disease with access to critical help they needed. They were able to connect volunteers with people who needed help buying groceries or were in urgent need of supplies and were unable to access them. In an excellent demonstration of the power of mutual aid, they collected 10,000+ reports, connecting those in need with those who can help and donated over 28,000 masks, ultimately supporting the Spanish government's pandemic response.

> *"A homeless person in Madrid had prepared himself in advance by buying several power banks to stay connected to the world through his phone. However, he could no longer access cafeterias to charge them. He asked for help through FrenaLaCurva. A lady saw his request and volunteered to charge his power banks regularly. The first time she went back with the charged power banks, the police stopped them, but the moment she said she was a FrenaLaCurva volunteer and she was helping this homeless person, the police said it was fine and let them be." Pablo Ruiz-Muzquiz, FrenaLaCurva Maps Technical Coordinator.*[8]

Now they are sharing their expertise, supporting the replication of their model in 22 other countries around the world: Portugal, Costa Rica, Ecuador, Chile, Mexico, Uruguay, Bolivia, Argentina, Colombia, France, Peru, Venezuela, Brazil, Guatemala, Germany, and Poland.

[8] https://www.ushahidi.com/blog/2020/05/18/the-frenalacurva-project-growth-beyond-expectation.

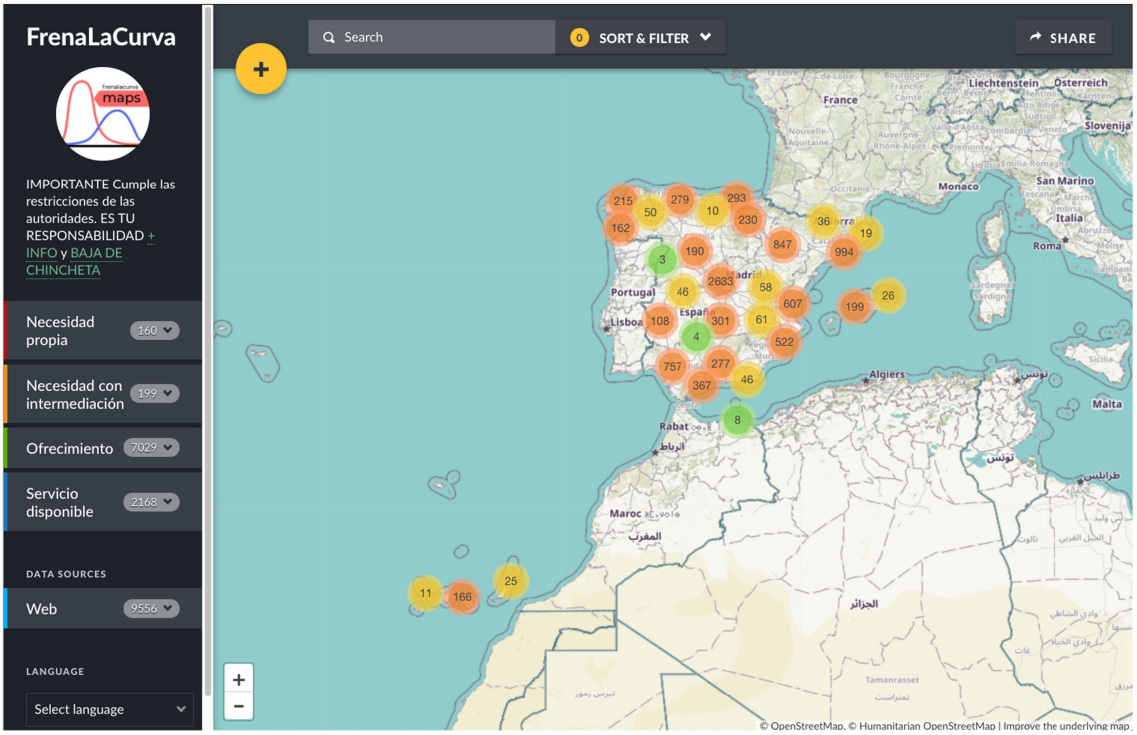


Fig. 2. Frena La Curva mutual aid map (https://es.mapa.frenalacurva.net).

