


# BMJ Open Working from home during COVID-19 in a Danish hospital research setting: experiences of researchers and healthcare providers, explored by Group Concept Mapping

Ina Olmer Specht <sup>1</sup>, Karoline Winckler,<sup>1</sup> Robin Christensen,<sup>1,2</sup> Claus Bomhoff,<sup>1</sup> Rie Raffing,<sup>1</sup> Eva Ejlersen Wæhrens<sup>1,3</sup>

**To cite:** Specht IO, Winckler K, Christensen R, *et al.* Working from home during COVID-19 in a Danish hospital research setting: experiences of researchers and healthcare providers, explored by Group Concept Mapping. *BMJ Open* 2022;**12**:e063279. doi:10.1136/bmjopen-2022-063279

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-063279>).

IOS and KW are joint first authors.

Received 29 March 2022  
Accepted 17 July 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

<sup>1</sup>The Parker Institute, Bispebjerg Hospital, Copenhagen, Denmark  
<sup>2</sup>Department of Clinical Research, University of Southern Denmark, Odense, Denmark  
<sup>3</sup>Institute of Public Health, University of Southern Denmark, Odense, Denmark

## Correspondence to

Dr Ina Olmer Specht;  
[ina.olmer.specht@regionh.dk](mailto:ina.olmer.specht@regionh.dk)

## ABSTRACT

**Objectives** The COVID-19 pandemic has changed the working environment, how we think of it and how it stands to develop into the future. Knowledge about how people have continued to work on-site and adjusted to working from home during the COVID-19 lockdown will be vital for planning work arrangements in the post-pandemic period. Our primary objective was to investigate experiences of working from home or having colleagues working from home during a late stage of the COVID-19 lockdown among researchers and healthcare providers in a hospital research setting. Second, we aimed to investigate researchers' productivity through changes in various proxy measures during lockdown as compared with pre-lockdown.

**Design** Mixed-method participatory Group Concept Mapping (GCM).

**Setting and participants** GCM, based on a mixed-method participatory approach, was applied involving researchers' and healthcare providers' online sorting and rating experiences working from home during the COVID-19 pandemic. At a face-to-face meeting, participants achieved consensus on the number and labelling of domains—the basis for developing a conceptual model.

**Results** Through the GCM approach, 47 participants generated 125 unique statements of experiences related to working from home, which were organised into seven clusters. Using these clusters, we developed a conceptual model that illustrated the pros and cons of working from home.

**Conclusion** The future work setting, the role of the office and the overall work environment need to respond to workers' increased wish for flexible work arrangements and co-decision.

## INTRODUCTION

In the beginning months of 2020, the COVID-19 pandemic began to sweep across the globe.<sup>1</sup> To contain and mitigate the spread of COVID-19, many countries ordered a lockdown of public institutions that did not

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The Group Concept Mapping includes the voice and involvement of the participants in all phases; the data are thus not research generated.
- ⇒ The sample size was large which generated a large number of statements, sufficient to reach data saturation.
- ⇒ The study was possibly limited by selection, as most of the participants were represented by personnel without patient contact during the lockdown.
- ⇒ This selection bias might affect the generalisability.

perform critical functions; in Denmark, the first lockdown started on 13 March 2020. In the early lockdown, many countries reported high rates of symptoms of anxiety, depression, post-traumatic stress disorder, psychological distress and stress.<sup>2</sup> Studies have shown that such symptoms were particularly acute among healthcare workers,<sup>3</sup> and that caregivers with contact with patients with COVID-19 patient had a higher prevalence of depression, anxiety, stress and burnout syndrome compared with caregivers without patient contact.<sup>4</sup> Lockdowns also strongly affected economies, resulting in many people losing their jobs or being furloughed until the pandemic was under control.<sup>5</sup> Notably, lockdowns exerted a greater negative effect on the well-being of unemployed and furloughed persons than on the employed.<sup>6</sup>

Where possible, many public and private organisations remedied the situation by imposing a remote work policy, making it possible for many employees and managers without frontline responsibilities to work from home. People who worked from home often had to care for children who were home due to the closing of childcare and



schools. Studies have investigated the early lockdown effect of home confinement and telework on mental well-being and psychological distress and have documented the distress felt by workers with demanding jobs, with a higher educational level, and those who were not sheltering at home.<sup>7</sup> Interestingly, physicians working at the hospital as compared with those working from home showed only a higher prevalence of stress, whereas exhaustion, anxiety and depression remained the same among the two groups.<sup>3</sup>

Positive experiences from the coronavirus-induced lockdown have also emerged,<sup>8</sup> both on a general level where the initial lockdown was characterised as a time with greater sense of belonging due to an overall societal feeling of togetherness,<sup>9</sup> and more specifically, in relation to working from home. Themes and experiences that have been identified in working from home include a better work–life balance with more flexibility, increased work efficiency with less disruption from coworkers, a better work environment, more effective meetings, easier access to coworkers and a higher sense of work control.<sup>10</sup> Thus, the experiences of early-stage lockdown among hospital workers—both of physicians and others working from home—were mixed, and the reports do not give a clear picture of when and for whom it was beneficial to work from home. Most of the previous studies investigated the early stage of lockdown, when the situation was new and unknown. It is possible that by later, when lockdown had become ‘the new normal’, workers’ attitudes toward home confinement might have changed.

