

# *La Recherche Après Temps Perdu:* How Covid-19 Is Impacting Research

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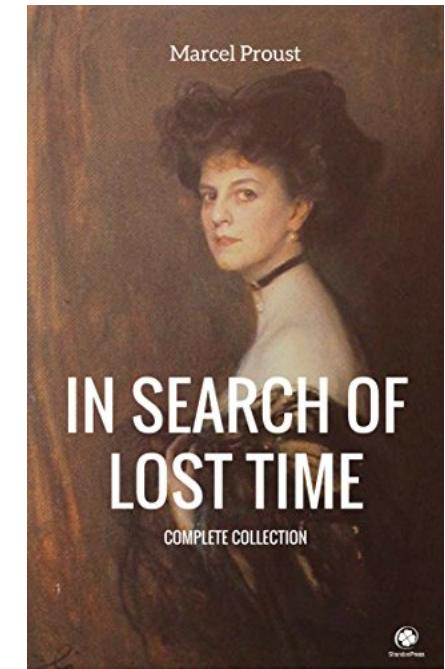
Harvard Medical School and Brigham & Women's Hospital

Boston, MA

USA

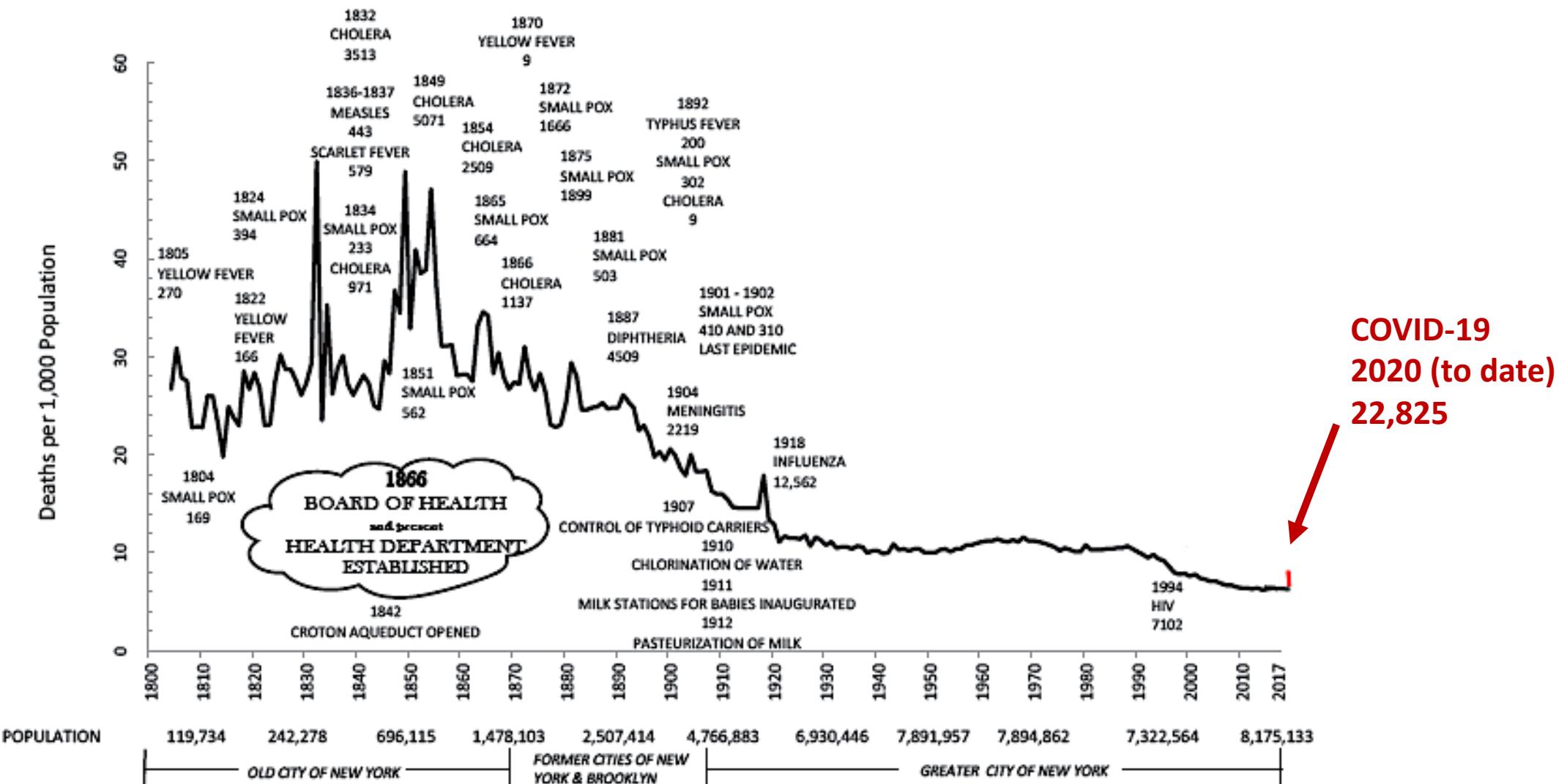
**“Remembrance of things past is not necessarily the remembrance of things as they were.”**

**— Marcel Proust (1871-1922)**



# The Conquest of Pestilence in New York City

*...As Shown by the Death Rate as Recorded in the Official Records of the Department of Health and Mental Hygiene.*



Source: NYC Bureau of Vital Statistics

# Research after lost time

- Effect on the funding of science
- Effect on what research is done
- Effect on the way research is carried out
- Effect on science education and training
- Effect on the way research is disseminated
- Effect on the way science and scientists are perceived

# COVID-19 Effects

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## The pandemic has been a disaster for hospitals and academic medical centers

