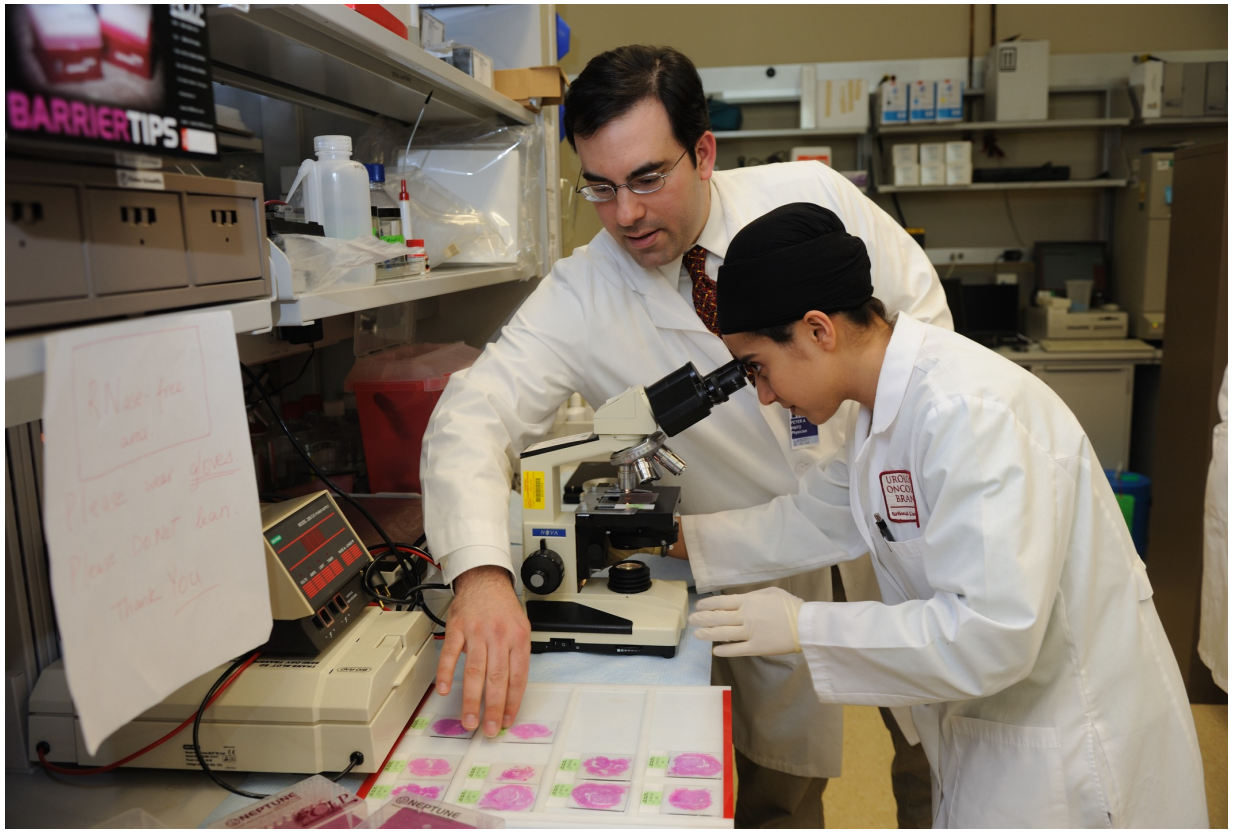
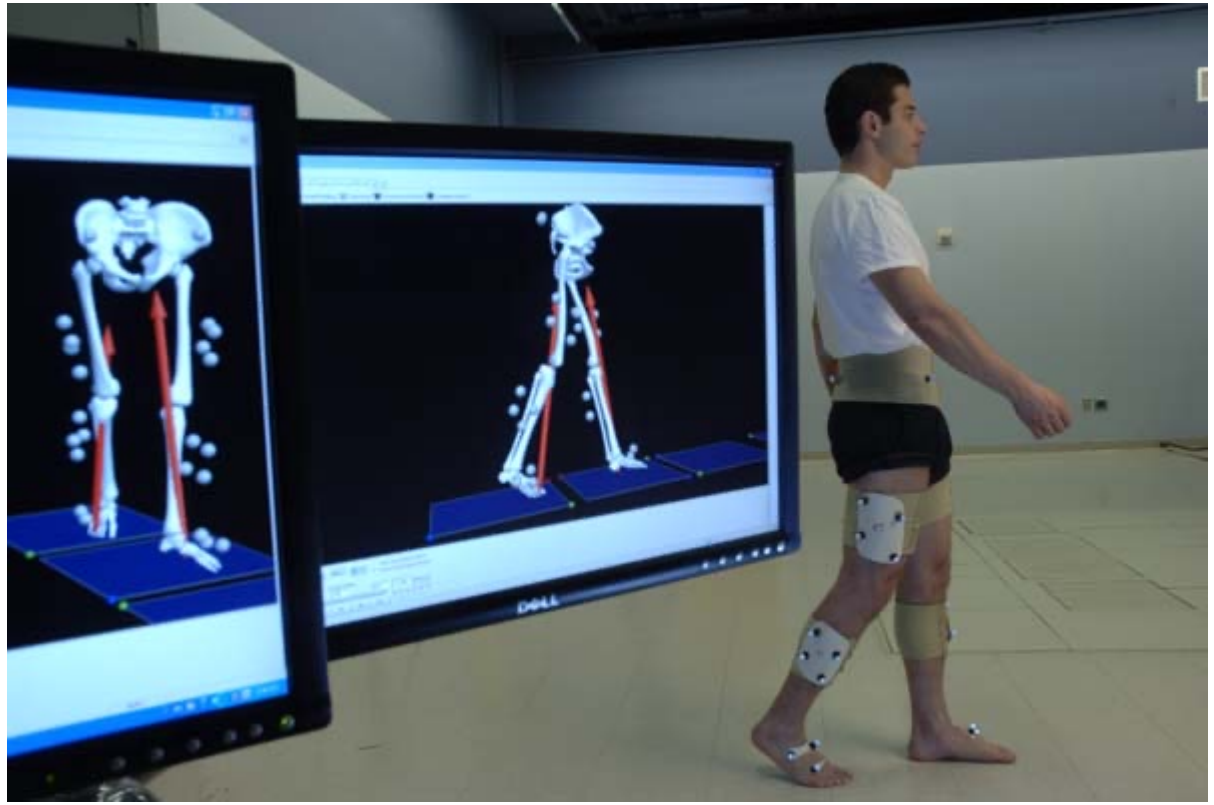
Use of artificial intelligence (AI) to analyze NIH Clinical Center research at scale (2017-2020)

October 21, 2022

Office of Portfolio Analysis (OPA)
DPCPSI, Office of the Director
National Institutes of Health

The impact of research at the NIH Clinical Center





The impact of research at the NIH Clinical Center

- Clinical Center researchers authored 931 publications between 2017 and 2020
  - 33.6% had evidence of clinical impact
    - clinical publications
    - cited by one or more clinical publications
    - cited by a Clinical Trial that has reported results in ClinicalTrials.gov
  - 4.1% had technological impact (the publication was cited by a patent)
  - 2.0% had both clinical and technological impact

- OPA has developed computational approaches that…
  - define what constitutes a distinct topic in an unbiased fashion
  - determine the age and rate of progress for each research topic
  - identify emerging areas of research
  - predict which topics will produce transformative breakthroughs in the coming 2 to 12 years*

*Santangelo et al. U.S. 2021 Patent Application No. 63/257,818

Questions

- Which research topics are represented in publications authored by Clinical Center researchers?
  - How productive are these topic areas?

- How extensive is collaboration between the Clinical Center and other NIH Institutes and Centers (ICs) in the Intramural Research Program (IRP)?
  - How extensive is collaboration within the IRP?
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  - Does collaboration lead to increased productivity?

