PHIRI
Population Health Information Research Infrastructure

EUROPEAN PUBLIC HEALTH CONFERENCE
BERLIN | 9-12 NOVEMBER 2022

Summarising research evidence related to COVID-19 impact

Workshop – 10th November 2022

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101018317

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The Population Health Information Research Infrastructure for COVID-19:

- a **European mechanism**, that aims to
- facilitate and support **data-driven population health research**
- and **exchange of best practices**
- to support **decision making**

41 partners

30 countries

3 years

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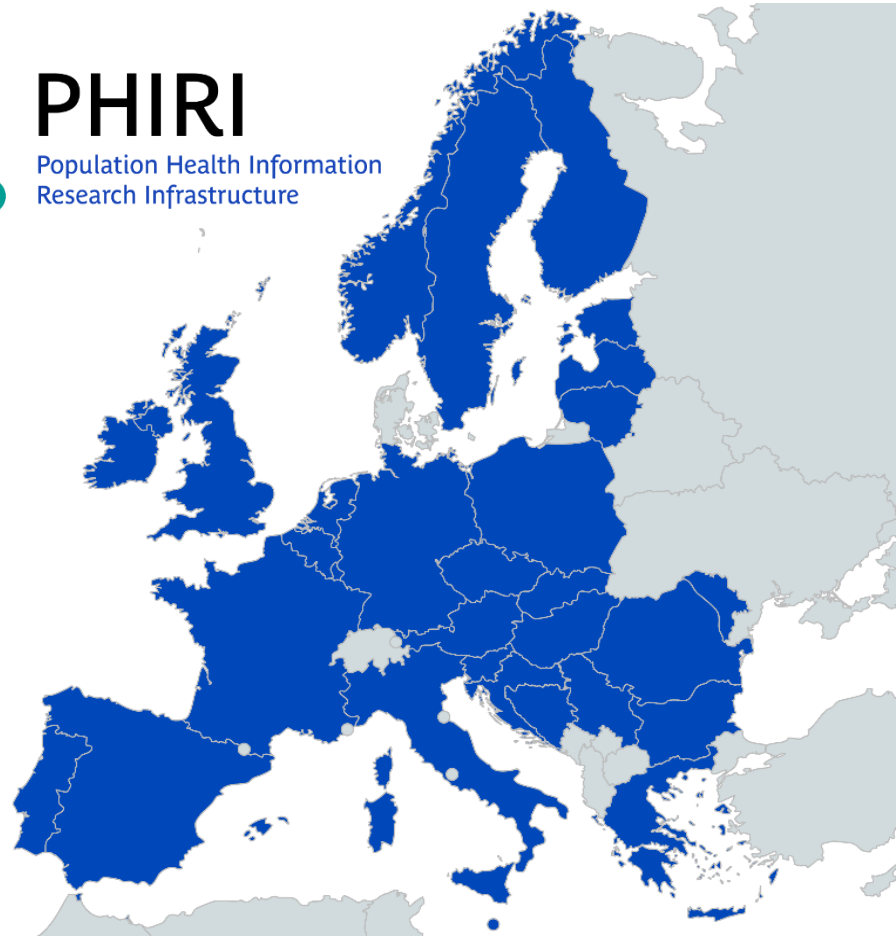

Map of PHIRI Partners

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The European Health Information Portal

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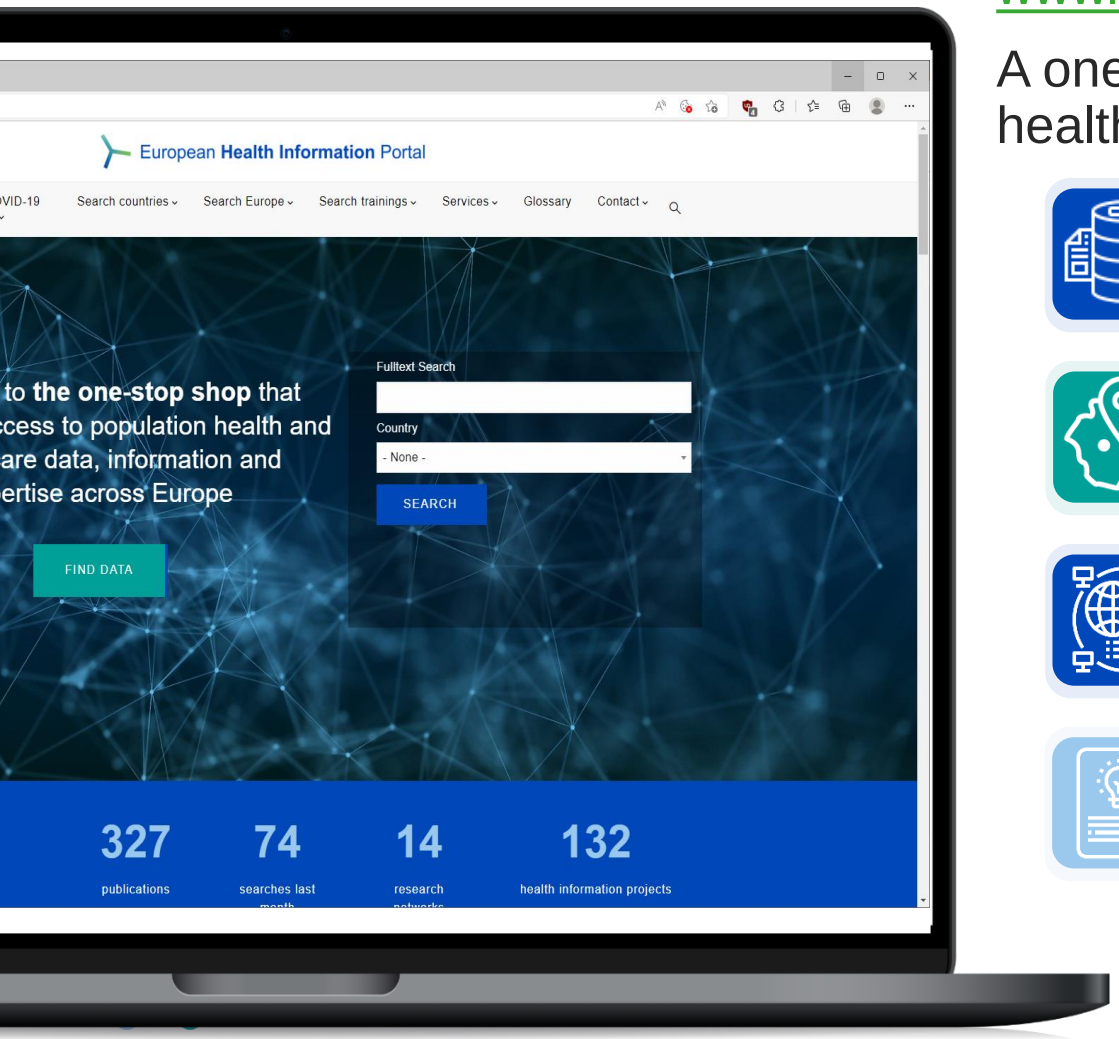

www.healthinformationportal.eu

A one-stop shop that facilitates access to population health and health care data, information and expertise across Europe.

- **Health information (data) sources**
- **Publications**
- **Countries and national nodes**
- **Trainings in all areas of population health**
- **Research infrastructures, Research networks**
- **COVID-19 Policy measures**
- **Health information projects**
- **COVID-19 Rapid Exchange Forum**

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Review of direct impact health indicators of COVID-19 in the scientific literature published between January 2020 and June 2021

César Garriga, Teresa Valero-Gaspar, Asunción Díaz, Carmen Rodríguez-Blázquez, Maria João Forjaz, PHIRI WP5.1 collaboration group

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN
Instituto de Salud Carlos III

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101018317

Objective

- To describe the **key health indicators** in the COVID-19 literature,
  - focusing on **differences in their calculation**
- To identify the **types of data sources**
  - used to estimate incidence, prevalence, mortality and severity associated with COVID-19 impact

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Methods

- Scoping review
- Search strategy in 3 databases (Pubmed, Embase and WHO Covid-19)
- Observational studies
- General population, hospitals and long-term care facilities
- Published in English
- January 2020 to June 2021
- Indicators of direct impact of COVID-19 worldwide.

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Methods – Screening

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1st stage

- Screening titles and abstracts

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INTELLIGENT SYSTEMATIC REVIEW

2nd stage

- Full-text reading
- Data charting of study characteristics
- Identifying indicators

3rd stage

- Data charting of indicator characteristics

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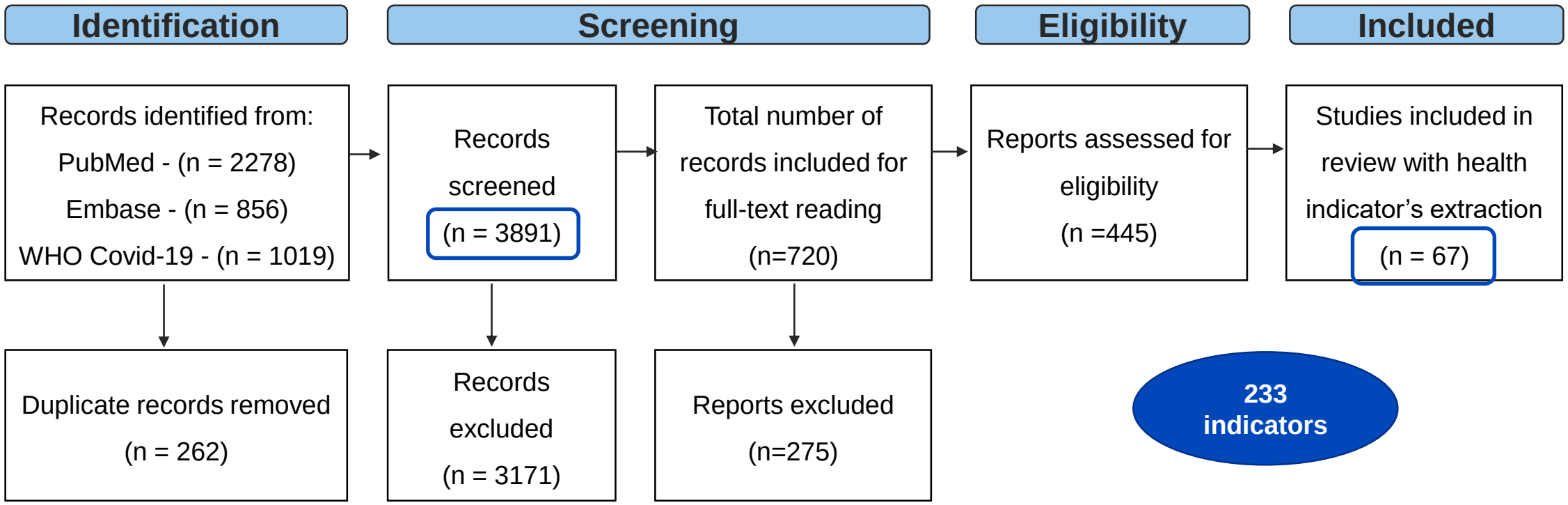
Results

Identification of studies via databases



PRISMA 2020 flow diagram for new systematic reviews which included searches of databases

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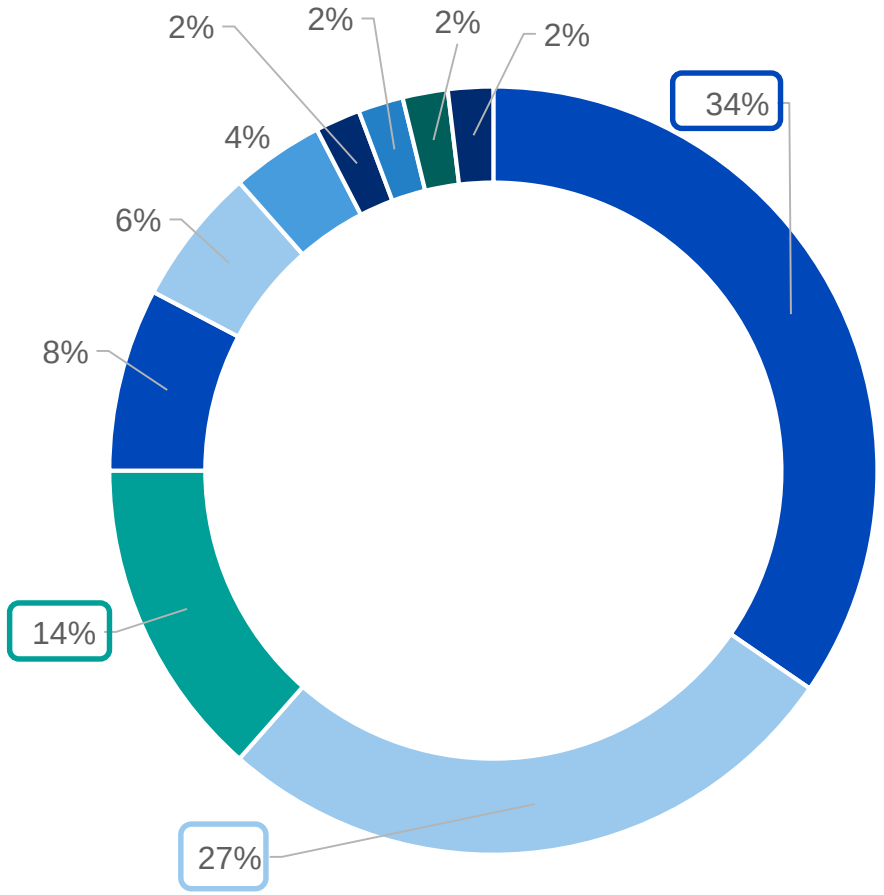
Results

