PubliCo. A new risk and crisis communication platform to bridge the gap between policy makers and the public in the context of the COVID-19 crisis

Giovanni Spitale

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

giovanni.spitale@ibme.uzh.ch

Sonja Merten

Swiss Tropical and Public Health Institute, Basel, Switzerland

University of Basel, Basel, Switzerland

sonja.merten@swisstph.ch

Kristen Jafflin

Swiss Tropical and Public Health Institute, Basel, Switzerland

University of Basel, Basel, Switzerland

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

kristen.jafflin@swisstph.ch

Bettina Schwind

Swiss Tropical and Public Health Institute, Basel, Switzerland

University of Basel, Basel, Switzerland

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

bettina.schwind@swisstph.ch

Andrea Kaiser-Grolimund

Swiss Tropical and Public Health Institute, Basel, Switzerland

Institute of Social Anthropology, University of Basel, Basel, Switzerland

andrea.kaisergrolimund@unibas.ch

Nikola Biller-Andorno (corresponding author)

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

biller-andorno@ibme.uzh.ch

+41 44 634 40 80

Institute for Biomedical Ethics and History of Medicine (IBME), Winterthurerstrasse 30, 8006 Zürich (CH)

Abstract

Introduction

Since the end of 2019, COVID-19 has had a significant impact on citizens around the globe. As governments institute more restrictive measures, public adherence could decrease and discontent mount. Providing high-quality information and countering fake news is important. But we also need feedback loops so that government officials can refine preventive measures and communication strategies. Policy-makers need information – preferably based on real-time data – on the public's cognitive, emotional and behavioural reaction to public health messages and restrictive measures. PubliCo aims to foster effective and tailored risk and crisis communication as well as an assessment of the risks and benefits of prevention and control measures, as their effectiveness depends on public trust and cooperation.

Methods and Analysis

Our project aims to develop a tool that helps tackle the COVID-19 infodemic, with a focus on enabling a nuanced and in-depth understanding of public perception. The project adopts a trans-disciplinary multi-stakeholder approach, including participatory citizen science. Methodologically, we combine literature and media review and analysis and empirical research using mixed methods, including an online survey and diary-based research, both of which are ongoing and continuously updated. Building on real-time data and continuous data collection, our research results will be highly adaptable to the evolving situation.

Ethics and dissemination

The Cantonal Ethics Committee of Canton Zurich has determined that PubliCo does not fall under the scope of the Swiss Human Research Act (BASEC Nr. 2020-02917). Our risk assessment and data protection plan were also reviewed and approved by CEBES, the IRB of the Institute for Biomedical Ethics and History of Medicine (IBME).

Project results, interpretative briefs and intermediate datasets will be publicly available via the project website (www.publico.community) and via open science repositories (Zenodo).

Strengths and limitations of this study

- PubliCo is a new modular and flexible tool to provide bi-directional interaction between citizens and policy-makers for risk and crisis communication
- PubliCo relies on quantitative and qualitative data to provide a precise, timely and rich analysis of complex phenomena
- PubliCo is open and transparent by design
- Although important safeguards are put in place in the code, in a less democratic context it could be used for social control
- Communicating complex notions with moral implications (e.g. about health risks, allocation strategies, and community benefits) is a challenge.

Keywords

Introduction

Background

Since the end of 2019, COVID-19 has significantly impacted the lives of people around the globe. Beyond infections, disease and death, the global public has been exposed to increasingly restrictive policy measures. Within weeks or even days, measures evolved from recommendations, such as frequent handwashing, to more disruptive interventions, including social distancing, cancellations of social events, closure of schools, and closed borders. Public life and ways of socializing that were taken for granted have come to an abrupt halt.

Exceptional circumstances, like this pandemic, generally have significant short-, mid- and long-term consequences in social, economic and maybe cultural and political terms. Some issues have already emerged, including social isolation of vulnerable groups, panic buying and stolen supplies, or instances of reprimanding others for their "irresponsible" behaviour. While the gradual easing of containment measures eased frustration in parts of the population following the first wave, the re-instalment of restrictive measures may lead to mounting discontent and decreasing public adherence to containment measures.

In Switzerland measures have been less restrictive than in many other countries, yet more drastic dispositions are conceivable and legally covered by the Swiss Epidemics Law should the situation require them, including a general curfew, mandatory testing or the use of mobile phone data for surveillance purposes. During the first wave (March to June 2020), the Swiss population has generally supported measures. As the second wave unfolds, however, the debate about public health measures like contact tracing, limits on visiting nursing home residents, home office, etc. has intensified.