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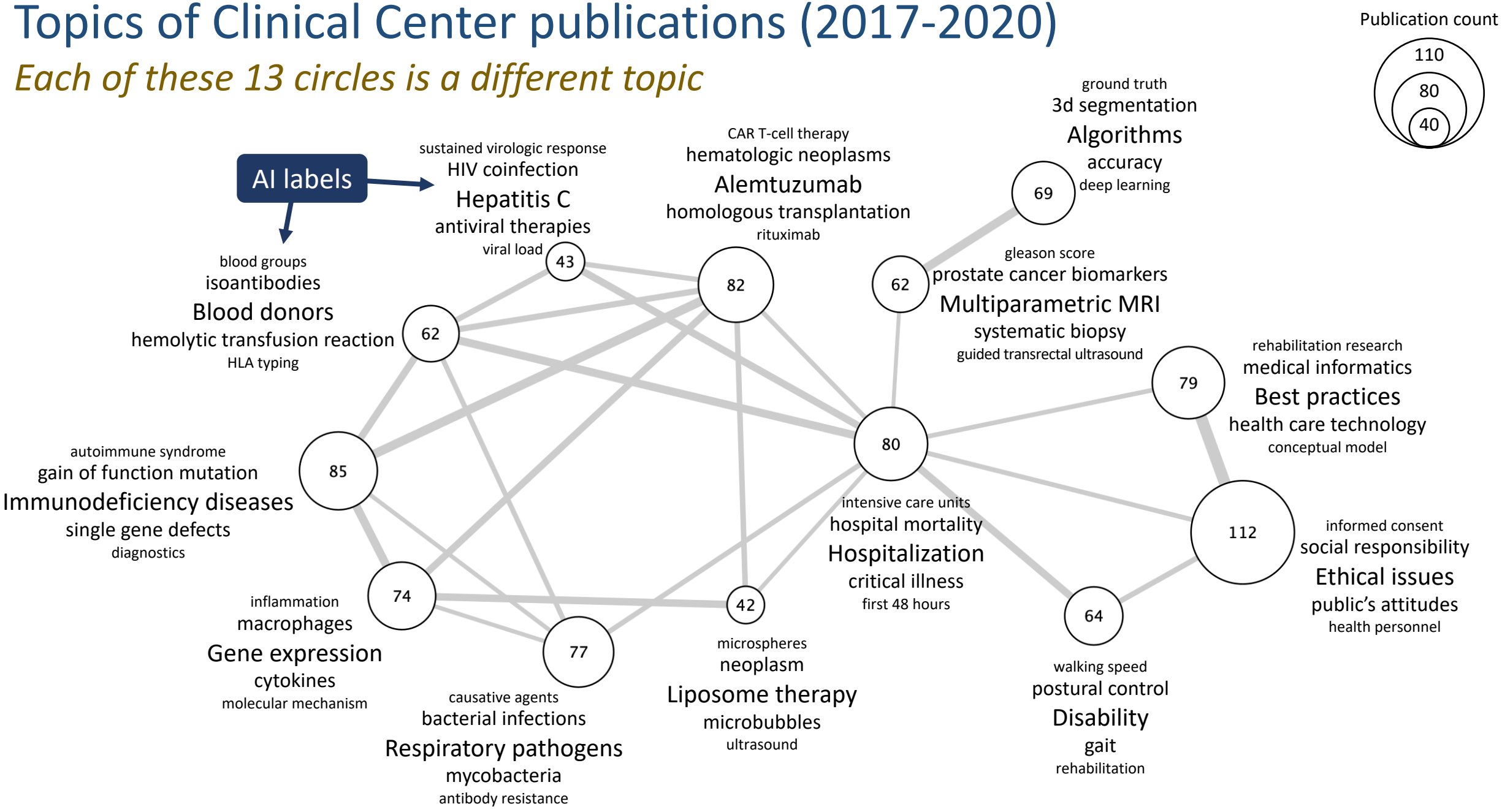
Topics of Clinical Center publications (2017-2020)

Each of these 13 circles is a different topic



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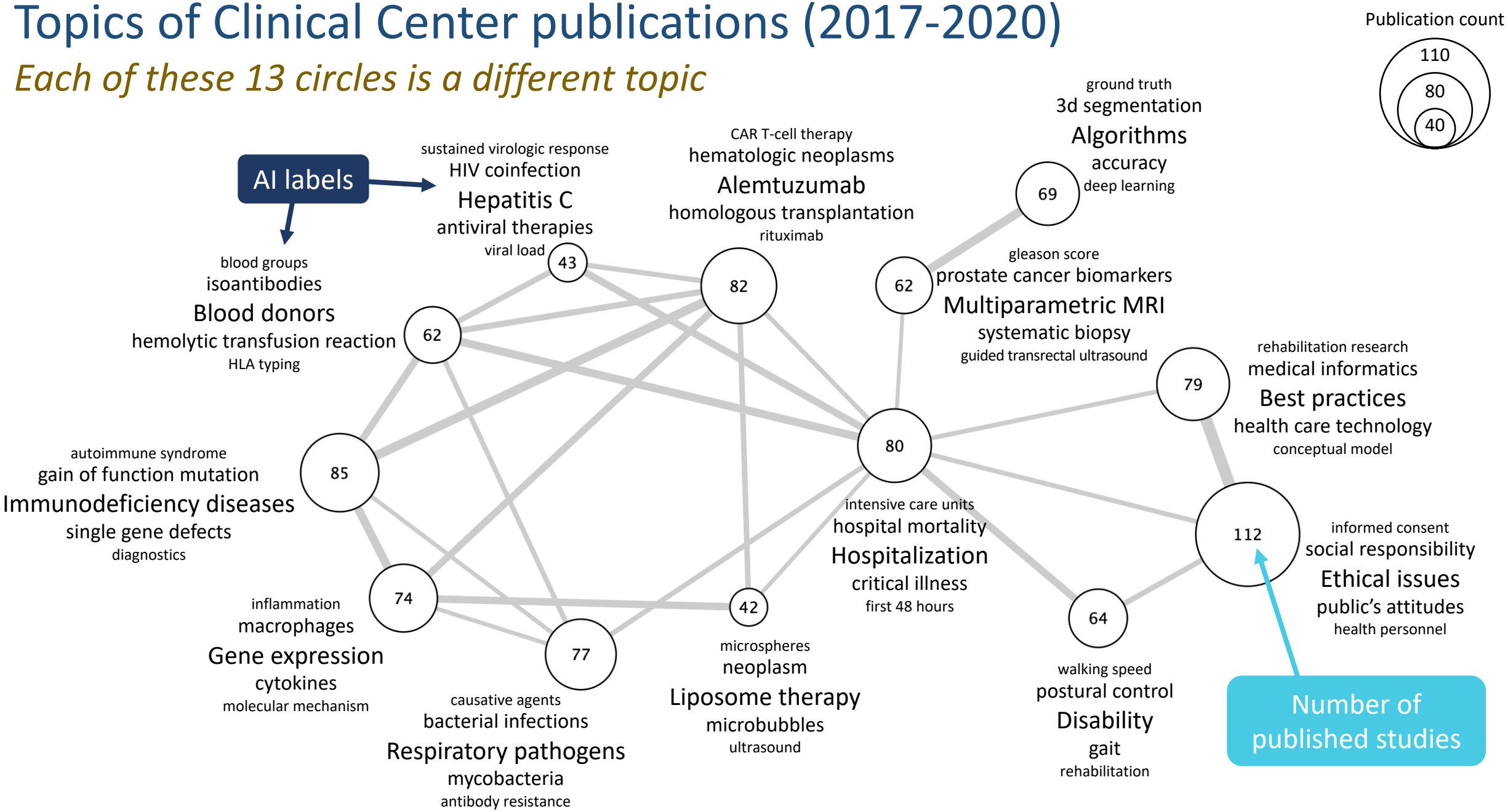

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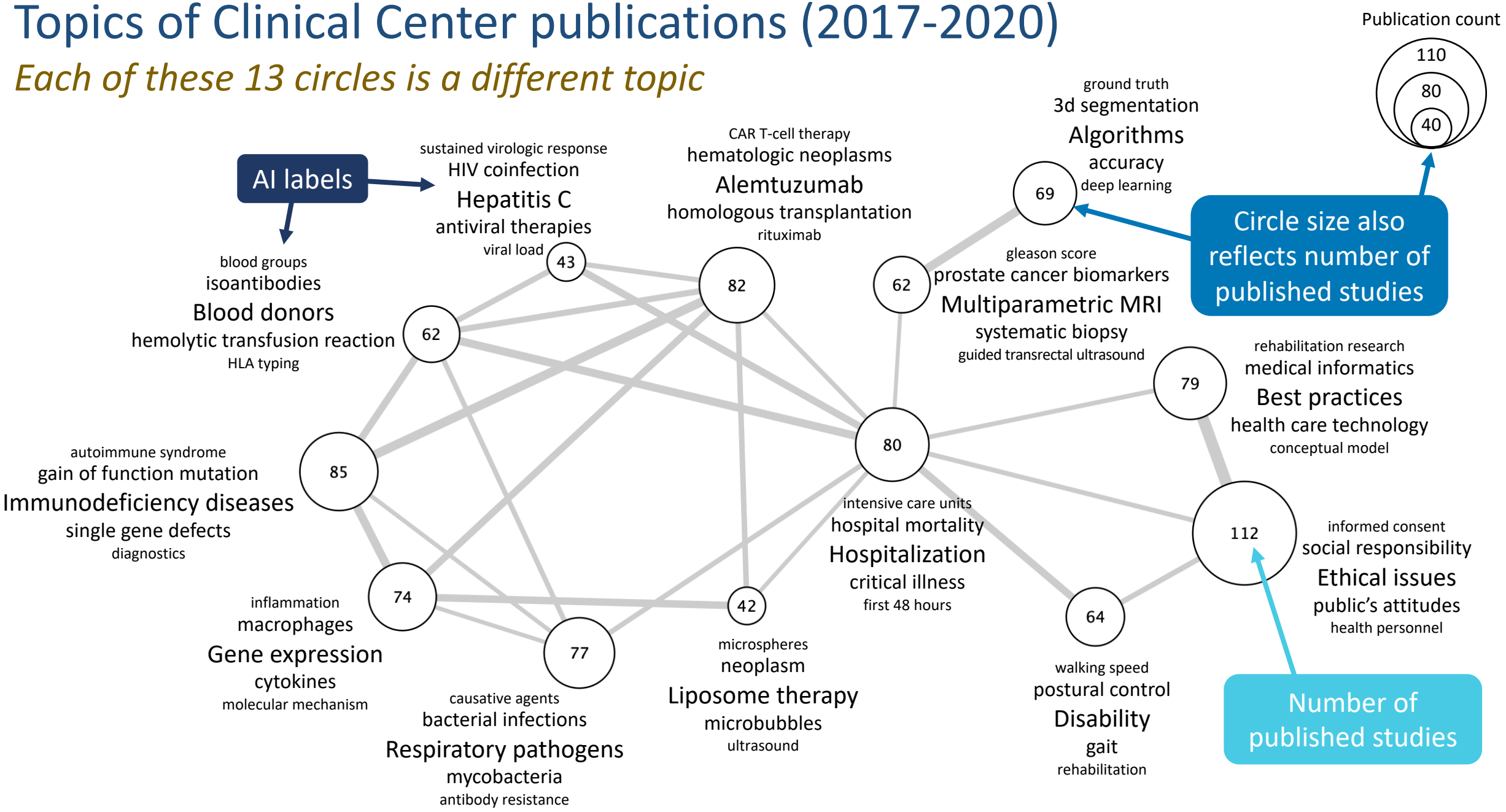

