

Denmark COVID-19 Snapshot MOnitoring (COSMO Denmark): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak in Denmark

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This study protocol is based on a standard protocol published by the World Health Organization/Regional Office for Europe (1), aimed at providing a general guidance on how to assess citizens' knowledge, perceptions, and behaviour related to the COVID-19 outbreak. As the aims, objectives, and research questions are similar across countries, we refer the reader to the standard protocol regarding these issues. Herein, we will only describe aspects specific to the Danish protocol.

Study methods and sample

The Danish survey will use a mixed cross-sectional/panel design. The first arm of the research design consists of weekly surveys to which we will invite cross-sectional samples of 5,000 participants each week for a period of eight weeks (i.e., 8 x 5,000 invited participants). In the second arm, we will invite 15,000 participants to be part of a panel, completing a shortened version of the survey each week over the whole study period. Both surveys will be flexibly adapted during the study period based on the epidemiological situation as well as key policy measures in response to it. The design thus allows us to investigate predictors of individuals' perceptions and behaviours at a given point of time as well as the changes thereof during the outbreak. We aim to compose the surveys such that the average completion time will not exceed 25/10 minutes for the cross-sectional/panel survey, respectively. Note that we plan to extend the study period conditional on external funding. In case of extension, we might consider changing the frequency of survey invitations from weekly to bi-weekly.

Recruitment of participants works as follows: In 2018, one of the authors (I.Z.) received contact information from 100,136 Danish citizens via Statistics Denmark (<https://www.dst.dk/en>). These citizens were chosen per random, but so that the group was – at that time – representative for the Danish adult population with regard to the distribution of age, gender, and place of residence. From this sample, we will invite randomly drawn subsamples to participate in the cross-sectional/panel survey. Specifically, we will invite 8 samples of 5,000 citizens each for the cross-sectional surveys, as well as one time 15,000 citizens to join the panel (concerning the panel, only those citizens who provide consent in the first week

will be invited to the following surveys). Participation is voluntarily. Participants who participate at least 6 times in the panel survey over the course of the study period will take part in a lottery to win 1 out of 30 vouchers worth 2,000 DKK. We might add further incentives conditional on additional funding.

The survey will be set up via *formr* (<https://formr.org>; 2). Invitations to the online survey will be sent via citizens' official digital mail (*e-Boks*, see <https://www.e-boks.com/danmark/en/>). The invitations will be sent out at the beginning of the week and participation is possible until Sunday night of the same week. Note that some invitations are likely to not be delivered because people moved abroad, passed away, or have otherwise no longer an official digital mail since the contact information was retrieved. Invitations to the first round of surveys will be sent in week 23, 2020. The study will run for 8 weeks (until week 20, 2020), with invitations sent weekly. We might extend the study period conditional on additional funding.

Variables

The below variables will be assessed in the survey of the first week (see the *formr* code of the questionnaire attached). The surveys will be adapted during the study period. We are going to annex a list of variables that were assessed in each week over the whole study period after data collection is finished. Yet, we encourage others to contact the authors in case they are interested in the current version of the survey.

Cross-sectional survey

- Demographics: age, gender, number and age of children, education, health status (chronic diseases), ZIP code
- Whether participant has been infected with COVID-19 and whether participant knows others who have been infected
- Perceived knowledge about COVID-19
- Knowledge about COVID-19: risk groups, transmission, treatment, incubation period
- Perceived probability and severity of infection with COVID-19
- Perceived knowledge and preparedness to avoid infection with COVID-19
- Adherence to measures aimed at avoiding infection with COVID-19 in general
- Perceived effectiveness of measures aimed at avoiding infection with COVID-19 for oneself, separately for each of the measures recommended in Denmark
- Perceived effectiveness of measures aimed at avoiding infection with COVID-19 for others, separately for each of the measures recommended in Denmark
- Own adherence to measures aimed at avoiding infection with COVID-19, separately for each of the measures recommended in Denmark
- Family/friends' adherence to measures aimed at avoiding infection with COVID-19, separately for each of the measures recommended in Denmark
- Perceived distance, novelty, speed of spreading, scientific knowledge, personal thinking, fear, media hype, worry, and helplessness regarding the COVID-19 outbreak
- Trust in different information sources (e.g., media) regarding information provided on COVID-19
- Use of different information sources (e.g., media) regarding information provided on COVID-19
- Trust in different authorities (e.g., police, politicians) to deal with the COVID-19 outbreak
- Perceived appropriateness of different policy measures (currently implemented or not) to tackle the COVID-19 outbreak