"Anti-corona" demonstrations in several cities, gatherings of hundreds of people celebrating the end of the lockdown or organized "illegal" soccer games were among the first signs of resistance to public health measures [1]. In order to effectively manage the current pandemic crisis, we must better understand how the Swiss public perceives public health measures taken and concerns they have about the pandemic and the government's response to it.

Information gaps

While governments are trying to steer through this crisis as cautiously as possible, the public is grappling with how to interpret what is happening. Communication is therefore key. Existing literature suggests that effective health communication can help enhance positive outcomes of public policy [2,3]. Importantly, the exposure to focused health campaigns in the context of epidemics has proven as an efficient tool not only to increase epidemic-related knowledge, but also to foster the adoption of recommended health behaviours [4,5].

While international organizations, national governments, public health authorities, scientific institutions and high-quality media are trying to inform the public as responsibly as possible, many other information sources of questionable credibility exist across media platforms all over Europe. Formal and informal opinion groups share content from these sources and influence public opinions in problematic ways, e.g., by blaming specific social and ethnic groups for the pandemic or by encouraging defiance of public health recommendations. Some media draw on dystopic pictures and morally loaded language, using war metaphors and reproaching those who voice doubts and criticism, which leads to polarization and an affectively charged debate producing strong counterreactions rather than factual and nuanced public deliberation [6]. This situation has led the WHO to warn of an "infodemic", wherein too much information of mixed quality make it hard for people to find reliable information [7]. The WHO and other public health agencies are working on refuting

myths regarding, e.g., false preventive measures and false cures, through fact checks of social media and writing responses[8].

However, providing high-quality information and countering fake news is not enough. Policy-makers also need feedback loops to give them real-time data on the public's cognitive, emotional and behavioural reaction to public health measures, allowing them to continuously refine and adjust preventive, control and containment measures and communication strategies.

A better understanding of the population's reaction to mitigation measures would allow better estimation of their potential effectiveness, influencing both communication strategies and policy choices [9,10]. It would also help to understand to what extent policy decisions match with citizens' moral values and preferences regarding, e.g., the allocation of scarce medical resources, contact tracing, or obligatory mask wearing [11]. Finally, understanding how different segments of the population perceive both the pandemic and public health measures is vital, as both disproportionately affected social groups that were already vulnerable before the pandemic [12]. How do, for example, frontline healthcare workers, older people, the chronically ill, or the economically vulnerable cope with the pandemic and mitigation measures? Given the limitations of "one size fits all" approaches to mitigation measures, local and subgroup data are critically needed to develop more efficient strategies [13].

So far, there has been mainly "one-way communication". We know little about different subgroups' understanding of the situation and readiness to comply with policies, and how this is affected by their preferred information sources. Cross-sectional opinion polls [14–16] encounter important limits in rapidly evolving situations – they are resource-intensive and limited in scope, their items are typically designed in a top-down way, they struggle with high non-response rates and provide snapshots rather than continuous monitoring [11]. Consequently, policy makers might rely on a suboptimal picture of reality in order to make their choices, and some citizens may feel that large demonstrations are the only way to make themselves heard. Even if the majority of the public support public policies and cooperate with them, this consensus may become fragile in the future if authorities disregard misunderstandings, concerns or unrest in certain segments of the population. Better monitoring of public perceptions would enable better communication and more effective containment measures that reduce collateral damage to society.

However, such monitoring must be done in a way that citizens do not perceive as unwanted surveillance but rather as an initiative that invites their active input and values their views and opinions.

Aims

PubliCo seeks to address these gaps. It is an experimental online platform built on a strong participatory citizen science component that will serve three purposes:

- Collecting real-time data on COVID-19-related public perception;
- Providing tailored, timely and reliable information to the public;
- Facilitating well-targeted health policy-making based on the theory that successful communication, public understanding and consent reinforce the effectiveness of public health measures [2,3,5].