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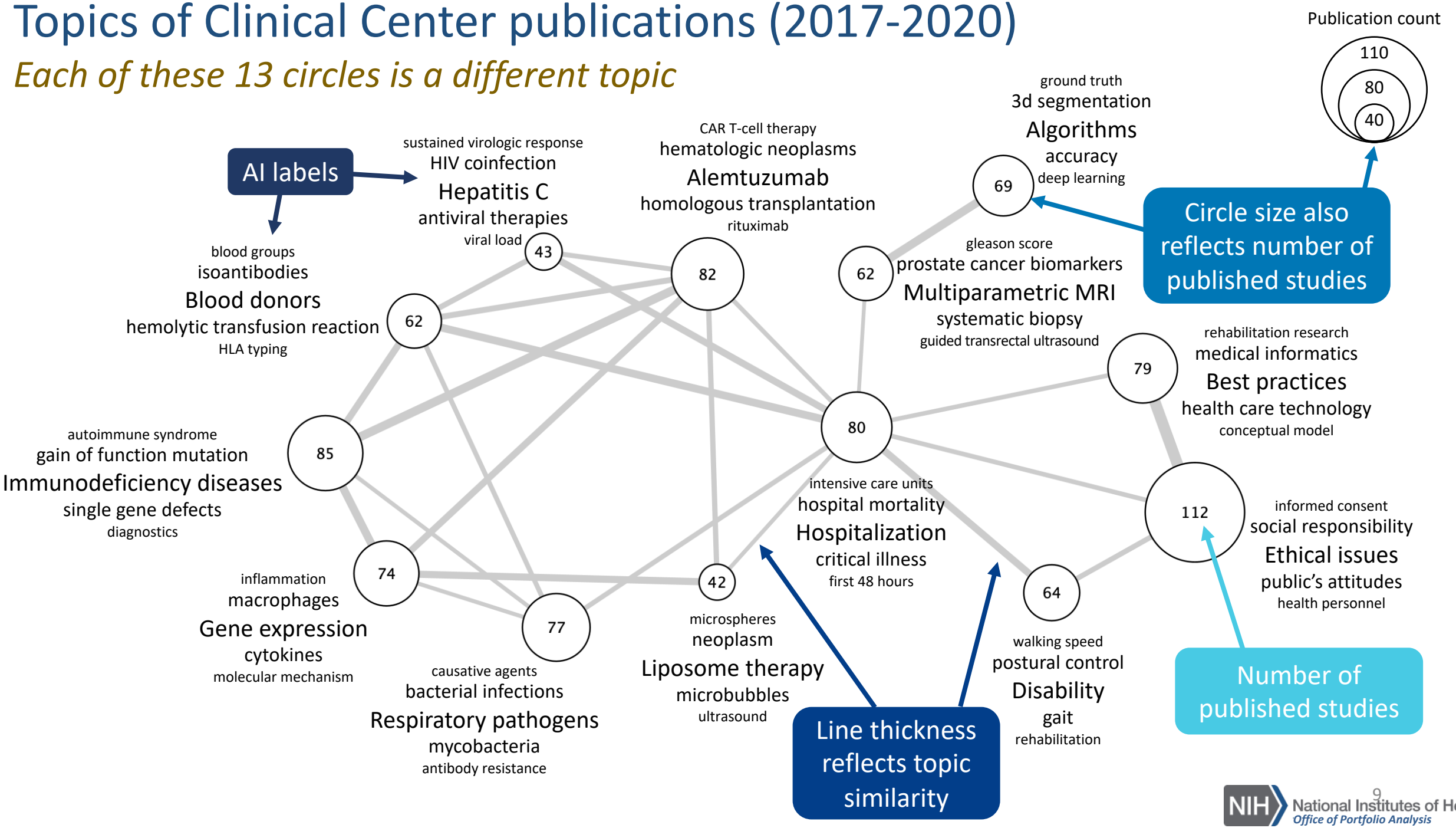

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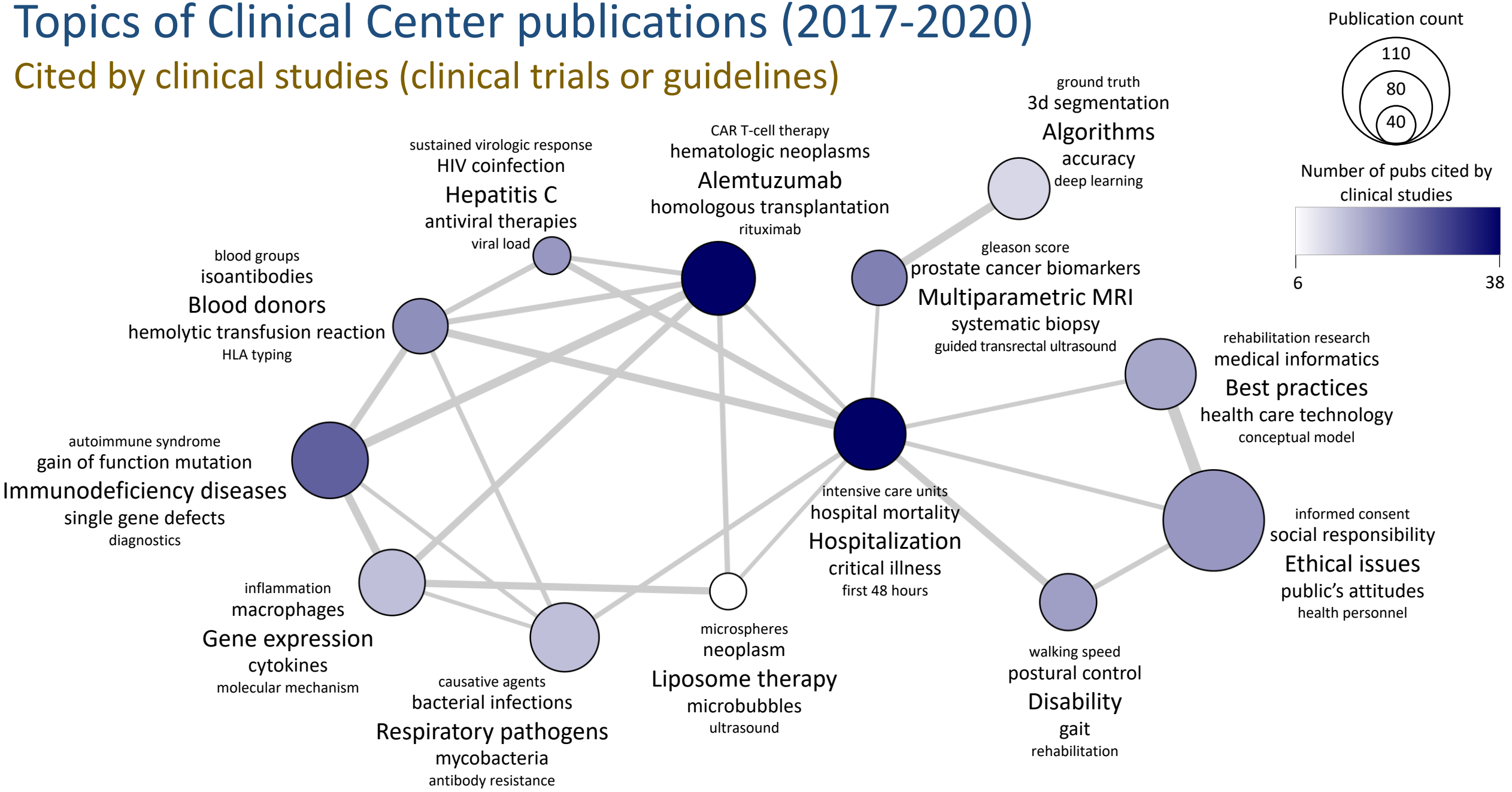
Topics of Clinical Center publications (2017-2020)

Cited by clinical studies (clinical trials or guidelines)