In order to rethink the future of work by giving people the option of choosing who and what tasks are suitable for remote and on-site work, we should learn from the experiences of employees with mixed job functions working from home or having colleagues working from home at a later stage of lockdown. Knowledge concerning what influences workers’ preferences for home and on-site work and what tasks are suitable for the two work environments will be important for optimal planning of work arrangements in the post-pandemic period.

The overarching aim of this study was first to investigate experiences of working from home or having colleagues working from home during the COVID-19 lockdown at a late stage among multidisciplinary researchers and healthcare providers in a hospital research setting. Second, it aimed to investigate the researchers’ productivity during lockdown as compared with pre-lockdown. Knowledge obtained from this study might be used in rethinking the future of work, modifying the role of the office and creating a more conducive work environment.

## METHODS

### Study design and procedures

To address the first aim of the study and ascertain broad perspectives on experiences from the COVID-19 late-stage lockdown in spring and early summer 2021, the authors of this study (‘the author group’) applied Group

Concept Mapping (GCM), a methodology for generating and structuring ideas on a specific topic, based on a mixed-method participatory approach.<sup>11 12</sup> The GCM process includes the following phases: (1) preparing, (2) generating ideas (brainstorming), (3) structuring statements (sorting and rating), (4) performing GCM analysis, (5) interpreting the map (validating) and (6) using (developing a conceptual model).<sup>12</sup> The results are illustrated in maps where ideas on the specific topic are organised thematically. Participants in GCM studies are involved in several steps of the research process, including generating ideas, structuring statements and interpreting the map. The GCM process may involve face-to-face group sessions, online participation or both.<sup>11</sup>

In this study, generating ideas and structuring the statements were conducted online between 1 June 2021 and 21 June 2021 using the Concept System Groupwisdom software, designed to support each step in the GCM process (Concept Systems Incorporated, 2019). Interpretation of the map took place at a 3-hour face-to-face validation session in June 2021. Members of the author group, except for the last author, were also invited to take part in the study along with the participants. The last author was responsible for conducting the GCM process, including preparation, the GCM analysis and being chair at the validation meeting. The study was conducted in Danish and afterwards the statements were translated into English by a native English-speaking employee.

### Participants and setting

The study took place at the Parker Institute, Bispebjerg and Frederiksberg Hospital, a clinical research institute working with evidence-based research within rheumatology and disease prevention, within the hospital system in the Capital Region of Denmark. Potential participants were all employees at the Parker Institute, who would not have traditionally worked from home. The invited employees were working as researchers, clinicians including physicians and nurses, research assistants and technical-administrative staff. The invited participants could freely choose to participate or not. Only the last author had information on who participated through the GCM online system. In Denmark, researchers were allowed to work physically at the hospital from late April 2020 but were encouraged to work from home when possible. While most of the invited participants were working from home during the COVID-19 lockdown, researchers, clinicians and research assistants involved in ongoing data collections, and physicians taking part in the COVID-19 emergency response and preparedness all attended physically at work.

### GCM: data generation

The previously described process of GCM serves as a structure describing the procedures in the study.

### Preparing for GCM

Before initiating the data collection, the first and last authors formulated and piloted a seeding question. The final version was: ‘What experiences have you had in connection with your/your colleagues working from home during the COVID-19 pandemic?’

### Generating ideas (brainstorming)

Potential participants were invited to participate by email with links to online participation using the CS Groupwisdom software. Participants were instructed to think broadly and generate as many answers as possible in response to the seeding question. They were reminded to keep each answer short, with only one meaning.

The statements generated were then consolidated; the first and last authors individually identified redundant statements (ie, ideas with the same wording or meaning). Next, they met and discussed their findings. Based on consensus, redundant statements were removed and minor linguistic revisions were made to clarify the meaning. The remaining statements were then imported into CS Groupwisdom in preparation for phases three and four.

### Structuring the statements (sorting and rating)

Again, potential participants were invited to participate by email in the sorting and rating, with a link to online participation using the CS Groupwisdom software. They were presented with the total number of statements and asked to organise all statements into piles, in any way that made sense to them. The only rules were: (a) there must be more than one pile and (b) there must be fewer piles than the number of statements. Each participant was asked to label each pile of statements and—based on the seeding question—rate the importance of each statement on a 4-point ordinal scale: (1) ‘not at all important’, (2) ‘somewhat important’ (3) ‘important’ and (4) ‘very important’. Pooled analysis of GCM studies indicated high reliability estimates for sorting and rating processes, as well as high representational validity.<sup>13</sup>

### Data analyses

#### GCM analysis (data analysis)

Based on the sorting and ratings, multidimensional scaling and cluster analyses were performed, in which related statements were grouped into clusters.<sup>11</sup> To ensure the quality of the overall sorting and rating data, single-participant data from phase three were included in the cluster analysis if more than 75% of the statements were sorted<sup>11</sup> and if fewer than five statements remained unrated.

