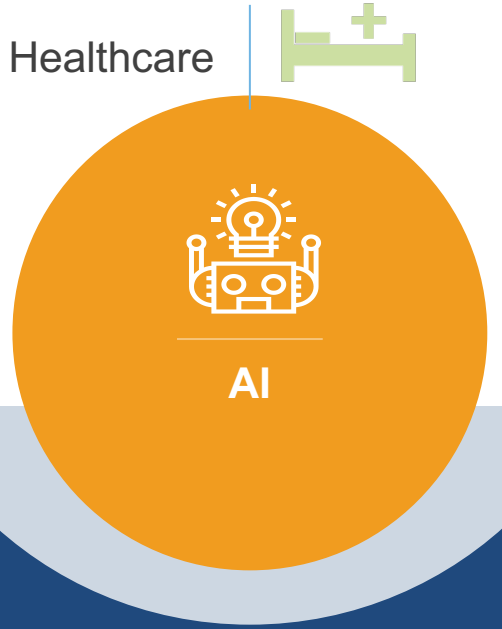
COVID-19 Data Index – Making datasets findable and accessible



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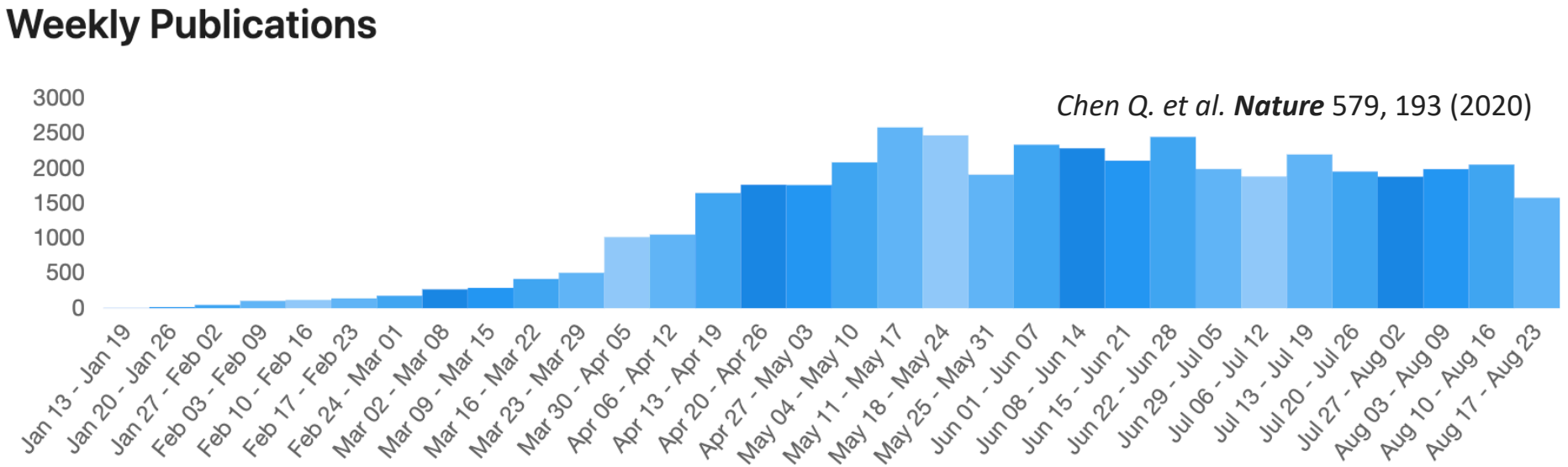
2020 KDD Workshop on Applied Data Science for Healthcare

Big Data Generated from COVID-19 Research

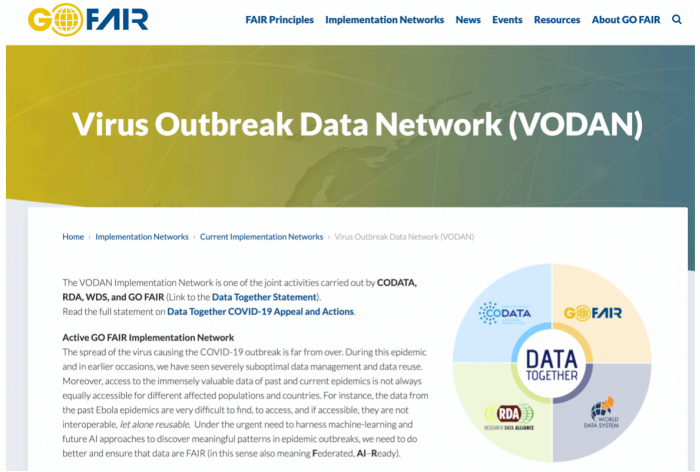
- Large volume of publications: 43,076 (LitCovid, 8/23)