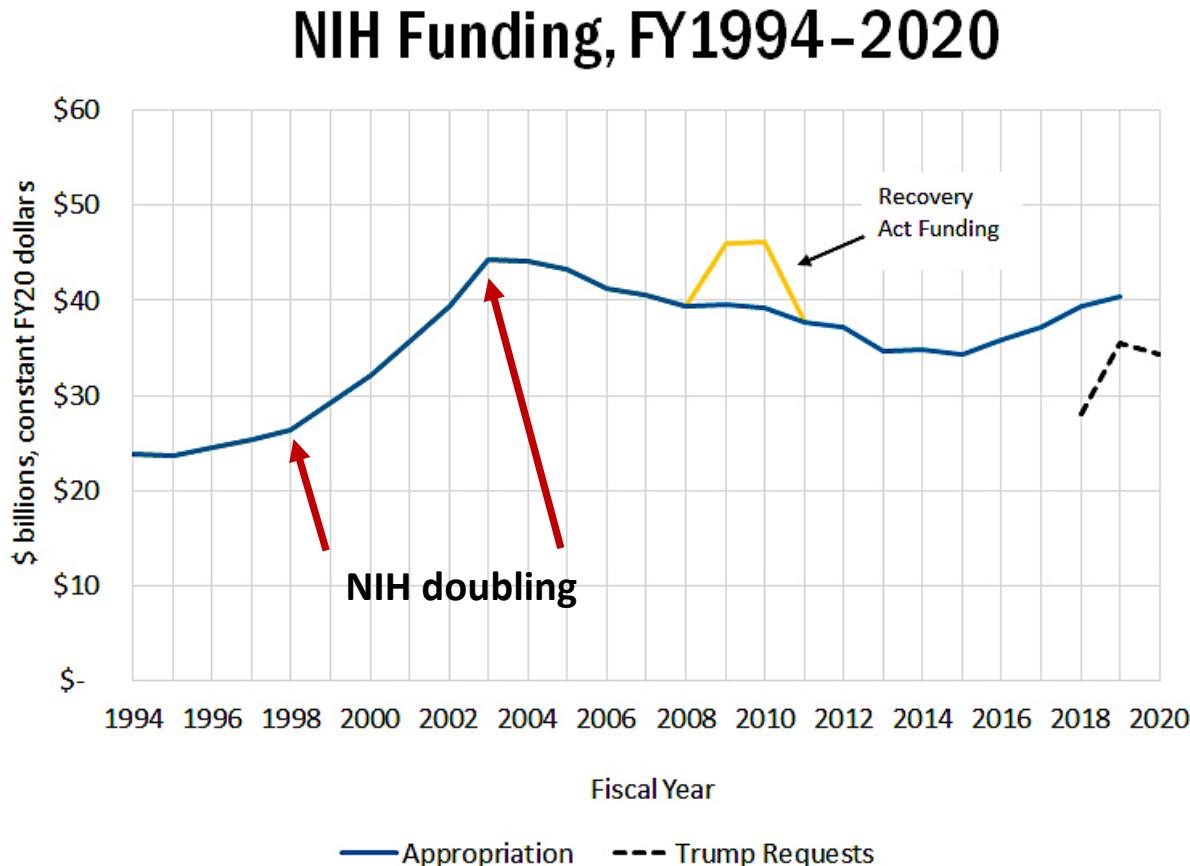
The American Hospital Association reported on June 24 that the nation's hospitals and academic medical centers have lost \$202.6 billion between March 1, 2020 and June 24, 2020. They further estimate that an additional minimum of \$120.5 billion will be lost between July and the end of December, for a total loss in 2020 of at least \$323 billion. These are probably underestimates.

(The budget of the National Institutes of Health is currently \$42 billion a year.)

The loss comes from 19.5% average reduction in inpatient volume and 34.5% average reduction in outpatient volume compared to baseline, plus increased costs for PPEs and screening for COVID-19, etc.