Within the multidimensional scaling analysis, ‘stress value’ is the statistic used to indicate congruence between the raw data and the processed data (goodness of fit). A low stress value (considered to be any value <0.39) indicates a good fit. During the cluster analyses, several cluster solutions were generated, and the one that matched the data the best (ie, the cluster solution representing

sufficient details on the topic) was applied, creating the cluster rating map. Based on the labels provided by the participants, cluster labels were suggested by the CS Groupwisdom software. Proximity of clusters on the map indicates how related they are; clusters closer together are more related than those further apart. The height of a cluster signifies its relative importance, with higher clusters (ie, the number of layers) containing statements being rated as more important.

### Interpreting the map (validating)

At the face-to-face validation session, participants met to interpret and validate the results. Based on the cluster rating map and an overview of clusters and statements presented by the last author, participants were grouped into small groups by the last author to (a) determine if each statement was placed in the right cluster, (b) consider the number of clusters and (c) consider if the cluster labels illustrated the theme of the cluster. Statements fitting into more than one cluster were to remain in their designated cluster, and only statements clearly misplaced were to be moved. Reflections and suggestions were discussed to obtain consensus.

### Using (developing a conceptual model)

Based on the validated cluster rating map, a final conceptual model was developed. To develop the model, the author group met to refine cluster labels and to reach consensus on a final conceptual model.

### Demographic data and descriptive statistics

When the GCM process was finalised, the author group sent out an anonymised online questionnaire concerning demographic information and work-related functions to all invited participants using the Electronic Data Capture system during late August and early September 2021.<sup>14</sup> Three reminders were sent to the invited participants. Characteristics of the study population are presented as count and percentages for categorical data, and median with IQRs for continuous variables using the statistical software SAS/STAT (release V.9.4; SAS Institute).

### Researcher productivity and proxy measures

To investigate researchers’ productivity, the number of employees, scientific publications, man years and funding applications sent were compared in the periods 1 January through 31 December 2019 (ie, before the pandemic and lockdown) and 1 January through 31 December 2020.

### Patient and public involvement

Using a GCM approach, the participants were naturally involved early in the research process. The research question (the seeding question) was based on an overall public interest in the area of working from home. The question was piloted and approved by colleagues not included as authors. The public was not involved in the choice of study design, but the design was chosen due to the participatory design.



**Table 1** Demographic information, n=41

	n	%	Median	IQR
Female gender, no (%)	34	83		
Age, years	41	45	39–51	
Working from home during late-stage lockdown, no (%)	28	68		
Work assignments can be done from home				
Yes, no (%)	16	39		
Partly, no (%)	19	46		
Management responsibility, no (%)	12	29		
Job function with patient contact, no (%)	16	39		
Have children <15 years, no (%)	19	48		
Number of children <15 years	19	2	2–2	
Number of individuals in the household	41	3	2–4	
Transport time to work (minutes)	41	25	15–40	
Would like the opportunity to work from home occasionally, no (%)	37	90		
IQR, Inter quartile range.				

## RESULTS

Among 68 invited employees, 43 (63%) responded to the questionnaire. Two respondents did not participate in the online GCM programme or the face-to-face validation meeting and were removed from the final sample (n=41, 60%). **Table 1** presents the demographic data of the participants. Of the final 41 participants, 34 (83%) were female, had a median (IQR) age of 45 (39–51) years and 19 (48%) had children below 15 years of age living at home. The median (IQR) number of individuals in the household was 3.<sup>2–4</sup> Almost one-third of the participants had a management function, 16 (39%) had a job function with patient contact and 28 (68%) reported that they had been working from home during the late stage of lockdown, although only 16 (39%) replied that their work tasks could be handled entirely from home.

Participants were involved in at least one of the GCM phases. In total, 47 (69%) of the invited employees participated in generating ideas, and 32 (47%) took part in structuring (sorting and/or rating) statements. Finally, 48 (71%) participants took part in the face-to-face validation meeting to interpret the cluster rating map.

### GCM data

A total of 203 ideas were generated, and after removing redundant ideas and minor linguistic revisions, 125 unique statements remained for sorting and rating. Participants sorted the statements into between 4 and 17 piles (median=9), except for one participant who sorted all statements into one pile. Also, one participant left a single statement unsorted. When asked to rate the statements' importance, three participants left all and two participants almost all (103 and 116, respectively) of the 125 statements unrated. Moreover, four participants each left one statement unrated. Hence, based on the

predefined criteria, sorting of statements was approved for 31 participants, and rating of statements was approved for 27 participants.

The multidimensional scaling analysis involved 16 iterations and revealed a low stress value of 0.19. In the analysis, solutions with 5–11 clusters were applied. The cluster solution with seven clusters, generated by the CS Groupwisdom software, was chosen because this solution seemed to provide sufficient details on the topic. The seven clusters, each containing between 3 and 27 statements, are presented in a cluster rating map (**figure 1**).

