How are we coping with the pandemic?

Mental health and resilience amid the Covid-19 pandemic in the EU

Annex 1 – Methods
Annex 1 reports the study methodology underlying the report on mental health and resilience amid the Covid-19 pandemic in the European Union. The methodological procedure for each of the four study pillars is presented, including the identification of Covid-19 policy responses in the EU Member States and the UK (1), of previous systematic reviews and meta-analyses (2), of primary observational studies (3), and of policy recommendations and (evidence-based) guidelines (4). For each pillar, the annex provides details on the corresponding eligibility criteria and search strategy, the process of study selection and data extraction as well as the data analysis and synthesis.
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AMK, NR, KL, TR, and MC have designed the study. CJS, AEM, and ML reviewed the study methodology and provided important expert feedback regarding the evidence synthesis methods and public health-relevant contents of the report. The systematic searches, study selection, data extraction, and data synthesis for the literature identified within the four pillars of this report have been performed by AMK, NR, TR, MC, and VK, with support of BW (data extraction, data synthesis). The first draft of this report has been written by AMK, with contributions of NR, BW, KL, TR, MC, and VK. All authors have reviewed and commented on the first draft and the final version of this report.

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http://epthinktank.eu (blog)
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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>BC</td>
<td>business/institutions closures</td>
</tr>
<tr>
<td>Covid-19</td>
<td>coronavirus disease 2019</td>
</tr>
<tr>
<td>DM</td>
<td>domestic movement restrictions</td>
</tr>
<tr>
<td>ECDC</td>
<td>European Centre for Disease Prevention and Control</td>
</tr>
<tr>
<td>e.g.</td>
<td>for example</td>
</tr>
<tr>
<td>EPHM</td>
<td>Emergency Public Health Measures</td>
</tr>
<tr>
<td>EPPI Centre</td>
<td>Evidence for Policy and Practice Information and Co-ordinating Centre</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GR</td>
<td>gathering restrictions</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>IASC</td>
<td>Inter-Agency Standing Committee</td>
</tr>
<tr>
<td>i.e.</td>
<td>that is</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>IMST</td>
<td>Incident Management Support Team</td>
</tr>
<tr>
<td>MAG</td>
<td>Microsoft Academic Graph</td>
</tr>
<tr>
<td>MERS-CoV</td>
<td>Middle East Respiratory Syndrome-related coronavirus</td>
</tr>
<tr>
<td>MW</td>
<td>mask wearing</td>
</tr>
<tr>
<td>N</td>
<td>sample size</td>
</tr>
<tr>
<td>n.a.</td>
<td>not applicable</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OxCGRT</td>
<td>Oxford Covid-19 Government Response Tracker</td>
</tr>
<tr>
<td>PHSM</td>
<td>public health and social measures</td>
</tr>
<tr>
<td>PRISMA</td>
<td>Preferred Reporting Items for Systematic Reviews and Meta-Analyses</td>
</tr>
<tr>
<td>RQ</td>
<td>research question</td>
</tr>
<tr>
<td>SARS-CoV</td>
<td>Severe Acute Respiratory Syndrome coronavirus</td>
</tr>
<tr>
<td>SARS-CoV-2</td>
<td>Severe Acute Respiratory Syndrome coronavirus type 2</td>
</tr>
<tr>
<td>SC</td>
<td>school closures</td>
</tr>
<tr>
<td>SMI</td>
<td>Support Measure Index</td>
</tr>
<tr>
<td>SWiM</td>
<td>synthesis without meta-analysis</td>
</tr>
<tr>
<td>TAG</td>
<td>Technical Advisory Group</td>
</tr>
<tr>
<td>TR</td>
<td>travel restrictions</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
1. Methods for pillar 1 – Identification of Covid-19 policy responses in the EU Member States and the UK

1.1. Eligibility criteria

Within pillar 1, we identified Covid-19 policy responses which had been made at the governmental level of EU Member States and the UK, including measures of containment as well as support measures. As presented in the main publication to this report (section 4.2), we considered various measures of containment (e.g., travel-related control measures) and support measures (e.g., economic aids), based on indicators used to monitor and analyse public health and social measures amid the Covid-19 pandemic by international dashboards like the Oxford Covid-19 Government Response Tracker and the WHO Dashboard on the Covid-19 situation in the WHO European Region (Hale, 2021; WHO, 2020a).

1.2. Search strategy

We inspected dashboards and websites provided by different institutions on the Covid-19 situation as well as policy responses:

- World Health Organization (WHO) – Regional Office for Europe (https://who.maps.arcgis.com/apps/dashboards/ead3c6475654481ca51c248d52ab9c61)
- Our World in Data (https://ourworldindata.org/policy-responses-covid)
- The World Bank (https://openknowledge.worldbank.org/handle/10986/33635)
- national websites (e.g., https://www.government.nl/topics/coronavirus-covid-19/information-for-business-owners).

1.3. Data analysis & synthesis

First, the containment measures, that have been implemented in the 27 EU Member States and the UK at different time points in the pandemic timeline, were summarised visually (gantt chart) and in text form using the data on the Public Health and Social Measures (PHSM) Severity Index, provided by the WHO Regional Office for Europe. Second, based on the information from different institutional websites, we also synthesised different categories of support measures provided by the EU Member States and the UK.
1.3.1. Containment measures

Identification of severity of containment measures for each EU Member State and the UK

In order to map the severity of containment measures in each EU Member State and the UK at a certain time point, the Public Health and Social Measures (PHSM) Severity Index has been implemented by the WHO, which allows the current polices to be compared visually across countries. This index has similarities with other indices of Covid-19 policy responses (e.g., 80.9% similarity between PHSM Severity Index and Oxford Covid-19 Government Response Tracker [OxCGRT] for a comparison between 10 EU countries). Therefore, only the data on the PHSM Severity Index have been used for this report.

Data on PHSM are regularly and systematically collected by the emergency public health measures function (EPHM) within the WHO Incident Management Support Team (IMST) at the WHO Regional Office for Europe from the following sources (given in order of preference): 1) government websites, 2) WHO communication channels (WHO country office and emergency hub communication), 3) media sources, and 4) thematic webpages and PHSM publicly available databases.

The PHSM data are then coded according to the WHO PHSM taxonomy and glossary, which systematically classify PHSMs into seven categories with 49 subcategories. The measures from six subcategories are coded as indicators in the PHSM Severity Index that directly relate to Covid-19 transmission.

