

# Impact of mobility changes on the spread of COVID-19: A systematic Review

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# BACKGROUND

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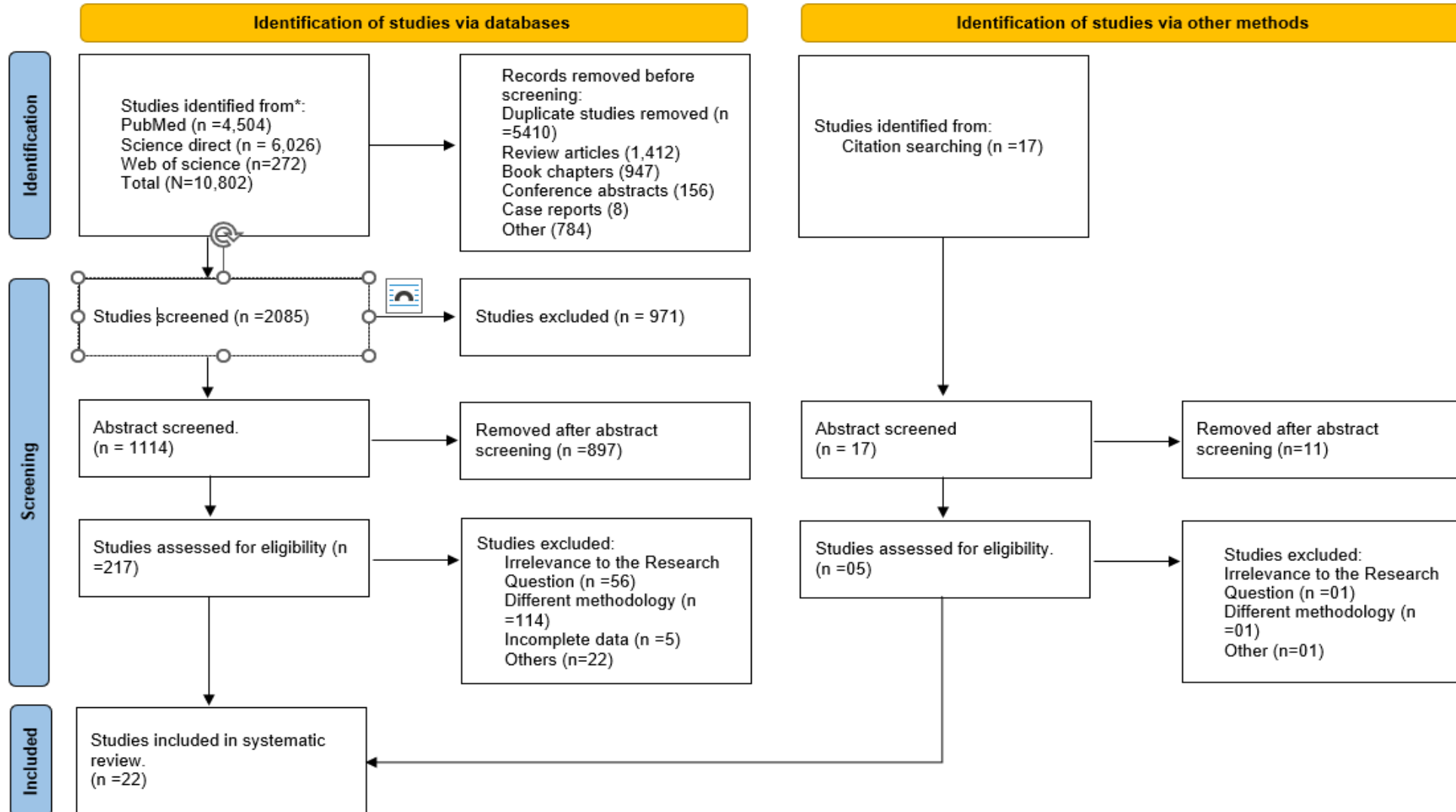
- A growing body of literature has attempted to elucidate the relationship between human mobility patterns and the transmission of the virus.
- This systematic review aims to synthesize existing research findings on the influence of human mobility on the spread of COVID-19.
- We explore the various methodologies employed, the diversity in scope and geography of the studies, and the implications of human movement on the epidemiological dynamics of COVID-19.

# Methods

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- Publications reporting on associations between COVID-19 Cases or Incidence and mobility change were identified by a systematic literature search using search string “corona or COVID-19 or COVID) and (community mobility or positioning system or mobile phone or apple mpd or cmr” from PubMed, Science direct, Web of science and manual reference screening, following the PRISMA reporting guidelines.
- First, titles and abstracts were screened, followed by a review of the full articles if they met the inclusion criteria.
- A systematic review was performed as the studies had used wide variety of study designs and different temporal units, making it hard to summarize findings by a meta-analysis.

# PRISMA FLOW DIAGRAM



# DATA USED IN THE STUDIES

COVID-19 Data	Mobility Data
COVID-19 Case data	Google community mobility reports
Incidence rate	Apple mobility data
Effective Reproduction number	Cell phone positioning data
Prevalence of COVID-19 infection per capita	John Hopkins stringency index data
No. of deaths or mortality data	Subways and BRT (Bus rapid Transit) data

# COMMON METHODOLOGIES APPLIED

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- Multiple linear regression
  - Toda-Yamamoto causality test
  - Time series multivariable regression analysis based on standard Ordinary Least Squares.
  - Difference-in-differences analysis
  - Multivariate log-linear regression
  - GLM with a negative binomial distribution combined with a non-linear distributed lag model
  - Pearson's correlation coefficient and fit a linear regression model
  - Conditional formatting techniques, box plotting, time-series trends plotting methods, and spatial kriging interpolation mapping techniques

# RESULTS

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- Twenty-two studies published between 01/11/2019 to 25/12/2022 using google, cell phone location, apple mobility and John Hopkins mobility data, reveal a significant cointegration between mobility patterns and pandemic indicators in the long term.
- There was a relationship between grocery, parks, residential, retail, and workplaces mobility, and the number of patients and deaths due to pandemic.
- During lockdown, major reductions were noticed in greenspace mobility and increased residence mobility, with higher stringency indices showing more pronounced changes.
- Statistically, significant relations were identified between daily confirmed cases and six categories of community mobility.
- Effective movement restriction strategies such as curfews demonstrated reductions in new COVID-19 admissions.

## Studies' origin

Region	No. of Studies	Countries
USA	3	
UK	2	
Rest of EU	4	Poland and Portugal, Turkey Greece, Lombardy (Italy)
Middle East	4	Kingdom of Saudi Arabia, Tehran, Iran, Oman, Iraq
Asia	5	Jakarta, Indonesia, Taiwan, Japan, Myanmar, India
Africa	1	Angola, Burkina Faso, Benin, Botswana, Cote d'Ivoire, Cameroon, Cape Verde, Egypt, Gabon, Ghana, Kenya, Libya, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Togo, Tanzania, Uganda, South Africa, Zambia, and Zimbabwe
Global	2	
South America	1	Brazil



# CONCLUSION

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- The review underlines the complex link between mobility patterns and pandemic spread, and effectiveness of targeted restrictions.
- Despite certain mobility types showing no direct disease spread impact, observed mobility changes underscore nuanced lockdown effects and policy impacts.
- Insights offer vital input towards creating tailored, equitable interventions balancing disease control and socio-economic implications, especially for vulnerable populations.

**Thanks for attention**