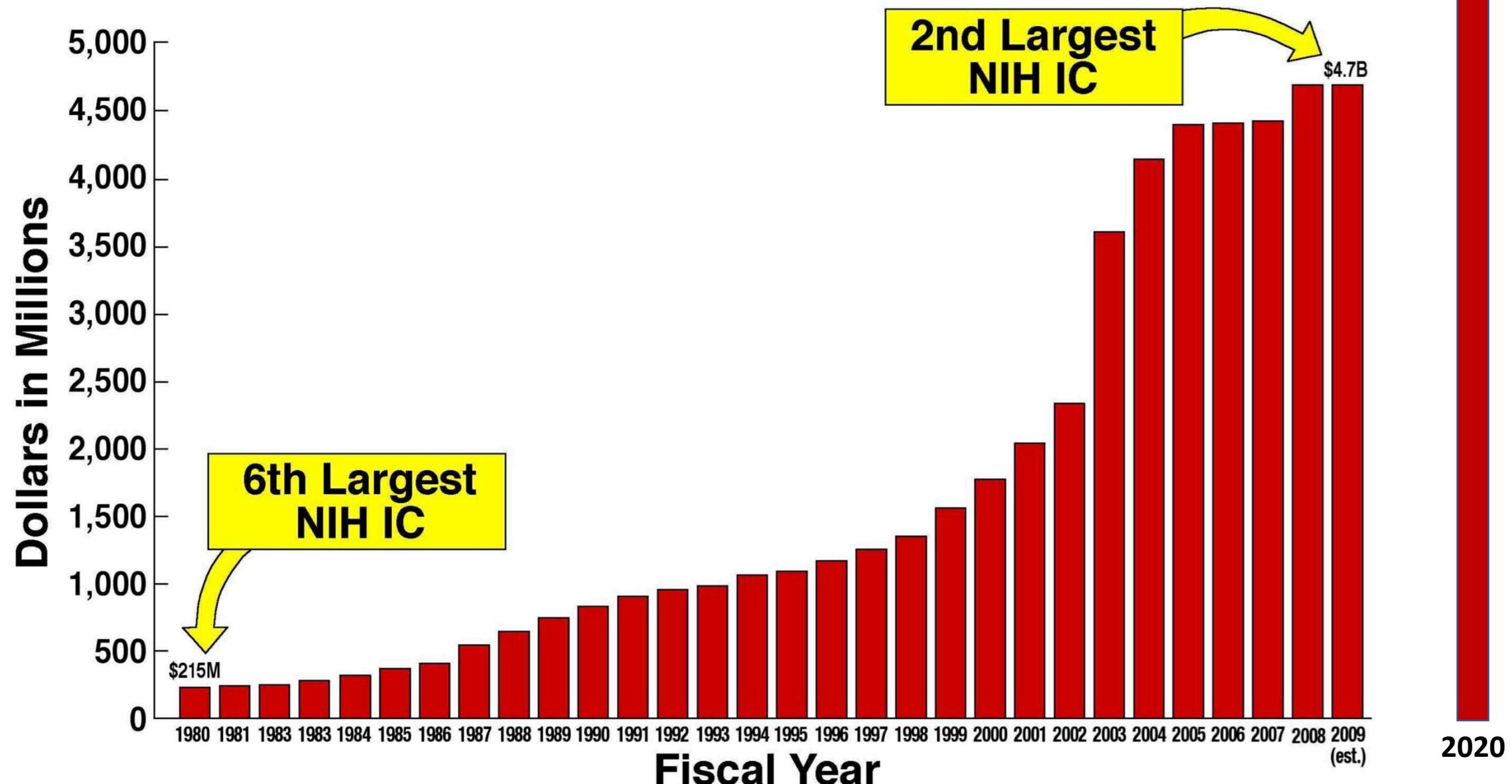
It is doubtful that more than 25-30% of these losses will be reimbursed by federal and state disaster relief spending.

# Research funding: Remembrance of things past



Data from Congressional Research Service Report R43341, "NIH Funding: FY1994–FY2020"

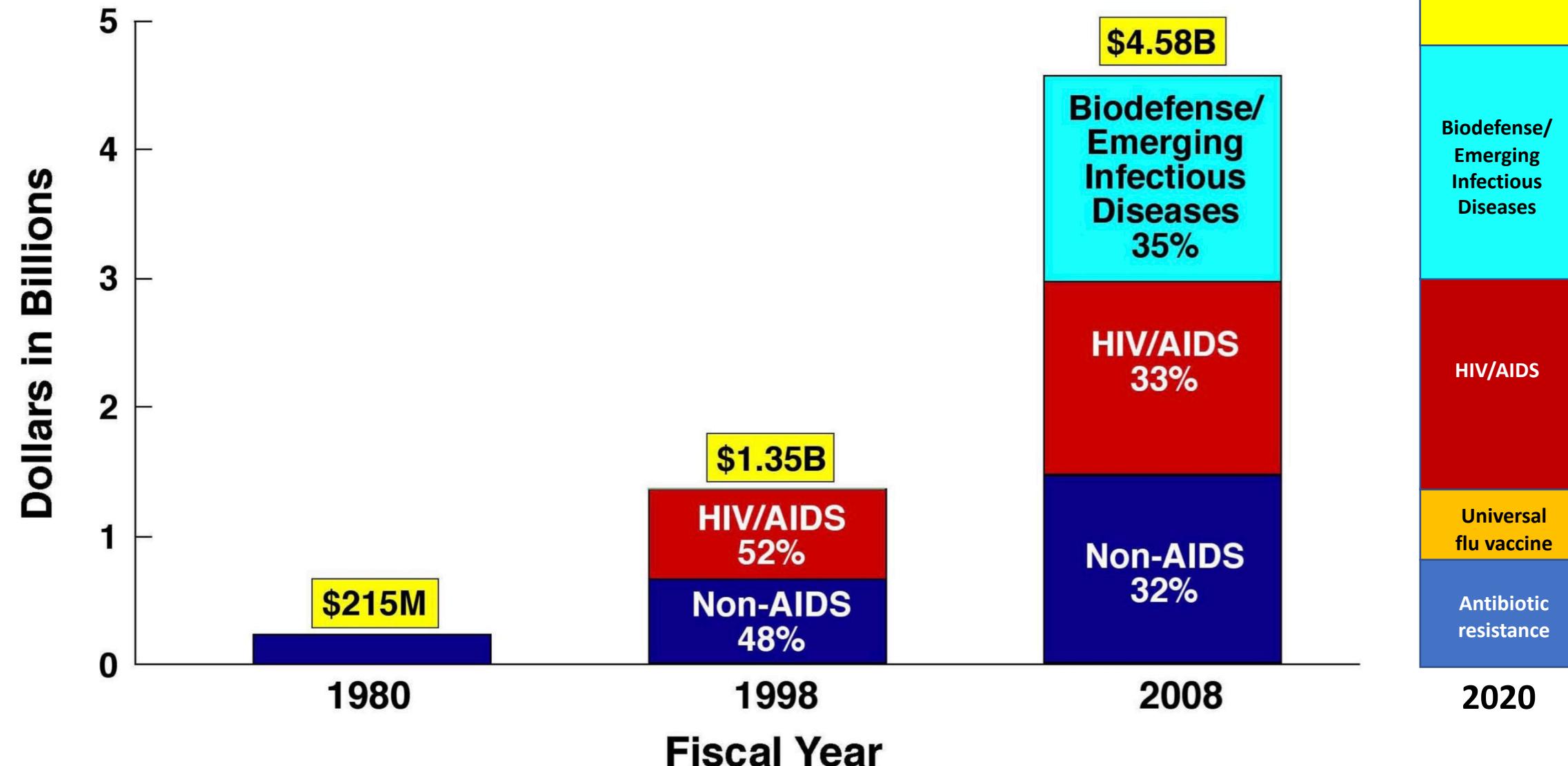
# NIAID Funding History, 1980-2009 (est.)