- Purchasing behaviours and working routines (home office) due to COVID-19 outbreak
- Worry about different (long-term) effects of the COVID-19 outbreak (e.g., economic recession, increased egoism)
- Empathy towards others related to COVID-19
- Prosocial behaviours shown related to COVID-19
- Perceived solidarity toward others, separately for different target groups (e.g., neighbourhood, country, EU)
- Perceptions and feelings related to physical isolation (e.g., boredom, loneliness, stress)
- Personality (Honesty-Humility and Emotionality from the HEXACO personality model)
- Resilience

Panel survey

- Demographics: age, gender, number and age of children, education, health status (chronic diseases), ZIP code
- Whether participant has been infected with COVID-19 and whether participant knows other who have been infected
- Perceived probability and severity of infection with COVID-19
- Perceived knowledge and preparedness to avoid infection with COVID-19
- Perceived distance, novelty, speed of spreading, scientific knowledge, personal thinking, fear, media hype, worry, and helplessness regarding the COVID-19 outbreak
- Worry about different (long-term) effects of the COVID-19 outbreak (e.g., economic recession, increased egoism)
- Resilience
- Perceptions and feelings related to physical isolation (e.g., boredom, loneliness, stress)
- Generalized trust in (a) the government and (b) other people

Data analysis, review, and publication of results

For the publicly available weekly reports of COSMO Denmark, only complete data sets will be considered in the analysis. The data will be analysed weekly to draw conclusions about (a) knowledge, perceptions, and behaviours in the current week, and (b) differences in knowledge, perceptions and behaviours across weeks. We will create and share the analysis scripts in a R Notebook environment.

We will share and weekly update a summary of the results on the project website: <https://cosmo.ku.dk>. We will not provide access to the individual data and only report aggregate results such that inferences about individual participants are not possible. Results from descriptive and inferential statistics will be accompanied by understandable interpretations. We will, however, refrain from policy recommendations.

Before publication on the website, the report of results will be reviewed by at least two members of the COSMO Denmark group for (a) accuracy of analyses, (b) accuracy of interpretations, and (c) understandability to a broader (non-scientific) audience.

Access to anonymized data will be granted to the international COSMO consortium to allow for cross-country comparisons.

Ethics

This research follows the ethical standards of the American Association for Public Opinion Research (AAPOR; <https://www.aapor.org/Standards-Ethics/AAPOR-Code-ofEthics.aspx>) and the American Psychological Association (APA; <https://www.apa.org/ethics/code/>). Participants are informed about the fact that aggregated results will be published online and in scientific publications. All participants have to provide informed consent before participation.

Access to individual, non-anonymized contact data is only granted to one of the authors (I.Z.), who received ethical approval for handling these data, and who will by no means share the individual information with others.

Funding and conflict of interest

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References

- 1 WHO/Europe (2020). COVID-19 Snapshot Monitoring (COSMO Standard): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak - WHO standard protocol. <http://dx.doi.org/10.23668/psycharchives.2782>
- 2 Arslan, R. C., Walther, M. P., & Tata, C. S. (2020). formr: A study framework allowing for automated feedback generation and complex longitudinal experience-sampling studies using R. *Behavior Research Methods*, 52, 376–387. <https://doi.org/10.3758/s13428-019-01236-y>