## 2.2 Case Study: Documenting COVID-19 Testing Experiences Globally

Rapid detection of COVID-19 is central to saving people's lives. China has been leading in testing, with reports of the country hitting capacity of 4.84 million in July 2020.[9] While there has been a marked improvement in testing capacity, many countries are still not conducting enough tests. As of March 13th, 2020, according to publicly available datasets, United Arab Emirates was leading in testing capacity, conducting 8.45 COVID-19 tests per 1,000 people. As of October 9th, 2020, only five countries, aside from China, were running more than 500 COVID-19 tests per 1,000 people, namely, Luxembourg (1,388.89), United Arab Emirates (1,123.67), Bahrain (915.40), Denmark (751.19) and Singapore (525.16) Figure 3. That has since changed significantly, with over 21 countries testing more than 1,000 tests per 1,000 people as of May 7th, 2021, such as Slovakia (6,521.13), Cyprus (6,233.49), Austria (3,742.03), among others. In Africa, South Africa, Morocco, and Namibia are leading with 183.89, 157.77 and 157.25 tests per 1,000 people. My country, Kenya, is still at 31.16 tests per 1,000 people as of May 2021 Figure 4.

Testing equipment has been mostly scarce in many countries, and very expensive. At the onset of the pandemic, there were reports of people being turned away at testing facilities due to shortages, despite being symptomatic. Official COVID-19 testing information was ambiguous and incomplete. Many governments were also more focused on minimising the political and economic effects of the virus than on helping the general public deal with health concerns.

Safecast, a non-profit organisation formed in response to the devastating Japanese earthquake and the subsequent meltdown of the Fukushima Nuclear Power Plant in 2011, launched a Ushahidi powered crowdsourced

[9] https://www.globaltimes.cn/content/1196755.shtml.

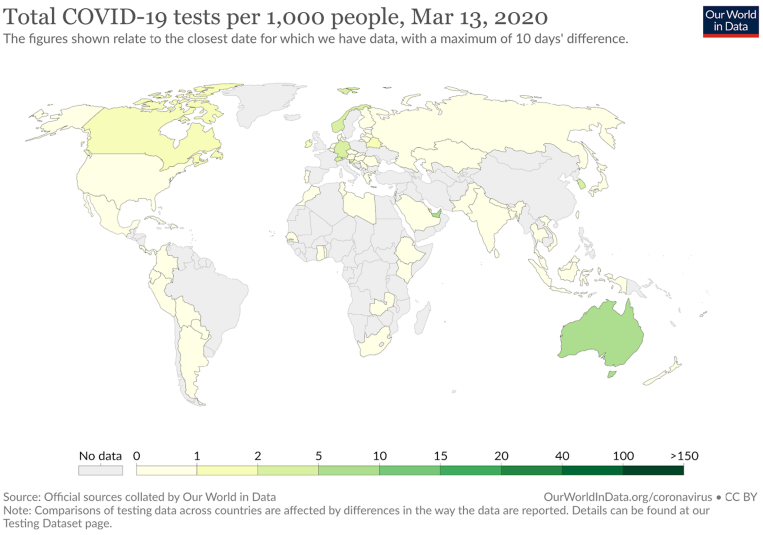


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Fig. 3. Total COVID-19 tests per 1,000 people, March 13th, 2020. Data collated by Our World in Data (https://ourworldindata.org).