At the face-to-face validation meeting of the study participants, discussions led to consensus about the location of the majority (n=123, 98.4%) of statements, and only two statements were moved between clusters. As presented in **table 2**, each cluster in the revised map now contained between 3 and 26 statements (**table 2** and online supplemental table 1). Furthermore, the participants suggested changes to all labels, based on the content of each cluster. These suggestions were further discussed among the author group, and this process resulted in the following seven key concept clusters (**table 2**).

Generally, statements were rated as important (n=93, 74.4%) or very important (n=11, 8.8%) (see online supplemental table 1). These ratings were also reflected by a cluster median value of 4 in cluster 5, and 3 in the remaining six clusters (**table 2**). In fact, in cluster 5 (concerning experiences related to flexibility), 10 (52%) of the cluster statements were rated as very important. In comparison, only one other cluster, cluster 6, concerning the effectiveness related to working from home, contained a statement (n=1, 4.3%) rated as very important.

### Conceptual model

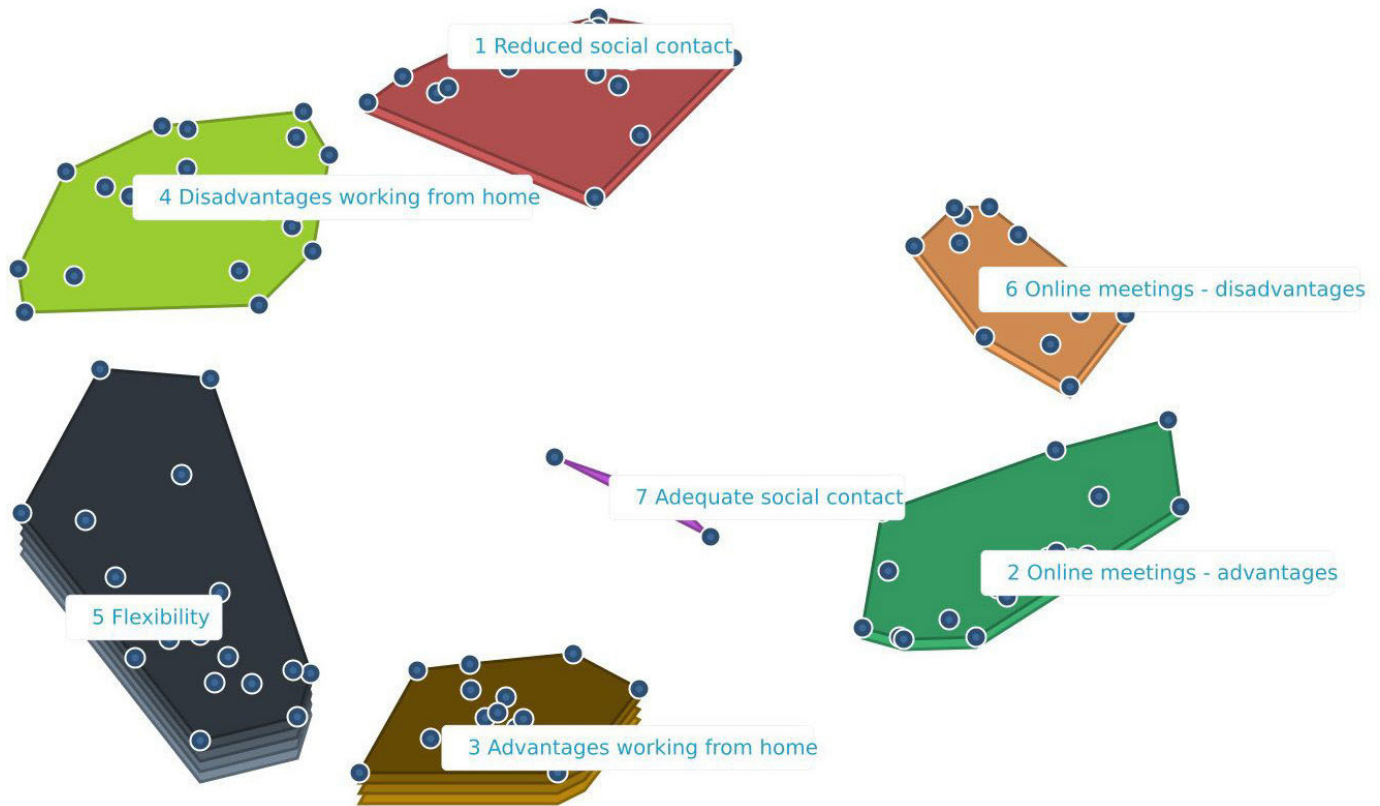
The final seven clusters and all the included statements are presented in online supplemental table 1. Based on these data, a final conceptual model revealing experiences related to working from home or having colleagues working from home was developed (**figure 2**). The model illustrates the pros and cons of working from home, with three evenly rated clusters in each category balanced by the highest rated cluster, 'flexibility', which contained statements related to co-decisions of the work environment. As such, 'flexibility' counted neither as a pro nor as a con regarding home confinement.

### Researchers' productivity

The number of scientific publications and funding applications sent during 2020 increased by 10.0% and 23.9%, respectively, when compared with 2019. At the same time, the number of researchers on staff and man years decreased by 24.5% and 10.2%, respectively.