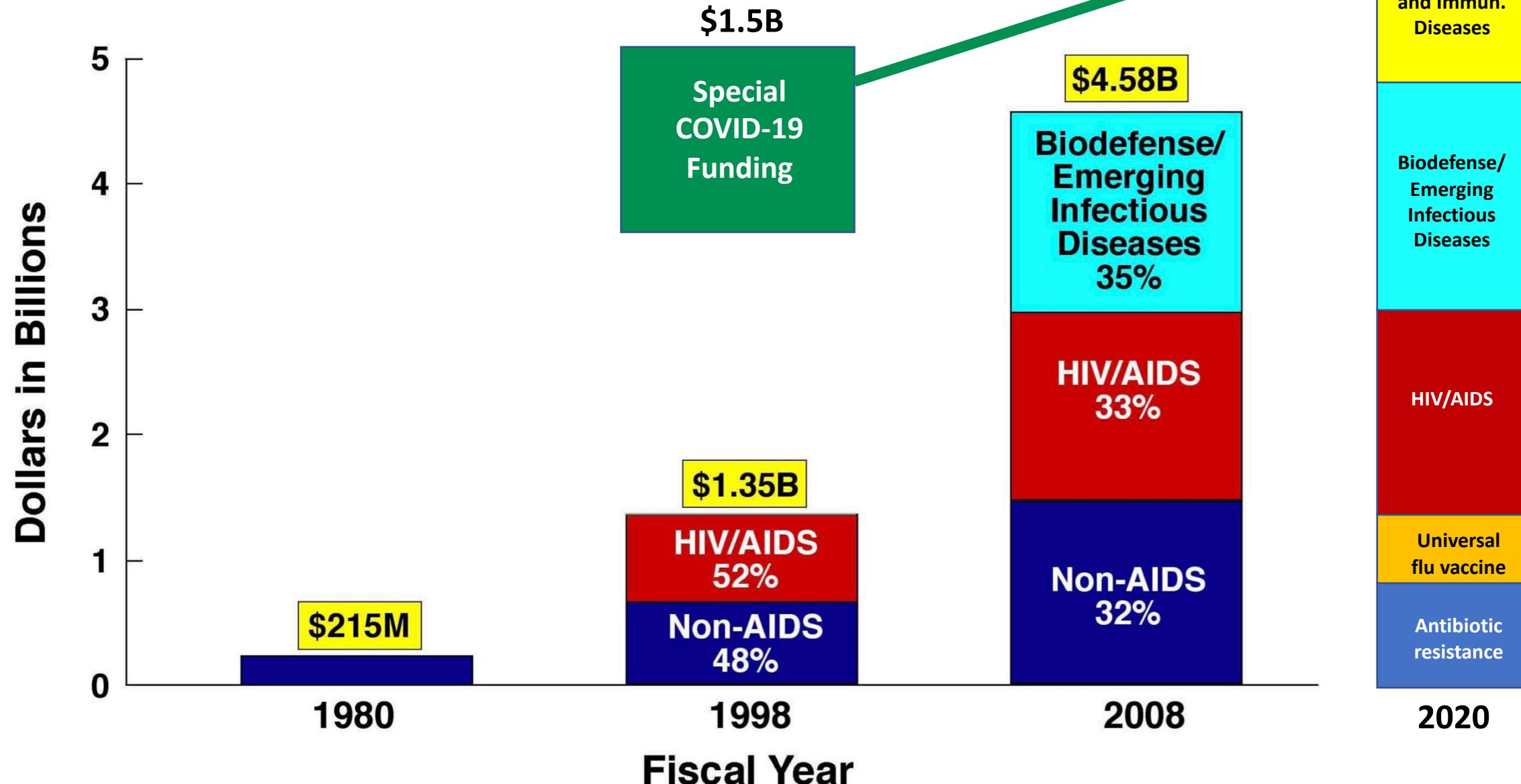
Note: FY 2008 includes \$22M Emergency Supplement for NIAID.