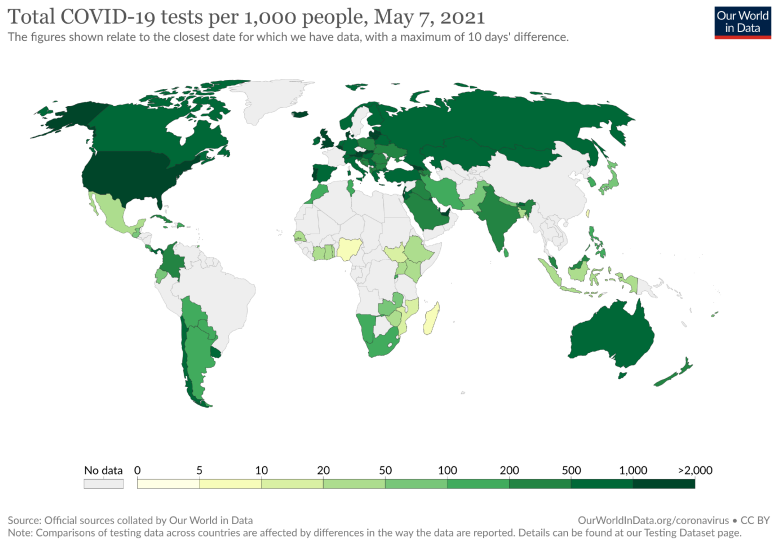


Fig. 4. Total COVID-19 tests per 1,000 people, May 7th, 2021. Data collated by Our World in Data (https://ourworldindata.org).

map to help people around the world document their COVID-19 testing experiences. Their goal was to provide credible information based on first-hand experiences, to help inform government response around the world, and hold officials accountable to citizens who required urgent assistance Figure 5.

They've been helping to put faces to the numbers and enabling people around the world to tell their stories, both harrowing and positive, creating better visibility into the problems around COVID-19 testing worldwide Figure 6.

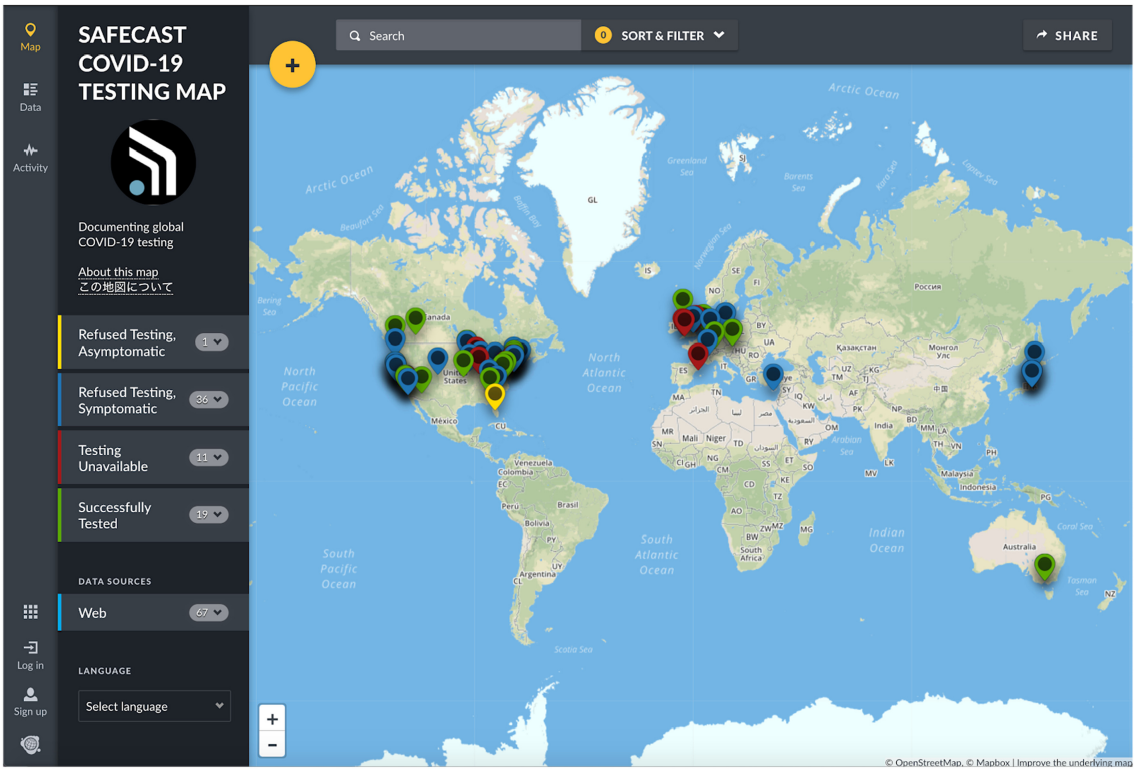


Fig. 5. Safecast COVID-19 testing map homepage (https://covid19map.safecast.org).