Morbidity: 52 indicators from 33 articles



- New cases in the population (n=18)
- Positivity rate (n=14)
- New and pre-existing cases divided by population (n=7)
- Percentage symptomatic/asymptomatic (n=4)
- Secondary attack rate (n=3)
- Incubation (n=2)
- Reproductive number (n=1)
- Space-time cluster (n=1)
- Growth rate (n=1)
- Infection case ratio (n=1)

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Results

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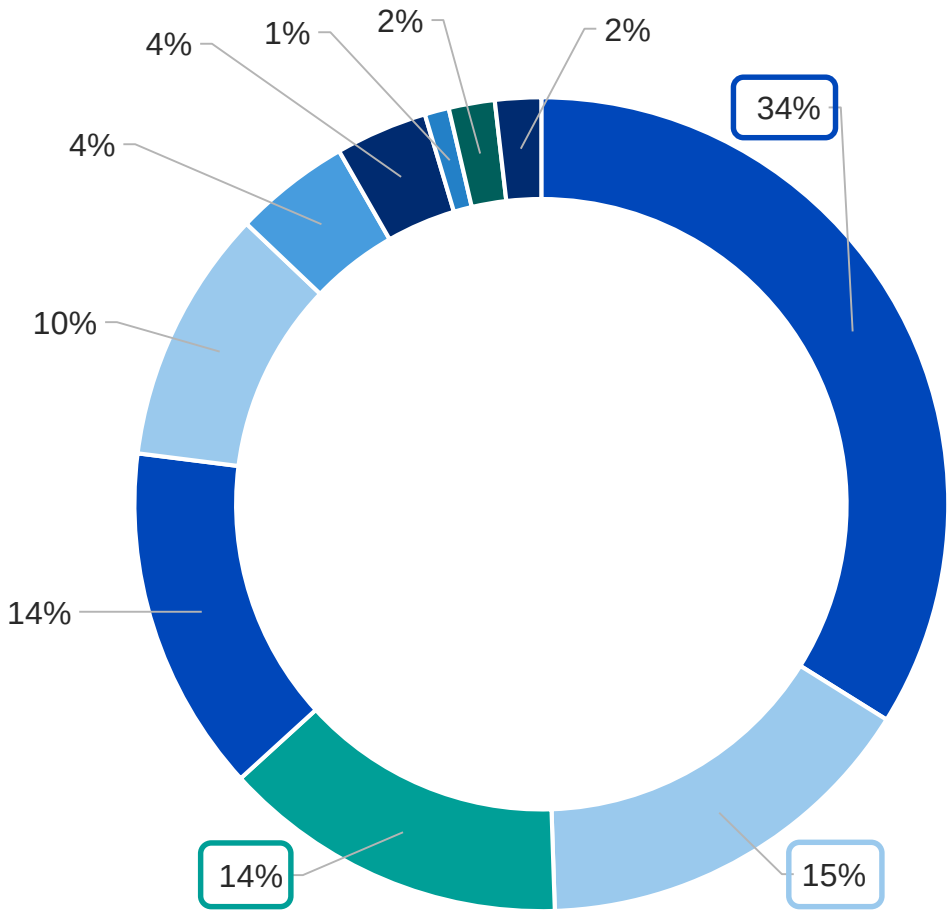
Severity: 105 indicators from 27 articles



- Ventilation procedures (n=37)
- ICU (n=17)
- Clinical outcomes/ Complications (n=15)
- Length of hospital stay (n=15)
- Hospitalisation (n=11)
- Other severity classifications (n=5)
- Treatments (n=4)
- Length ventilation (n=1)
- Growth rate (n=1)
- Infection case ratio (n=1)

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Results

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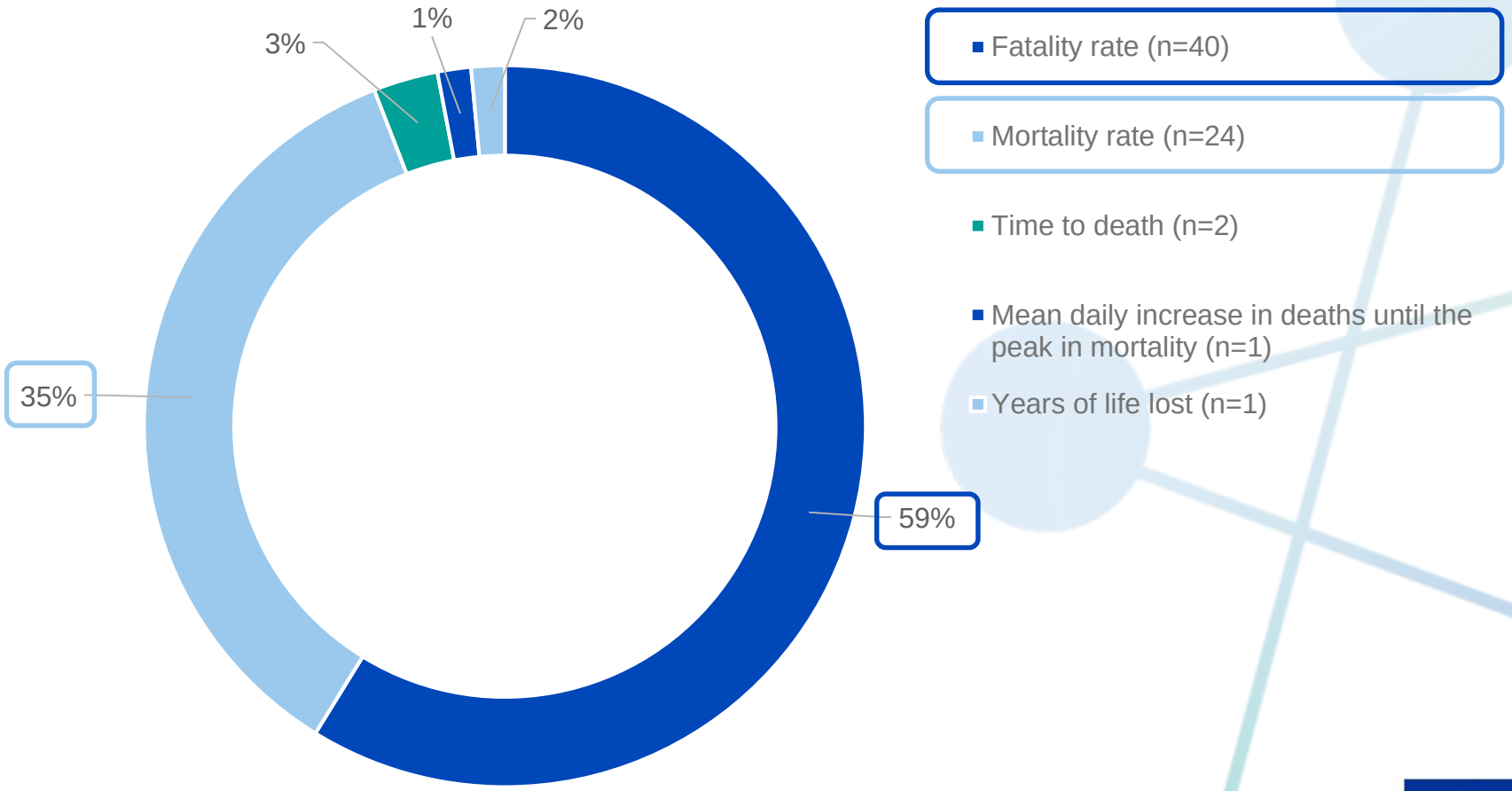
Mortality: 68 indicators from 51 articles



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Conclusions

- According to the scientific literature, a **wide variety of health indicators** has been used to measure the direct impact of COVID-19

- The **systematization of indicators** used in the current COVID-19 pandemic could **inform** for future health crises management

- The categorization of the different indicators in the last phase of this study will allow us to detect possible **strengths** and **difficulties** inherent in their implementation

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Researchers involved in the scoping review

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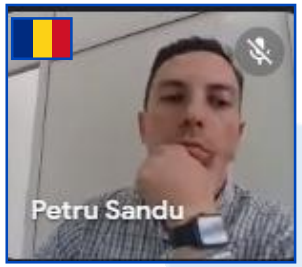
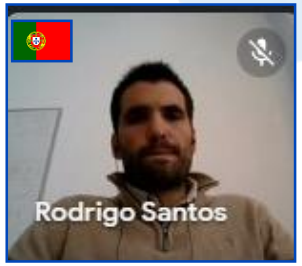
From left to right: Carmen Rodríguez Blázquez, Teresa Valero Gaspar, César Garriga, Maria João Forjaz and Asunción Díaz

19 researchers from 11 institutions





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Looking for methodologies and data pathways used in research to assess the COVID-19 impact: a scientific literature review

Rodrigo Feteira-Santos, Paulo J. Nogueira

Workshop: Summarising research evidence related to COVID-19 impact

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FACULDADE DE MEDICINA LISBOA

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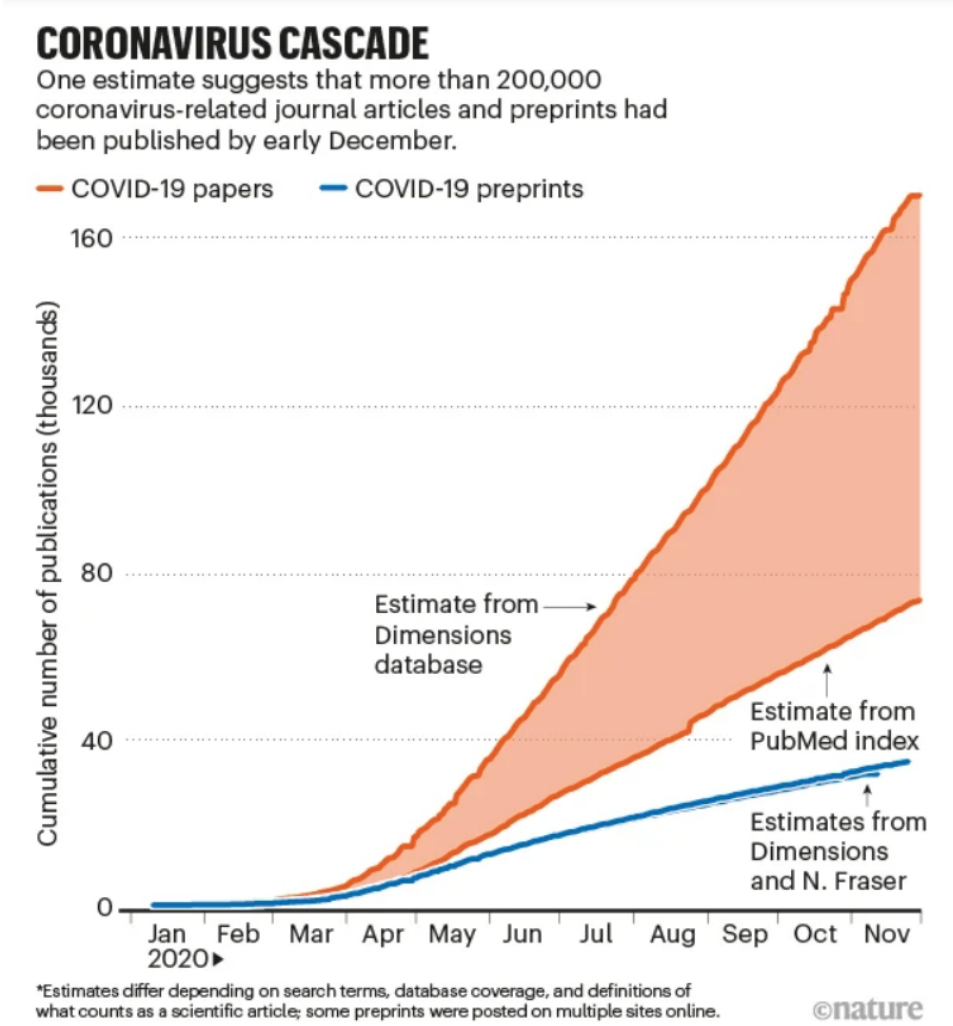
Mapping methods used in COVID-19 impact research