## DISCUSSION

Our study examining working from home during COVID-19 in a Danish hospital research setting clearly revealed an increased interest among researchers and



**Figure 1** Cluster rating map with seven clusters. Proximity of clusters on the map indicates how related they are. The height of a cluster signifies its relative importance, with higher clusters (ie, the number of layers) containing statements being rated as more important.

healthcare providers in flexible work arrangements. This interest might be perceived as controversial because many studies on the effects of COVID-19 lockdown on work conditions have highlighted disadvantages, including lower employee productivity, an inadequate work environment and psychological challenges.<sup>2 6 15</sup>

In the present study, a GCM approach to investigate late-stage COVID-19 lockdown was used to synthesise experiences among researchers and healthcare providers, and in the conceptual model, seven overall clusters emerged: (1) reduced social contact, (2) online meetings—advantages, (3) advantages working from home, (4) disadvantages working from home, (5) flexibility, (6) online meetings—disadvantages and (7) adequate social contact. The participants rated statements within the cluster ‘flexibility’ as the most important experience of working from home or having colleagues working from home. The study also revealed an increase in the number of funding applications sent and scientific publications, despite a decrease in the number of research staff. However, the increases in the former might be due to researchers’ having more time for immersion in other research activities due to clinical trials being paused during the first half of 2020 and a reduction in patient contact during lockdown.

The results of the present study correspond well to a study of the early stages of COVID-19 lockdown that involved participants from 29 European countries, with

the majority from Denmark (23.3%). In that study, most of the participants—representing knowledge workers—had a more positive rather than negative experience of working from home during COVID-19 lockdown.<sup>10</sup> Similar to the present study, the main advantages were work–life balance, improved work efficiency and more work control, whereas the disadvantages were home office constraints, work uncertainties and inadequate tools. Because that study investigated the early lockdown stage, it highlighted a need for further studies investigating aspects of later stages of the COVID-19 lockdown among knowledge workers.<sup>10</sup> The highest rated cluster of the present study of late-stage lockdown was ‘flexibility’, with statements like ‘The combination of meeting at work and the possibility of working from home is optimal.’ In the Danish late-stage lockdown, many institutions provided the flexibility of part-time working at the office or at home—hence, home confinement was not as severe as in the early lockdown. Statements like ‘Working from home is a good alternative but I want to decide, myself, when it is most relevant for me’ and ‘I appreciate the possibility of changing between working from home and meeting up physically. It gives job satisfaction and makes me more effective’ underlined the importance of flexibility and co-decision of the work environment for a good work–life balance and efficacy. It is important to acknowledge that in the late-stage lockdown in Denmark, children below 15 years of age were allowed to go physically to daycare

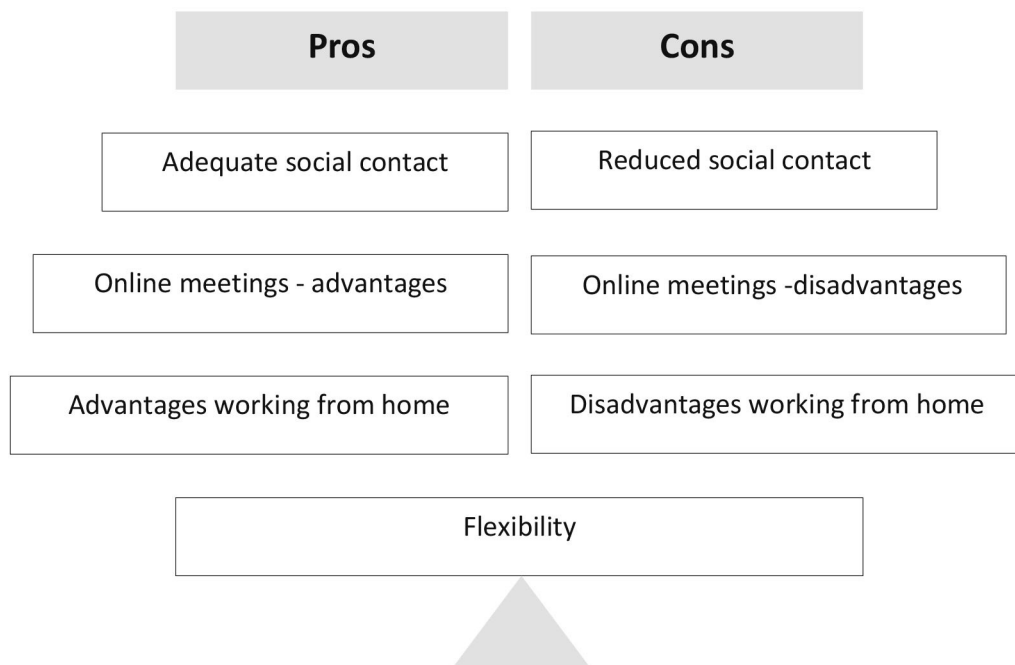
**Table 2** Description of the final seven clusters