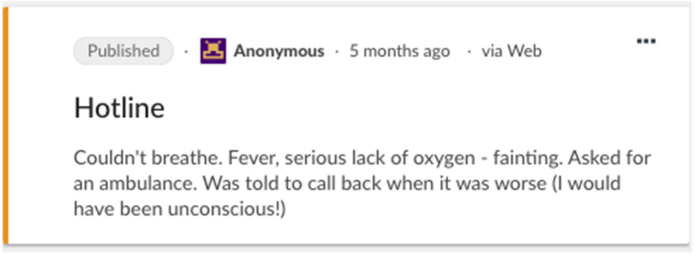


Fig. 6. Citizen report as shared on Safecast's COVID-19 testing map.

It is abundantly clear that coming out of this crisis will require collective action and responsibility. It is therefore crucial for us to continue providing adequate avenues for inclusion and engagement of the general public in response efforts.

## 3 LOOKING BEYOND RESPONSE, AND INTO PREPAREDNESS

Technology platforms like Ushahidi have helped ensure that ordinary citizens can play a part in responding to COVID-19 by lowering barriers of access to information and technology, thus enabling wide-scale engagement. They have significantly contributed to response efforts by local communities, humanitarian actors, NGOs, and governments alike.

However, with warnings of pandemic breakouts being published in research reports spanning multiple decades, we have to ask ourselves, what gaps prevented us from being prepared to tackle COVID-19, and what role can open systems and collective intelligence play in filling those gaps?

## 3.1 Learning from Previous Outbreaks of Diseases

"Those who cannot remember the past are condemned to repeat it." George Santayana

It is not lost on us that many of our behavioural patterns in responding to COVID-19 are eerily similar to historical pandemics, e.g., the Spanish flu of 1918. Even then, some communities imposed quarantines, schools were closed, public gatherings were banned, and citizens were urged to put on masks to curb the spread of the flu.

However, experts globally are lamenting the fact that the world has failed to learn from previous pandemics and disease outbreaks. Governments around the world have been rightfully accused of having invested poorly in pandemic preparedness, learning from years of scientific research as well as recommendations from responses to previous outbreaks. In 2015, epidemiologist Michael Baker outlined vital lessons from the Ebola, AIDs, and SARS epidemics.[11] In 1918, 50 million people died in a year from the Spanish flu. AIDS has killed more than 30 million people since 1981. In 2014, the World Bank forecasted that the financial impact of the Ebola pandemic over two years would reach $32.6 billion.[12] Yet, here we are, seven months into a global pandemic that has killed over one million people, that is threatening to have a disastrous impact on the worldwide economy, and is unravelling years of progress by exacerbating inequalities in low-income communities.

**Why are our healthcare systems still unprepared to handle disease outbreaks despite risks having presented themselves decades and centuries ago? Why are our existing social protection programs inadequate to shield citizens despite having experienced similar economic impacts in years that have passed?**

## 3.2 Making a Case for Data Sharing

Several reports have emerged that China suppressed information regarding SARS for nearly six months and did the same for over a month with its COVID-19 outbreak, leading to delayed response and further spread of the disease in many parts of the world. I have to ask myself if the world would have found out about this sooner if internet freedom wasn't an issue for the Chinese population. China's internet censorship is said to be more advanced than in any other country in the world.[13] The government not only blocks website content but also monitors an individual's internet access. Platforms like Twitter and WhatsApp are blocked in China unless accessed through VPNs. China has also been ranked as the worst abuser of Internet Freedom for the sixth consecutive year in an annual report by Freedom House.[14] **Does this make a case for fighting for internet freedom around the world? Promoting freedom of speech and embracing platforms that empower ordinary citizens to tell their stories, and not rely solely on a top-down data-sharing approach? Would Social Media Intelligence (SOCMINT) tools have been able to detect this outbreak sooner?**