Consequently, similar to other international dashboards (e.g., OxCGRT), the composite PHSM Severity Index indicates the severity of the following six measures of containment: 1) mask wearing, 2) school closures, 3) closures of offices, businesses, institutions, and operations, 4) gathering restrictions, 5) domestic movement restrictions, and 6) international travel restrictions.

The severity/stringency of PHSMs in these categories is ordinally scaled (e.g., from no measures–0 to the most severe form of that measure, e.g., 5 for restrictions on domestic movement; see Table 1).

In addition, the categories (except for international travel restrictions) are categorised according to a binary focus scale, which can be used to indicate whether the measures apply to the whole population or only to a specific subnational region or subgroup of people. In general, standard coding principles for the scales are used to ensure comparability across countries. Furthermore, validation of the scales and coding principles is carried out to check for consistency and accuracy.

The six category indicator scores are then averaged to create the PHSM Severity Index. Each indicator score includes the ordinal value of the classification and the binary focus variable, if present. If a measure refers only to a specific region within the country or to a subgroup of people, one fifth of the maximum value of the ordinal scale is subtracted. This ensures that there is a weighted reduction, regardless of the number of levels of the ordinal scale. This procedure considers that a regional measure or a measure targeting a specific group of people is less severe than an equally intensive measure at the national level.

Overall, the PHSM Severity Index ranges between 0–100, with higher values indicating more severe measures. The values of the six categories and the PHSM Severity Score (as their average) are then visualised using colours, with darker colours expressing higher values and more severe measures (Figure 1).
Table 1: Ordinal and scope scales of the six PHSM indicators (taken from WHO, 2020a)

<table>
<thead>
<tr>
<th>ID</th>
<th>Indicator</th>
<th>Ordinal scale</th>
<th>Binary scope scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>i0</td>
<td>Wearing of masks</td>
<td>0 – No mask policy</td>
<td>0 – Targeted (subnational)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 – Recommended wearing masks in any setting</td>
<td>1 – General (national)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – Require wearing masks on a risk-based approach (in settings where physical distancing is not possible, such as public transport, retrial and refugee camps)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – Require wearing masks universally (in any setting in the community and in any transmission scenario)</td>
<td></td>
</tr>
<tr>
<td>i1</td>
<td>Closure of schools</td>
<td>0 – No measures</td>
<td>0 – Targeted (subnational)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 – Recommended closing (or work from home) and/or recommend/require adapting (such as implementing sanitary measures)</td>
<td>1 – General (national)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – Require closing (or work from home) for some sectors or categories of workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – Require closing (or work from home) for all but essential services (such as grocery stores, pharmacies and doctors’ surgeries)</td>
<td></td>
</tr>
<tr>
<td>i2</td>
<td>Closure of offices, businesses, institutions, and operations</td>
<td>0 – No measures</td>
<td>0 – Targeted (subnational)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 – Recommended closing (or work from home) and/or recommend/require adapting (such as implementing sanitary measures)</td>
<td>1 – General (national)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – Require closing (or work from home) for some sectors or categories of workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – Require closing (or work from home) for all but essential services (such as grocery stores, pharmacies and doctors’ surgeries)</td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO (2020a)

Figure 1: Six individual indicators (left) are averaged to create the composite PHSM Severity Index (right)
<table>
<thead>
<tr>
<th>ID</th>
<th>Indicator</th>
<th>Ordinal scale</th>
<th>Binary scope scale</th>
</tr>
</thead>
</table>
| i3 | Restrictions on gatherings              | 0 – No restrictions  
1 – Restrictions on very large gatherings (the limit is above 1000 people)  
2 – Restrictions on gatherings between 101 and 1000 people  
3 – Restrictions on gatherings between 11 and 100 people or restrictions on certain types of gatherings (such as religious, sporting, cultural, or national events)  
4 – Restrictions on gatherings of 10 people or fewer or ban on all types of gatherings | 0 – Targeted (subnational)  
1 – General (national)                                                                                                                                   |
| i4 | Restrictions on domestic movement      | 0 – No measures  
1 – Recommend not leaving house and/or recommend limiting domestic movement  
2 – Restriction on domestic movement (such as ban on travelling between or into certain regions, outside a certain radius from place of residence, or night-time curfew)  
3 – Requirement not to leave house with exceptions for the following: essential activities (grocery shopping and essential trips), daily exercise, limited social interactions (visiting family or friends), or travel to other places of residence  
4 – Requirement not to leave house with exception only for essential activities (grocery shopping, pharmacy, or essential trips)  
5 – Requirement not to leave house with exceptions for essential activities (grocery shopping or essential trips) allowed only under certain conditions (such as being allowed to leave house only once a week, during designated timeslot, or only one household member can leave at a time) | 0 – Targeted (subnational or groups of people)  
1 – General (national)                                                                                                                                   |
| i5 | Limitations to international travel    | 0 – E0 + Q0  
1 – E0 + Q1; E1 + Q0  
2 – E0 + Q2; E1 + Q1; E2 + Q0  
3 – E1 + Q2; E2 + Q1; E3 + Q0  
4 – E2 + Q2; E3 + Q1  
5 – E3 + Q2  
6 – E4 | Not applicable                                                                                                                                                                                                 |
Classification of EU Member States and the UK according to severity of containment measures in respective survey period

To ensure a transparent and objective classification of countries and, thus, of the identified observational studies, only measures of containment with the highest severity in the respective country (i.e., darkest colour on the WHO scale) were considered to define the degree of severity of the following measures: 1) mask wearing (MW), 2) school closures (SC), 3) business/institutions closures (BC), 4) gathering restrictions (GR), 5) domestic movement restrictions (DM), 6) and international travel restrictions (TR). For example, following the WHO (ordinal) scale, the highest level of “domestic movement restrictions” indicated (home) confinement in a certain country, that is, citizens were required not to leave the house except for essential activities (e.g., grocery shopping; see level 5; WHO, 2020a). The containment measures in a EU country and the UK were categorised as:

- weak, if ≤ 3 of the six above-mentioned measures had been implemented
- moderate, if > 3 of the six above-mentioned measures had been implemented
- severe, if domestic movement restrictions at the highest level of severity (i.e., home confinement) had been implemented.

1.3.2. Support measures

Classification of EU Member States and the UK according to implementation of support measures

With respect to support measures in the EU Member States and the UK, we identified whether support measures in different categories had been implemented in the respective country or not. In addition, for each domain of support measures (e.g., financial/economic, work-related), a self-developed index score (“Support Measure Index” [SMI]) was attributed to each country, depending on the number of measures in vigor in the respective domain. A sub-score for the following four domains was developed:

1) financial/economic support measures (subscale range: 0–6)
2) work-related support measures (subscale range: 0–6)
3) health systems support measures (subscale range: 0–5)
4) psychological support measures (subscale range: 0–2).