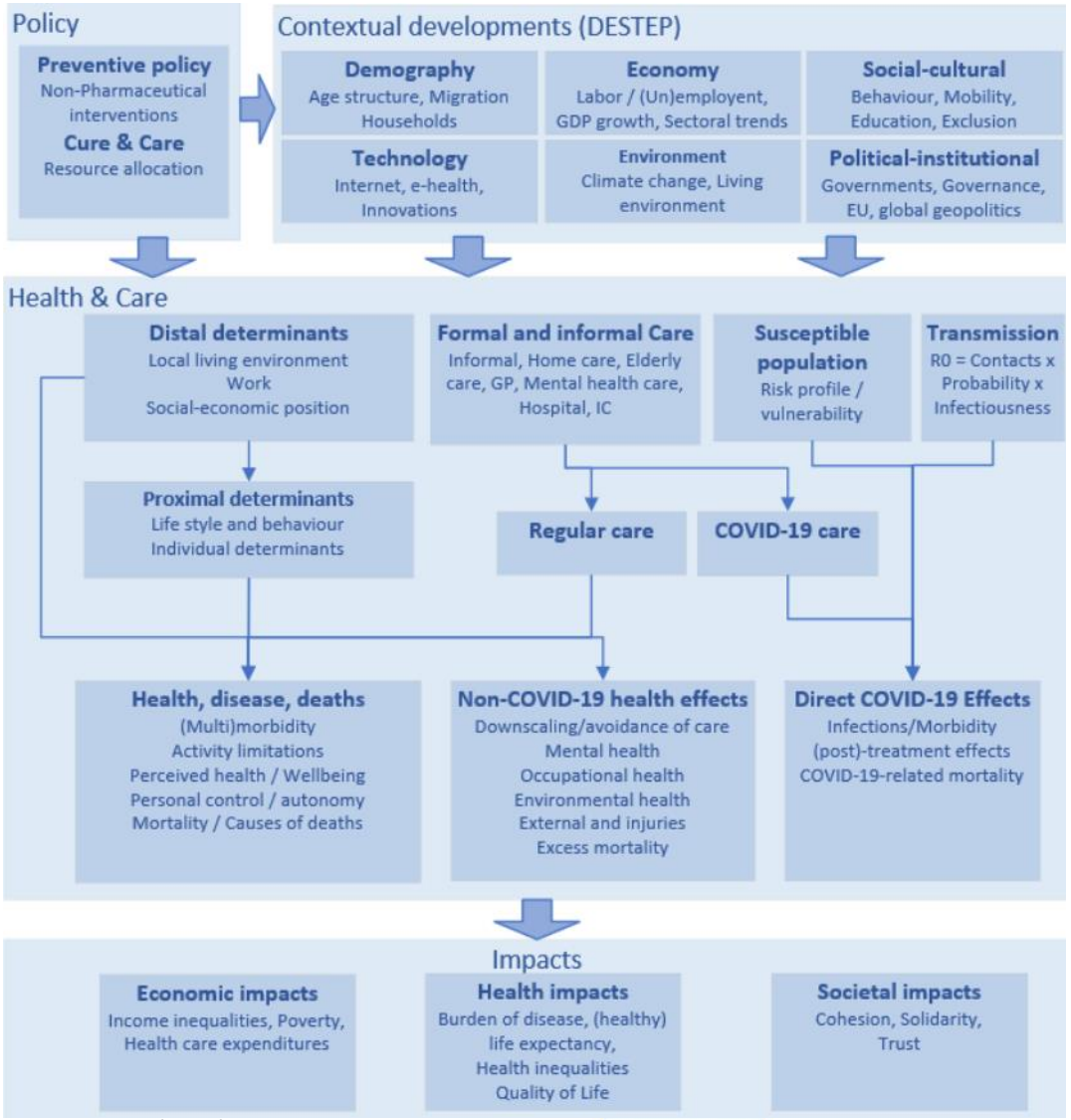
- Exponential increasing amount of information being produced – infodemics
- Significant quantity and wide range of literature types - peer-reviewed articles, pre-prints, opinions, guidelines, case reports, reviews
- To understand the available information regarding how the COVID-19 impact was measured, and also any gaps which are needed to address for better prepare future pandemics



Source: Else H. (2020). How a torrent of COVID science changed research publishing - in seven charts. *Nature*, *588*(7839), 553. https://doi.org/10.1038/d41586-020-03564-y

PHIRI definition of COVID-19 impacts

- Economic and societal disruptions were observed, and over time we will likely observe other long-term impacts (as determinants of health were affected: income, healthcare services, physical environment)
- Direct and indirect impact
- Immediate impacts such as morbidity and mortality, but also medium- and long-term impacts



Source: PHIRI (2021)

Methods

- Mapping review - to map and characterise methods and data pathways used in the direct and indirect COVID-19 impact-related research
- PubMed search: covid-19 AND data, November 2019-November 2020
- Screening, using a list of exclusion criteria
- First screening and second screening (changing criteria due to understanding of published evidence)
- Text-mining analysis

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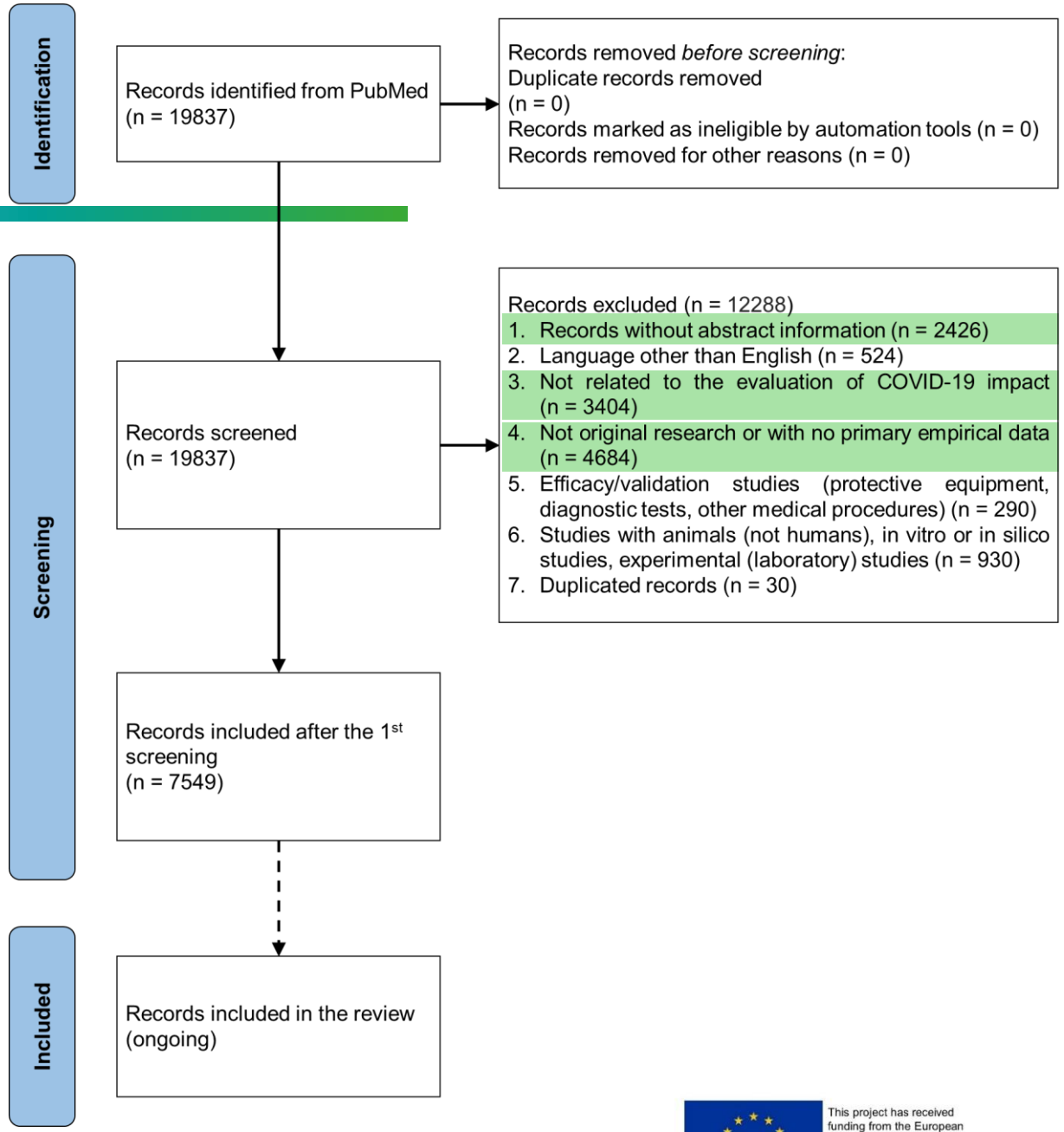
Preliminary results

- 19 837 records retrieved from PubMed
- First screening
  - 7 549 records included
- Second screening ongoing



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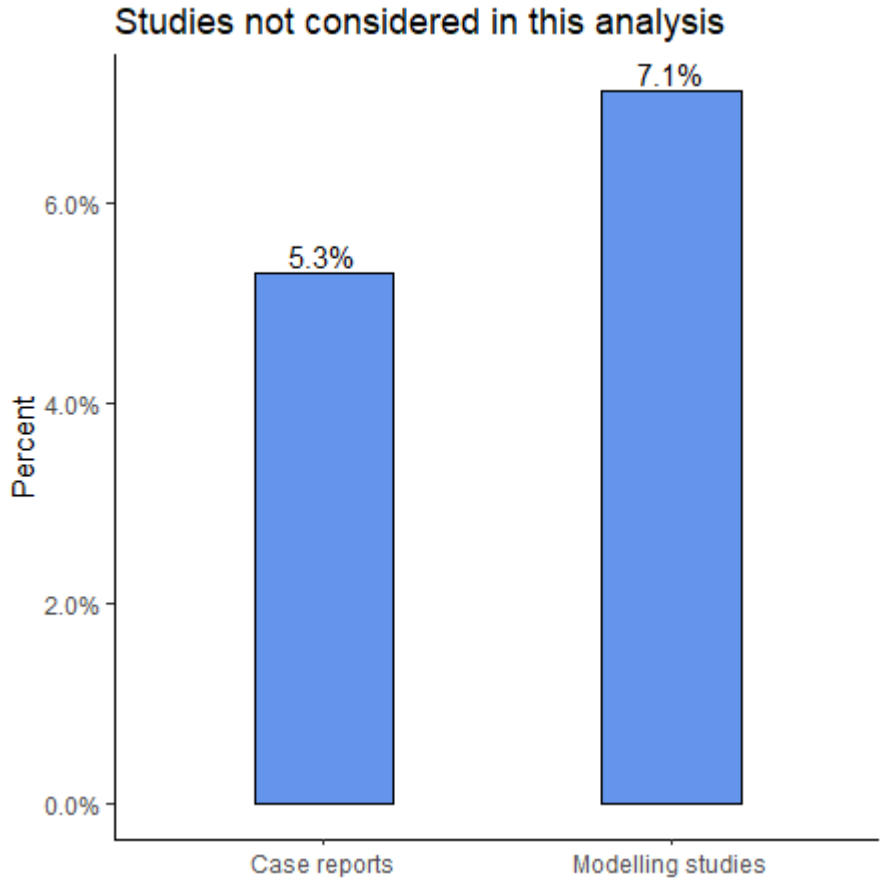
Preliminary results

- Sample screened until now (n=4412)

- Sample analysed (n=3864)
  - Case reports (n=234)
  - Modelling reports (n=314)