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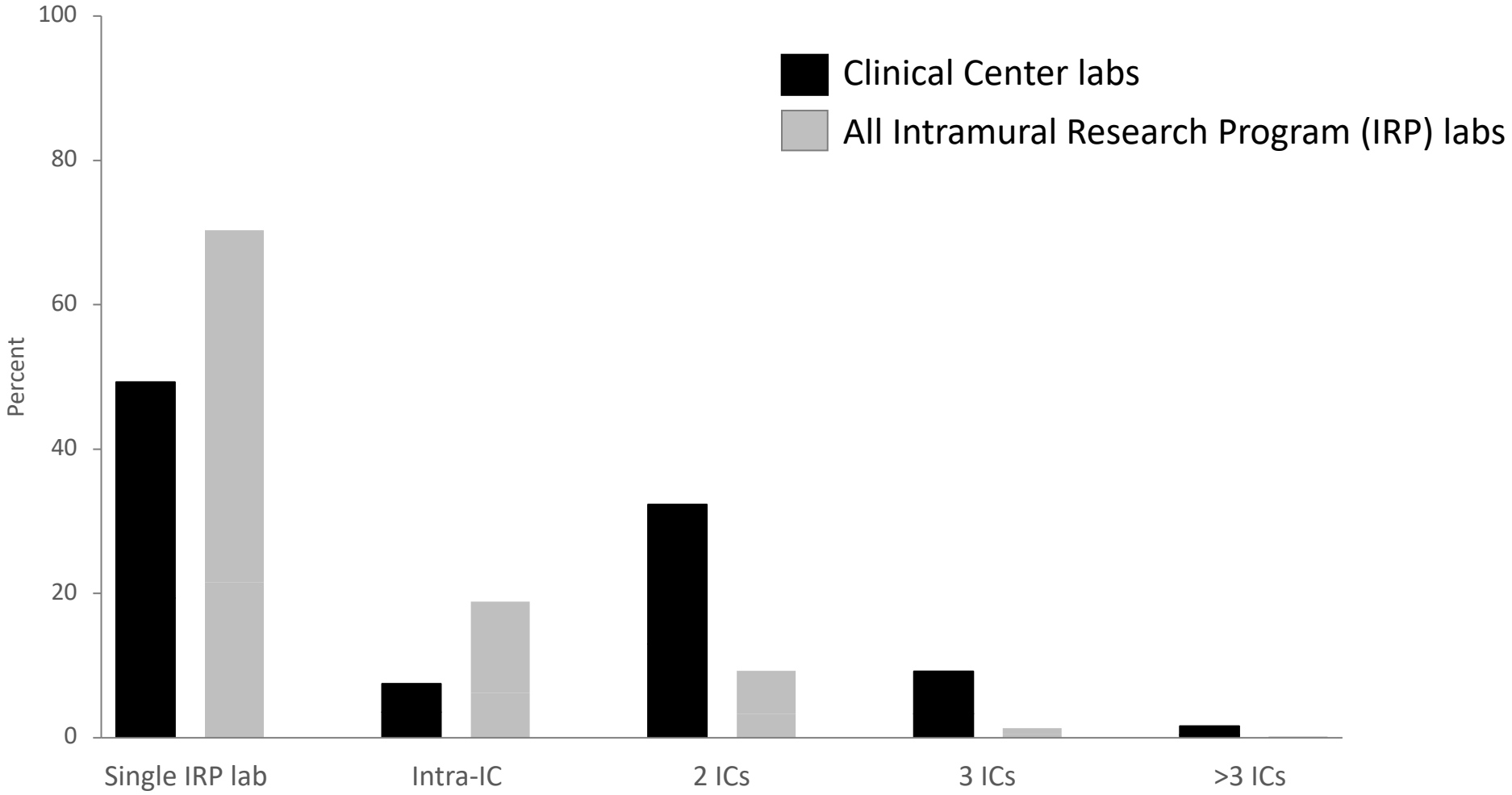
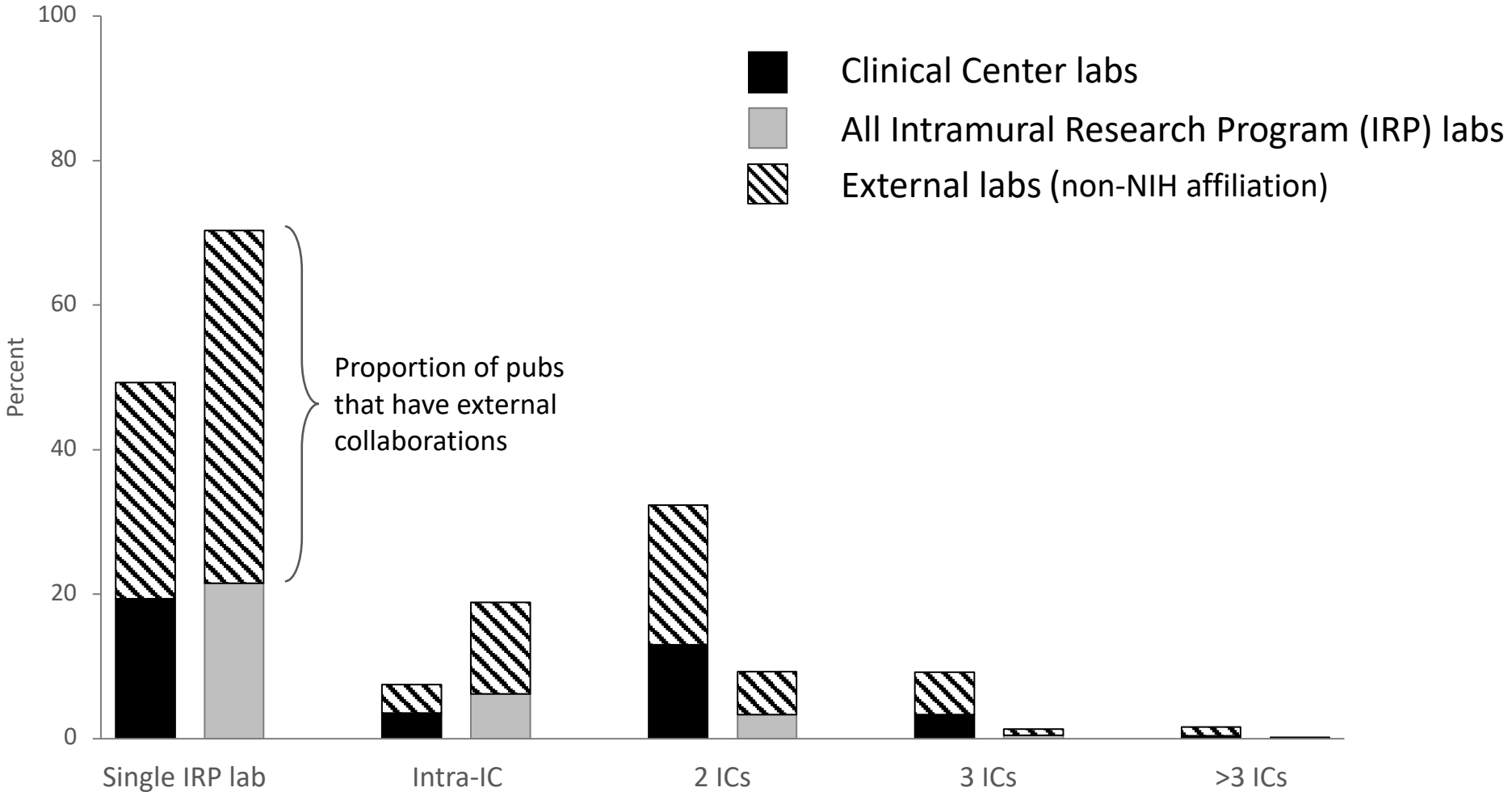
Clinical Center labs are highly collaborative



Clinical Center: 931 pubs
All IRP: 22,928 pubs

Most Clinical Center collaborations include non-NIH labs



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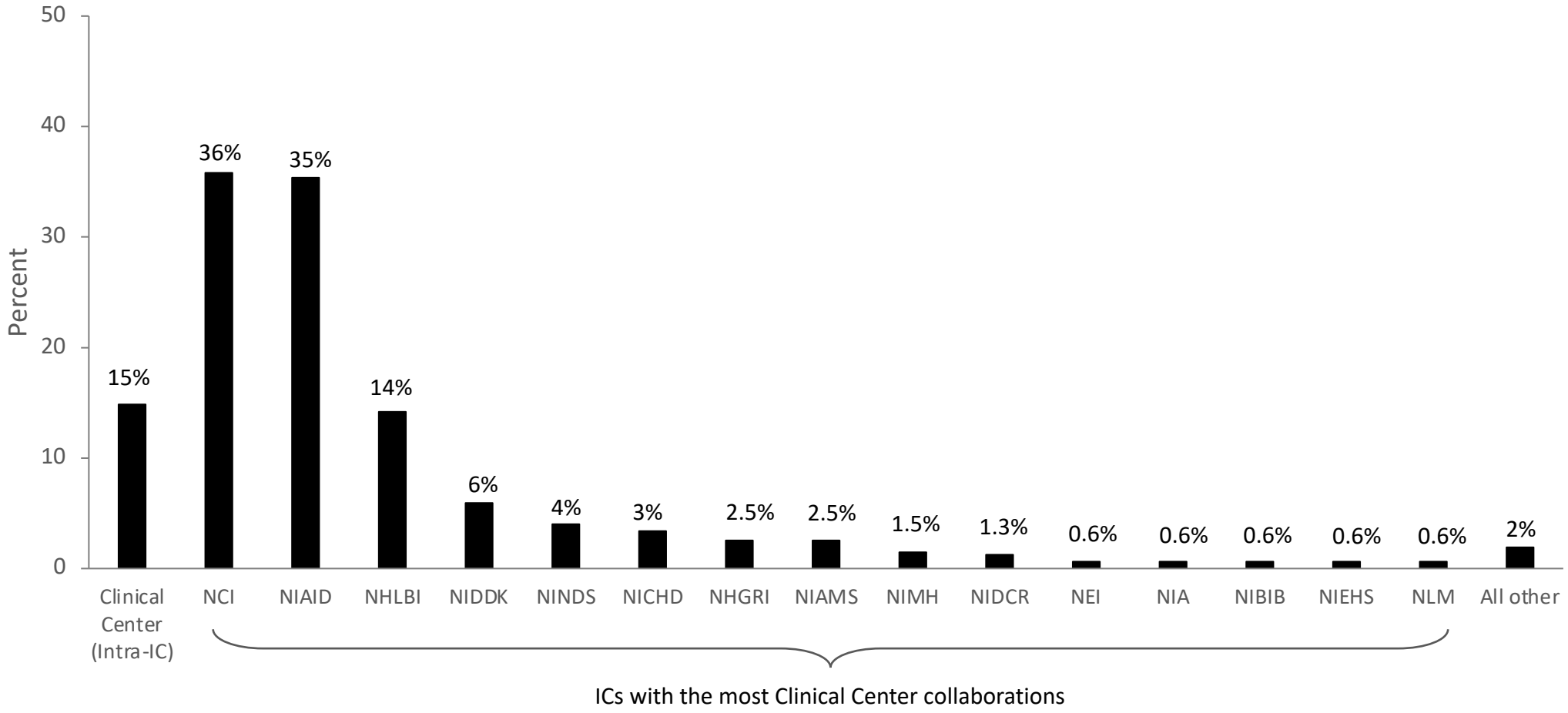
Clinical Center labs collaborate most intensively with NCI and NIAID