NIH.gov

# Evolution of the NIAID Budget



# Evolution of the NIAID Budget

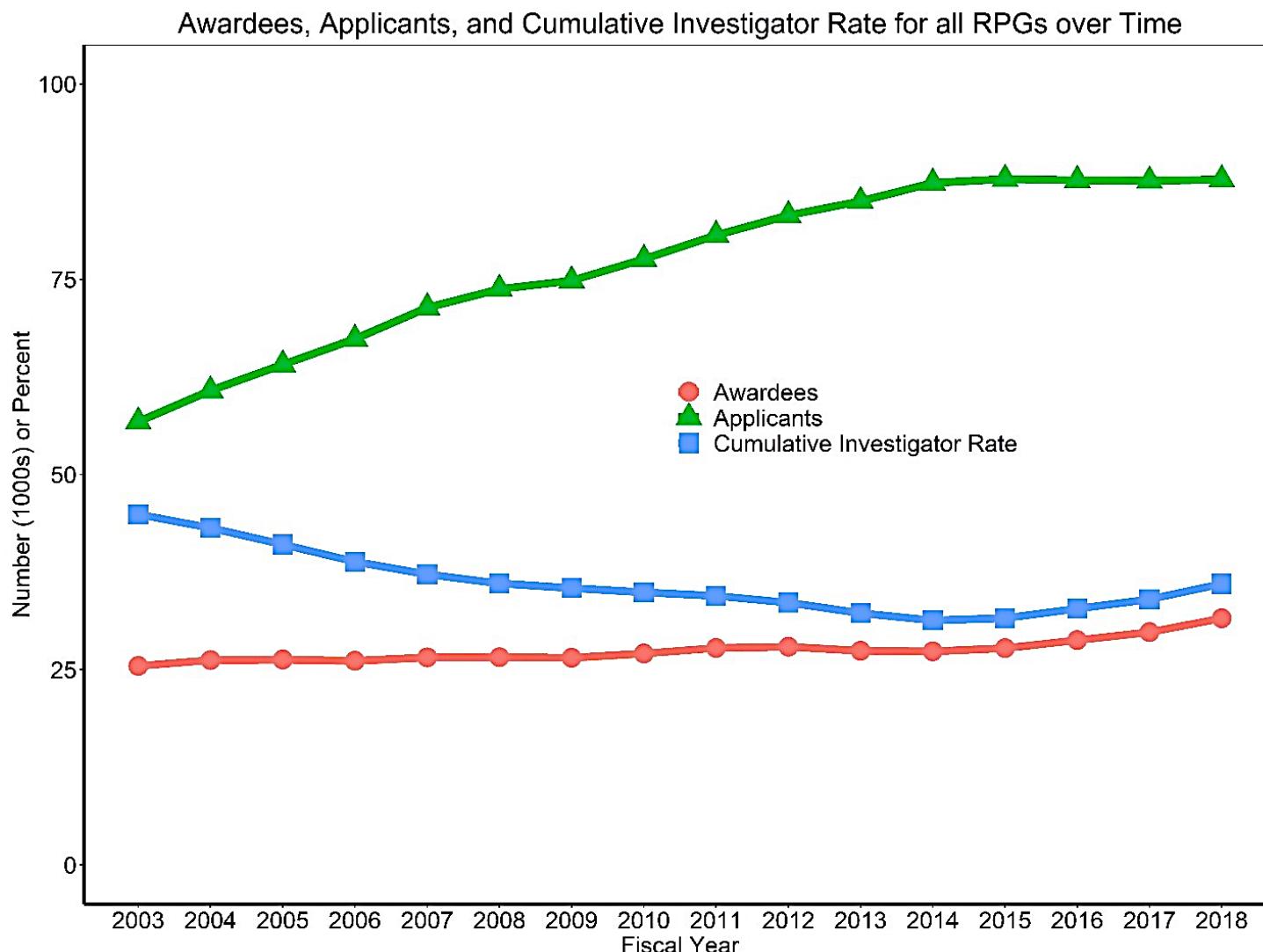


# The Matthew Effect

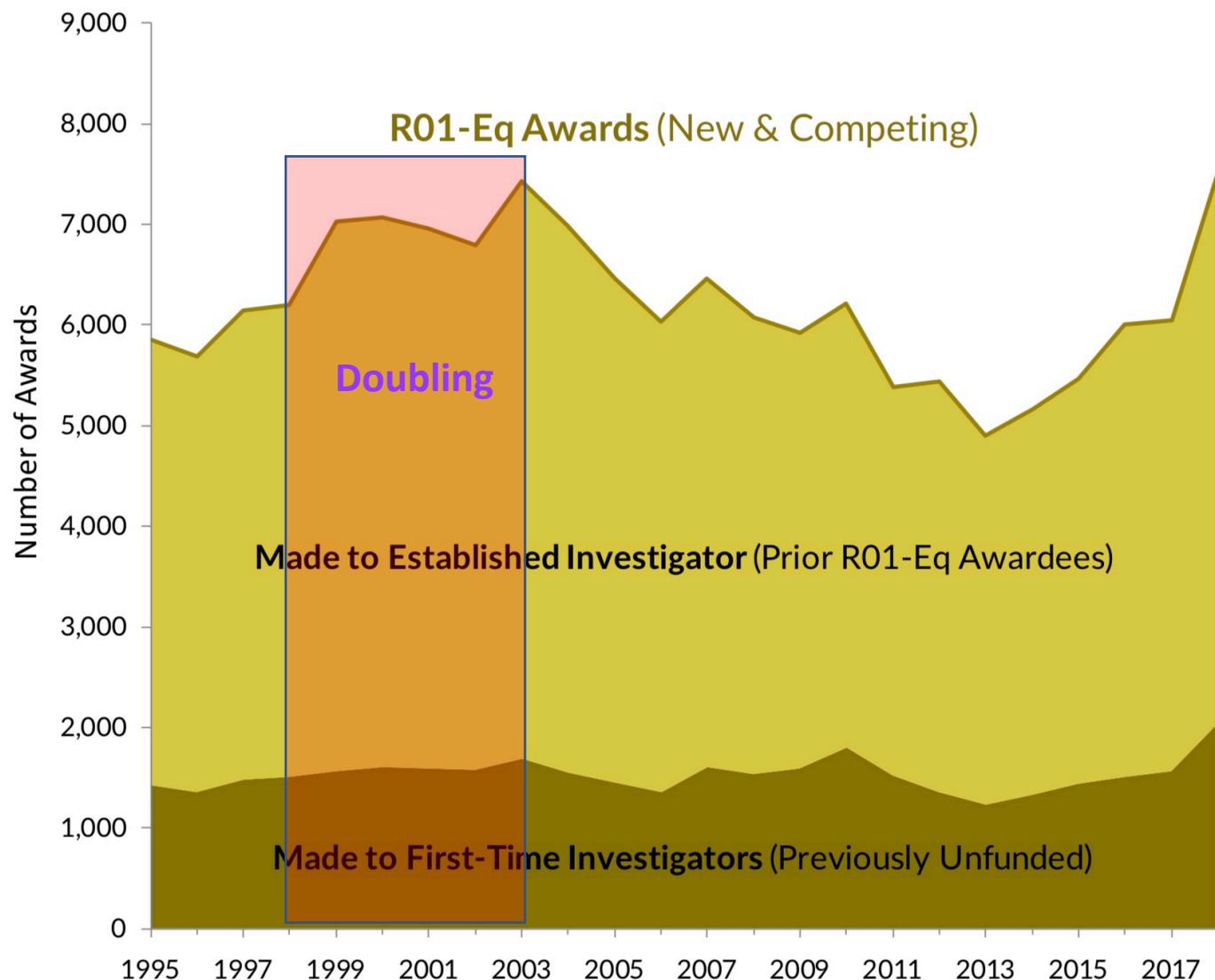
**"For whosoever hath, to him shall more be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that which he hath."**