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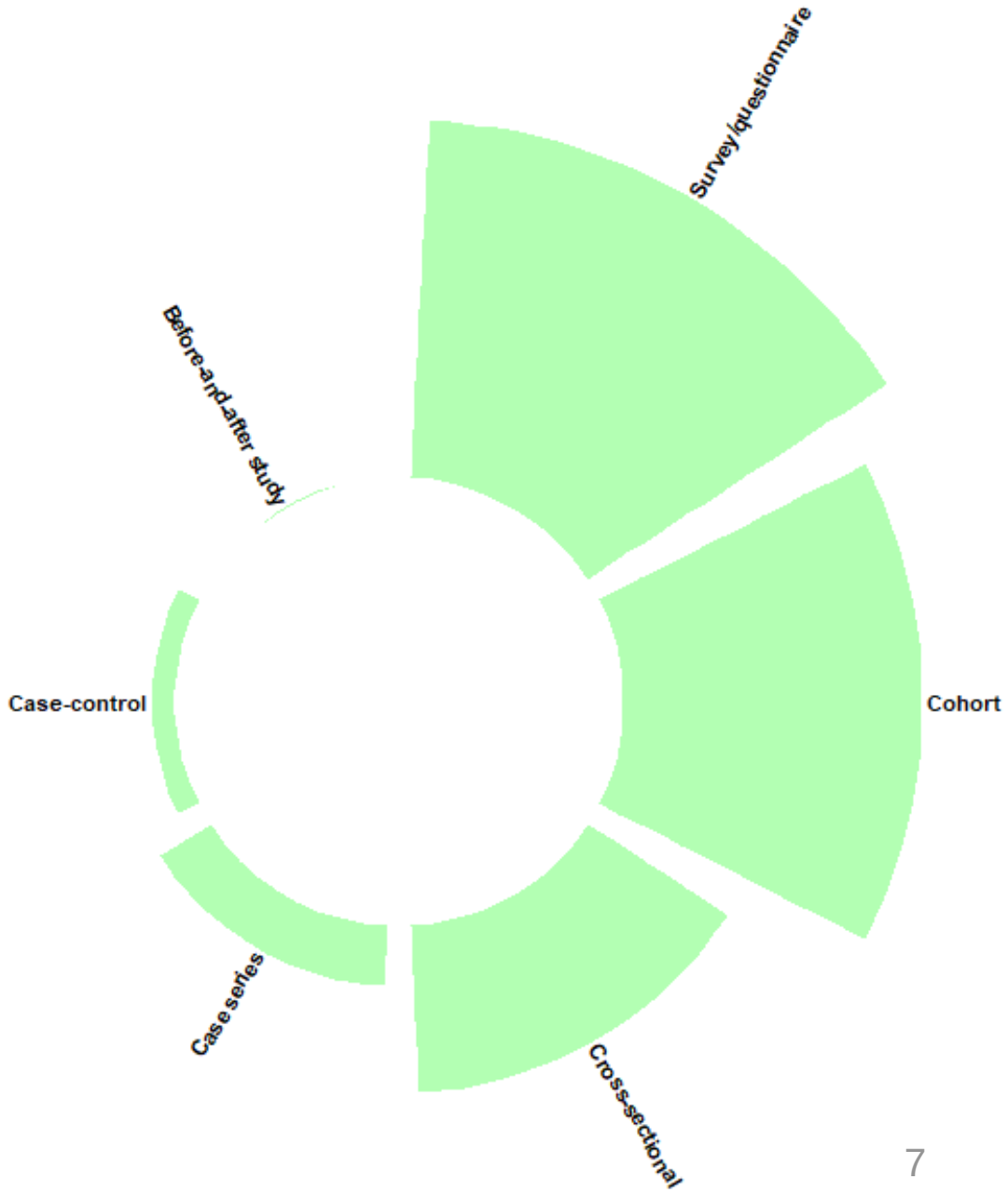
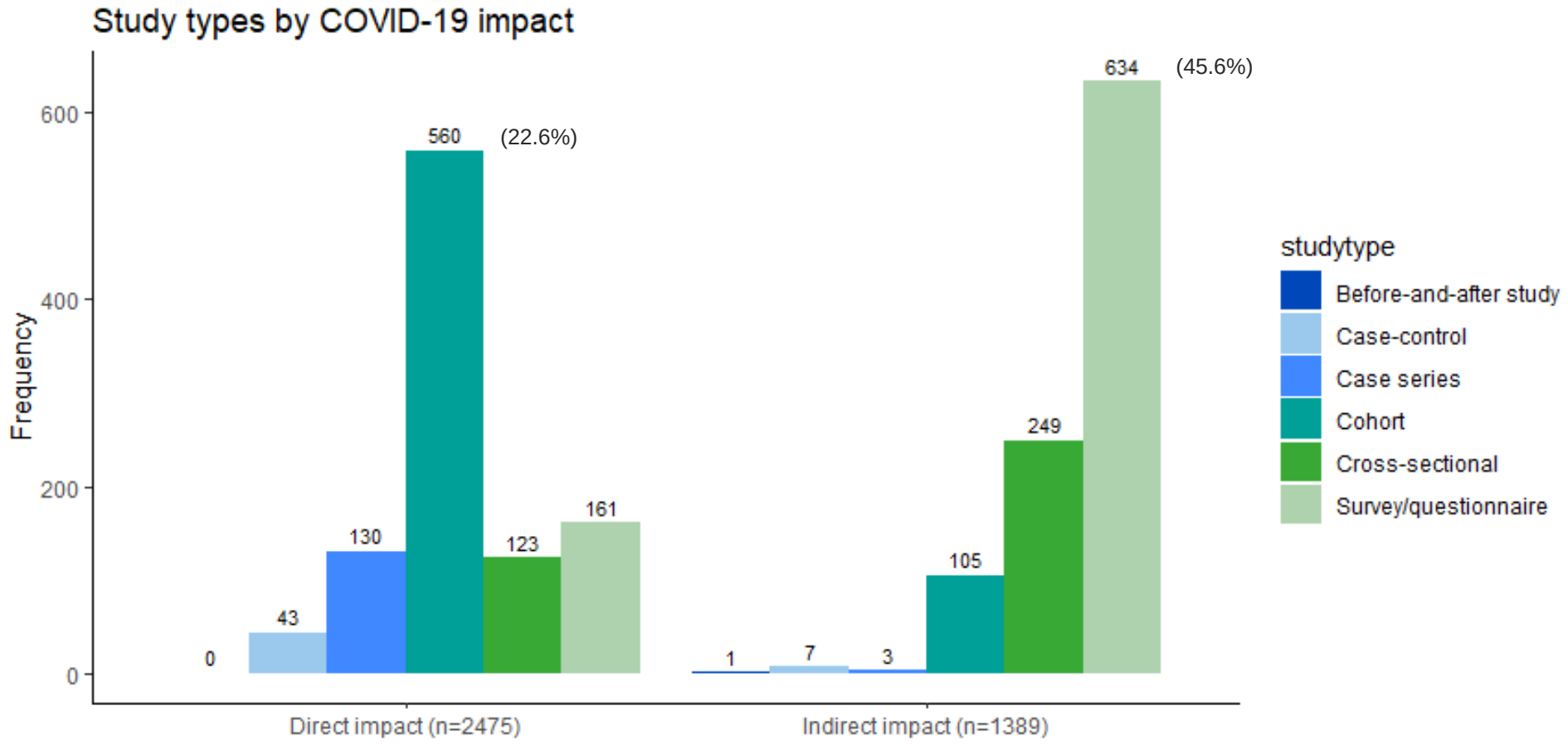
Preliminary results

- Conservative approach, searching **abstracts** for:
  - Survey/questionnaire (35.0%, n=1353)
  - Cohort (25.3%, n=979)
  - Cross-sectional (15.9%, n=614)
  - Case series (4.6%, n=176)
  - Case-control (1.7%, n=67)
  - Controlled before-and-after study (0.1%, n=2)

- Results from screening according to the type of COVID-19 impact assessed:
  - Direct impact (64.1%, n=2475)
  - Indirect impact (35.9%, n=1389)



Preliminary results



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Preliminary results

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Preliminary results

- Direct impact studies

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Preliminary results

- Indirect impact studies

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Limitations and challenges

- First approach using only articles' abstracts
- Word frequency was used as a proxy of study designs
- Studies report harmonisation
- Evidence from other databases and grey literature were not considered, though the large body of PubMed evidence

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Next steps

- Next approach using full-text articles
- Other text-mining methods to summarise the information
- Analysis of other study characteristics, such as statistical methods or research themes

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Thank you!

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Etiologic and prognostic roles of frailty, multimorbidity and socioeconomic characteristics in the development of COVID-19 related health outcomes: systematic reviews of population-based studies

Tatjana Makovski MD, MPH, PhD

Santé publique France

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Performed within *Population Health Information Research Infrastructure (PHIRI)* EU funded project

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Tatjana T. Makovski, Jinane Ghattas, Stéphanie Monnier-Besnard, Lisa Cavillot, Monika Ambrožová, Barbora Vašinová, Rodrigo Feteira-Santos, Peter Bezzegh, Felipe Ponce Bollmann, James Cottam, Romana Haneef, Brecht Devleesschauwer, Niko Speybroeck, Paulo Jorge Nogueira, Maria João Forjaz, Joël Coste, Laure Carcaillon-Bentata

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Context

- Impact of the COVID-19 crisis on populations' health, health systems, economic stability…
- ***Age or certain chronic conditions*** (e.g. cardiometabolic) were ***associated*** with an ***elevated risk*** of poorer outcomes linked to COVID-19 (e.g. infection, mortality, etc.)
- ***Frailty and multimorbidity associated*** with poor outcomes independently of age and single chronic conditions
- At the time of the review, few studies evaluated the association between frailty and multimorbidity with regards to COVID-19 outcomes
- ***Impact may also be stronger for*** *certain* ***socioeconomically deprived groups***

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Objectives

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To conduct a systematic literature review in order to :

1. assess the ***etiologic role*** of ***frailty, multimorbidity and socioeconomic status*** on the risk of SARS-CoV-2 short term outcomes (infection, hospitalisation, ICU admission, mechanical ventilation or mortality)

2. evaluate the ***prognostic value*** of above determinants regarding short-term and long-term health impact of Covid-19 such as functional decline, quality of life, mental health, work absenteeism, etc.

➔ **Population based approach**

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Methods

Multimorbidity measured by : disease count, comorbidity indices (e.g. Charlson index (CCI)), disease combinations

=> Definition of multimorbidity: coexistence of ≥ 2 conditions
(van den Akker et al, 1996)

Frailty measured by : standardised scales and scores for frailty (e.g. Fried's score, accumulation of deficit by Rockwood, etc.)

Socioeconomic factors measured by : standardised scales and measures of the socioeconomic gradient (e.g. education, income, race, immigrant status, etc.)

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Methods

- **4 databases explored**: PubMed, Embase, WHO COVID-19 global literature on coronavirus disease and PsycINFO
- Study registered in the ***Prospero registry*** for systematic review protocols : CRD42021249444

  => **initial search 7 April, 2021** (since January 2020)
  => update for frailty 1 February, 2022

- **Prisma recommendations** for the systematic review
- Review had **two parts** : **biomedical and socioeconomic**
- Title/abstract and full text screening, data extraction and quality assessment ***performed in pairs***
- 13 colleagues participated in the review process; 2 first reviewers