Clinical Center researchers authored 931 publications between 2017 and 2020

472 (51%) were collaborative with authors from other NIH ICs



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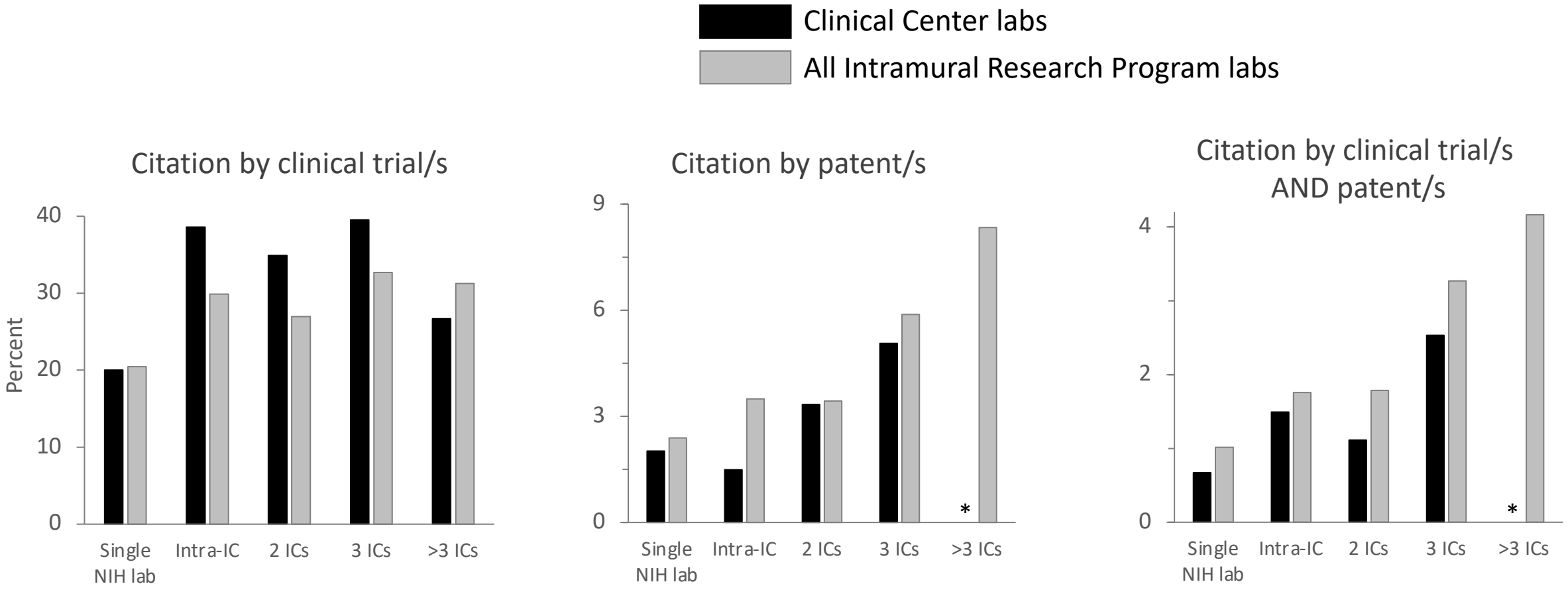
Collaborative publications are more impactful



* Asterisks indicate a Clinical Center percentage of 0%

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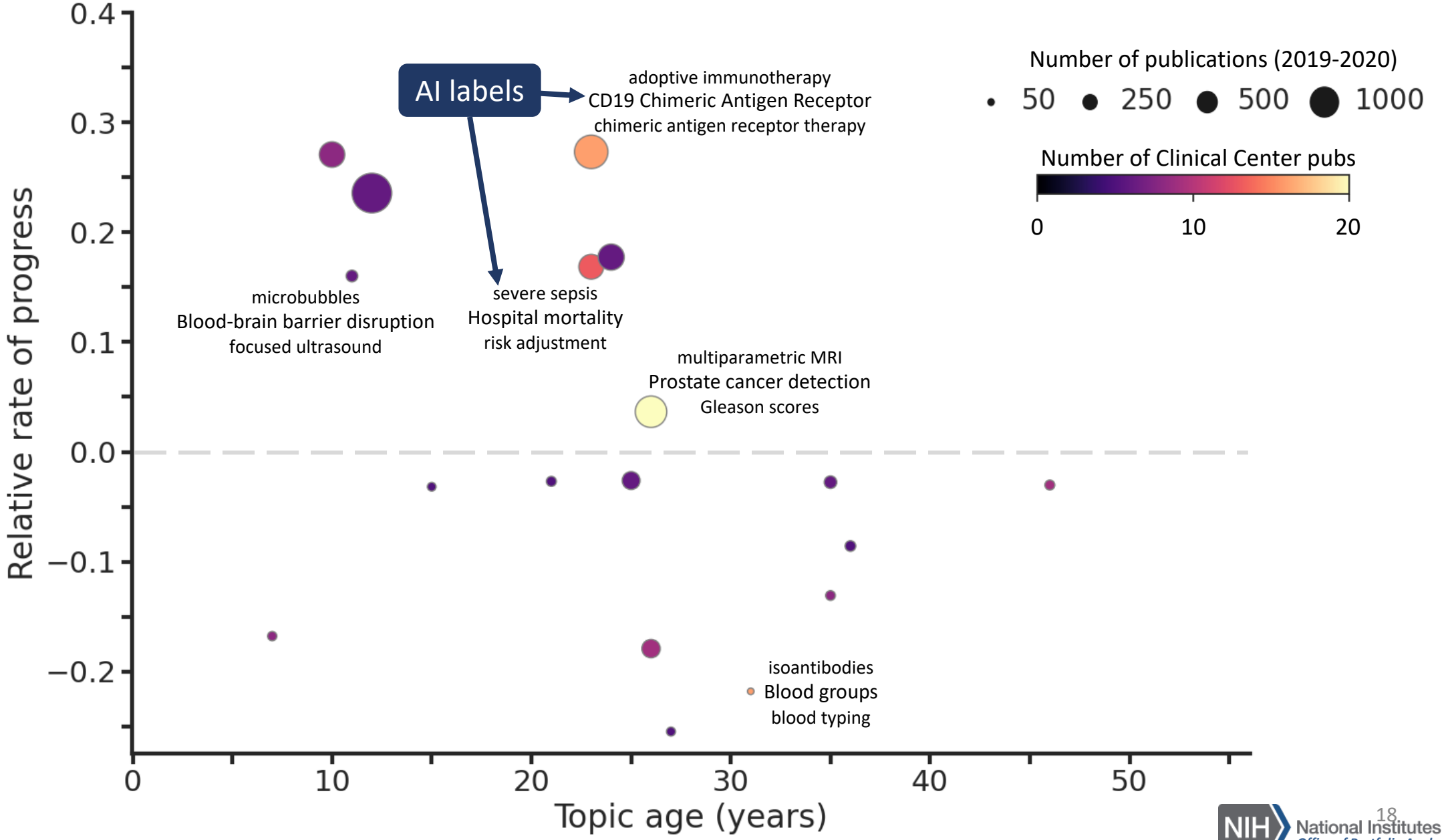
Rate of Progress: Questions

- What topics have the highest percentage of Clinical Center publications (2017-2020)?
- What percentage of publications in the Clinical Center topics were funded by NIH overall?
- What percentage of publications in the Clinical Center topics reported the results of clinical studies?