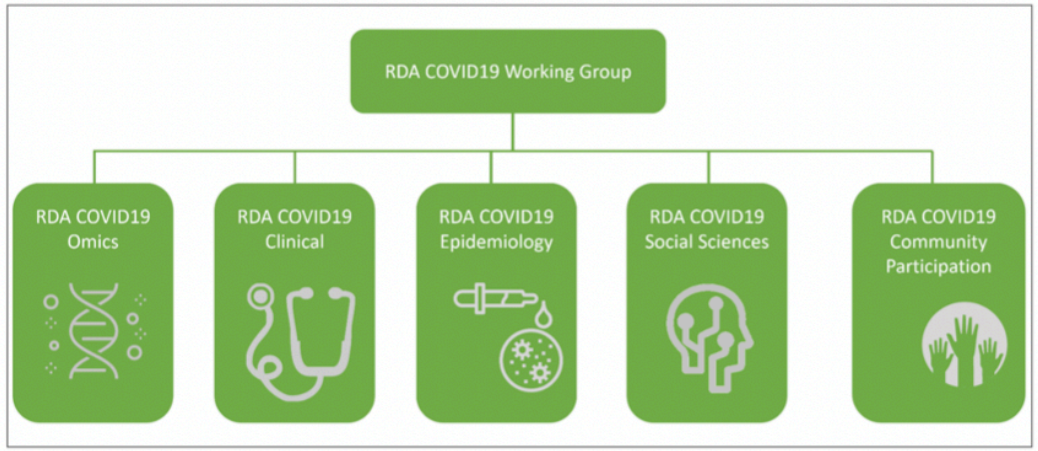


- Heterogenous types of datasets
  - Epidemiological data on testing and case statistics at various locations
  - Omics data from labs
  - Clinical data from surveys, studies (e.g., imaging, assays) or from electronic health records
  - Administrative (e.g., PPE, ventilators, hospitalizations, ICU beds)
  - Socio-demographic, environmental, economic, individual mobility and transportation data.

Effort on Sharing COVID-19 Data

- FAIR Principles (Findable, Accessible, Interoperable, and Reusable)