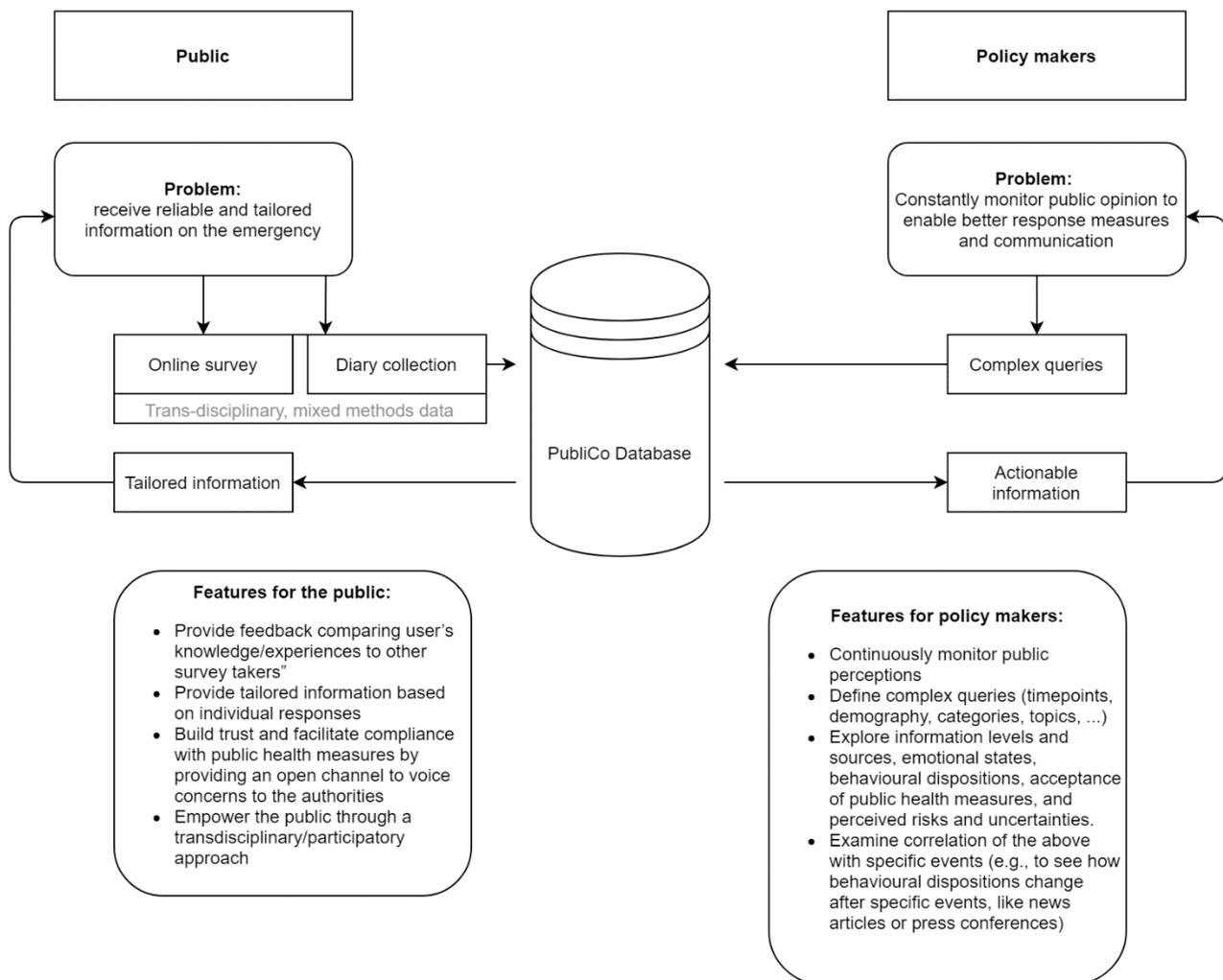**Context: emergency response**
Data flow in PubliCo

Figure 1. PubliCo conceptual structure: after completing a short survey (PubliCo Survey), citizens can receive information tailored to their needs. Users can also register as citizen scientists and contribute diaries (PubliCo Diaries). Policy makers can study the information provided by citizens in order to conceive, deploy and evaluate more efficient mitigation and containment measures (PubliCo Analytics).

Methods and analysis

Concept

The project combines analytical work and empirical studies using mixed methods and strong citizen science components in order to deliver a functional platform composed of three main elements: PubliCo Survey; PubliCo Diaries, PubliCo Analytics.

PubliCo Survey will be the main source of quantitative information. Based on demographic characteristics and scores on selected subscales, citizens will obtain information specific to their needs. For example, people living in border regions will receive information about neighboring countries, and people with children will receive information about safety measures in schools. The survey will be ongoing, providing real-time data on public perception and readiness to cooperate with public health strategies.