One point was given for each measure implemented by the respective country. The total score SMI with a possible range of 0–19 was calculated by summing the sub-scores.

Use of narrative analysis to interrelate data on support measures and mental health

To analyse the impact of governmental support measures on changes in mental health, we conducted a narrative synthesis, considering all comparisons carried out across the included primary studies measuring mental health outcomes. For this purpose, the comparisons were divided into a) comparisons of assessments before versus during the pandemic and b) comparisons of several assessments during the pandemic.

The comparisons were considered independent of the population group and the outcome. The direction of changes in mental health were categorised as deterioration (↓), no change (↔), and improvement in mental health (↑). If for one EU Member State and the UK, several different directions of change in mental health were stated, the direction reported most frequently was considered as a general tendency for the respective country’s population.
In case the same number of comparisons indicated two different directions of change in mental health, a “deterioration” and an “improvement” were prioritised over “no change”. If the same number of comparisons indicated a deterioration and an improvement in mental health, “no change” was considered as the general tendency for the respective country. In case several directions of change in mental health were stated for one comparison (e.g., a decline in psychological distress after an initial increase), the comparison was considered as “no change”.
2. Methods for pillar 2 – Identification of systematic reviews and meta-analyses

With the aim to conduct an **umbrella review**, that summarised relevant findings of previous Covid-19-related mental health research and allowed to put the results of identified primary studies (pillar 3) into context, previous **systematic reviews and meta-analyses** were identified within pillar 2.

### Systematic review

- “[…] type of research synthesis that are conducted by review groups with specialized skills, who set out to identify and retrieve international evidence that is relevant to a particular question or questions and to appraise and synthesize the results of this search to inform practice, policy and in some cases, further research” (Munn, 2018; p. 2)
- Based on international standards for performing and reporting systematic reviews, they mainly comprise:
  - a literature search in scientific databases using a pre-defined search strategy
  - the screening and study selection based on pre-specified inclusion/exclusion criteria by two independent reviewers
  - the data collection from eligible studies by two independent reviewers
  - a quality assessment of eligible studies
  - the systematic analysis and presentation of data from eligible studies in text and tabular form
  - and possibly a meta-analysis, depending on the available studies and data.

### Meta-analysis

- **Statistical combination** of the results from two or more separate studies that are sufficiently comparable (e.g., concerning study design, outcomes measured; Deeks, 2021)
- Examples of use: comparison of data between two groups (e.g., values in mental health variables before vs. during the Covid-19 pandemic) or pooling the findings across multiple studies

### Umbrella review

- Literature review summarising evidence from multiple systematic reviews on a similar topic (e.g., Covid-19 mental health research)
- It is conducted according to international standards for systematic reviews (i.e., including a systematic search in scientific databases, study selection, data collection, and analysis).
2.1. Eligibility criteria

We considered systematic reviews and meta-analyses of quantitative studies, that is, these reviews included completed and published cross-sectional studies, longitudinal studies and/or repeated cross-sectional studies.

**Cross-sectional study**
- Study measuring the outcomes of interest (e.g., mental health)

**Longitudinal study**
- Study including repeated measurements in individuals (e.g., mental health is assessed at different time points)

**Repeated cross-sectional study**
- Study including repeated measurements in different individuals (e.g., mental health is assessed at different time points)

**Quantitative study**
- A study collecting and analysing numerical data (e.g., using standardised questionnaires that contain items to be answered on a numerical scale)

**Qualitative study**
- A study collecting and analysing non-numerical data (e.g., interview or using questionnaires with open questions)

**Mixed-methods study**
- A study combining the collection and analysis of quantitative and qualitative data

Although it is not possible to make causal conclusions about the effects of the Covid-19 pandemic based on solely cross-sectional data, the limitation to systematic reviews including at least one longitudinal or repeated cross-sectional study (i.e., study designs with more than one time point), would have resulted in a very limited number of reviews. Therefore, for pillar 2, we applied no selection criterion concerning the study designs that were included in a review. In addition, systematic reviews including qualitative or mixed-methods studies (e.g., interview studies providing qualitative data) were also considered. Table 2 presents the eligibility criteria that were used for reviews.

**Table 2: Eligibility criteria for systematic reviews and meta-analyses (pillar 2)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion &amp; exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Inclusion criteria: any population group, for example:</td>
</tr>
<tr>
<td></td>
<td>- general public/general population</td>
</tr>
<tr>
<td></td>
<td>- employees:</td>
</tr>
<tr>
<td></td>
<td>- healthcare workers</td>
</tr>
<tr>
<td></td>
<td>- other (non-healthcare) employees</td>
</tr>
<tr>
<td></td>
<td>- specific subgroups of working adults (e.g., self-employed, migrant workers)</td>
</tr>
<tr>
<td></td>
<td>- individuals affected by unemployment because of the pandemic</td>
</tr>
<tr>
<td></td>
<td>- different age groups:</td>
</tr>
<tr>
<td></td>
<td>- children/adolescents (&lt; 18 years)</td>
</tr>
<tr>
<td></td>
<td>- young to middle-age individuals (≥ 18 years to &lt; 60 years), including university students</td>
</tr>
<tr>
<td></td>
<td>- older individuals (≥ 60 years)</td>
</tr>
<tr>
<td></td>
<td>- SARS-CoV-2 infected individuals</td>
</tr>
<tr>
<td></td>
<td>- patient populations:</td>
</tr>
<tr>
<td></td>
<td>- patients with pre-existing chronic health conditions (e.g., chronic diseases, mental disorders, geriatric patients, or a combination of these)</td>
</tr>
<tr>
<td></td>
<td>- pregnant women</td>
</tr>
<tr>
<td></td>
<td>- Covid-19 patients, including those suffering from severe courses of disease or long-term consequences (“long Covid-19”)</td>
</tr>
</tbody>
</table>
### Exposure

- subgroups with particular risk exposure, for example:
  - informal caregivers
  - working parents
  - individuals with low socioeconomic status

Exclusion criteria: n.a.

**Inclusion criteria:**
- exposure to Covid-19 pandemic (i.e., review or meta-analysis exclusively investigates the effects of the Covid-19 pandemic)

Exclusion criteria:
- exposure to other epidemic or pandemic infectious disease outbreaks (e.g., Severe Acute Respiratory Syndrome coronavirus [SARS-CoV], Middle East Respiratory Syndrome-related coronavirus [MERS-CoV], Ebola, Human Immunodeficiency Virus [HIV], influenza)
- BUT: A review could consider Covid-19 along with other epidemics/pandemics, like SARS-CoV etc. In these cases, the review was included as long as it included at least three Covid-19-related studies (five studies for healthcare staff)

### Comparator

n.a.