**- Matthew 25:29**

# The rich get richer?



# The rich get richer !



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# The money

To date NIH has received emergency funding for COVID-19-related activities in two supplemental bills that together provide:

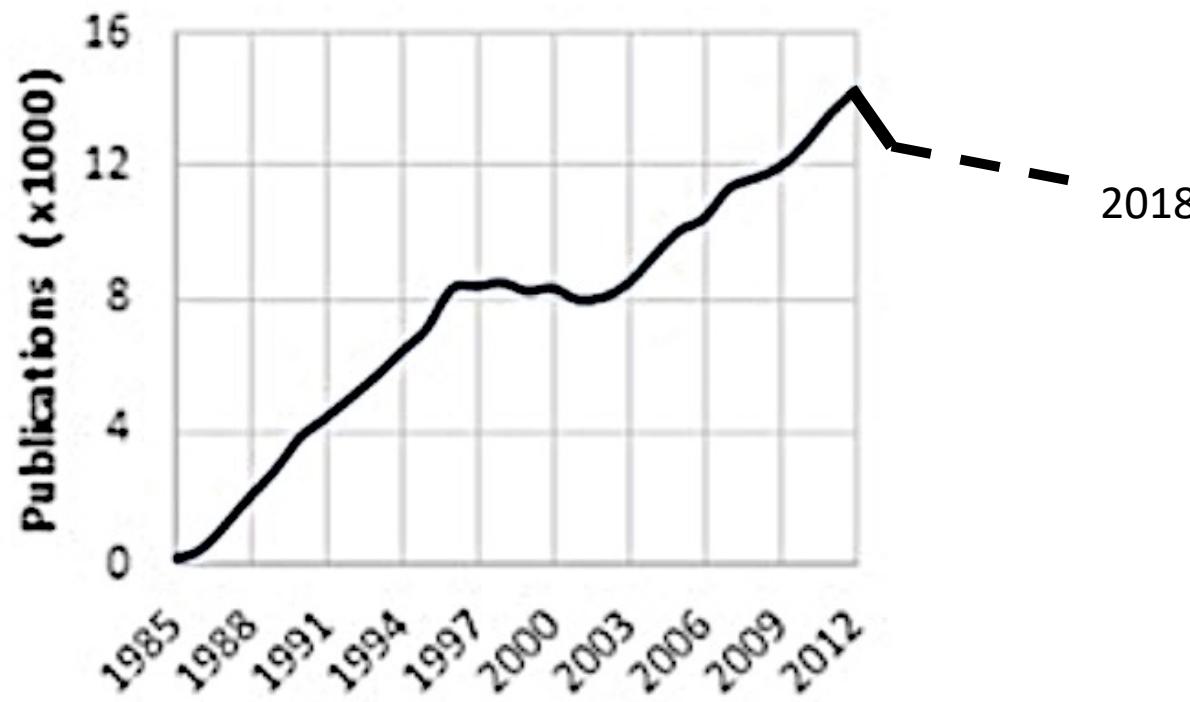
- **\$1.532 billion for NIAID**
- **\$103.4 million for NHLBI**
- **\$60 million for NIBIB**
- **\$36 million for NCATS**
- **\$30 million for the NIH Office of Director**
- **\$10 million for NIEHS**
- **\$10 million for NLM**