Cluster number of ideas (%)	Cluster median* (min–max)	Summary of content
1. Reduced social contact 26 (20.8)	3 (2–3)	Relationships with colleagues constituted a major part of reduced social contact. Participants throughout the institute experienced losses of: contact, availability, feelings of unity, the camaraderie that develops in the workplace and perspective on projects. The newly employed found it hard to generate relationships and that the research environment suffered because social contact so necessary to the development of ideas was reduced. The productive and informative informal meetings and the communication that comes with daily physical contact were missed. Similarly, informal problem-solving became more difficult due to reduced social contact. Extroverted participants found it hard to work from home; they missed having colleagues to ‘unburden themselves’ to and found working from home boring.
2. Online meetings–advantages 23 (18.4)	3 (2–3)	One of the major advantages of online meetings is that they make it easier to gather people from various places, both locally and internationally, which increases the possibility of brainstorming with a broader, more diverse population of collaborators. Flexibility was also mentioned as an advantage, manifesting as going in and out of meetings when working to solve a problem; doing other things at the same time; and having a walk and talk or linking virtual with physical attendance. Participants claimed online meetings were less time-consuming and more down to business and focused. Moreover, they opened the possibility of more people working simultaneously on a document. Participants found that internet teleconferencing was quick to learn and that planning of meetings was easier due to their being no transportation requirements. More meetings could be fit into 1 day, and online meetings allowed more participants to partake in weekly recurring meetings. Participants came to regard virtual meetings as a natural part of the workday and a convenient alternative to physical meetings.
3. Advantages working from home 23 (18.4)	3 (2–4)	Participants claimed the major advantage of working from home was they achieved much more when they could work in a quieter environment. Fewer distractions and interruptions and better concentration were mentioned as important factors, with better concentration regarding both general and specific tasks. Participants found they worked more effectively, were more focused, solved problems with fewer disruptions, were more engaged and were more productive overall. Working from home and using virtual solutions made it easier for some participants—especially those with part-time or multisite employment—to juggle different work assignments, appointments and tasks. Working from home also made it easier to establish a good work rhythm, with participants enjoying the time savings from not having to commute to work.
4. Disadvantages working from home 20 (16.0)	3 (2–3)	A major disadvantage of working from home was the increased overlap between worktime and private time. Participants missed the distinction and found it difficult to hold regular breaks and to stop working. Another cited disadvantage was ill-equipped home offices. Participants were less motivated at home, and it was difficult to maintain momentum on projects. Staring at the screen all day made participants more tired, and many found concentrating was difficult. Participants were less effective at home and more inactive, and some missed their bicycle ride to work. Participants mentioned that they preferred to meet up physically at work and to have maximum 1 day working from home per week.
5. Flexibility 19 (15.2)	1 (1–4)	Participants found flexibility between working from home and meeting up physically gave job satisfaction. This job satisfaction included motivation and effectiveness and it made a difference to participants that they could choose work hours that suited them. Working from home gave a better work/life balance and made the workday more flexible. Domestic life benefited from reduced stress, and work schedules could be fit around family life and events. Participants appreciated the trust placed in them to do their work regardless of where they worked from. Savings on transportation—both in terms of commuting time and expenses—and environmental benefits also were mentioned—as were longer workdays. Participants mentioned that their productivity depended on the character of the work and that some tasks were better suited than others to working from home.
6. Online meetings–disadvantages 11 (8.8)	2 (2–3)	Online meetings were experienced as tiresome and mentally exhausting, especially if participants had many virtual meetings, if the meetings were back to back, or if the participants had to teach virtually for a whole day. During online meetings, participants lost focus, and presenters sometimes failed to respond when communicating and explaining concepts. Participants suggested that the online meetings could work as a supplement. Participants found that they worked better with people they knew before the pandemic; and that they lacked experience using technical equipment such as a web cam, which is an essential tool for online meetings.
7. Adequate social contact 3 (2.4)	3 (2–3)	Only a few participants found social contact during lockdown as adequate. They did not think working together was difficult, and they found it easy to stay in contact as long as colleagues were available via telephone or email during work hours.

Statements can be found in online supplemental table 1.  
\*The cluster median is calculated based on median values of ratings of importance for each statement within each cluster. Min and max represent the lowest and highest median value, respectively, for ideas within a cluster.

and school, which was pointed out in statements like ‘It is a lot less stressful working from home under conditions that can be customized to the family.’ Approximately half

of the participants had children younger than 15 years. Had these children been home confined, the results might have been different, as shown previously.<sup>1617</sup> In a



**Figure 2** Conceptual model. Pros and cons balancing on the cluster 'flexibility'.

study investigating preschool, we showed that children were rated more hyperactive and had an overall decrease in child emotional–behavioural function during lockdown as compared with pre-lockdown, potentially due to parental stress in relation to the work–life balance.<sup>18 19</sup> Thus, forcing telework and home confinement of the entire family might have negative consequences on well-being and job performance<sup>19 20</sup> as shown by a French study investigating anxiety and depressive symptoms pre-COVID-19 lockdown, during the first wave and again during the second wave.<sup>21</sup> The study showed a continuing increase in mean scores of anxiety and depressive symptoms.<sup>21</sup>