PubliCo Diaries will be the main source of qualitative information. Qualitative solicited diaries can provide "unique insights into the life-worlds inhabited by individuals; their experiences, actions, behaviors, and emotions and how these are played out across time and space" [17].

The diary approach empowers citizens to integrate their personal experiences and perceptions [18] while remaining in control not only of the content described but also of the pace and time of data collection [17]. In this way, this participatory method allows the involvement of citizens in the research process and the visualization of everyday negotiation processes in real time due to the immediacy of documentation [17,19].

Users will register as citizen scientists and keep a weekly diary in which to record their reflections on how COVID-19 and related policy measures affect their daily routine, social practices, values and priorities. Citizen scientists may also keep their diaries offline or record audio files and have the text entered by project staff afterwards so that segments of the population that don't have time to keep a written diary or are less tech-savvy can participate. In this way, PubliCo Diaries attempts to reach diverse groups of citizens currently encountering different personal situations and possibilities (e.g. pregnant women, older people, people on short-time work, youth or people with a migration background). These texts will provide information about meaning, plus new insights on emerging, unforeseen aspects taken up by the diary authors. Finally, qualitative analysis of the diary data will inform the revision or generation of new survey items.

PubliCo Analytics will be the "access door" to the data collected through the survey and the diaries. It will provide information to be used for analyses directed to policy-makers regarding information levels, behavioral dispositions, emotional states, moral preferences. It also allows analysis of correlations of, e.g., vaccine prioritization preference and demographic sub-groups or support of preventive measures and COVID-19 experience. Finally, PubliCo Analytics will contain thematically focused policy briefs, in which we contextualize the data, interpret core findings, and make recommendations.

Development
Developing the PubliCo platform involves work on three components:

- Development of PubliCo survey and user feedback;
- Realization and testing of the platform;
- Definition of analytic capabilities of PubliCo analytics;

PubliCo Survey and user feedback
In order to define the content of the survey and user feedback we adopted a threefold strategy: identify the kind of information people look for through the analysis of Google Trends data, map the information available in the media through Natural Language Processing (NLP) on news from major media outlets, and determine the focuses of COVID-19 related behavioural and social science research (BSSR) assessing the content of the data collection instruments for COVID-19 compiled by the NIH Office of Behavioral and Social Sciences.

The analysis of Google Trends data on searches about COVID-19 performed in Switzerland between January and July 2020 displays a high diversity in information consumption patterns, that vary greatly depending on the Canton of residency. Swiss residents may therefore welcome a system like PubliCo, which delivers personalized information [20].

We identified the following categories of queries regarding the pandemic and its effects:

- Georeferenced information
- Information from official sources (e.g: WHO, Federal authorities)
- Quantitative information

- News and updates
- Medical information
- Tips

In order to understand how the media discuss and frame COVID-19 in Switzerland, we used Factiva, a news monitoring and search engine developed and owned by Dow Jones that has access to full text articles published by major media outlets worldwide. We gathered and downloaded all the news articles published between January and July 2020 on Covid-19 and Switzerland.

Natural Language Processing (NLP) and analysis of the frequencies of lemmas [21] revealed some differences across languages. The analysis of German lemmas indicates a public discourse focused on quantitative aspects of the pandemic; the French subcorpus focused on describing the pandemic and its effects on people; the Italian subcorpus focused more on cases and fatalities; the English subcorpus seems dominated by information reported from other sources, which makes sense as English is not an official language of the Confederation, and by many lemmas like "company", "group", "market", suggesting greater attention to the economic and financial impact of the pandemic [20].

All the subcorpora provide the following macro-categories of information:

- georeferenced information (information specific to countries, Cantons or cities);
- general information about the pandemic and about the virus;
- reports from authorities and official bodies;
- quantitative information.

The NIH Office of Behavioral and Social Sciences released a document listing "data collection instruments, including surveys, for assessing COVID-19-relevant BSSR domains for clinical or population research" [22]. Reviewing the surveys listed in the document we identified 6 main topics of interest: financial impact, social practices, behavioral dispositions, moral preferences, emotional state and cognitive understanding [20].

A comparison between information consumption patterns, information available in the media, and BSSR research interests identified 5 categories of information to collect and to provide through PubliCo:

- Demographics;
- Cognitive understanding;
- Behavioral dispositions;
- Emotional state;
- Moral orientations.