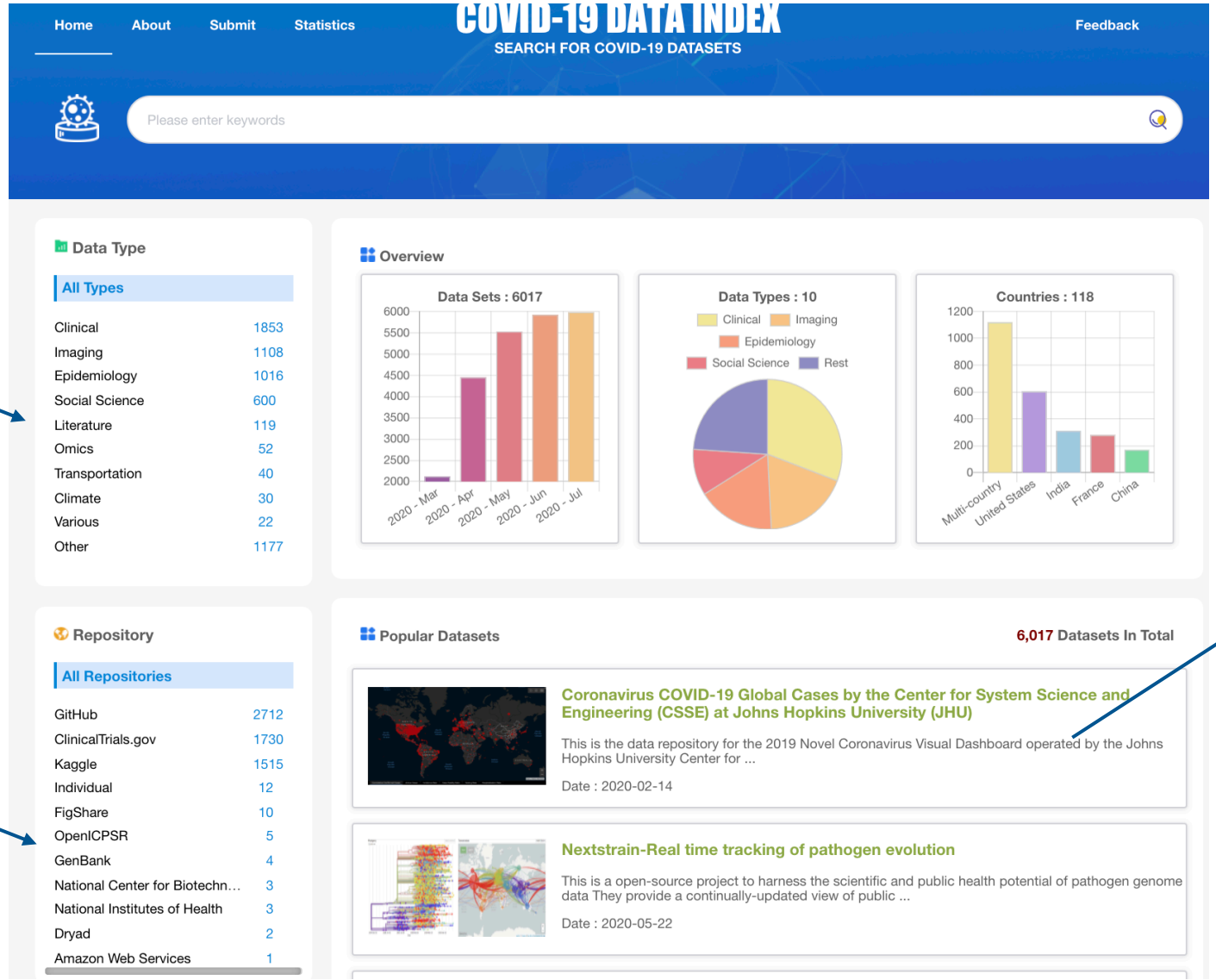


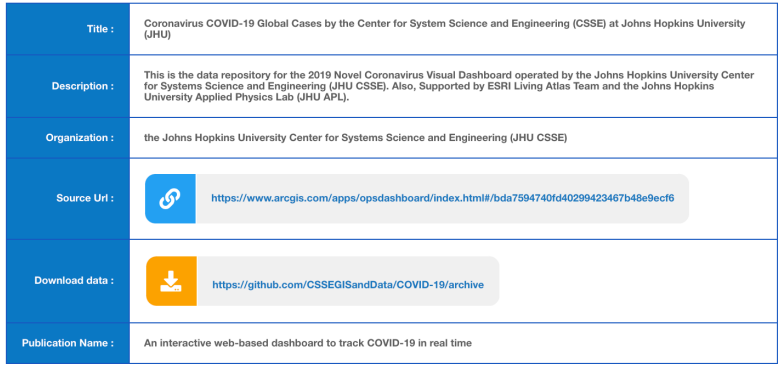
- Other data sharing initiatives

Our Approach – COVID-19 Data Index (www.covid19dataindex.org)