Platforms like Humanitarian Data Exchange and Our World in Data have been helpful to many of us in understanding the pervasiveness of this pandemic, aggregating and visualising datasets from countries that have made this information publicly available. Still, COVID-19 has magnified the gaps that exist in enabling efficient

[10] J. Hasell, E. Mathieu, D. Beltekian, et al. 2020. A cross-country database of COVID-19 testing. Sci Data 7, 345 (2020). https://doi.org/10.1038/s41597-020-00688-8.

[11] https://www.theguardian.com/healthcare-network/2015/may/07/five-lessons-we-should-have-learned-from-pandemics.

[12] https://www.worldbank.org/en/news/press-release/2014/10/08/ebola-new-world-bank-group-study-forecasts-billions-in-economic-loss-if-epidemic-lasts-longer-spreads-in-west-africa.

[13] https://web.archive.org/web/20170815063930/http://ireport.cnn.com/docs/DOC-1255127.

[14] https://freedomhouse.org/report/freedom-net/2020/pandemics-digital-shadow.

sharing of data, and specifically around health, between global health actors. Dr. Linda Thomas-Hemak, Chief Executive Officer of the Wright Center for Community Health, called out the absence of consistent data sharing and access as one of the most significant efficiency and safety threats in the healthcare delivery system.[15] Individual healthcare systems at local, regional, and national levels are capturing their data in different formats, and it's taking time to integrate them and extract learnings that can be shared across other systems.

## 4 CONCLUSION

In these unprecedented times, new technologies and open data can play a significant role in helping us build resilience in our communities through crisis preparedness. It is essential to develop or leverage existing tools to improve the identification of relevant and accurate data for better decision making. Part of improving our decision-making involves ensuring that data "blind spots", where governments and other actors do not have information are improved to provide a more comprehensive picture of the situation on the ground. Inclusive engagement and collaboration between ordinary citizens and their duty bearers are paramount.

Governments are attempting to adapt to the new normal to support the recovery of their economies and bolster their social protection programs to ensure citizens' livelihoods are not disrupted. They may benefit from data sharing platforms that help them better identify areas to target their response programs, but also use predictive analytics to inform adaptation of existing interventions and make policy changes for the future.

The Safecast team's work intended to help people share their stories on how difficult it was to get access to testing, with the hope that it would motivate politicians and governments to increase the availability of testing to their citizens, by shedding light on areas to target and focus their testing efforts, based on real life experiences.

Frena La Curva's mutual aid initiative supported the Spanish government's social protection mechanisms, by empowering ordinary citizens to become a part of the solution. They were able to surface thousands of data points within a matter of weeks, directly from those affected by the crisis, which provided better insight into the extent to which people needed support during the Spanish lockdown.

We also need to invest in interoperable data exchange systems, especially in the health sector, not only at local and national levels but on a global scale. However, more needs to be done to strike a balance between building robust data sharing systems and maintaining individual digital privacy rights.

Internet freedom and access are critical in enabling the free flow of information and promoting freedom of expression, as a tool for preparedness. However, surveillance is not the only blocker to access. Cost is also a substantial, contributing factor. There is pent up demand for the internet, but most people in the global south cannot afford it. We need to heavily invest in infrastructural developments and partnerships that will make internet access a fundamental human right for all.

It is only a matter of time before the next pandemic hits the world. There are more than 1,400 known human pathogens whose capability of causing epidemics increases every day. We can only hope that we will be prepared to tackle it, and will leverage the use of open systems, and collective intelligence now, to learn from our mistakes.

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