### Outcome

**Inclusion criteria:** any of the following outcomes is investigated
- loneliness OR
- mental health with a broad range of eligible outcomes, such as:
  - anxiety symptoms and/or worrying
  - depressive symptoms
  - stress symptoms and/or perceived stress
  - sleep problems and/or sleep quality
  - general psychological distress
  - peri-/post-traumatic stress symptoms
  - substance abuse, substance use disorder
  - self-harm, suicidal ideation, suicidality
  - well-being, life satisfaction, quality of life
- i.e., types of outcomes specified as interesting outcomes in the eligibility criteria of the review AND measured in at least one included EU-based study

**Exclusion criteria:**
- above-mentioned outcomes NOT specified as interesting outcomes in eligibility criteria of the review OR NOT measured in at least one included EU-based study

### Study design

**Inclusion criteria:**
- systematic review/meta-analyses of quantitative studies
- performed and reported in line with international standards, such as Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), Cochrane Collaboration guidelines or Synthesis without meta-analysis (SWiM) guidelines
- review searches performed in at least two bibliographic databases (e.g., MEDLINE)
- included a quality or risk of bias assessment of included studies
• included a systematic synthesis of data (e.g., meta-analysis or any other systematic quantitative or qualitative evidence synthesis (e.g., evidence map, table, plots)
• inclusion of EU studies:
  o at least 3 studies performed in an EU Member State (+ UK) or at least 3 mainly EU-based studies among the included studies (i.e., ≥75% or any percentage of participants from EU Member States as long as data from these Member States can be extracted and analysed separately); for healthcare staff: at least 5 studies performed in an EU Member State (+ UK)

Exclusion criteria:
• theoretical/discussion papers
• editorials, letters to the editor, commentaries (if they do not refer to a specific review and report the results of this review)
• reviews not systematically synthesising their data (either quantitatively or qualitatively)

Note. Covid-19: coronavirus disease 2019; e.g.: for example; EU: European Union; i.e.: that is; n.a.: not applicable; UK: United Kingdom.

2.2. Search strategy

To identify systematic reviews and meta-analyses regarding the effects of the Covid-19 pandemic on different psychosocial and mental health outcomes in EU populations, we combined traditional database searching (e.g., PubMed as database of medical research and associated fields like psychology) with searches in databases that collect and categorise studies using advanced machine learning techniques (e.g., Microsoft Academic Graph [MAG]), and (living) evidence maps and syntheses of empirical Covid-19 research¹ (e.g., EPPI Centre’s [Evidence for Policy and Practice Information and Co-ordinating Centre] living systematic map).

The search terms were based on logic model presented in the Main publication and were piloted in preliminary searches. Table 3 includes the search strategy, with an example search strategy for PubMed.

Table 3: Search strategy to identify systematic reviews and meta-analyses (pillar 2)

<table>
<thead>
<tr>
<th>Category</th>
<th>Search strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources</td>
<td>Bibliographic databases:</td>
</tr>
<tr>
<td></td>
<td>• PubMed</td>
</tr>
<tr>
<td></td>
<td>Databases/neural networks using machine learning:</td>
</tr>
<tr>
<td></td>
<td>• Epistemonikos (<a href="https://www.epistemonikos.org/">https://www.epistemonikos.org/</a>)</td>
</tr>
<tr>
<td></td>
<td>• Microsoft Academic Graph (MAG; searched through EPPI Reviewer 4; <a href="http://eppi.ioe.ac.uk/cms/er4/Manuals/MicrosoftAcademicGraphinEPPIReviewer/tabid/3754/Default.aspx">http://eppi.ioe.ac.uk/cms/er4/Manuals/MicrosoftAcademicGraphinEPPIReviewer/tabid/3754/Default.aspx</a>)</td>
</tr>
<tr>
<td></td>
<td>Living evidence syntheses and maps/databases of empirical Covid-19 research and of reviews:</td>
</tr>
<tr>
<td></td>
<td>• EPPI Centre’s living systematic map of the evidence (<a href="http://eppi.ioe.ac.uk/cms/Projects/DepartmentofHealthandSocialCare/Publishedreviews/COVID-19Livingsystematicmapoftheevidence/tabid/3765/Default.aspx">http://eppi.ioe.ac.uk/cms/Projects/DepartmentofHealthandSocialCare/Publishedreviews/COVID-19Livingsystematicmapoftheevidence/tabid/3765/Default.aspx</a>)</td>
</tr>
</tbody>
</table>

¹To select these evidence maps and syntheses, the following resources were used: http://eppi.ioe.ac.uk/cms/Projects/DepartmentofHealthandSocialCare/Publishedreviews/COVID-19Livingsystematicmapoftheevidence/COVID-19Resources/tabid/3767/Default.aspx; https://www.bium.ch/en/search-for-literature-related-to-covid-19-selection-of-resources/; https://www.mcmasterforum.org/networks/covid-end
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- L*VE by Epistemonikos ([https://app.iloveevidence.com/loves/5e6f6db9669c00e4ac0722701d](https://app.iloveevidence.com/loves/5e6f6db9669c00e4ac0722701d))
- specifically for reviews:
  - Covid-19 Evidence Reviews (VA Evidence Synthesis Program; [https://www.covid19reviews.org](https://www.covid19reviews.org))

<table>
<thead>
<tr>
<th>Search period</th>
<th>2020 onwards</th>
</tr>
</thead>
</table>
March 21, 2021: Covid-19+ by McMaster PLUS, EPPI Centre’s living systematic map of the evidence, L*VE by Epistemonikos, LitCovid, Living map of Norwegian Institute of Public Health  
March 22, 2021: Epistemonikos, PubMed |

**Example search strategy (PubMed)**


2. ("coronavirus"[Title/Abstract] OR "COVID-19"[Title/Abstract] OR "2019-nCoV"[Title/Abstract] OR "SARS-CoV-2"[Title/Abstract]) AND

3. ((("review"[Publication Type] OR "review literature as topic"[MeSH Terms] OR "review"[All Fields]) AND "classification"[MeSH Terms]) OR "meta analysis as topic"[MeSH Terms] OR "systematic review"[Title/Abstract] OR "meta-analysis"[Title/Abstract])) AND (2020:2021[pdat])

**Note.** MeSH terms: Medical Subject Headings terms; Covid-19: coronavirus disease 2019

*Psychological resilience* was included as a search term in the above-described strategy. In addition – based on the concept of resilience as a positive outcome in the face of adversities (i.e., mental health despite stressors; Kalisch, 2015) – it was also considered *indirectly*, by investigating the effects of the Covid-19 pandemic and its related stressors (e.g., measures of containment) on the mental health of EU and UK citizens. Individuals or population groups in EU Member States and the UK who maintain or
regain mental health amid the Covid-19 pandemic, for example, because they are characterised by specific protective factors, could be considered as resilient (Kalisch, 2015; Kalisch, 2017).