Citizen scientists will be involved in the validation of the survey and of the information we intend to provide. This will be accomplished through the web-based project builder of the Citizen Science Center Zurich [23].

Realization and testing of the platform

The PubliCo platform is being developed in cooperation with Belka, a software house based in Trento/Munich, with extensive expertise in user experience design and development. The platform is web-based, mobile first, and is built on a stack of open source software (React, SurveyJS, Typescript, Django, MariaDB, Docker, CicleCI, NGINX). Particular attention is being devoted to the development of a backend for researchers, allowing non-technical staff to add and modify both survey items and information for the users. The content management system supports a multilingual interface. User experience testing will help ensure the platform is accessible to a large part of the Swiss population.

Definition of analytic capabilities of PubliCo analytics

Results from the online survey will be analyzed in multiple ways. Users will have direct feedback for certain variables (e.g: information level, behavioral dispositions), including scores and official information based on responses to knowledge questions but also basic descriptive statistics (means and frequencies) for all users and specific sub-groups or respondents from specific cantons.

In addition, through PubliCo analytics, researchers and policy makers will be able to answer complex questions like "Are people who know someone who got infected by COVID-19 more likely to get vaccinated?" "How would people who have personal experience with COVID-19 prefer the vaccine to be distributed?" Queries can restricted to specific subgroups (e.g. age, residency, level of education).

Project researchers will also analyze results for periodic policy briefs. Questions to be examined will vary over time and will include basic descriptive statistics for the different domains included in the survey (knowledge, emotional state, behavioral dispositions and moral preferences), sub-group analyses by geographical area and target group, and correlation analyses. Questions to be examined through correlation analysis include:

- What is the relationship between participant knowledge and willingness to comply with public health restrictions?
- What is the relationship between participant knowledge and emotional state?
- What is the relationship between participant's emotional state and their willingness to comply with public health restrictions?
- What factors influence participants' moral preferences?

These and other questions will be analyzed using regression analysis with a significance level of $\alpha = 0.05$.

The diary narratives will be anonymized and analyzed in conjunction with the ongoing data collection by means of thematic analysis [24] using the Software MAXQDA [25].

Selected data will be displayed in PubliCo Analytics in a visually appealing form (e.g. infographics, live maps). Advanced analytics will be employed whenever possible (NLP for text elements, predictive modelling of, e.g., public behavior in case of new measures taken). Many passages, from the analysis of diaries to the automated analysis of selected subscales, will be automatized by means of NLP and other related AI applications. These techniques will ensure that the platform is more cost effective and that results of analysis and actionable information are available faster.

Data collection will be adapted to how the situation evolves, taking up emerging themes (e.g. vaccine distribution; balancing work requirements and protection of persons with risk factors). Core findings and recommendations will be published in thematically focused policy briefs.

Data collection

Data collection for PubliCo Survey will start with a pilot phase (December 2020 to March 2021), during which we will collect analytics on how the platform and its different tools are used. For this purpose, we will use a shorter version of the PubliCo survey (which is currently under evaluation through Citizen Science Center Zurich). The tool is already able to collect and provide information, but we want to collect more bottom-up input before deploying the full survey.

Data collection for PubliCo Diary will start during the pilot phase as well. Participants will be given a brief guide to the diary method, which will inform them about the openness of the method (e.g., without concerns about spelling and grammar). The guide will ask them to jot down their experiences and thoughts

from the beginning of the pandemic to the current day and their everyday worries, emotions, risks, experiences, decisions and actions during and/or after the pandemic in at minimum a weekly rhythm for a duration of at least 4 weeks. This will allow "to document changes in values, attitudes, knowledge and behavior" [26].

In order to increase the user base, after the pilot phase PubliCo shall be disseminated through:

- General media through featured articles in order to reach the general population;
- Mailing lists of the Universities of Zurich and Basel in order to reach undergraduate and graduate students;
- Facebook groups in order to reach selected target groups, including migrants and parents;
- Teachers' associations in order to reach high school students;
- Participants of the Swiss branch of the DIPEx International Study on COVID-19 in order to reach people who had direct experience of COVID-19;
- A demoscopic company that will solicit a representative sample for comparative purposes.

The outboarding section will also invite the users to share the tool further via social media, email or similar systems, and to register as citizen scientists for the PubliCo Diary component. We will also investigate possibilities of disseminating through official channels, like the automatic SMS sender of the Federal Office of Public Health.