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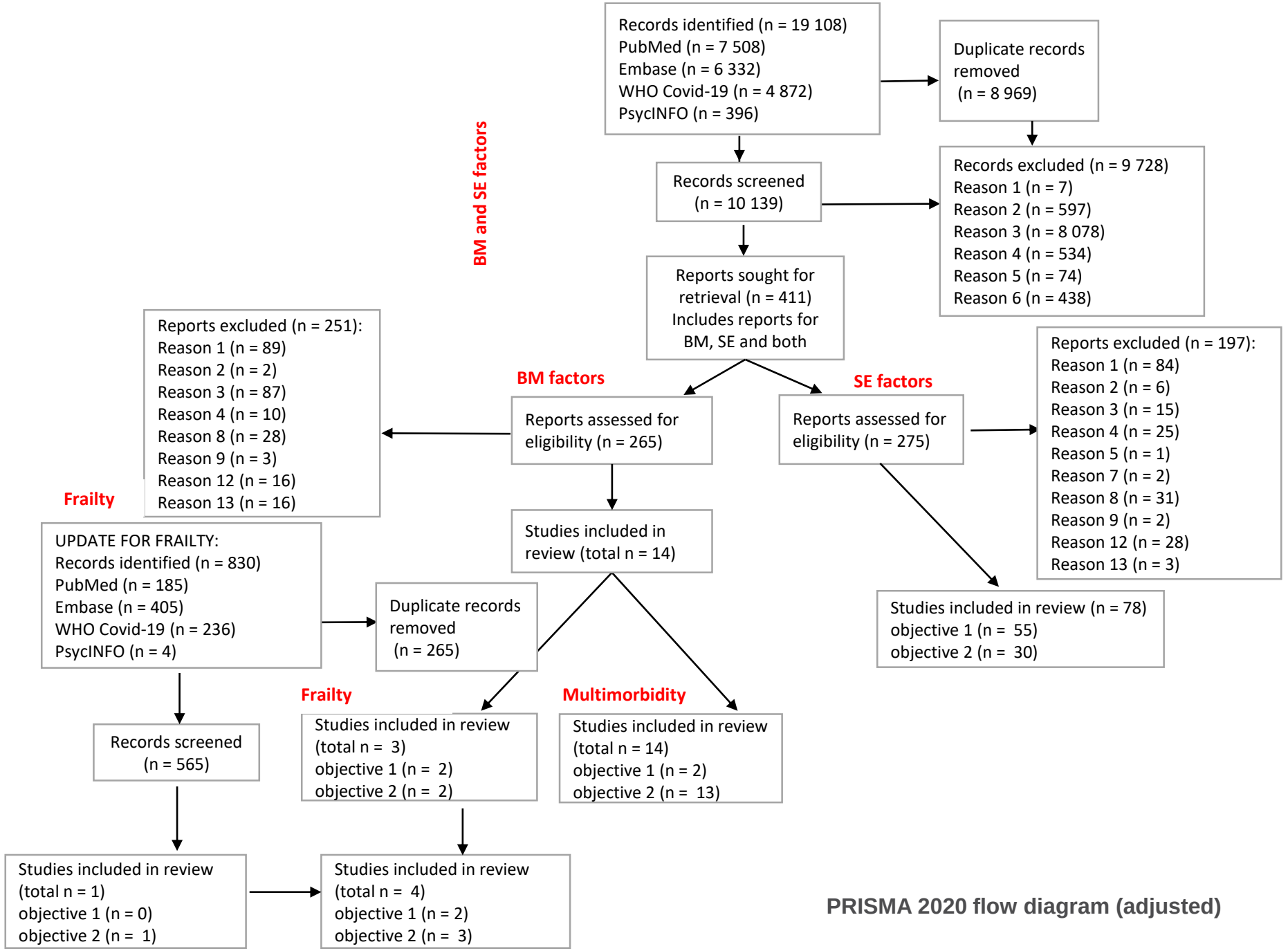
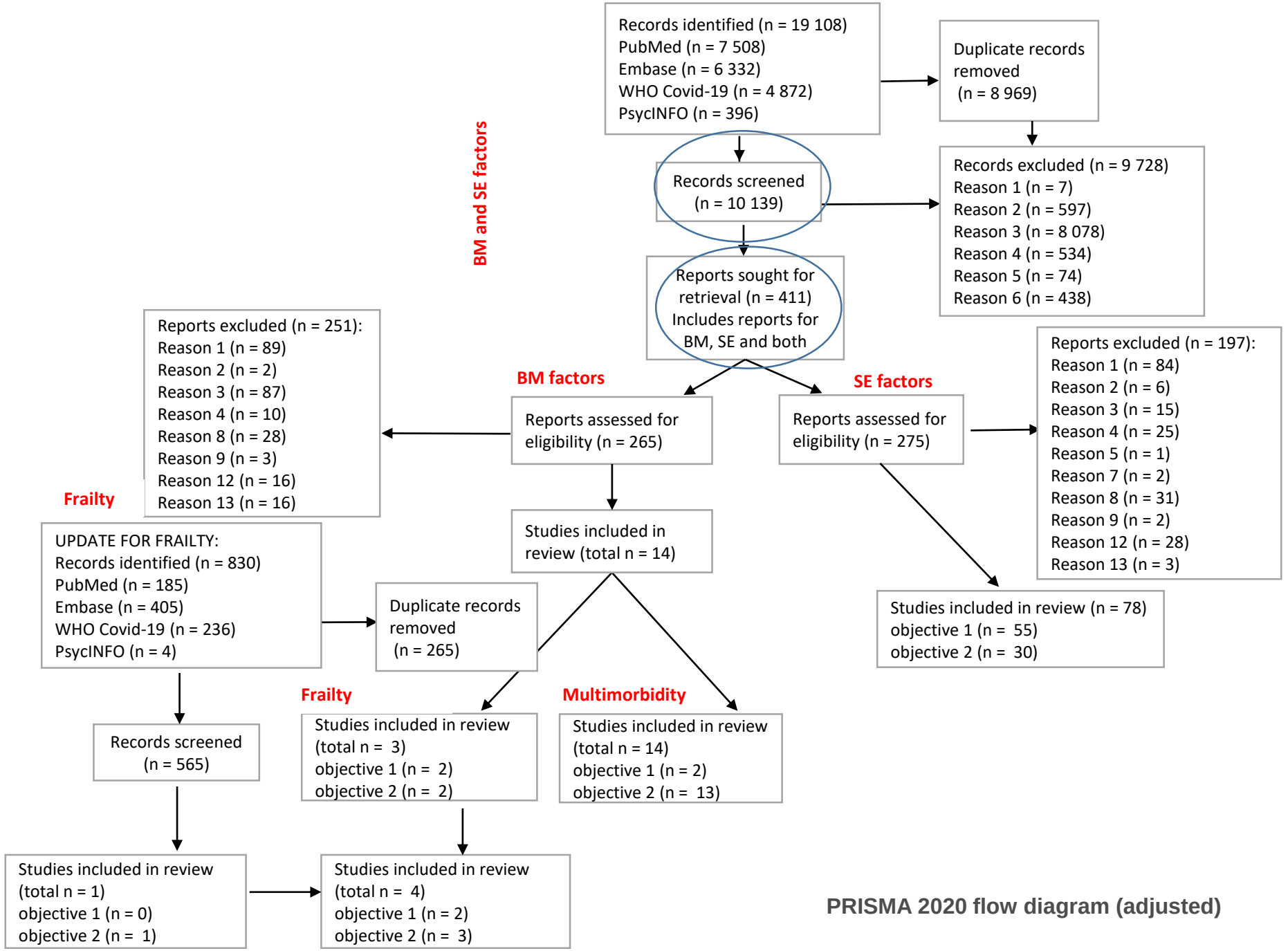
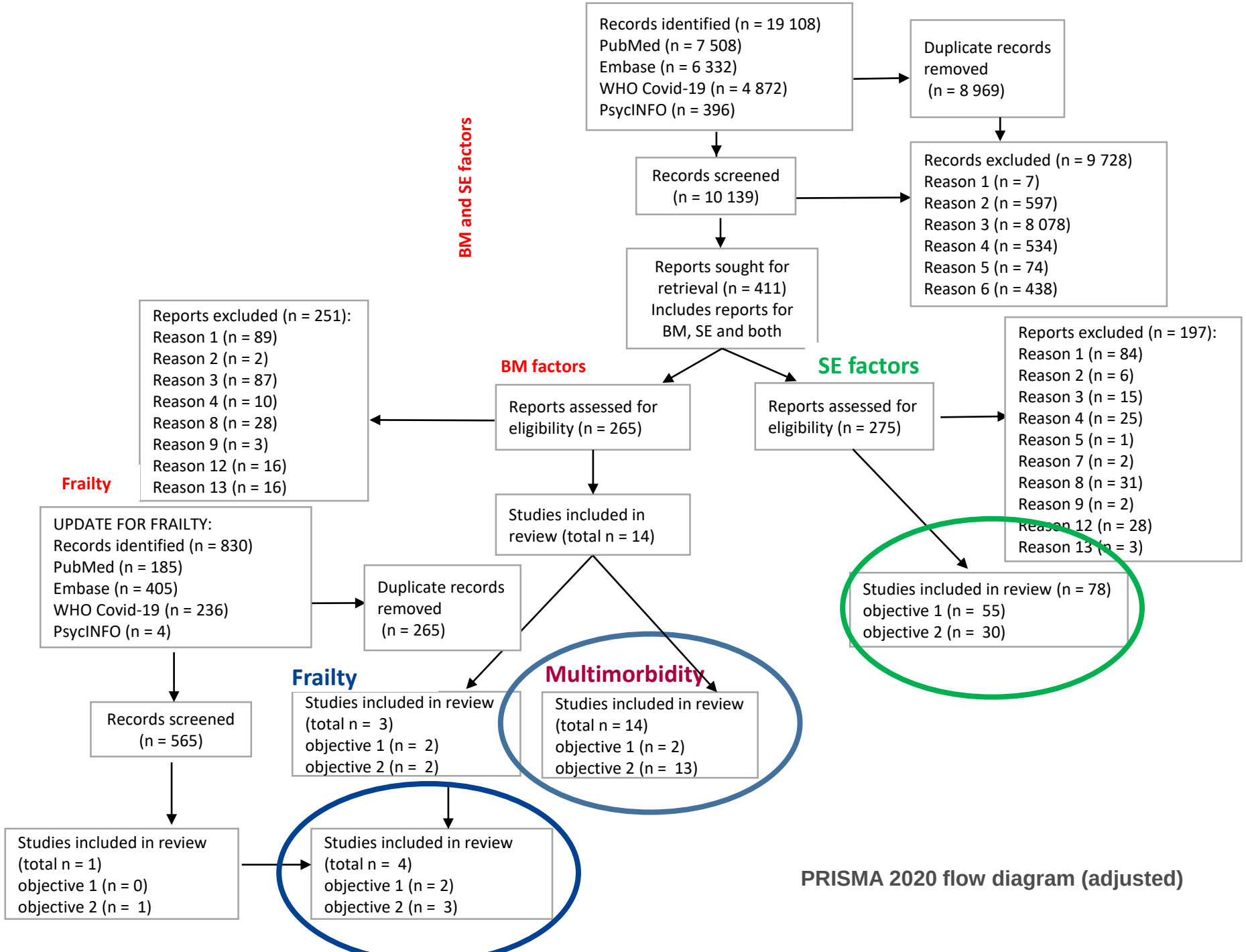


PRISMA 2020 flow diagram (adjusted)



PRISMA 2020 flow diagram (adjusted)



PRISMA 2020 flow diagram (adjusted)

Multimorbidity: results (etiologic role)

		SARS-CoV-2 Infection		Hospitalisation		Mortality	
First author (Country)	Sample	N (%) of people for which the outcome occurred	Association with multimorbidity	N (%) of people for which the outcome occurred	Association with multimorbidity	N (%) of people for which the outcome occurred	Association with multimorbidity
Mak et al.2020 (England)	N = 410 199	N = 7 590 (1.85%)	OR (95%CI) for 1 CCI score increase = 1.30 (1.28-1.32)	N = 2 812 (0.69%)	OR (95%CI) for 1 CCI score increase = 1.47 (1.44-1.50)	N = 514 (0.1%)	OR (95%CI) for 1 CCI score increase = 1.53 (1.48-1.59)
Izurieta et al. 2021 (US)	N = 24 367 476	NA	NA	N = 27 961 (0.11%)	OR (95%CI) for CCI>0 = 1.09 (1.06-1.13)	N = 12 613 (0.05%)	OR (95%CI) for CCI>0 = 1.08 (1.03-1.14)

➔ Associations between multimorbidity scores and the risk of infection, hospitalisation and mortality in the general population

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Multimorbidity: results (prognostic role) - mortality

	Mortality		
First author (Country)	Sample	N (%) of people for which the outcome occurred	Association with multimorbidity
Haase et al. 2020 (Denmark)	N = 308	N = 118 (37%)	N conditions = mortality rate (95%CI) – non adjusted 0 = 0,24 (0,16-0,35) 1 = 0,36 (0,26-0,48) 2 = 0,46 (0,35-0,58) 3 = 0,5 (0,33-0,66) 4 = 0,4 (0,12-0,74) 5 = 0,83 (0,36-1) 6 = 1
Millán-Guerrero et al. 2020 (Mexico)	N = 231 772	N = 28 510 (12.3%)	N conditions = HR (95%CI) 0 = 1 1 = 1.19 (1.16-1.23) 2 = 1.43 (1.39-1.48) 3 = 1.57 (1.50-1.65) ≥4 = 1.72 (1.60-1.84)
Reilev et al. 2020 (Denmark)	N = 11 122	N = 577 (5.2%)	N conditions = OR (95%CI) 0 = 1 1 = 2.6 (1.6-4.0) 2 = 2.6 (1.7-4.1) 3 = 3.5 (2.2-5.4) ≥4 = 5.2 (3.4-8.0)
Sousa et al. 2020 (Brasil)	N = 4 784 (2 570 Covid-19 positive patients; remaining, other SARI patients)	N = 353 (15.2%)	N conditions = OR (95%CI) 0 = 1 1 = 3.03 (2.34-3.94) ≥2 = 4.81 (3.48-6.63)

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Multimorbidity: results (prognostic role) – mortality (continued)