2.3. Study selection

The references identified by each data source were collected and de-duplicated using EPPI-Reviewer, a web-based software programme for managing and analysing data in literature reviews (Thomas, 2020).

In line with methodological guidelines for performing systematic reviews and meta-analyses, such as the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA; Page, 2021) and the Cochrane guidelines (Higgins, 2021), the study selection was performed in duplicate by two reviewers working independently. First, the titles/abstracts of identified records were screened to immediately exclude irrelevant papers. Subsequently, the full-texts of potentially relevant records were assessed for eligibility. Any disagreements were resolved by discussion or by consulting a third reviewer in the screening team. The study selection process for systematic reviews and meta-analyses was performed along with the screening of primary studies (see 3.3).

2.4. Data extraction

To extract all relevant data of the included systematic reviews, a customised data extraction sheet in Excel was used. For this report, data extraction was performed by a single reviewer, with any uncertainties being resolved by discussion in the team or by consulting a second reviewer. The following aspects were extracted:

- **Number of included studies** (total; EU-based studies) and information on EU-based studies (author, year, country)
- **Population**: population groups considered for the review; sample sizes (pooled, range) of included studies (total; EU-based studies); survey periods of included studies (total; EU-based studies); if containment measures were implemented in the included studies (yes/no; e.g., quarantine)
- **Methodological characteristics**: search strategy (e.g., databases searched, time frame searched, preregistration); guidelines applied to perform and report the review; quality assessment tool; meta-analysis (yes/no; if yes, with inclusion of EU-based studies yes/no)
- **Characteristics of included studies**: study designs (total; EU-based studies); quality (total; EU-based studies); assessment period
- **Meta-analytical findings with inclusion of EU-based studies** (e.g., respective outcome; pooled results, such as pooled prevalence; eventual subgroup analyses to identify risk/protective factors)
- **Narrative synthesis of findings in EU-based studies** (e.g., regarding mental health impact of the pandemic, risk/protective factors)
- **Limitations of the systematic review or meta-analysis**
- **Key conclusions of the review and implications derived from the review findings** (especially for practice)

2.5. Quality assessment

Our eligibility criteria for systematic reviews identified within pillar 2 served as a proxy for methodological quality, namely minimum criteria as suggested by PRISMA and Cochrane (Higgins, 2021; Page, 2021). Therefore, within the scope of the current report, no formal assessment of the quality of identified systematic reviews was performed.
2.6. Data analysis & synthesis

The information extracted from previous systematic reviews and meta-analyses were synthesised in narrative and tabular form for the umbrella review, separately for different population groups (i.e., general population, patient populations, employees, children and adolescents, young to middle-aged individuals, older adults, mixed populations).
3. Methods for pillar 3 – Identification of primary studies

3.1. Eligibility criteria

The eligibility criteria for primary studies are presented in Table 4.

Table 4: Eligibility criteria for primary studies (pillar 3)

<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion &amp; exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Inclusion criteria: any population group, for example:</td>
</tr>
<tr>
<td></td>
<td>• general public/general population</td>
</tr>
<tr>
<td></td>
<td>• employees:</td>
</tr>
<tr>
<td></td>
<td>o healthcare workers</td>
</tr>
<tr>
<td></td>
<td>o other (non-healthcare) employees</td>
</tr>
<tr>
<td></td>
<td>o specific subgroups of working adults (e.g., self-employed, migrant workers)</td>
</tr>
<tr>
<td></td>
<td>o individuals affected by unemployment because of the pandemic</td>
</tr>
<tr>
<td></td>
<td>• different age groups:</td>
</tr>
<tr>
<td></td>
<td>o children/adolescents (&lt; 18 years)</td>
</tr>
<tr>
<td></td>
<td>o young to middle-age individuals (≥ 18 years to &lt; 60 years), including university students</td>
</tr>
<tr>
<td></td>
<td>o older individuals (≥ 60 years)</td>
</tr>
<tr>
<td></td>
<td>• SARS-CoV-2 infected individuals</td>
</tr>
<tr>
<td></td>
<td>• patient populations:</td>
</tr>
<tr>
<td></td>
<td>o patients with pre-existing chronic health conditions (e.g., chronic diseases, mental disorders, geriatric patients, or a combination of these)</td>
</tr>
<tr>
<td></td>
<td>o pregnant women</td>
</tr>
<tr>
<td></td>
<td>o Covid-19 patients, including those suffering from severe courses of disease or long-term consequences (“long Covid-19”)</td>
</tr>
<tr>
<td></td>
<td>• subgroups with particular risk exposure, for example:</td>
</tr>
<tr>
<td></td>
<td>o informal caregivers</td>
</tr>
<tr>
<td></td>
<td>o working parents</td>
</tr>
<tr>
<td></td>
<td>o individuals with low socioeconomic status</td>
</tr>
<tr>
<td>Exclusion criteria:</td>
<td>n.a.</td>
</tr>
<tr>
<td>Exposure</td>
<td>Inclusion criteria:</td>
</tr>
<tr>
<td></td>
<td>• exposure to Covid-19 pandemic (i.e., study exclusively investigates the effects of the Covid-19 pandemic)</td>
</tr>
<tr>
<td></td>
<td>• study performed at least in part after the first officially registered Covid-19 case in the respective country based on national infection dates published by the World Health Organization (<a href="https://covid19.who.int/WHO-COVID-19-global-data.csv">https://covid19.who.int/WHO-COVID-19-global-data.csv</a>)</td>
</tr>
<tr>
<td>Exclusion criteria:</td>
<td>exposure to other epidemic or pandemic infectious disease outbreaks (e.g., Severe Acute Respiratory Syndrome coronavirus [SARS-CoV], Middle East Respiratory Syndrome-related coronavirus [MERS-CoV], Ebola, Human Immunodeficiency Virus [HIV], influenza)</td>
</tr>
<tr>
<td>Comparator</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
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### Outcome