Data collection will be iterative and will proceed for at least two years. We expect the tool to be refined and enhanced as data collection and analysis moves forward. The current version of the survey is available at www.publico.community.

Ethics and dissemination

One aim of PubliCo is to deliver personalized information in the context of public health emergencies. However, providing personalized information can be potentially problematic. Feedback on knowledge-based questions simply involves notifying users of wrong answers and giving access to reliable sources, like the WHO or official information outlets [27]. Some uneasiness remains around making assumptions about citizen's informational needs and possibly contributing to knowledge "bubbles". Providing personalized information from subscales regarding emotional response, moral preferences or mental wellbeing is more challenging. For these topics we will provide a comparison between individual scores and sample means. In this sense, it is fundamental to clarify the descriptive nature of the scores without any claims as to what the norm should be (is-ought problem). The final strategy needs to be defined with expert advisors and citizen scientists after evaluating potential outcomes.

The Swiss Cantons are affected in different ways by the COVID-19 pandemic. Our approach, comparing geo-located data, might reveal differences in behaviours and attitudes that could correlate with the course and the severity of the pandemic. Because of this, we will collect some demographic information (personal data, potentially also sensitive as defined in the Law on Information and Data Protection (IDG) par. 3 of the Canton of Zurich) and some information about personal philosophical or religious beliefs (sensitive data as defined in IDG par. 3).

As assessed by the Cantonal Ethics Committee of Canton Zurich, PubliCo does not fall under the scope of the Swiss Human Research Act (BASEC Nr. 2020-02917). Our risk assessment and data protection plan were also reviewed and approved by CEBES, the institutional review board of the IBME at the University of Zurich.

The potential harms generated by the project fall in two categories: re-identification (and thus attribution of specific opinions to specific persons) and morally problematic questions.

Potential event	Potential consequences	Type of harm	Severity (1-5)	Likelihood (1-5)
Re-identification of a participant	Participants can feel betrayed by the data controller and lose trust in research/society	Psychological	2	1
Re-identification of a participant	Participants with controversial opinions could lose their jobs when these are considered particularly dangerous by their employers	Economical	3	1
Re-identification of a participant	Participants with controversial opinions could be rejected and isolated from the societies of which they are part	Social	3	1
Re-identification of a participant	Participants with controversial opinions could be physically assaulted because of their opinions	Physical	5	1
Morally problematic questions	Participants can be upset when asked about morally problematic topics (e.g. allocation of scarce resources) especially if directly touched by the issue at stake	Psychological	2	3

Table 1. Risk assessment of PubliCo.

The most prominent category of risks is connected to re-identification of participants. To minimize chances of this, the survey component is completely anonymous by design (not even the IP address is collected) and the diary component is pseudonymous by design (we can attribute diaries to users, but we cannot attribute users to persons). The only remaining concrete risk for re-identification is posed by what users could write in the diaries. Because of this, we take extra care in planning the access, use and management of this category of data: no personal identifiers are collected upon registration, diary text is accessible upon request to trusted third parties (e.g: research institutions), and the content is manually checked for full anonymity beforehand. We are confident that the instrument is safe from a data protection point of view.

All the data will be stored in a virtual machine hosted in the data centre of the University of Zurich with access restricted to the project members. The chances of identification, in the eventuality of a data leak, are very low.

In order to mitigate the second category of risk we are discussing the whole survey tool with expert advisors and citizen scientists in order to get double feedback on the issues involved. That said, the impact would still be low, and more importantly the distressed user can interrupt or end participation at any time.

The very nature of this project implies another general risk: in a less democratic context the tool we are developing could be used for social control. This is a potential risk we cannot mitigate for other countries.

For Switzerland, the whole infrastructure of the project is built keeping in mind a transparent and democratic approach, important in general in the scientific enterprise, but fundamental in a context in which the data yielded from the system are used in order to make decisions impacting the public.

Overall, participants do not have an immediate personal benefit beyond the insights gained through the survey experience and feedback, but do have a long-term community benefit resulting from the tool being used to deploy public health measures that consider and take into account their preferences. Therefore, we consider the risk-benefit balance justifiable.