# “Follow the money”



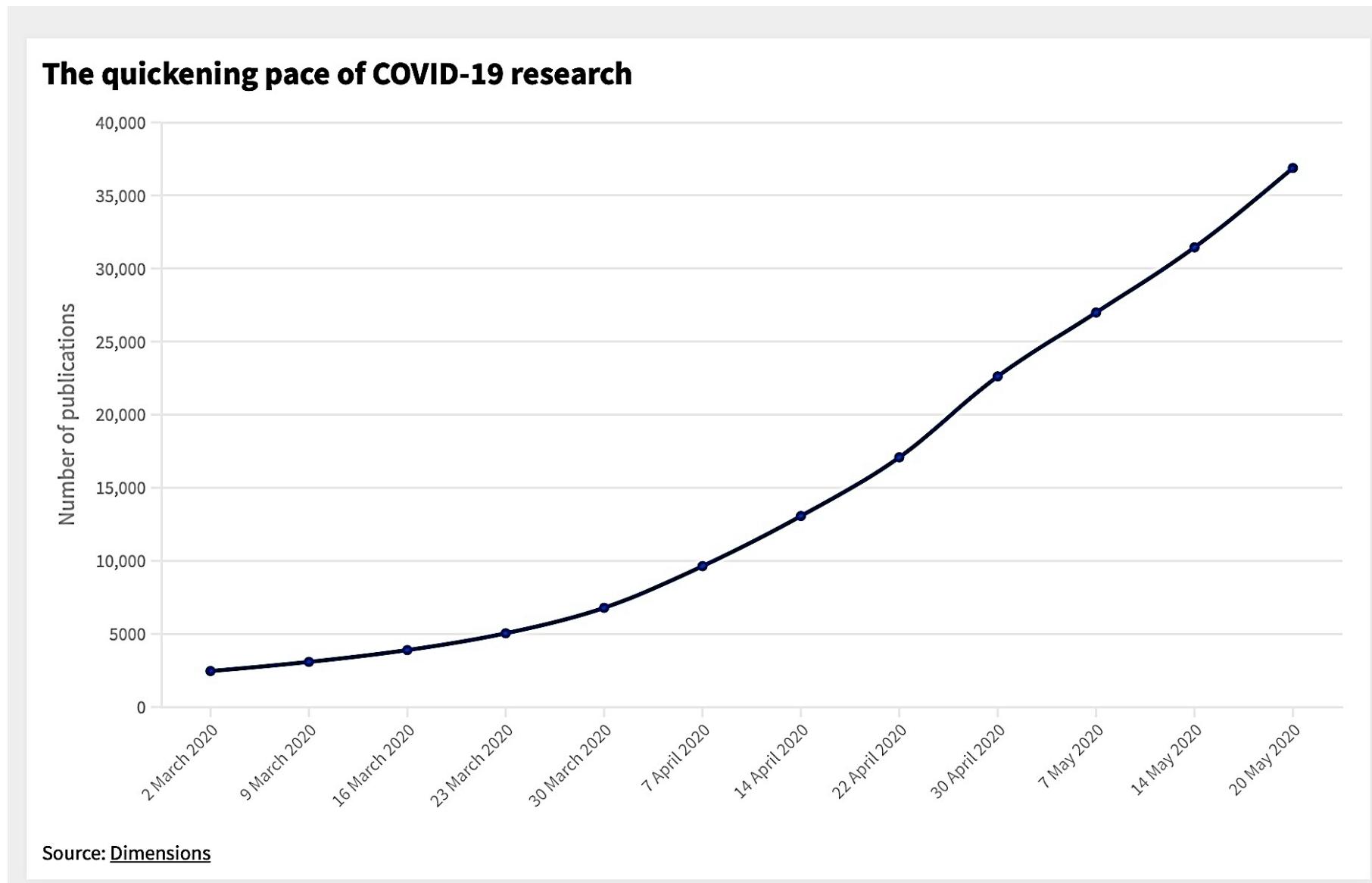
FBI Associate Director W. Mark Felt, aka "Deep Throat", to reporter Bob Woodward in *All The President's Men*

# Remembrance of things past: HIV/AIDS papers per year (209,608 total by 2012)



Highest total in one year: 14,250. Things slowed down a bit from 2013-2018, but another ~60,000 papers appeared in that period, an average of about 12,000/yr

# As of June 2020: almost 40,000 published in journals and preprints in 4 months



# A template guaranteeing a high profile publication or big grant. Select choices as appropriate.

**Title:**

**(Modeling/Determining/Evaluating) the (Course/Infectivity/Efficacy) of the COVID-19 pandemic (Second Wave/Virus Strain/Vaccine Candidates)**

**Abstract:**

We have applied our **(usual experimental method/standard mathematical model/simulation program)** to the COVID-19 pandemic. Although we needed to make a number of unverifiable assumptions, we were able to **(predict/confirm/refute)** several important facts about the **(virus/course of the disease/approach to treatment/method of spread/liability of resurgence/immunity)**. Of course, given the assumptions, our conclusions are not definitive. More research is needed.

# COVID-19 Effects

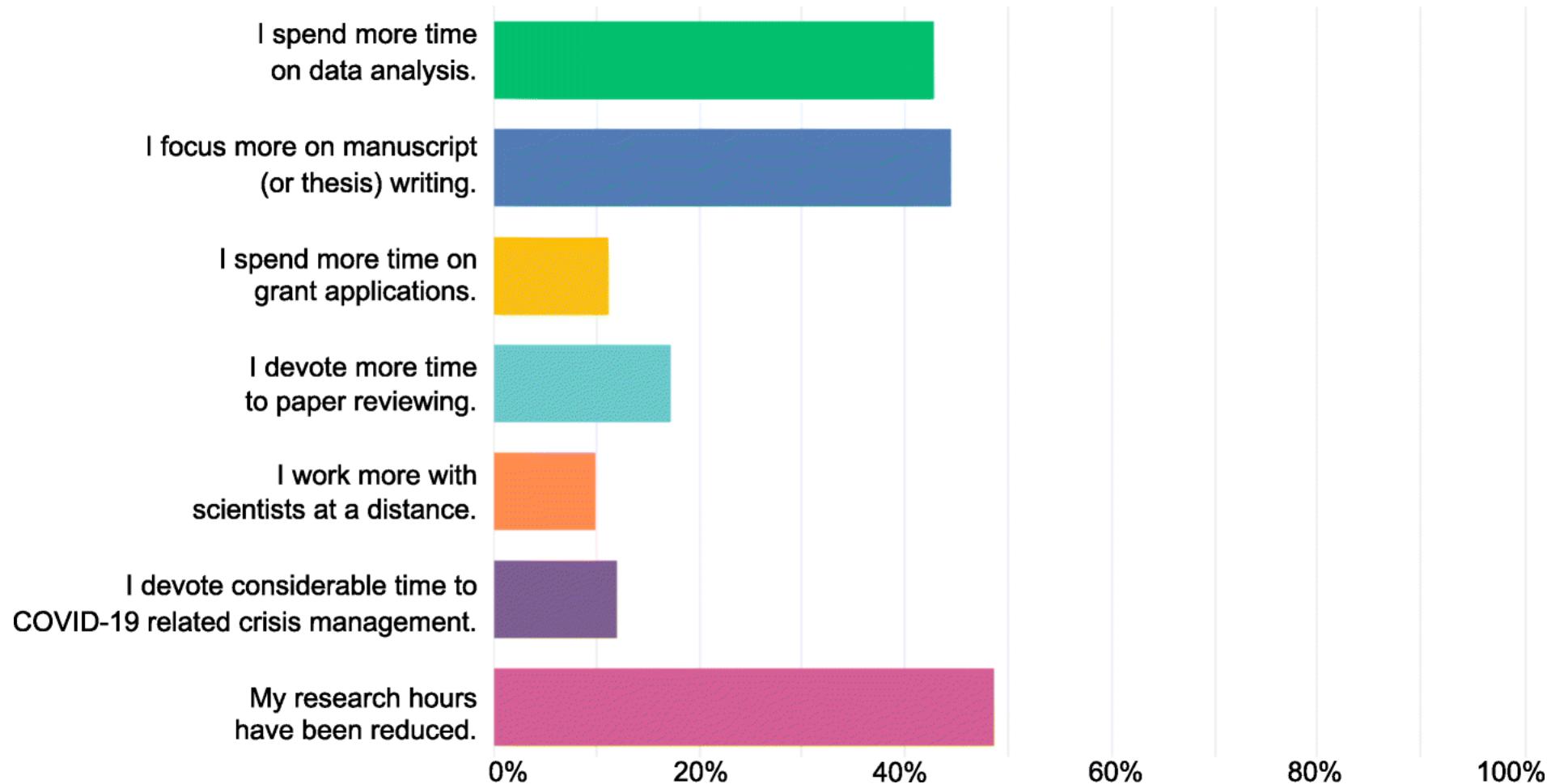
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**GLOOM AND ZOOM**