**Inclusion criteria:** any of the following outcomes is investigated
- loneliness OR
- mental health with a broad range of eligible outcomes, such as:
  - anxiety symptoms and/or worrying
  - depressive symptoms
  - stress symptoms and/or perceived stress
  - sleep problems and/or sleep quality
  - general psychological distress
  - peri-/post-traumatic stress symptoms
  - substance abuse, substance use disorder
  - self-harm, suicidal ideation, suicidality
  - well-being, life satisfaction, quality of life

**Exclusion criteria:** study does NOT measure any of the above-mentioned outcomes

### Study design

**Inclusion criteria:**
- observational quantitative (survey) study
- longitudinal design (i.e., repeated measurements in the same individuals at several assessments) or repeated cross-sectional design (i.e., measurements in different individuals at several time points)
- for general population: sample size of N ≥ 1,000 participants at all time points; for other populations also smaller sample sizes
- performed in an EU Member State (+ UK) or mainly EU-based study conduction (i.e., ≥75% or any percentage of participants from EU Member States as long as data from these Member States can be extracted and analysed separately)

**Exclusion criteria:**
- intervention studies
- theoretical/discussion papers
- editorials, letters to the editor, commentaries (if they do not report the results of original research)

---

**Note.** Covid-19: coronavirus disease 2019; e.g.: for example; EU: European Union; n.a.: not applicable; UK: United Kingdom.

### 3.2. Search strategy

The search methods for the identification of primary quantitative studies concerning the effects of the Covid-19 pandemic on different psychosocial and mental health outcomes in EU populations are presented in Table 5. In line with pillar 2, a PubMed search was combined with databases using machine learning (e.g., MAG) and existing living evidence syntheses (e.g., EPPI Centre’s living systematic map). The search terms were also based on the logic model presented in the Main publication and were piloted in preliminary searches.
Table 5: Search strategy to identify primary studies (pillar 3)

<table>
<thead>
<tr>
<th>Category</th>
<th>Search strategy</th>
</tr>
</thead>
</table>
| Sources  | Bibliographic databases:  
|          | • PubMed  
|          | Databases/neural networks using machine learning:  
|          | • Epistemonikos (https://www.epistemonikos.org/)  
|          | • Microsoft Academic Graph (MAG; searched through EPPI Reviewer 4;  
|          | http://eppi.ioe.ac.uk/cms/er4/Manuals/MicrosoftAcademicGr  
|          | aphinEPPI-Reviewer/tabid/3754/Default.aspx)  
|          | Living evidence syntheses and maps/databases of empirical Covid-19 research and of reviews:  
|          | • EPPI Centre’s living systematic map of the evidence (http://eppi.ioe.ac.uk/cms/Projects/DepartmentofHealthandS  
|          | ocialCare/Publishedreviews/COVID-  
|          | 19Livingsystematicmapoftheevidence/tabid/3765/Default.as  
|          | px)  
|          | • Living map of Norwegian Institute of Public Health (https://www.fhi.no/en/qk/systematic-reviews-hta/map/;  
|          | https://www.nornesk.no/forskningskart/NIPH_mainMap.html)  
|          | • L*VE by Epistemonikos (https://app.iloveevidence.com/loves/5e6fd3969c00e4ac07  
|          | 2701d)  
|          | • LitCovid (https://www.ncbi.nlm.nih.gov/research/coronavirus/)  
|          | • specifically for primary studies:  
|          | o DepressD (https://www.depressd.ca/research-que  
|          | stion-1-symptom-changes)  
| Search period | 2020 onwards |
| Search dates | March 18, 2021: DepressD  
|          | March 21, 2021: EPPI Centre’s living systematic map of the evidence, L*VE by Epistemonikos, LitCovid, Living map of Norwegian Institute of Public Health  
|          | March 22, 2021: Epistemonikos, PubMed  
| Example search strategy (PubMed) | 1) ("Mental health"[MeSHTerms] OR "Psychological distress"[MeSH Terms] OR "resilience, psychological"[MeSH Terms] OR "Mental health"[Title/Abstract] OR "mental burden"[Title/Abstract] OR "Psychological distress"[Title/Abstract] OR "resilien*"[Title/Abstract] OR "hardiness*"[Title/Abstract] OR ("loneliness"[MeSHTerms] OR "loneliness"[Title/Abstract] OR "social isolation"[Title/Abstract] OR "isolation"[Title/Abstract]) OR ("social participation"[MeSH Terms] OR "social participation"[Title/Abstract]) OR ("accept*"[Title/Abstract] OR "compliance"[Title/Abstract] OR "adher*"[Title/Abstract] OR "attitude"[Title/Abstract]) OR ("hygiene behavior"[Title/Abstract] OR "social distancing"[Title/Abstract] OR "infection prevention behav*"[Title/Abstract]) OR ("vaccine confidence"[Title/Abstract] OR "vaccination confidence"[Title/Abstract] OR "vaccine hesitancy"[Title/Abstract] OR "vaccination hesitancy"[Title/Abstract] OR "vaccine intention"[Title/Abstract] OR "vaccination intention"[Title/Abstract] OR "intention to
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As in the search for systematic reviews and meta-analyses, we considered psychological resilience as a search term in the above-described strategy (see Table 5). However, through the search for different mental health outcomes in the context of the Covid-19 pandemic, the construct was also searched for indirectly based on the definition of resilience as mental health despite stressors (Kalisch, 2015; Kalisch, 2017).

3.3. Study selection

The study selection for primary studies was also performed by two independent reviewers using EPPI-Reviewer. Any disagreements were resolved by discussion or by consulting a third reviewer.

3.4. Data extraction

To extract all relevant data of the included primary research studies, a customised data extraction sheet in Excel was used. For this report, data extraction was performed by a single reviewer, with any uncertainties being resolved by team discussion or by consulting a second reviewer. The following aspects were extracted:

- **Study design**
- **EU country** (EU Member State or the UK)
- **Population**: representative (yes/no); inclusion/exclusion criteria; population group considered in the study; sample size; proportion of female participants; age (mean, i.e., average and standard deviation and/or age range)
- **Assessment**: assessment period; pre vs. during assessment or assessment of trajectory during the pandemic, or both
- **Stage of pandemic** (e.g., SARS-CoV-2 infection rate, number of Covid-19 cases, Covid-19-related deaths) and containment measures in the study period (yes/no; e.g., confinement)
- **Outcome data**: each mental health outcome measured in the study; assessment tools (range of possible values); changes in outcomes pre vs. during or trajectories during pandemic; results on risk/protective factors

3.5. Quality assessment

As this report primarily aimed at giving an overview of the current evidence on psychosocial and mental health consequences of the Covid-19 pandemic for the Members of the European Parliament and various stakeholders, we did not plan to perform a formal quality assessment of the included primary (empirical) studies. Our eligibility criteria for primary quantitative studies (longitudinal and repeated cross-sectional
studies) ensure a certain level of quality based on the study design (e.g., causal conclusions on effects of the Covid-19 pandemic due to the repeated assessments).