Argoty-Pantoja et al. 2021 (Mexico)	N = 412 017	N = 45 754 (11.1%)	Outpatients Disease combinations = HR (95%CI) Obesity & hypertension = 2.84 (2.29-3.51) Diabetes & hypertension = 3.58 (3.05-4.22) Diabetes & obesity = 4.69 (3.53-6.23) Diabetes & obesity & hypertension = 5.57 (4.54-6.84) Hospitalised Disease combinations = HR (95%CI) Obesity & hypertension = 1.31 (1.21-1.42) Diabetes & hypertension = 1.51 (1.43-1.59) Diabetes & obesity = 1.32 (1.18-1.46) Diabetes & obesity & hypertension = 1.66 (1.54-1.79)
Hernandez-Vasquez et al. 2020 (Mexico)	N = 51 053	N = 5 233 (10.3%)	N conditions = OR (95%CI) 0 = 1 1 = 1.89 (1.75-2.04) 2 = 2.51 (2.30-2.73) ≥3 = 3.49 (3.15-3.86)
Cho et al. 2020 (South Korea)	N = 7 327	N = 223 (3%)	HR (95%CI) for CCI score increase 1.14 (1.09-1.20)
Mak et al.2020 (England)	N = 2 812	N = 417 (14.8%)	OR (95%CI) for 1 CCI score increase = 1.17 (1.11-1.23)
Navaratnam et al. 2020 (England)	N = 79 124	N = 28 200 (30.8%)	OR (95%CI) associated with CCI : 0 = 1.0 1 = 1.60 (1.51-1.68) 2 = 2.06 (1.94-2.18) 3 = 2.41 (2.27-2.57) ≥ 4 = 3.04 (2.88-3.22)
Ticinesi et al. 2021 (Italy)	N = 1 264	N = 318 (25%)	OR (95%CI) associated with multimorbidity (binary): 0 = 1.0 ≥2 = 1.64 (1.10-2.45) OR (95%CI) associated with number of diseases: 1.17 (1.04-1.31)

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Multimorbidity: results (prognostic role) – hospitalisation and mechanical ventilation

		Hospitalisation		Mechanical ventilation	
First author (Country)	Sample	N (%) of people for which the outcome occurred	Association with multimorbidity	N (%) of people for which the outcome occurred	Association with multimorbidity
Reilev et al. 2020 (Denmark)	N = 11 122	N = 2 254 (20%)	N conditions = OR (95%CI) 0 = 1 1 = 1.7 (1.5-2.0) 2 = 2.1 (1.8-2.5) 3 = 3.1 (2.5-3.8) ≥4 = 3.9 (3.2-4.8)	NA	NA
Cho et al. 2020 (South Korea)	N = 7 327	NA	NA	N = 123 (1.7%)	OR (95%CI) per CCI score 1.10 (1.01-1.18)

➔ Associations between multimorbidity scores and the risk of hospitalisation and mechanical ventilation in individuals infected by SARS-CoV-2

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Frailty: results (etiologic role) – mortality

UK Biobank database
Data 1st March - 30th November 2020
N = 410 199
Frailty score : Hospital Frailty Risk Score

Mak et al. 2021

TABLE 3 Multivariate adjusted associations of the concurrent frailty and comorbidity measures with COVID-19 mortality in the full sample and COVID-19 inpatients

Variable[a]	Full sample (n = 410,199)
Concurrent HFRS[c]	
Low risk	1
Intermediate risk	2.76 (2.05–3.71)*
High risk	8.42 (6.08–11.66)*
Concurrent CCI[c]	1.23 (1.16–1.30)*
Age	1.11 (1.09–1.13)*
Male sex	2.12 (1.71–2.63)*
Ethnicity	
White	1
Asian	2.04 (1.15–3.60)*
Black	3.93 (2.38–6.50)*
Others	1.06 (0.39–2.87)

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Frailty: results (prognostic role) – mortality

National Health Service data – UK
Data 1st March - 31st May 2020
N = 91 541
Fragility scale: Hospital Frailty Risk Score

Navaratnam et al. 2021

Multilevel logistic regression models of factors associated with in-hospital mortality

Variable	Model 1 (demographics and deprivation), Odds ratios (95% CIs)	Model 2 (demographics, deprivation and time), Odds ratios (95% CIs)	Model 3 (demographics, deprivation, time and frailty), Odds ratios (95% CIs)
Age band (years)			
18-39 (reference)	1 (reference)	1 (reference)	1 (reference)
40-49	**2.220 (1.842 to 2.674)**	**2.219 (1.841 to 2.674)**	**2.211 (1.834 to 2.665)**
50-59	**5.156 (4.373 to 6.080)**	**5.218 (4.423 to 6.156)**	**5.238 (4.439 to 6.180)**
60-69	**10.550 (9.985 to 12.388)**	**10.931 (9.305 to 12.842)**	**8.202 (6.946 to 9.686)**
70-79	**19.216 (16.399 to 22.517)**	**20.271 (17.290 to 23.766)**	**10.811 (9.077 to 12.878)**
≥ 80	**29.989 (25.623 to 35.099)**	**32.978 (28.161 to 38.621)**	**15.922 (13.371 to 18.959)**
Sex			
Female	1 (reference)	1 (reference)	1 (reference)
Male	**1.481 (1.433 to 1.530)**	**1.450 (1.402 to 1.499)**	**1.479 (1.430 to 1.530)**
Deprivation quintile			
5 (least deprived)	1 (reference)	1 (reference)	1 (reference)
4	1.033 (0.976 to 1.093)	1.042 (0.984 to 1.103)	1.031 (0.973 to 1.092)
3	**1.104 (1.044 to 1.168)**	**1.133 (1.070 to 1.199)**	**1.115 (1.053 to 1.181)**
2	**1.091 (1.032 to 1.153)**	**1.120 (1.059 to 1.185)**	**1.094 (1.034 to 1.158)**
1 (most deprived)	**1.121 (1.060 to 1.186)**	**1.156 (1.092 to 1.224)**	**1.117 (1.054 to 1.183)**
Ethnicity			
White	1 (reference)	1 (reference)	1 (reference)
Asian	**1.236 (1.156 to 1.322)**	**1.172 (1.094 to 1.254)**	**1.229 (1.147 to 1.316)**
Black	**1.101 (1.016 to 1.192)**	1.021 (0.942 to 1.107)	1.068 (0.985 to 1.159)
Mixed	**1.258 (1.038 to 1.525)**	**1.235 (1.016 to 1.500)**	**1.305 (1.073 to 1.587)**
Other	0.952 (0.862 to 1.051)	0.929 (0.841 to 1.028)	0.972 (0.878 to 1.075)
Period of discharge (alive or following death)			
24th to 31st May	-	1 (reference)	1 (reference)
10th to 23rd May	-	0.968 (0.881 to 1.064)	0.967 (0.880 to 1.063)
26th April to 9th May	-	**1.300 (1.189 to 1.421)**	**1.312 (1.199 to 1.435)**
12th to 25th April	-	**1.880 (1.725 to 2.050)**	**1.961 (1.798 to 2.139)**
29th March to 11th April	-	**2.583 (2.369 to 2.816)**	**2.844 (2.607 to 3.104)**
15th to 28th March	-	**2.749 (2.479 to 3.048)**	**3.080 (2.775 to 3.418)**
1st to 14th March	-	**2.670 (1.896 to 3.761)**	**2.909 (1.060 to 4.108)**
Hospital Frailty Risk Score band			
None	-	-	1 (reference)
Mild	-	-	1.018 (0.931 to 1.115)
Moderate	-	-	**2.004 (1.854 to 2.166)**
Severe	-	-	**2.419 (2.234 to 2.619)**

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Socioeconomic factors: results

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- Studies ***mostly*** reported on ***COVID-19 cases and mortality***
- ***Few studies*** reported on ***hospitalisation, ICU admission, mechanical ventilation***
- ***Individual-level*** and ***ecological*** studies
- ***Majority*** reported on ***race and ethnicity***
- ***Poorer COVID-19 related outcomes*** often observed for ***certain ethnic groups*** (such as Black and Asian vs. White), as well as for ***socioeconomically deprived*** population
- Most of the studies conducted in ***the US and the UK***

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Socioeconomic factors: results (etiologic role) – infections

	Individual-level studies			
First author (Country)	Sample	N (%) of people for which the outcome occurred (total and per socioeconomic determinants level where available)	Association with socioeconomic determinants Unadjusted	Association with socioeconomic determinants Adjusted
L. Charles Bailey **2021 USA**	N = 135 794	4814 infections (3.55%) White N = 2085 (43.31%) Black N = 1543 (32.05%) Hispanic N = 1026 (21.31%) Asian or Pacific Islander N= 160 (3.32%)	NA	Socioeconomic determinants = OR (95%) Race / ethnicity White = Reference Black 2.66 (2.43 – 2.90) Hispanic 3.75 (3.39 – 4.15) Asian or Pacific Islander 2.04 (1.69 – 2.48)
Chadeau-Hyam, Marc **2020 UK**	N = 4509	1325 COVID-19 cases (32.92%)	Socioeconomic determinants = HR (95%) Ethnicity White = Reference Black = 2.14 (1.57-2.93) Other 1.68 [1.29-2.18] Education High = Reference Intermediate = 1.25 (1.07-1.46) Low = 1.40 [1.16-1.68] Type of accommodation House = Reference Flat = 1.02 (0.85-1.24)	Socioeconomic determinants = HR (95%) Ethnicity White = Reference Black = 2.14 (1.57-2.93) Other 1.68 [1.29-2.18] Education High = Reference Intermediate = 1.15 (1.05-1.26) Low = 1.24 (1.12-1.37) Type of accommodation House = Reference Flat = 0.98 (0.90-1.06)

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Socioeconomic factors: results (prognostic role) – mortality

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	Individual-level studies				
First author (Country)	Sample	N (%) of people for which the outcome occurred (total and per socioeconomic determinants level where available)	Association with socioeconomic determinants Unadjusted	Association with socioeconomic determinants Adjusted	Adjustment factors
Pedro Baqui **2020** **Brazil**	N = 11 321 Hospitalised patients February 27 2020 – May 4 2020	N = 3328 (29.40%) White N = 1696 Black N = 245 East Asian N = 69 Indigenous N = 8 Mixed (Pardo) N = 1310	NA	Socioeconomic determinants = HR (95%) White = Reference Black = 1.32(1.15;1.52) East Asian = 1.12(0.88;1.44) Mixed (Pardo) = 1.45(1.33;1.58)	Age, comorbidities, gender
Paloma Ferrando-Vivas **2021** **England**	N = 9990 Hospitalized COVID-19 cases March 1 2020-June 22 2020	N=3933 Ethnicity White N = 2530 (67.1%) Asian N = 591 (15.7%) Black N = 373 (9.9%) Other/mixed N=278 (7.4%) Quintile of deprivation 1 (least deprived) N=519 (14.5%) 2 N = 583 (16.3%) 3 N = 702 (19.6%) 4 N = 869 (24.2%) 5 (most deprived) N=913 (25.5%)	NA	Socioeconomic determinants=HR (95%CI) Ethnicity White = reference Asian = 1.270(1.154-1.397) Black = 1.053(0.933-1.190) Other/mixed = 0.991(0.872-1.127) Quintile of deprivation 1 (least deprived) = Reference 2 = 1.017(0.901-1.149) 3 = 1.006(0.897-1.128) 4 = 1.063(0.951-1.188) 5 (most deprived) =1.137(1.011-1.279)	Age, BMI, any dependency prior to hospital admission, immunocompromised, sedated for entire of the first 24h, highest temperature, lowest systolic blood pressure, highest heart rate, highest respiratory rate, Pa02/FiO2, mechanical ventilation, mechanical ventilationxPa02/FiO2, highest blood lactate concentration, highest serum creatinine, highest serum urea, lowest hemoglobin concentration lowest platelet count

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Discussion

Dose-effect association between all measures of multimorbidity, frailty and socioeconomic factors and all outcomes (mainly mortality assessed)

Scarcity of the population-based studies for multimorbidity and frailty; studies on ***etiologic roles rare*** for all risk factors

Associations with ***long term outcomes not identified***

Comparison of data limited by diversity of study contexts, risk factors' measurement tools, methodological approaches

⇒ **It is required to further explore the risks associated with poor health outcomes to ensure more effective health management and prevention practices for ongoing and potential future health crises**

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Thank you!

Best poster award, Symposium on multimorbidity 2021, Amsterdam, the Netherlands

Makovski et al. “Etiologic and prognostic roles of frailty, multimorbidity and socioeconomic characteristics in the development of SARS-CoV-2 infection and related severe health outcomes: protocol for systematic reviews of population-based studies“ *accepted in BMJ Open*

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Systematic review on digitals tools used for contact tracing of COVID-19 patients: interim results

Brigid Unim*, Irisa Zile-Velika, Janis Misins, Zane Pavlovska, Luis Lapao, Mariana Peyroteo, Luigi Palmieri

*Istituto Superiore di Sanità, Rome, Italy

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101018317

Background

- Contact tracing is a public health intervention implemented in synergy with other measures (e.g., testing, physical distancing, vaccination) to curb the covid-19 pandemic

- A wide range of digital solutions have been developed worldwide: national contact tracing applications, online platforms against disinformation, dashboards, artificial intelligence-based apps, wearable devices, drones, etc.