Open science by design

We believe that adopting a democratic, bottom-up approach to designing and developing PubliCo would greatly improve public perception of the project, while allowing us to tackle urgent and unforeseen issues [28]. As such, every component of PubliCo will be publicly available: the research project, the intermediate datasets and the software used to compile them, the source code, the raw data and the interpretative briefs. The only data that will be subject to manual check before release is the raw text of the diaries, as stated above.

This setup will increase trust in the project, encourage secondary use of PubliCo data, and ease the implementation of the tool in other countries.

Limitations

This design has two main limitations. Our approach focuses on public perception rather than on observational data of real practices. There may be discrepancies between opinions, attitudes and behavioral dispositions and what people actually do. On the other hand, we think much insight is to be gained already from what people are in principle agreeable to or what they will consider inacceptable.

The second limitation regards the information to provide at the end of the survey: for some topics, e.g. the concrete risk posed by COVID-19, it is (still) difficult to find solid figures and the way they are communicated can generate problems and misunderstandings. In this sense we have opted for a different approach: users will be pointed first to the official information provided by the Federal Office of Public Health, and secondly (depending on their scores in cognitive understanding) to PubMed queries designed to yield systematic reviews or meta-analyses. This way, following once again an open science spirit, citizens will be able to access the relevant literature.

Acknowledgements

References

1   swissinfo.ch. 1,000 people gather for unofficial football match. swissinfo.ch. 2020.https://www.swissinfo.ch/eng/corona-restrictions-broken-_1-000-people-gather-for-unofficial-football-match-/45778644 (accessed 27 Nov 2020).

2   Lee ST, Basnyat I. From press release to news: mapping the framing of the 2009 H1N1 A influenza pandemic. *Health Commun* 2013;**28**:119–32. doi:10.1080/10410236.2012.658550

3   Sandell T, Sebar B, Harris N. Framing risk: communication messages in the Australian and Swedish print media surrounding the 2009 H1N1 pandemic. *Scand J Public Health* 2013;**41**:860–5. doi:10.1177/1403494813498158

4   Ning L, Niu J, Bi X, *et al.* The impacts of knowledge, risk perception, emotion and information on citizens' protective behaviors during the outbreak of COVID-19: a cross-sectional study in China. *BMC Public Health* 2020;**20**:1751. doi:10.1186/s12889-020-09892-y

5   Lin L, Savoia E, Agboola F, *et al.* What have we learned about communication inequalities during the H1N1 pandemic: a systematic review of the literature. *BMC Public Health* 2014;**14**:484. doi:10.1186/1471-2458-14-484

6   Semino E. "Not Soldiers but Fire-fighters" – Metaphors and Covid-19. *Health Commun* 2021;**36**:50–8. doi:10.1080/10410236.2020.1844989

7   WHO. Novel Coronavirus(2019-nCoV) Situation Report - 13. 2020.https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf (accessed 4 May 2020).

8   WHO. Coronavirus disease (COVID-19) advice for the public: Myth busters. 2020.https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters (accessed 4 May 2020).

9   Plough A, Bristow B, Fielding J, *et al.* Pandemics and health equity: lessons learned from the H1N1 response in Los Angeles County. *J Public Health Manag Pract JPHMP* 2011;**17**:20–7. doi:10.1097/PHH.0b013e3181ff2ad7

10   van der Weerd W, Timmermans DR, Beaujean DJ, *et al.* Monitoring the level of government trust, risk perception and intention of the general public to adopt protective measures during the influenza A (H1N1) pandemic in The Netherlands. *BMC Public Health* 2011;**11**:575. doi:10.1186/1471-2458-11-575

11   Kaplan G, Baron-Epel O. Personal needs versus national needs: public attitudes regarding health care priorities at the personal and national levels. *Isr J Health Policy Res* 2015;**4**. doi:10.1186/s13584-015-0010-2

12   Adams-Prassl A, Boneva T, Golin M, *et al.* Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *J Public Econ* 2020;**189**:104245. doi:10.1016/j.jpubeco.2020.104245

13   SteelFisher GK, Blendon RJ, Ward JRM, *et al.* Public response to the 2009 influenza A H1N1 pandemic: a polling study in five countries. *Lancet Infect Dis* 2012;**12**:845–50. doi:10.1016/S1473-3099(12)70206-2

14   SRF. Umfrage der SRG - So denkt die Schweiz über die Corona-Krise. Schweiz. Radio Fernseh. SRF. 2020.https://www.srf.ch/news/schweiz/umfrage-der-srg-so-denkt-die-schweiz-ueber-die-corona-krise (accessed 7 Jun 2020).