Rate of progress: Topics of Clinical Center publications (2017-2020)



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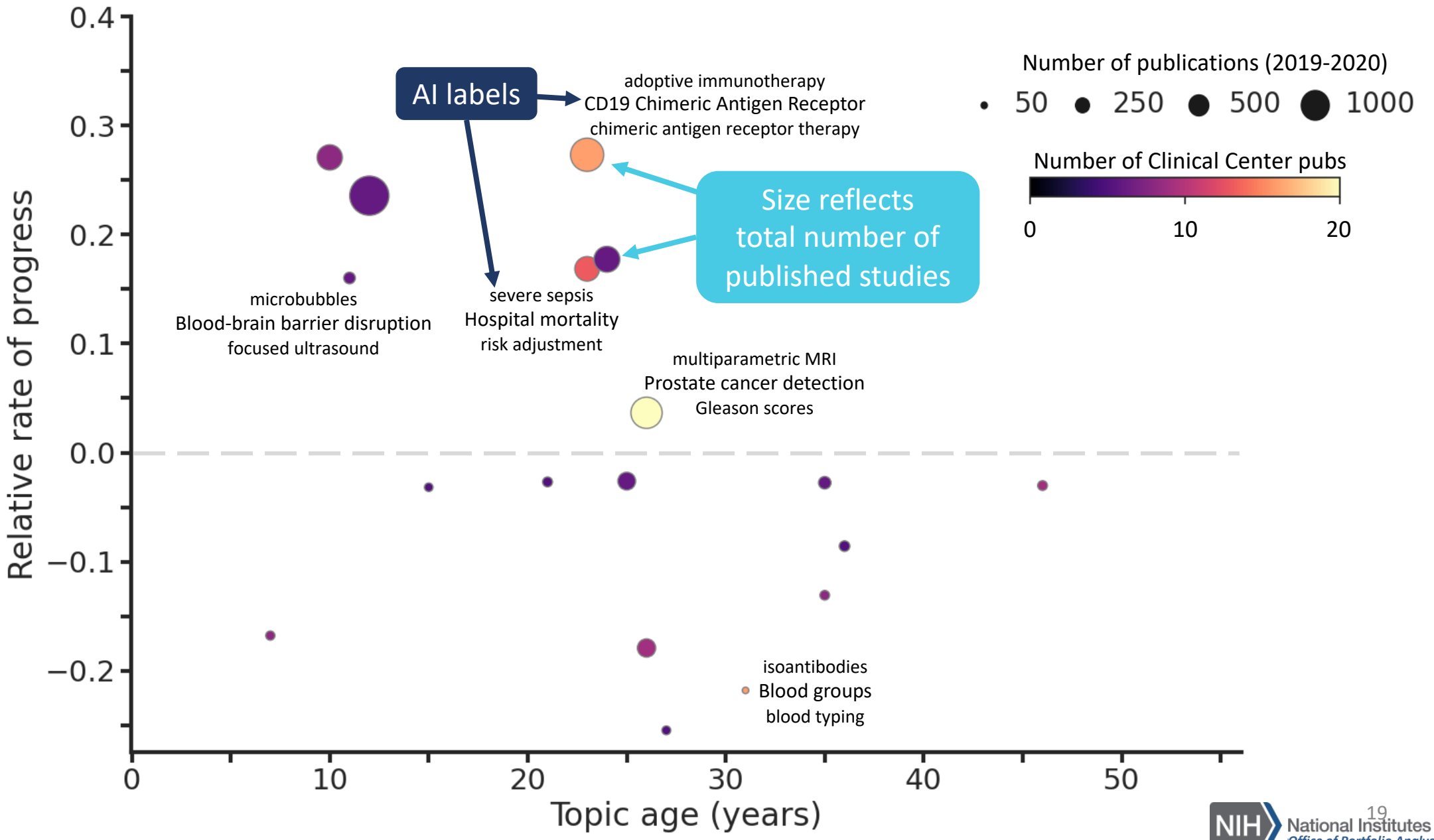

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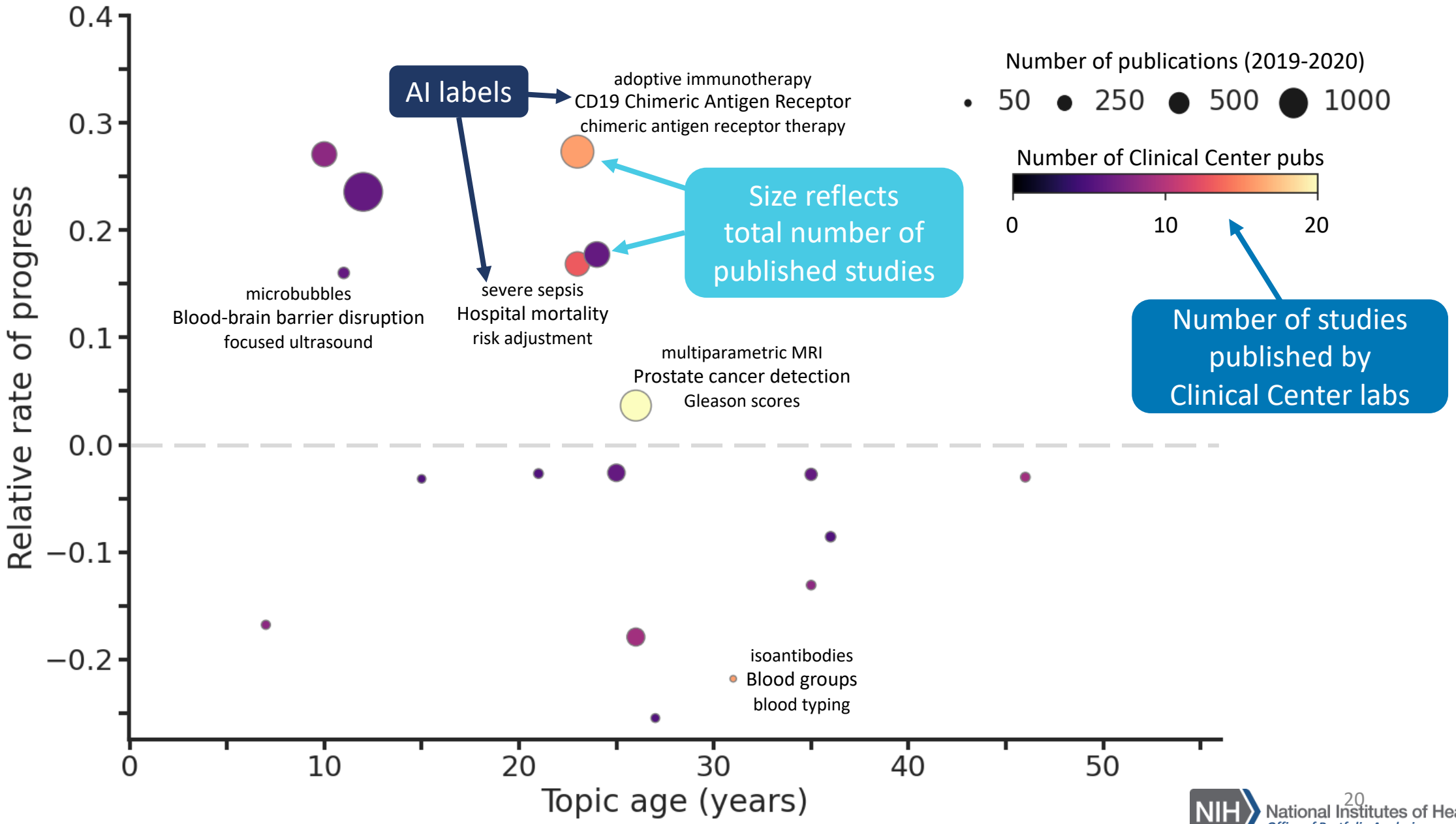

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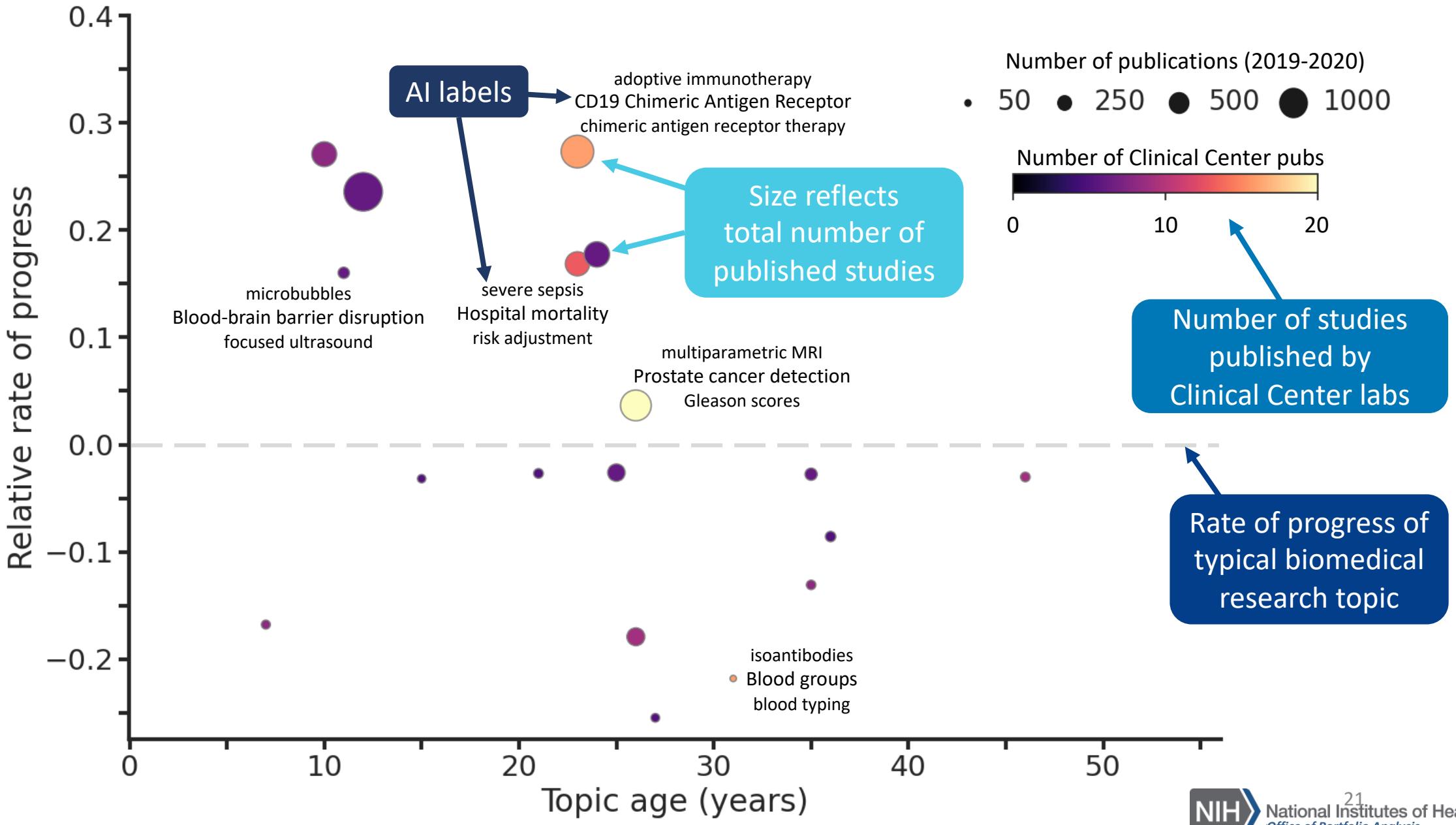