3.6. Data analysis & synthesis

To summarise the findings of the included observational (survey) studies, we also used a narrative and tabular synthesis of the extracted data, separately for different population groups (i.e., general population, patient populations, employees, children and adolescents, young to middle-aged individuals, older adults, mixed populations). Due to the large between-study heterogeneity between survey studies, for example, regarding survey periods, population groups, and outcome measures, we decided not to pool the quantitative data in meta-analyses, following the recommendations in the literature (e.g., Deeks, 2021). More details are presented in section 5 of this annex.
4. Methods for pillar 4 – Identification of policy recommendations and (evidence-based) guidelines

4.1. Eligibility criteria

As one source of information to derive policy options of relevance for EU Member States, we identified existing (policy) recommendations at the level of European (mental health) organizations (e.g., WHO Technical Advisory Group [TAG] on mental health impacts of Covid-19 in the WHO European Region). In addition, we inspected the recommendations made based on the summarised evidence in previous systematic reviews and meta-analyses (see pillar 2).

Within another PubMed search (see Table 6), we also planned to check for the availability of evidence-based recommendations and guidelines in the context of the Covid-19 pandemic. However, we were not yet able to identify any research papers on concrete evidence-based guidelines amid the current pandemic.

Table 6: Eligibility criteria for policy recommendations and (evidence-based) guidelines (pillar 4)

<table>
<thead>
<tr>
<th>Category</th>
<th>Inclusion &amp; exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td></td>
</tr>
<tr>
<td>Inclusion criteria:</td>
<td>general public/general population</td>
</tr>
<tr>
<td></td>
<td>age group: adults (≥ 18 years)</td>
</tr>
<tr>
<td></td>
<td>patient populations:</td>
</tr>
<tr>
<td></td>
<td>o patients with pre-existing chronic health conditions (e.g., chronic diseases, mental disorders, geriatric patients, or a combination of these)</td>
</tr>
<tr>
<td></td>
<td>o pregnant women</td>
</tr>
<tr>
<td>Exclusion criteria:</td>
<td>age group: only children or adolescents (&lt; 18 years)</td>
</tr>
<tr>
<td></td>
<td>healthcare professionals</td>
</tr>
<tr>
<td>Exposure</td>
<td></td>
</tr>
<tr>
<td>Inclusion criteria:</td>
<td>exposure to Covid-19 pandemic (i.e., study exclusively investigates the effects of the Covid-19 pandemic)</td>
</tr>
<tr>
<td></td>
<td>exposure to Covid-19 policy recommendations, restrictions, regulations, or guidelines</td>
</tr>
<tr>
<td>Exclusion criteria:</td>
<td>exposure to other epidemic or pandemic infectious disease outbreaks (e.g., Severe Acute Respiratory Syndrome coronavirus [SARS-CoV], Middle East Respiratory Syndrome-related coronavirus [MERS-CoV], Ebola, Human Immunodeficiency Virus [HIV], influenza)</td>
</tr>
<tr>
<td>Comparator</td>
<td>n.a.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Inclusion criteria: any of the following outcomes is investigated</td>
</tr>
<tr>
<td></td>
<td>o mental health with a broad range of eligible outcomes, such as:</td>
</tr>
<tr>
<td></td>
<td>♦ anxiety symptoms and/or worrying</td>
</tr>
</tbody>
</table>
Study design

<table>
<thead>
<tr>
<th>Inclusion criteria:</th>
<th>Exclusion criteria:</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ depressive symptoms</td>
<td>• case-series, one-time cross-sectional studies, studies without empirical data</td>
</tr>
<tr>
<td>♦ stress symptoms and/or perceived stress</td>
<td>• theoretical/discussion papers</td>
</tr>
<tr>
<td>♦ sleep problems and/or sleep quality</td>
<td>• editorials, letters to the editor, commentaries (if they do not report the results of original research)</td>
</tr>
<tr>
<td>♦ general psychological distress</td>
<td></td>
</tr>
<tr>
<td>♦ peri-/posttraumatic stress symptoms</td>
<td></td>
</tr>
<tr>
<td>♦ self-harm, suicidal ideation, suicidality</td>
<td></td>
</tr>
</tbody>
</table>

Exclusion criteria: study does NOT measure any of the above-mentioned outcomes

4.2. Search strategy

We performed a PubMed search (search strategy in Table 7) and inspected the websites and information from the following institutions:

- WHO, Regional Office of the European Union (WHO, 2020b)
- Inter-Agency Standing Committee (IASC Reference Group on Mental Health and Psychosocial Support in Emergency Settings, 2020)
- European Centre for Disease Prevention and Control (ECDC, 2017)
- Mental Health Europe (Mental Health Europe, 2020a, 2020b)

Any recommendations made by the authors of previous systematic reviews and meta-analyses (e.g., implications for practice presented in discussion part of a review) had already been extracted within pillar 2 (see 2).
Table 7: Search strategy for policy recommendations and (evidence-based) guidelines in PubMed (pillar 4)

<table>
<thead>
<tr>
<th>Category</th>
<th>Search strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources</td>
<td>Bibliographic databases: PubMed</td>
</tr>
<tr>
<td>Search period</td>
<td>March 1, 2020 onwards</td>
</tr>
<tr>
<td>Search dates</td>
<td>March 3, 2021: PubMed</td>
</tr>
</tbody>
</table>

Example search strategy (PubMed)³

1. (((((polic*[Title/Abstract]) OR (recommendation*[Title/Abstract]) OR (regulat*[Title/Abstract]) OR (rule*[Title/Abstract]) OR (implicati*[Title/Abstract]) OR (suggesti*[Title/Abstract]) OR (guideline*[Title/Abstract]) OR (lockdown*[Title/Abstract]) OR (social distanc*[Title/Abstract]) OR (face mask*[Title/Abstract]) OR (isolation*[Title/Abstract]) OR (quarantin*[Title/Abstract]) AND