- The aim of this study was to evaluate the effectiveness and impact of tracking COVID-19 patients using digital tools

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Methods

- A systematic literature review was performed on 9 online databases to identify observational studies on digital contact tracing, published 2020-2021, in English
- Studies identified through the Population Health Information Research Infrastructure - PHIRI project were also included
- An ad hoc form was developed for data extraction of relevant information
- Quality assessment of the included studies was performed with validated instruments: EPHPP for population-based studies; CHEER for modeling studies

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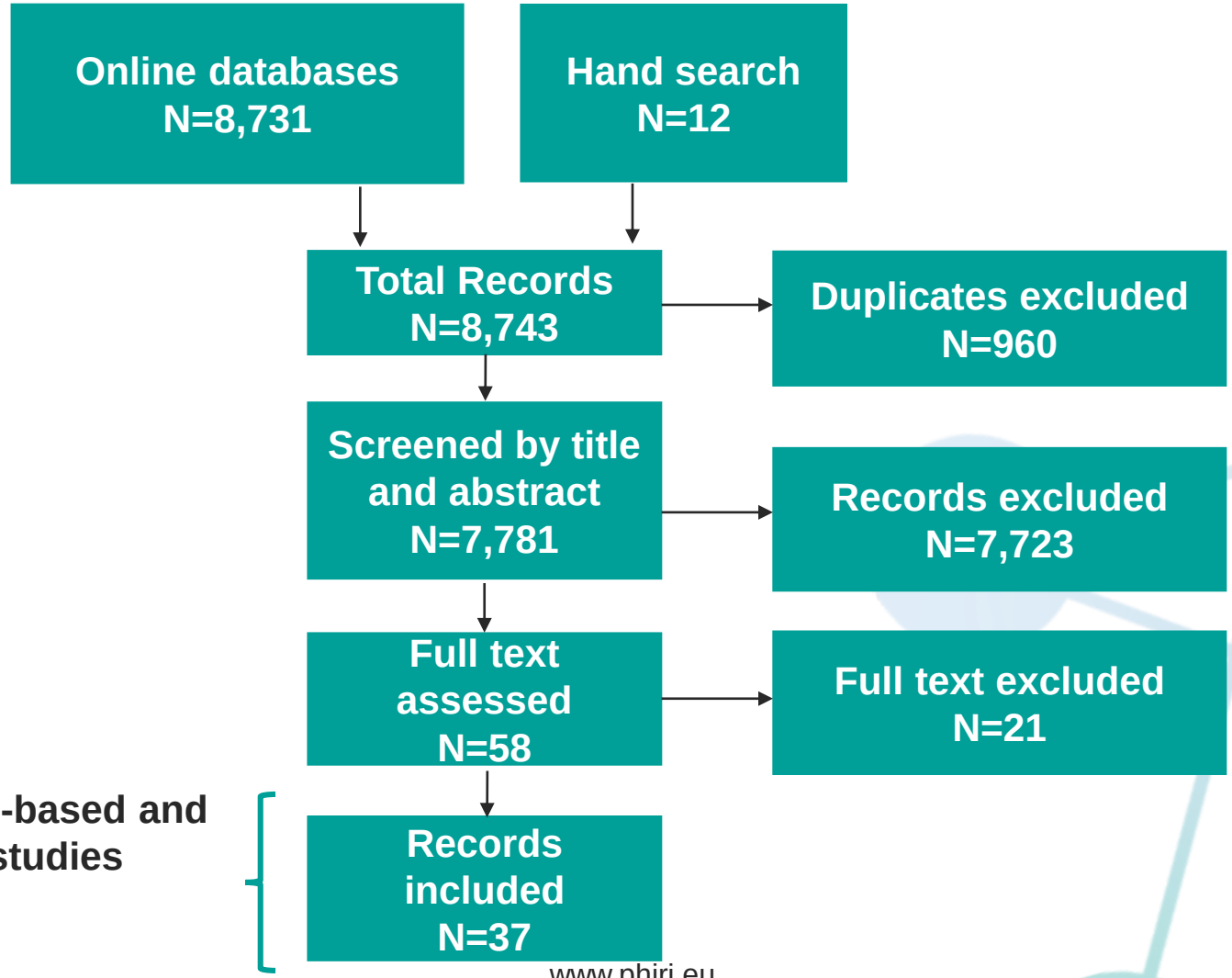
Results: Flow chart of the selection process



13 population-based and
24 modeling studies

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Results: Population-based studies

First author, year	Country	Close contacts of covid-19 cases identified; N close contacts per index case	Reduction of effective reproduction number (Re or Rt) or reduction of covid-19 infections
Bae, 2020	Korea	1,687 (14,5 ±26,3 close contacts per index case)	Rt = 6,1 at the beginning of the outbreak; at the end Rt = 0,79
Barrett, 2020	Ireland	1,336	nr
Chen, 2020	Taiwan	627,386 possible contact-persons were identified.	nr
Fetzer, 2021	UK (England)	nr	Reduction in subsequent new infections of 63% and a reduction in subsequent COVID-19–related deaths of 66%
Jian, 2020	Taiwan	8,051 close contacts (16.5 close contact/index case)	nr
Krueger, 2020	USA	1,622 contacts (2.9 per index case)	nr
Kwon, 2020	Korea	13	nr
Mack, 2021	USA	189	COVID-19 transmission was reduced through environmental change, increased personal protection, avoidance of high-risk interactions
Salathé, 2020	Switzerland	185 exposed contacts (0.24 per index case)	nr
Urbaczewski, 2020	China, Germany, Italy, Singapore, South Korea, USA	nr	nr
Wymant, 2021	UK (England and Wales)	1.7 million (4.2 per index case)	Each confirmed covid-19 positive individual who consented to notification of their contacts through the app prevented one new case.
Yamamoto, 2020	Japan	cohort: 72; cross-sectional: nr	nr
Zhang, 2020	China	5 out of 100 secondary cases (5%)	nr

Results: Modeling studies

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First author, year	Intervention
Abueg, 2021	Exposure notifications, non-pharmaceutical interventions
Barrat, 2020	isolation, MCT, DCT, recursive contact tracing
Currie, 2020	3 testing scenarios: DCT with different levels of testing
Nakamoto, 2020	DCT (households, schools, workplaces, etc.)
Whaiduzzaman, 2020	DCT
Yasaka, 2020	DCT, quarantine
Moreno Lopez, 2021	Combined impact of DCT, testing and isolation of clinical cases
Pollmann, 2021	DCT, quarantine, testing, social distancing
Bradshaw, 2021	DCT with/without manual tracing, isolation
Almagor, 2020	contact tracing, testing, self-isolation
Kucharski, 2020	No control, DCT, MCT, testing, mass testing, self-isolation of symptomatic cases, quarantine
Ferrari, 2021	DCT
Wilmink, 2020	DCT
Wallentin, 2020	Four scenarios: DCT, lockdown
Ferretti, 2020	Isolation of symptomatic individuals, DCT, quarantine
Bulchandani, 2021	DCT, quarantine of infected population
Nuzzo, 2020	DCT, targeted self -isolation
Kim, 2021	DCT
Hinch, 2020	DCT, physical distancing, generalized lockdowns
Firth, 2020	DCT, quarantine
Peak, 2020	Individual quarantine or active monitoring of contacts (includes phone based self-monitoring)
Aleta, 2020	No interventions, isolation, quarantine

Conclusions

- Several countries in Europe and beyond have developed and implemented digital technologies to contain the covid-19 pandemic

- The level of implementation of the new devices among the general population and health care providers is mostly low/medium across Europe

- The level of implementation increased during the pandemic (e.g., Germany, Austria, the Netherlands, Italy)

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Conclusions

- Digital contact tracing is a valuable approach to limit the spread of SARS-CoV-2 but must be combined with other preventive measures and the population uptake must be high

- Barriers to wide implementation: privacy and security issues, institutional distrust, low health literacy, lack of expertise among health care providers

- The use of digital technologies according to data security and privacy regulation, targeted public health interventions to enhance health literacy and training programs for health professionals in information technologies could increase the implementation level of the new devices and improve emergency preparedness towards future health treats

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Thank you for your attention!

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Foresight and Preparedness Studies on COVID-19 in the World: A Systematic Literature Review

Mariana Peyroteo, NOVA University of Lisbon, Portugal
Jakov Vukovic, Croatian Institute of Public Health, Croatia
Luís Lapão, NOVA University of Lisbon, Portugal

UNIVERSIDADE NOVA DE LISBOA

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Foresight

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*"Foresight is a **systematic, participatory, future-intelligence-gathering, and medium-to long term vision-building process** aimed at enabling present-day decisions and mobilizing joint actions"*

OECD (2020), "*Strategic foresight for the COVID-19 crisis and beyond: Using futures thinking to design better public policies*"

*"Foresight **assists us in thinking critically and systemically about change and its implications** for both emerging risks and emerging opportunities"*

WHO (2022), "*Foresight approaches in global public health: a practical guide for WHO staff*"

A foresight study refers to a broad range of methodologies to structurally describe possible futures

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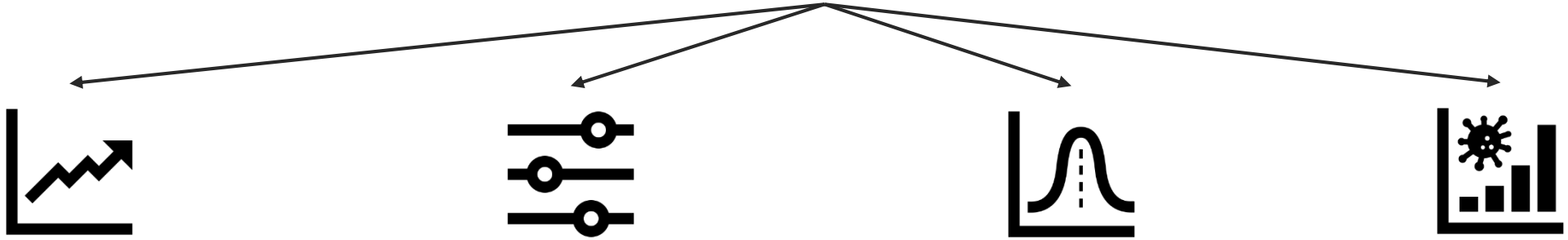
Foresight