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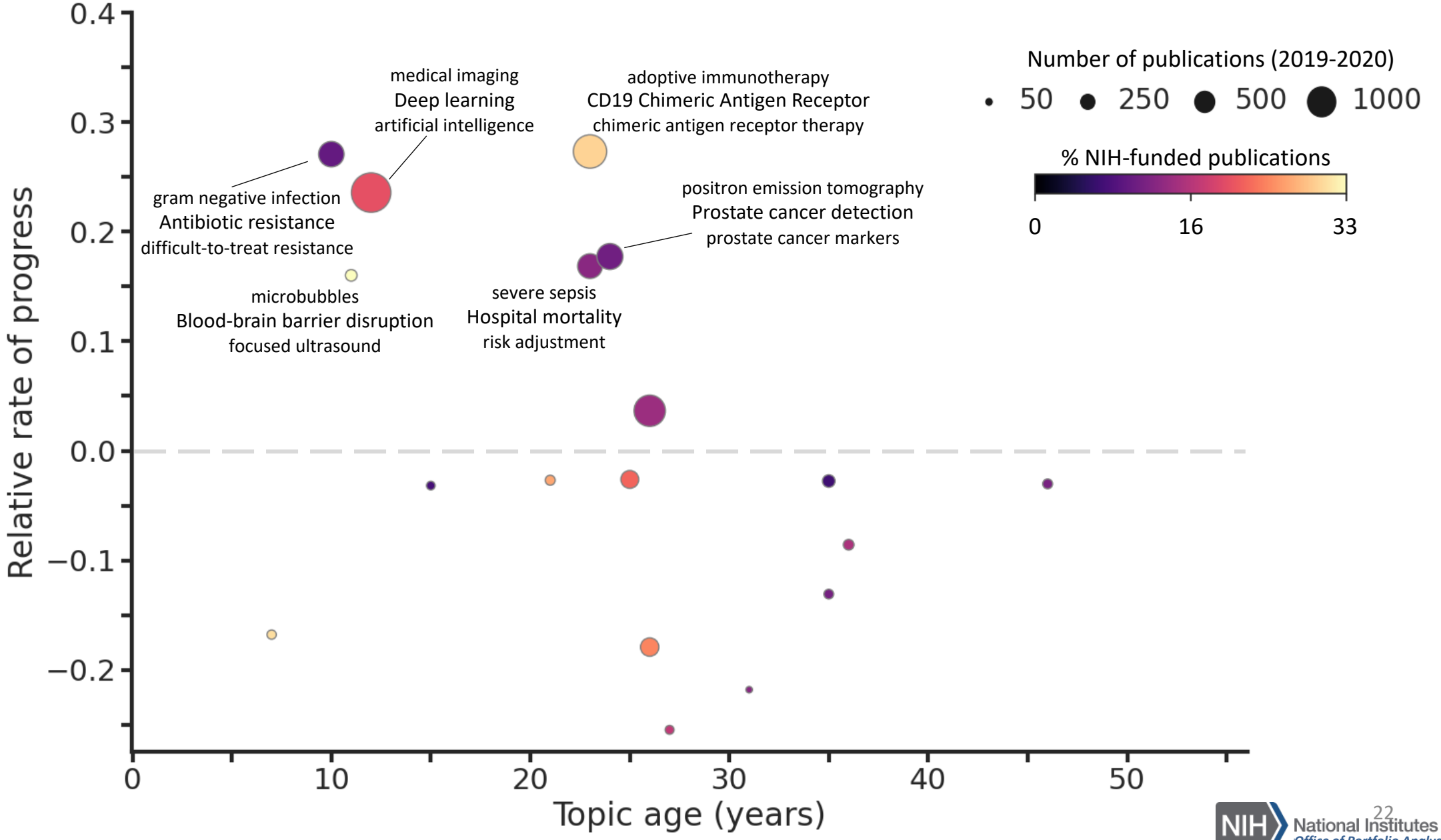
Rate of progress (fast): NIH-funded publications (2017-2020)



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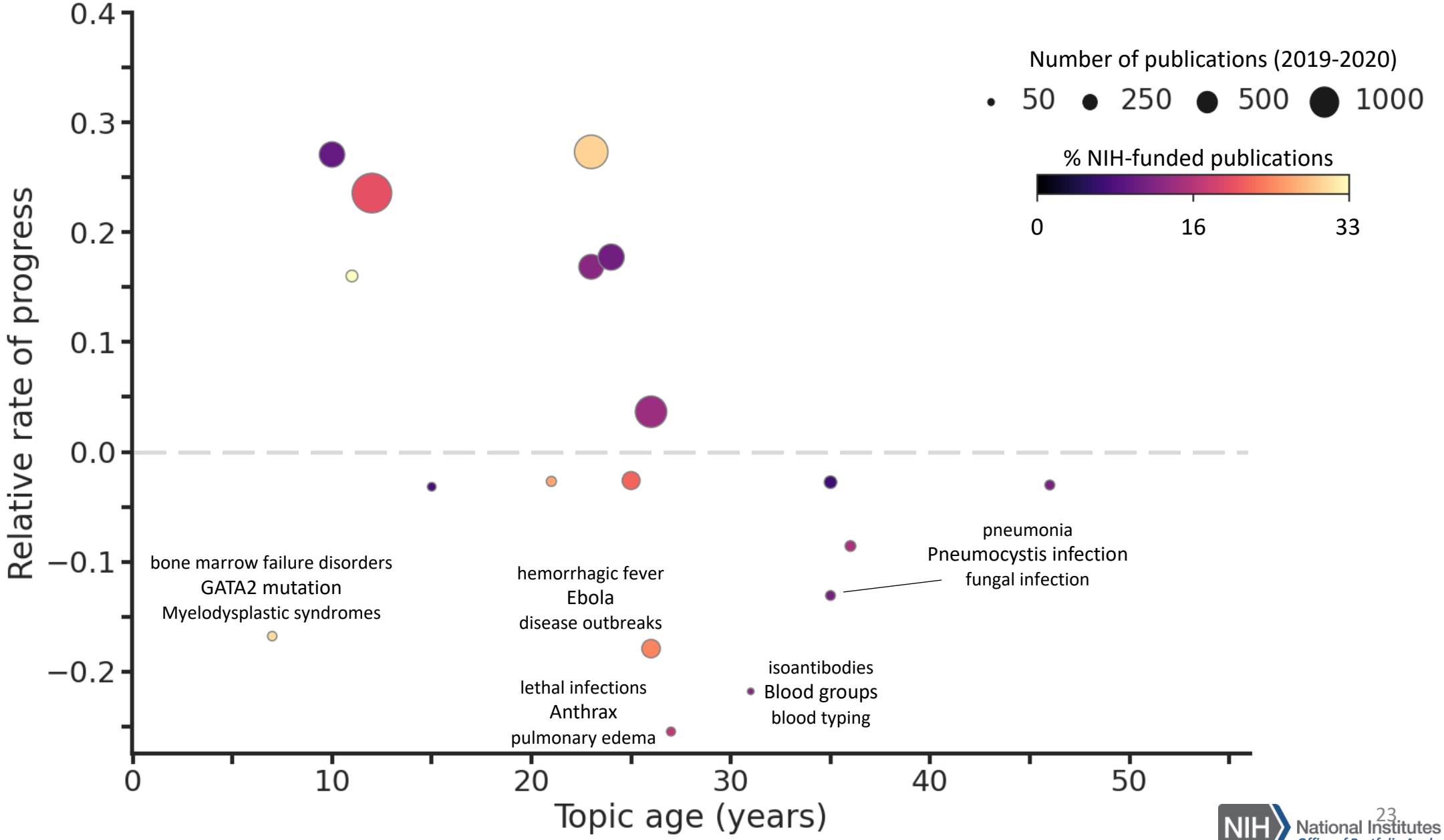
Rate of progress (slow): NIH-funded publications (2017-2020)