15   tagesschau.de. DeutschlandTrend extra: Deutsche finden Versammlungsverbot gut. tagesschau.de. 2020.https://www.tagesschau.de/inland/deutschlandtrend-extra-blitzumfrage-103.html (accessed 7 Jun 2020).

16   Betsch C, Wieler L, Bosnjak M, *et al.* Germany COVID-19 Snapshot MOnitoring (COSMO Germany): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak in Germany. Published Online First: 3 March 2020. doi:http://dx.doi.org/10.23668/psycharchives.2776

17 Milligan C, Bartlett R. Solicited Diary Methods. In: Liamputtong P, ed. *Handbook of Research Methods in Health Social Sciences*. Singapore: : Springer 2019. 1447–64. doi:10.1007/978-981-10-5251-4_15

18 Harvey L. Intimate reflections: private diaries in qualitative research. *Qual Res* 2011;**11**:664–82. doi:10.1177/1468794111415959

19 Hyers L. *Diary Methods: Understanding Qualitative Research*. Oxford University Press 2018. https://www.oxfordscholarship.com/view/10.1093/oso/9780190256692.001.0001/oso-9780190256692 (accessed 7 Jun 2020).

20 Jafflin K, Merten S, Spitale G, *et al.* PubliCo: Improving risk and crisis communication in the context of the COVID-19 crisis. Ad-hoc white paper for the Health Ethics & Governance Unit on Ethics & COVID-19, WHO. 2021.

21 Spitale G, Merten S, Biller-Andorno N. Lemmas and Named Entities analysis in major media outlets regarding Switzerland and Covid-19. 2020. doi:10.5281/zenodo.4036071

22 NIH Office of Behavioral and Social Sciences Research. COVID-19 OBSSR Research Tools. 2020.https://www.nlm.nih.gov/dr2/COVID-19_BSSR_Research_Tools.pdf (accessed 10 Jun 2020).

23 Citizen Science Center Zurich. CS Project Builder - PubliCo. Citiz. Sci. Cent. Zurich. 2020.https://lab.citizenscience.ch/en/project/231 (accessed 27 Nov 2020).

24 Hyers LL. *Diary Methods: Understanding Qualitative Research*. Oxford, New York: : Oxford University Press 2018.

25 Woolf NH, Silver C. *Qualitative Analysis Using MAXQDA: The Five-Level QDATM Method*. Routledge 2017.

26 Constant N, Roberts L. Narratives as a mode of research evaluation in citizen science: understanding broader science communication impacts. *J Sci Commun* 2017;**16**:A03. doi:10.22323/2.16040203

27 EU vs Disinformation. EU vs DISINFORMATION. EU Vs DISINFORMATION. 2020.https://euvsdisinfo.eu/ (accessed 10 Jun 2020).

28 Smart P, Holmes S, Lettice F, *et al.* Open Science and Open Innovation in a socio-political context: knowledge production for societal impact in an age of post-truth populism. *RD Manag* 2019;**49**:279–97. doi:https://doi.org/10.1111/radm.12377

Authors' contributions

All authors contributed to the conception and design of the study.

GS performed the analysis of the Google Trends/Factiva corpora and coordinates the work on the software of the platform. GS, KJ, and NBA developed the implementation of the survey component. BS, AKG, and SM developed the implementation of the diary methodology. All authors contributed to the definition of the analytics component.

GS wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the final version.

Availability of data

The Google trends dataset is available here: 10.5281/zenodo.4550751

The software used for the analysis of the Factiva corpus is available here: 10.5281/zenodo.3991613

The raw results of the analysis of the Factiva corpus are available here: 10.5281/zenodo.4036070

Due to copyright restrictions, the Factiva corpus is available through Factiva.

Patient and public involvement

Citizen scientists are involved in the development of PubliCo from the very early stage. After defining the potential topics of interest of PubliCo, the research team submitted them for validation to Citizen Science Center Zurich. Citizen scientists have access to the intermediate datasets. Comments from Citizen Scientists have been taken into account in the development and revision of PubliCo Survey. PubliCo Diaries relies on Citizen Scientists, who will also be able to perform text mining on the corpus, generating their own hypotheses and contributing to the refining of the data analysis. All the data, the analysis and the interpretative briefs will be available to the public through PubliCo Analytics.

Funding

Competing interests

The authors have no competing interests to declare.

Word count

3918