It includes different methodologies and different time frames

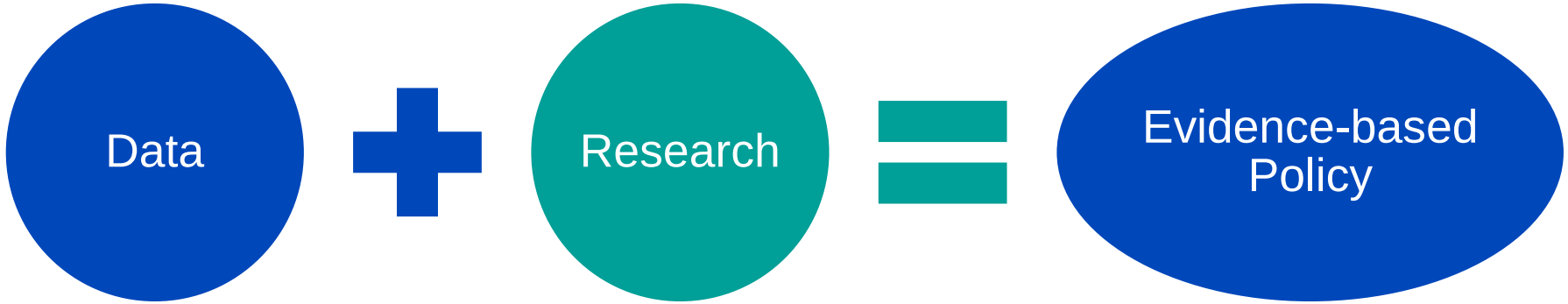


trend impact analyses

driver analyses

policy scenarios

business-as-usual scenarios



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Foresight and Preparedness

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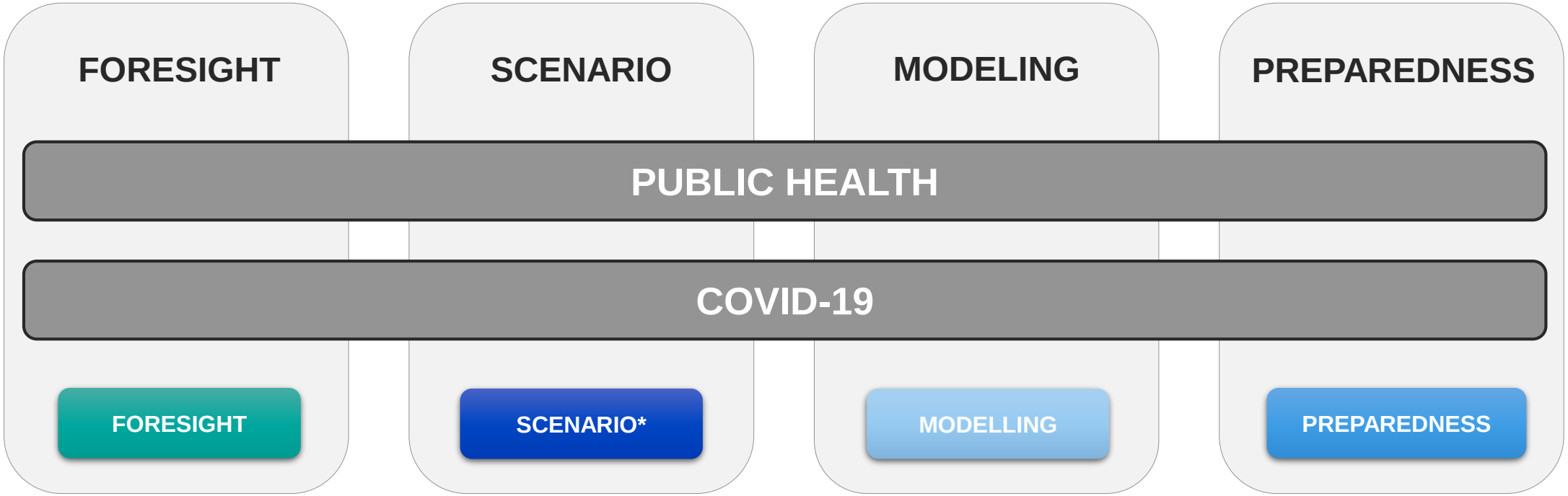
GOAL: Overview of foresight activities (foresight, scenario building, modeling and preparedness) worldwide and what measures and policies have been suggested for managing the Pandemic COVID-19.



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Methods

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PRISMA METHODOLOGY

1st Phase

Database: WEB OF SCIENCE + ELSEVIER Scopus

Key-words: "*Public Health*" AND "*COVID-19*" AND "*Scenario**" OR "*Modelling*" OR "*Foresight*" OR "*Preparedness*"

2nd Phase

Restrictions:

- Time Range – [2019-2022]
- * Except for Foresight – [2015-2022]
- Language – English or Portuguese
- Source – only journal papers

3rd Phase

- Population Health
- Non-Pharmaceutical Approaches

Abstracts + Full-Articles: R + zotero

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Results

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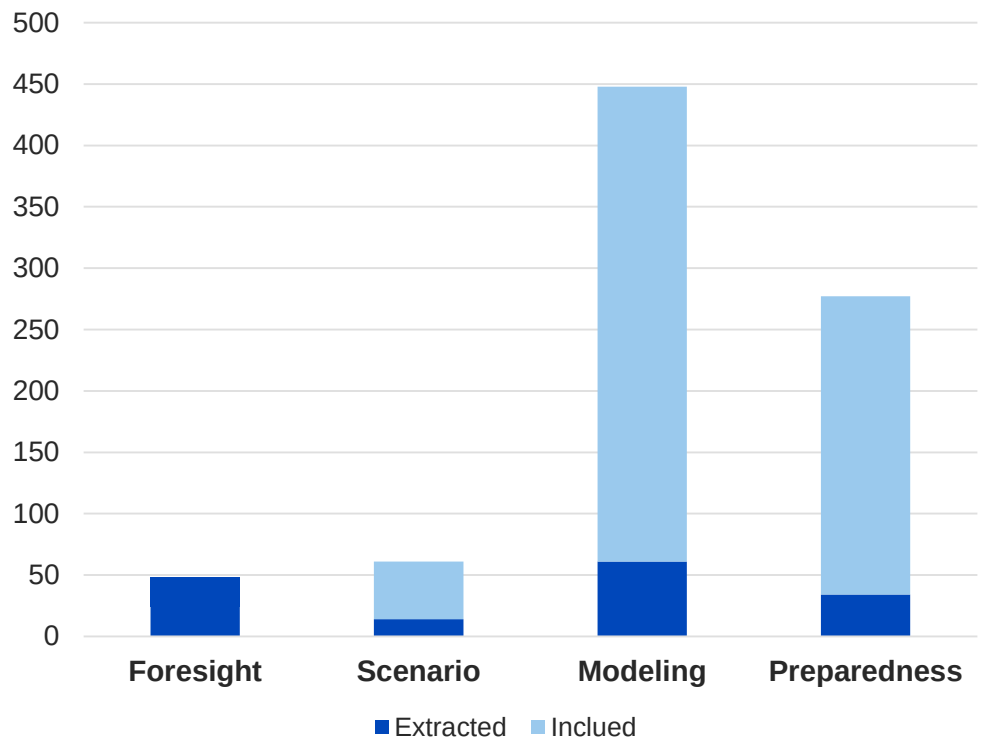
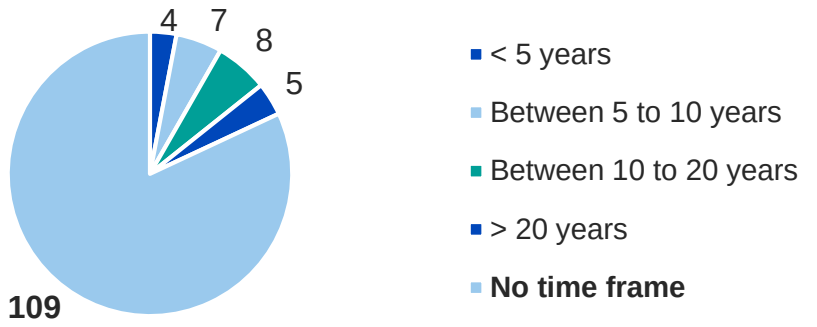
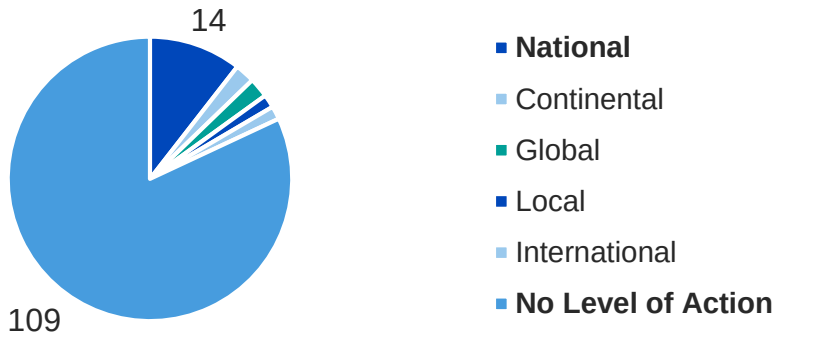
Number of Articles under analysis



Time Horizon



Spacial Level



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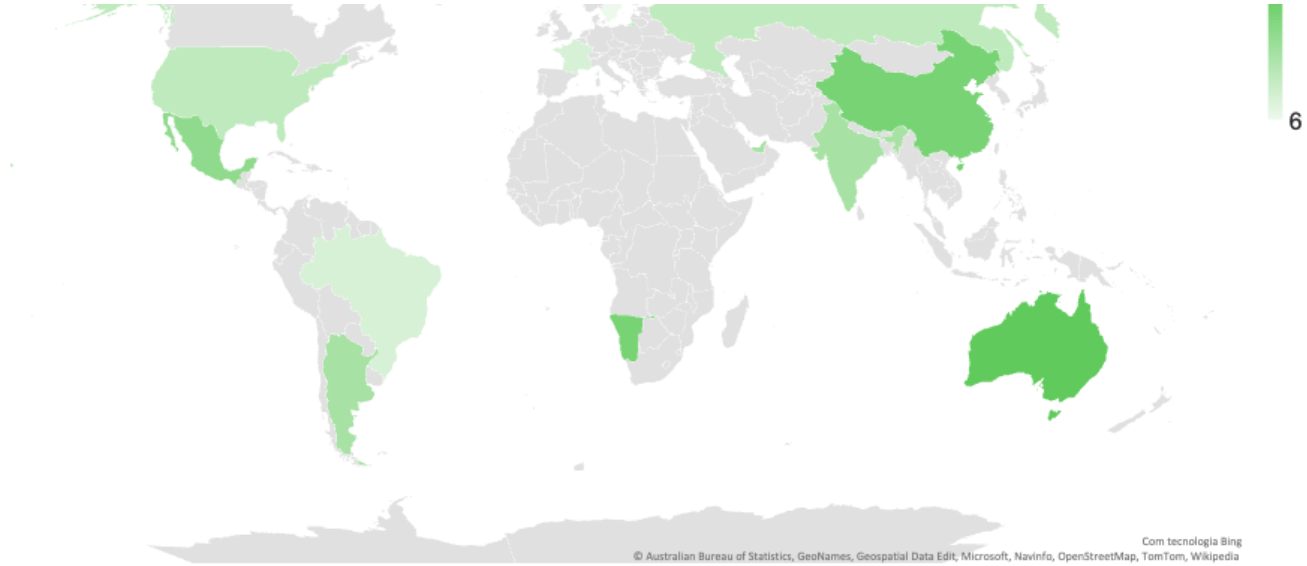
Discussion



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Discussion

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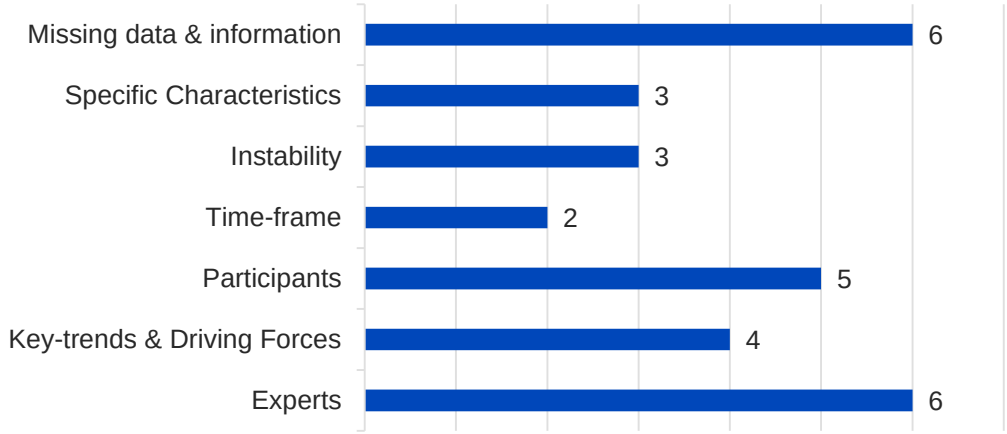
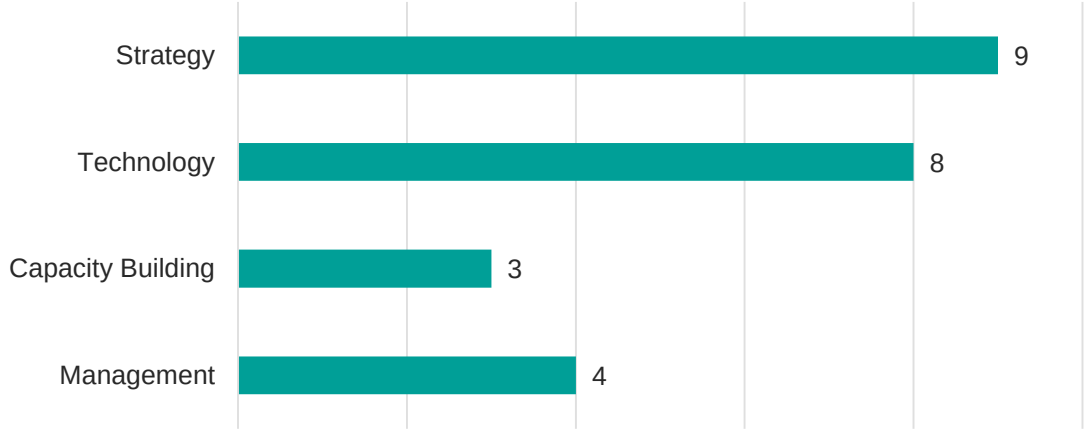
Limitations



Policy Measures



- This study identified an increasing interest in prospective studies in public health and that COVID-19 had been a relevant motivation.
- However, it also pointed-out the global lack of proper preparedness plans that need to be carefully addressed.
- There is both an opportunity to promote the creation of a public health foresight network and to develop more comprehensive research on this field.

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