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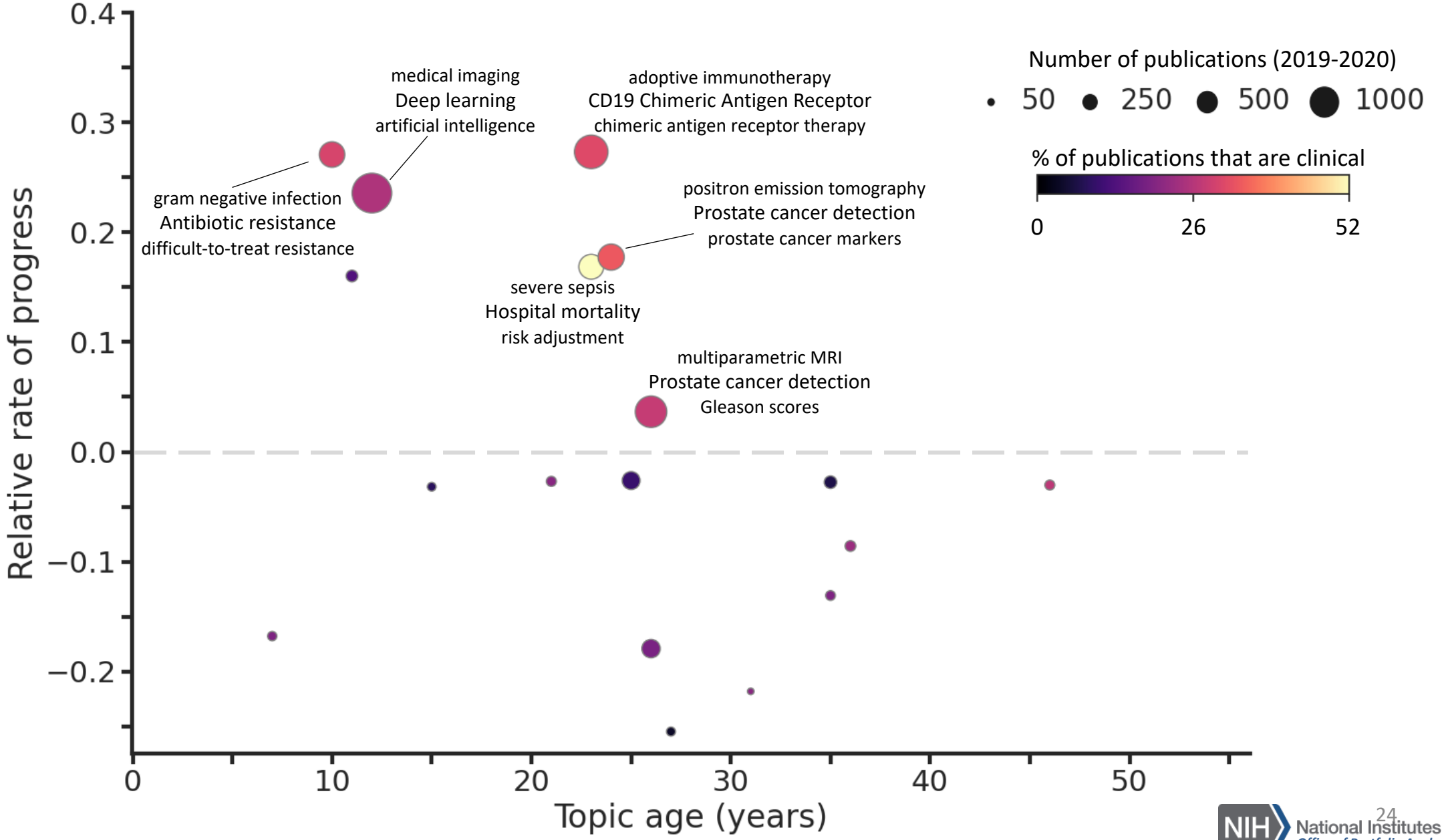
Rate of progress: Clinical publications (2017-2020)



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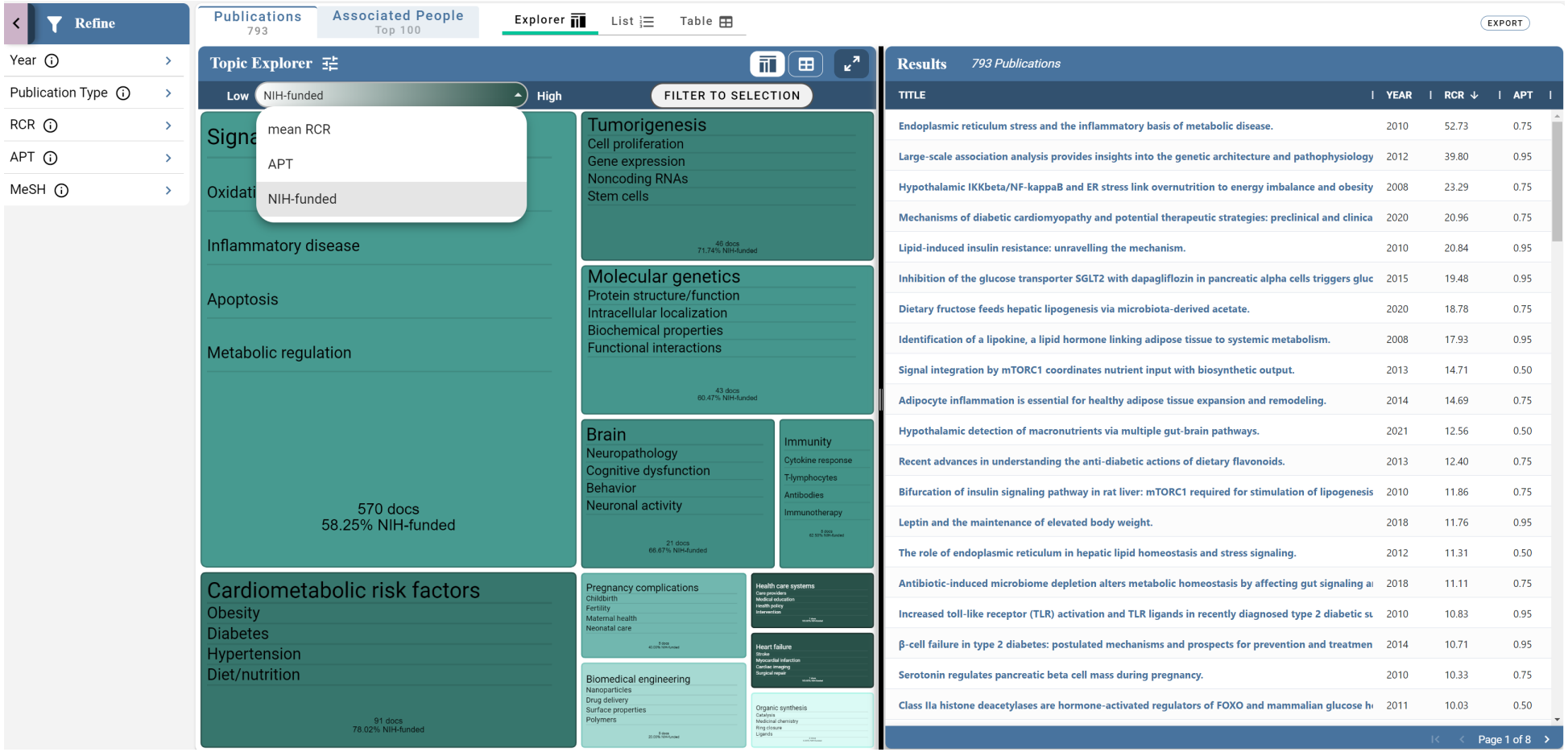
The OPA team

A new public OPA tool coming soon to a browser near you!

iSearch ANALYTICS

watch for our limited beta launch in a few months!

follow us on twitter for updates: @NIH_OPA



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Summary and Conclusions

- Clinical Center researchers published 931 studies between 2017 and 2020
  - 43% of Clinical Center publications were collaborative with other ICs
  - 60% of Clinical Center publications were collaborative with researchers outside NIH
  - Clinical Center PIs collaborated the most with researchers from NCI and NIAID
  - 95% of Clinical Center PIs had collaborators in another IC, external to the NIH, or both
- Collaborative publications were more influential and generally had greater clinical and technological impact
- Clinical Center publications map to topics that are clinically focused and progressing at a moderate to fast rate
- Clinical Center publications are focused on 13 distinct topics, 4 of which were noteworthy because they had the highest:

Clinical citations	Patent citations	Intra-NIH collaborations	Total publications and external collaborations
intensive care units	ground truth	CAR T-cell therapy	informed consent
hospital mortality	3d segmentation	hematologic neoplasms	social responsibility
Hospitalization	Algorithms	Alemtuzumab	Ethical issues
critical illness	accuracy	homologous transplantation	public's attitudes
first 48 hours	deep learning	rituximab	health personnel