Seven clusters informed our conceptual model, which solidified the experiences in relation to home confinement among researchers and healthcare workers in a hospital research setting. According to the conceptual model, the following clusters were categorised as pro-home confinement: online meetings–advantages; advantages working from home and adequate social contact. However, the model also revealed cons to home confinement, including reduced social contact, disadvantages working from home and online meetings–disadvantages. The results showed that the participants were neither for nor against working from home, thus showing a more complex picture of the participants' experiences, which the cluster 'flexibility' highlights by balancing the two sides. The take home message of our model was that the participants appreciated the possibility of flexibility and co-decision and a well-balanced work–life. Flexible workplace practices like working from home were slowly increasing in the modern workplace culture pre-COVID-19<sup>22 23</sup>; however, pre-COVID-19 managerial and executive resistance as well as occupational constraints were major obstructions to these

types of working arrangements.<sup>24</sup> After organisations have been forced into more flexible working arrangements due to COVID-19 lockdowns, many are considering continuing this practice after the pandemic.<sup>24</sup> The conceptual model from our study provided a nuanced image of working from home based on the perspective of the employee. Organisations can use this model to discuss, support, and/or mitigate employees' experiences and perceived challenges from home confinement. Our findings suggest that the previous management paradigms (ie, those in place prior to the global COVID-19 pandemic) in conventional organisations, large and small, public and private, might yield dissatisfaction if they ignore the apparent wish for flexibility.

Previous studies have shown that productivity during lockdown fell, especially among employees with home-confined toddlers.<sup>25</sup> Although the number of research staff decreased during 2020, productivity in 2020, during COVID-19 lockdown, was not affected in relation to the number of scientific publications produced and grants applied for at the department. This finding accords with the work assignments among the participants, where only 14.7% were not at all able to fulfil their job function from home mainly due to clinical work. Also, many participants reported more time for immersion in their work when working from home, by being less exposed to interruptions. The studies showing reduced productivity might simply be a consequence of job assignments not being possible to perform from home. The results from the present study provide insights into work experiences among knowledge workers with non-material input and output and with the possibility to work from home.<sup>26</sup> The conceptual model is therefore not generalisable across companies and working domains.



This study was possibly limited by selection, as most of the participants were represented by researchers and healthcare providers without patient contact during the lockdown. This selection bias might affect the generalisability of the results in relation to employees with clinical functions. Also, we did not stratify by gender although previous studies have shown gender differences in well-being during lockdown with lower well-being among women.<sup>21 27</sup> In our study, 83% were women, thus a stratification might not have changed the results much. However, the sample size was large, which generated a large number of statements, and the fact that 78 of the statements were redundant indicated that the number of statements was sufficient to reach data saturation. The redundancy was also illustrated in our calculated stress value, which was comfortably below the commonly accepted threshold. Another strength of this study is the high number of participants in the sorting, rating and validation phases, which assured a valid statistical analysis. Finally, the GCM includes the voice and involvement of the participants; the data are thus not research generated. The method involved the participants in all phases—generation of data, data analysis and validation of results.

In conclusion, the GCM approach proved to be a relevant method for revealing experiences of working from home or having colleagues working from home during a late stage of COVID-19 lockdown. These experiences indicated a wish for co-decision and interest toward more flexibility, especially when addressing the balance between work and spare time, and the usefulness of the conceptual model for planning of future work arrangements in a hospital research setting.

**Acknowledgements** We would like to thank Christine Tara Lang for the great job of translating all statements into English. The Parker Institute is grateful for the financial support received from public and private foundations, companies and private individuals over the years. The Parker Institute, Bispebjerg and Frederiksberg Hospital, is supported by a core grant from the Oak Foundation (OCAY-18-774-OFIL). The Oak Foundation is a group of philanthropic organisations that, since its establishment in 1983, has given grants to not-for-profit organisations around the world.

**Contributors** Substantial contributions to the conception or design of the work and interpretation of data for the work—IOS, KW, RR, RC, CB and EEW. Analysing the data—IOS, KW and EEW. Drafting the work or revising it critically for important intellectual content—IOS, KW, RR and EEW. Final approval of the version to be published—IOS, KW, RR, RC, CB and EEW. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved—IOS, KW, RR, RC, CB and EEW. The guarantor - EEW.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Disclaimer** The views expressed in the submitted manuscript are the authors' own and not an official position of the institution or funder.

**Competing interests** The authors all work at the study setting and have all been working from home during the study period in varied degrees. The authors have no financial or personal interests in the study results.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Not required.