Diverse Data Types

Different Repositories

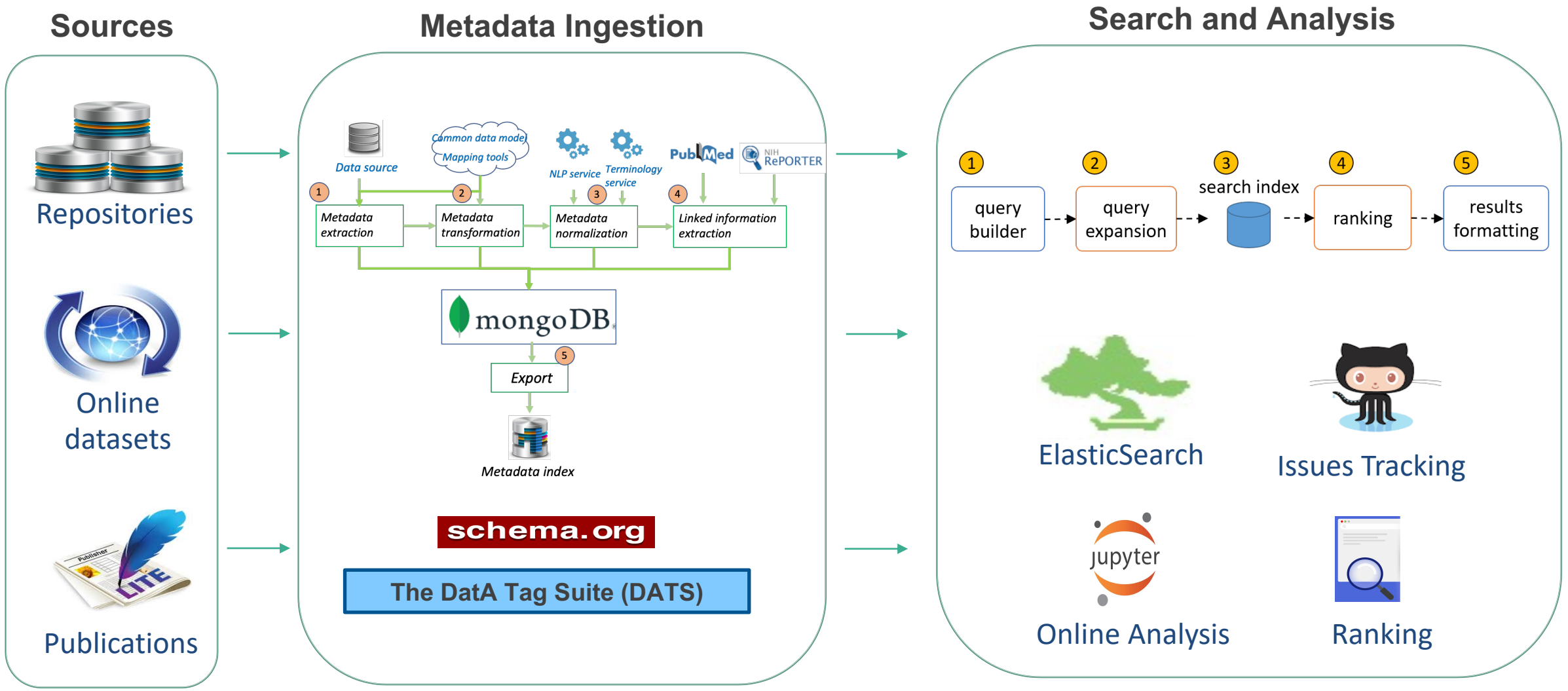




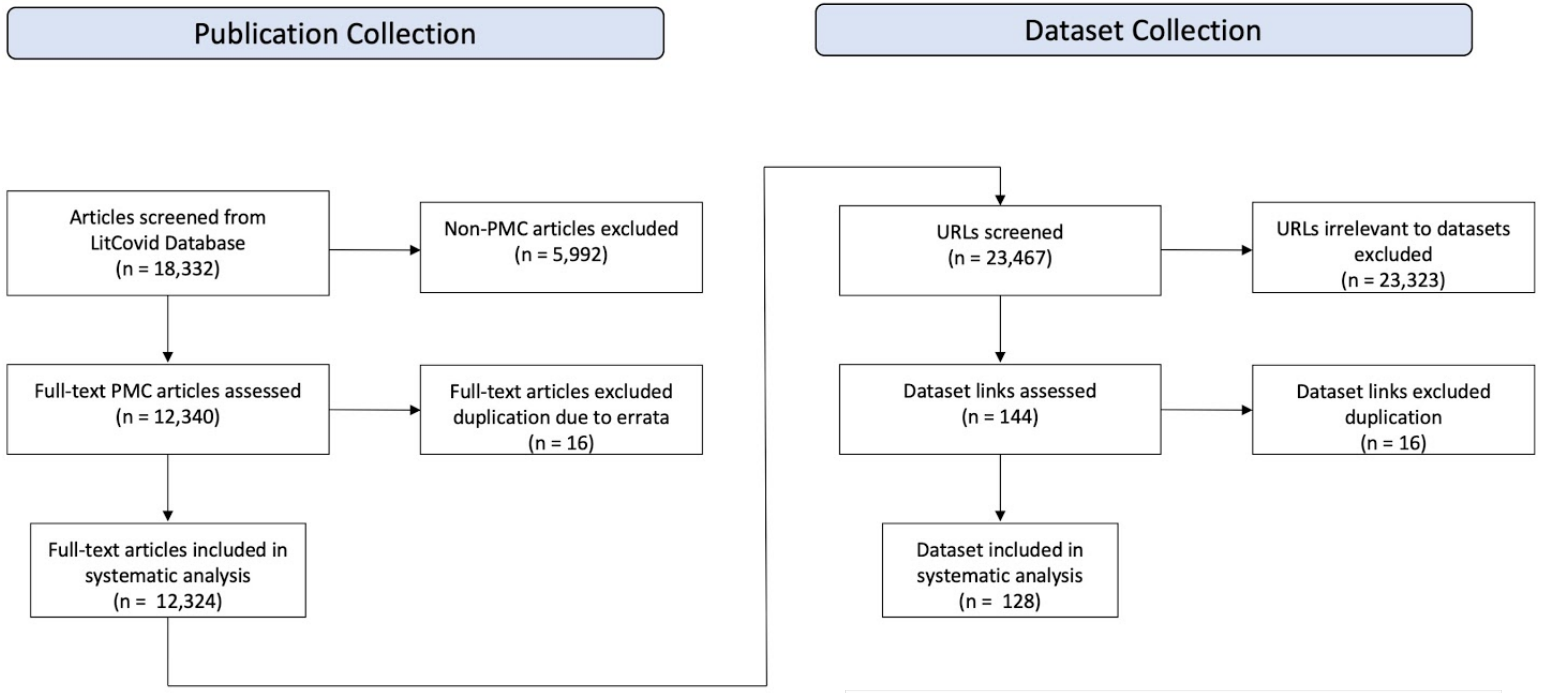
Links to detailed information and direct downloading

Ohno-Machado and Xu. ***Nature*** 584, 192 (2020)

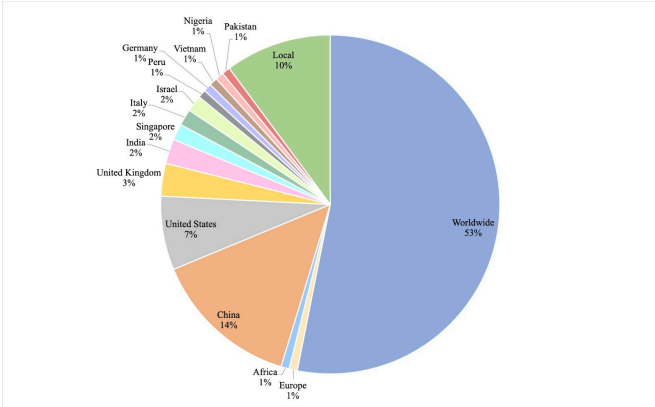
COVID-19 Data Index Workflow



A review of COVID-19 datasets in PubMed Central articles



- Research questions
  - Accessibility
  - Content
  - Citation



Key Findings:

- Only 2% of PMC articles provided Data Availability Statement.
- 28.5% of PMC articles mentioned at least one data link
- 84.4% datasets are immediately downloadable
- Epidemiological datasets accounts for 53.9%
- GitHub is the most popular data repository

Most Cited COVID-19 Datasets in PMC

Dataset	Overall Citations	URL Citations	Article Citations
John Hopkins University Dashboard[2]	454	416	275
Real-time estimation of the novel coronavirus incubation time[3]	239	0	239
Worldometers[34]	231	231	0
Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV-2)[37]	189	0	189
Estimates of the severity of coronavirus disease 2019: a model-based analysis[38]	132	0	132
Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts[5]	104	0	104
Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus[39]	102	1	102
Early dynamics of transmission and control of COVID-19: a mathematical modelling study[3]	97	0	97
The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak[6]	90	0	90
CDC[35]	87	87	0

Summary

- Data sharing is critical for reproducible research including COVID-19
- FAIR Principles are important for sharing digital assets; but significant efforts are needed to develop FAIR-compliant datasets
- Citation analysis could be the incentive for data sharing; but more work is need for formally citing datasets and measuring its impact

Thank you!

Questions?

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