2. (((((((mental health*[Title/Abstract]) OR (psychological*[Title/Abstract]) OR (psycho-social*[Title/Abstract]) OR (loneliness*[Title/Abstract]) OR (depressi*[Title/Abstract]) OR (fear*[Title/Abstract]) OR (stress*[Title/Abstract]) OR (anxiet*[Title/Abstract]) OR (resilien*[Title/Abstract]) OR (isolation*[Title/Abstract]) OR (social participation*[Title/Abstract]) OR (accept*[Title/Abstract]) OR (suicid*[Title/Abstract]) OR (compliance*[Title/Abstract]) OR (adher*[Title/Abstract]) OR (vaccine intention*[Title/Abstract]) OR (vaccin*[Title/Abstract]) OR (vaccination acceptance*[Title/Abstract])) OR (anit vaccine*[Title/Abstract]) OR (vaccine refusal*[Title/Abstract]) AND

3. (((((Covid-19*[Title/Abstract]) OR (pandemic*[Title/Abstract]) OR (Corona*[Title/Abstract]) OR (SARS-CoV-2*[Title/Abstract]) AND

4. 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Search strategy (PubMed)³

³ Example search strategy in PubMed is based on the search strategy used in the systematic review and is not intended to be exhaustive or exhaustive.
4.3. Study selection

The study selection for the references identified through the PubMed search was also conducted by two independent reviewers using Rayyan (Ouzzani, 2016). Any disagreements were resolved by discussion among all reviewers.

4.4. Data extraction

All relevant data of studies identified through the PubMed search were extracted using a customised data extraction sheet. The following categories were extracted for each included study:

- **Study location** (EU Member State)
- **Study design**
- **Population** (sample size, % female, age mean [standard deviation] and/or range)
- **Covid-19-related policies in place at the time**
- **Study period**
- **Outcome categories**
- **Results**

4.5. Data analysis & synthesis

The recommendations made by the authors of previous systematic reviews and meta-analyses were summarised in tabular form for each population group. The same applied to the recommendations found on different websites (e.g., from the WHO TAG on mental health impacts of Covid-19). The results of the PubMed literature search were summarised in text form.
5. Data analysis and synthesis across the 4 pillars to address the research questions

With respect to **Research question (RQ) 1**, we used a visual presentation (gantt charts) of containment and support measures implemented in the 27 EU Member States and the UK at different time points in the pandemic timeline.

**RQ2** concerning the psychosocial and mental health effects of the Covid-19 pandemic and of related policy responses was answered based on the tabular and narrative synthesis of primary (quantitative observational) studies. For this purpose, the primary studies within a certain population group (e.g., general population) were clustered according to their survey period (i.e., state of pandemic depending on number of Covid-19 cases) and the containment measures in force at this time. This information was then indirectly associated with the data on mental health outcomes in this period. Given the heterogeneous entry into force of different support measures, which was difficult to determine for each EU Member State, we only considered whether support measures had been implemented or not in different domains. This information was then also associated with data on mental health outcomes. The previous systematic reviews and meta-analyses summarised for this report (pillar 2) were used to identify agreements and disagreements with the primary studies and to put the findings of primary studies in the context of previous research.

To answer **RQ2**, we decided against calculating meta-analyses across primary studies due to the considerable clinical and methodological heterogeneity between the identified primary studies (e.g., outcomes, survey periods) and since no consistent effect measures had been used across the studies. Instead, for the main publication, the findings were summarised narratively using vote counting and graphical analysis (Campbell, 2020), while we also discussed the limitations of this approach (see **Main publication**). Whenever possible and if available in the publications of primary studies, we reported the statistical significance of a result (e.g., for a comparison of a specific mental health outcome from before to during the Covid-19 pandemic) along with the respective **effect sizes** to describe the range of observed effects for this report. Furthermore, the statistical data reported by the primary studies (e.g., statistical test used) have been described in detail in **Annex 2 – Results**, clustered by population group.

**Effect size**
- A general term for estimating the effect of a variable that distinguishes two study groups in a study (e.g., a treatment or preventive measure that one group has received and the other not, or the exposure to a stressor like the Covid-19 pandemic, which differs between the two groups)

(Cochrane Collaboration, 2005)

**RQ3** and **RQ4** regarding country-level, population-level, and individual risk and protective factors for mental health in different population groups amid the Covid-19 pandemic were answered in three ways.

**EU Member State and population group as moderator.** First, the primary studies were clustered depending on the **EU country** (EU Member State or the UK) where they had been performed, to clarify the role of this potential country-level moderator. Second, the studies were also clustered into subgroups depending on the **population group**. We analysed the reported comparisons a) between assessments before and during the Covid-19 pandemic and b) between several assessments during the course of the pandemic, counting the number of reported comparisons with an increase, a decrease, or stability with regard to the respective outcome. The direction of change in mental health most frequently reported was considered as a general tendency for the respective country or population. If for one EU country (or the UK) or population group, several different directions of change in mental health were stated, the direction reported most frequently was considered as a general tendency for the respective country or population group. In case the same number of comparisons indicated two different directions of change in mental health, a “deterioration” and an “improvement” were prioritised over “no change”. If the same number of comparisons indicated a deterioration and an improvement in mental health, “no change” was considered as the general tendency for the respective EU country (or the UK) or population group.
In case several directions of change in mental health were stated for one comparison (e.g., a decline in psychological distress after an initial increase), the comparison was taken into account as “no change”.

**Individual risk and protective factors.** For each population group (e.g., general population), the risk and protective factors, which had been **directly** investigated in systematic reviews/meta-analyses and primary studies, were summarised at different levels (e.g., sociodemographic, psychological).

Given the large heterogeneity between the studies, we also decided against performing meta-analysis to answer RQ3 and RQ4. Based on the scope of this report and its aim to present the findings of our analysis in plain language for the Members of the European Parliament, the main publication and *Annex 2 – Results* only summarise those factors for which there was (statistical) evidence that they could influence the mental health impact of the Covid-19 pandemic. To analyse the EU country and the population group as country- and population-level level risk/protective factors, we also used vote counting and **narratively summarised** the findings of the primary studies. More detailed information about all factors investigated (including those for which there was no [statistical] evidence of being a risk or protective factor, inconsistent evidence in a specific population group, or the statistical significance was unclear), can be requested from the authors of this report.
6. References


Annex 1 reports the study methodology underlying the report on mental health and resilience amid the Covid-19 pandemic in the European Union (EU). The methodological procedure for each of the four study pillars is presented, including the identification of (1) Covid-19 policy responses in the EU Member States and the United Kingdom, (2) previous systematic reviews and meta-analyses, (3) primary observational studies, and (4) policy recommendations and (evidence-based) guidelines. For each pillar, the annex provides details of the corresponding eligibility criteria and search strategy, the process of study selection and data extraction, as well as the data analysis and synthesis.