**Ethics approval** According to Danish legislation, approval from the Committee on Health Research Ethics and the Danish Data Protection Agency was not required, as no subjects were exposed to medical interventions/devices and no sensitive data were collected. Electronic informed consent was obtained, and all participants were informed about their right to withdraw at any time from the study.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request. Data are available upon reasonable request by email: bfh-dl-org-parkerinstitutet@regionh.dk.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iD

Ina Olmer Specht <http://orcid.org/0000-0002-3114-4715>

#### REFERENCES

- 1 WHO. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Available: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020> [Accessed 11 Mar 2020].
- 2 Xiong J, Lipsitz O, Nasri F, *et al*. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord* 2020;277:55–64.
- 3 Appiani FJ, Rodríguez Cairolí F, Sarotto L, *et al*. Prevalence of stress, burnout syndrome, anxiety and depression among physicians of a teaching hospital during the COVID-19 pandemic. *Arch Argent Pediatr* 2021;119:317–24.
- 4 Kannampallil TG, Goss CW, Evanoff BA, *et al*. Exposure to COVID-19 patients increases physician trainee stress and burnout. *PLoS One* 2020;15:e0237301.
- 5 Dreger C, Gros D. Lockdowns and the US unemployment crisis. *Econ Disaster Clim Chang* 2021:1–15.
- 6 Escudero-Castillo I, Mato-Díaz FJ, Rodríguez-Alvarez A. Furloughs, teleworking and other work situations during the COVID-19 Lockdown: impact on mental well-being. *Int J Environ Res Public Health* 2021;18:18062898. doi:10.3390/ijerph18062898
- 7 De Sio S, Cedrone F, Nieto HA, *et al*. Telework and its effects on mental health during the COVID-19 lockdown. *Eur Rev Med Pharmacol Sci* 2021;25:3914–22.
- 8 Prochazka J, Scheel T, Pirozek P, *et al*. Data on work-related consequences of COVID-19 pandemic for employees across Europe. *Data Brief* 2020;32:106174.
- 9 Saiz J, González-Sanguino C, Ausín B. The role of the sense of belonging during the alarm situation and return to the new normality of the 2020 coronavirus pandemic (COVID-19) in Spain. *Psychol Stud* 2021;1–11.
- 10 Ipsen C, van Veldhoven M, Kirchner K, *et al*. Six key advantages and disadvantages of working from home in Europe during COVID-19. *Int J Environ Res Public Health* 2021;18:18041826. doi:10.3390/ijerph18041826
- 11 Kane M, Trochim WM. *Concept mapping for planning and evaluation*. London: Sage Publications, Inc.
- 12 Kane M, Rosas S. *Conversations about group concept mapping, applications, examples and enhancements*. California: Sage Publications, Inc, 2017.
- 13 Rosas SR, Kane M. Quality and rigor of the concept mapping methodology: a pooled study analysis. *Eval Program Plann* 2012;35:236–45.
- 14 Harris PA, Taylor R, Thielke R, *et al*. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for



- providing translational research informatics support. *J Biomed Inform* 2009;42:377–81.
- 15 Afonso MdaS, Castilho G, Lavrador MSF, *et al.* The impact of dietary fatty acids on macrophage cholesterol homeostasis. *J Nutr Biochem* 2014;25:95–103. doi:10.1016/j.jnutbio.2013.10.001
  - 16 Clemens V, Köhler-Dauner F, Ziegenhain U, *et al.* Predictors of parental coping during the Covid-19 pandemic: a survey in Germany. *Front Psychol* 2021;12:715327.
  - 17 Shepherd-Banigan M, Bell JF, Basu A, *et al.* Workplace stress and working from home influence depressive symptoms among employed women with young children. *Int J Behav Med* 2016;23:102–11.
  - 18 Specht IO, Rohde JF, Nielsen A-K, *et al.* Changes in emotional-behavioral functioning among pre-school children following the initial stage Danish COVID-19 lockdown and home confinement. *Front Psychol* 2021;12:643057.
  - 19 Henter R, Nastasa LE. Parents' emotion management for personal well-being when challenged by their online work and their children's online school. *Front Psychol* 2021;12:751153.
  - 20 Calvano C, Engelke L, Di Bella J. Families in the COVID-19 pandemic: parental stress, parent mental health and the occurrence of adverse childhood experiences-results of a representative survey in Germany. *Eur Child Adolesc Psychiatry* 2021:1–13.
  - 21 Lu L, Contrand B, Dupuy M, *et al.* Mental and physical health among the French population before and during the first and second COVID-19 lockdowns: latent class trajectory analyses using longitudinal data. *J Affect Disord* 2022;309:95–104.
  - 22 Allen TD, Golden TD, Shockley KM. How effective is telecommuting? Assessing the status of our scientific findings. *Psychol Sci Public Interest* 2015;16:40–68.
  - 23 Kröll C, Nüesch S. The effects of flexible work practices on employee attitudes: evidence from a large-scale panel study in Germany. *Int J Human Res Manage* 2019;30:1505–25.
  - 24 Prager F, Rhoads M, Martínez JN. The COVID-19 economic shutdown and the future of flexible workplace practices in the South Bay region of Los Angeles County. *Transp Policy* 2022;125:241–55.
  - 25 Chapman DG, Thamrin C. Scientists in pyjamas: characterising the working arrangements and productivity of Australian medical researchers during the COVID-19 pandemic. *Med J Aust* 2020;213:516–20.
  - 26 Alvesson M. De Gruyter 2011.
  - 27 Parlangeli O, Palmitesta P, Bracci M, *et al.* University teachers during the first lockdown due to SARS-CoV-2 in Italy: stress, issues and perceptions of misconduct. *Sci Eng Ethics* 2022;28:9.