## As of June 22, 2020

- 77% of life scientists' institutes were fully shut down. More than 40% of life scientists say they are using the extra non-lab time to focus on data analysis, grant and paper writing
- More than 70% of wet lab scientists report they have lost up to 6 months of work
- About 30% of theoretical and computational scientists report the same thing
- Women made up more than two-thirds of the wet lab scientists surveyed, and they reported having fewer productive hours during the pandemic than their male colleagues

# As of June 22, 2020



# **Petsko's Law of Working From Home**

**The first casualty is personal grooming**

# Petsko's Law of Working From Home



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# **What parts of education and training work well remotely in the sciences and medicine, and what parts don't?**

**Works well**, especially for people with child-care responsibilities:

## **Seminars**

Bigger audience, broader audience, lower cost, better speakers

## **Group meetings and faculty meetings**

Sometimes, if data can be shared and critiqued remotely

## **Telemedicine**, especially in neurology

**Doesn't work well:**

## **Classroom education**

## **Laboratory and other practical education**

## **Grant reviews, promotion reviews, and hiring**

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Some people are starting to wonder about this:

## Let's just get rid of peer review

Two Truths and a Take, Season 2 Episode 19

Alex Danco May 31  

## Alex Danco's Newsletter

Two Truths and a **Take**, most Sundays



*First, universities everywhere are going to face an enormous budget crunch, all at the same time, and that could provide the coordinated crisis that prompts university libraries to all capitulate on paying expensive journal subscription fees that they can no longer afford.*

*Really breaking apart and rebuilding the academic publishing and career advancement model is hard to do incrementally, because the existing system is held together by so many feedback loops. But COVID-19 is a huge reset that everyone's going to experience at the same time.*

# Some people are starting to wonder about this:

## Is Peer Review a Good Idea?

Remco Heesen , Liam Kofi Bright 

*The British Journal for the Philosophy of Science*, axz029,

<https://doi.org/10.1093/bjps/axz029>

**Published:** 16 May 2020



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### Abstract

Prepublication peer review should be abolished. We consider the effects that such a change will have on the social structure of science, paying particular attention to the changed incentive structure and the likely effects on the behaviour of individual scientists. We evaluate these changes from the perspective of epistemic consequentialism. We find that where the effects of abolishing prepublication peer review can be evaluated with a reasonable level of confidence based on presently available evidence, they are either positive or neutral. We conclude that on present evidence abolishing peer review weakly dominates the status quo.

# But is peer review the real problem?

I would argue that the real problem is the hegemony of a small number of boutique journals and their offspring:

*Nurture*

*Silence*

*Hell*

Somehow we have to stop making WHERE you publish a proxy for the QUALITY of the work. Could the COVID -19 pandemic contribute to a change? Yes. Will it? I have doubts:

- 1) This problem exists because scientists are too busy to actually read the papers of people they are supposed to evaluate. Not clear that will change if papers are just loaded onto preprint servers. Will anyone bother to read the comments reader leave? Will any readers bother to leave any for most papers?
- 2) Yes, peer review can be biased and takes too long, and maybe the experience of rapid publishing during the pandemic will help with that, but the rapidity only applies to COVID-19 papers and most scientists won't have experienced any difference.
- 3) Peer review provides a guarantee of quality for people outside the field and for science journalists.
- 4) The Matthew effect applies in science publishing too, and abandoning peer review may make that worse.

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# Not a good time and place to be an expert

- Marginalization of the CDC

Trump administration orders hospitals to send coronavirus data to Washington, not the CDC

[Adrianna Rodriguez](#) USA TODAY

Published 9:27 a.m. ET Jul. 15, 2020 | Updated 10:39 a.m. ET Jul. 15, 2020



- Attacks on Dr. Anthony Fauci

- Pseudoscience and conspiracy theories abound

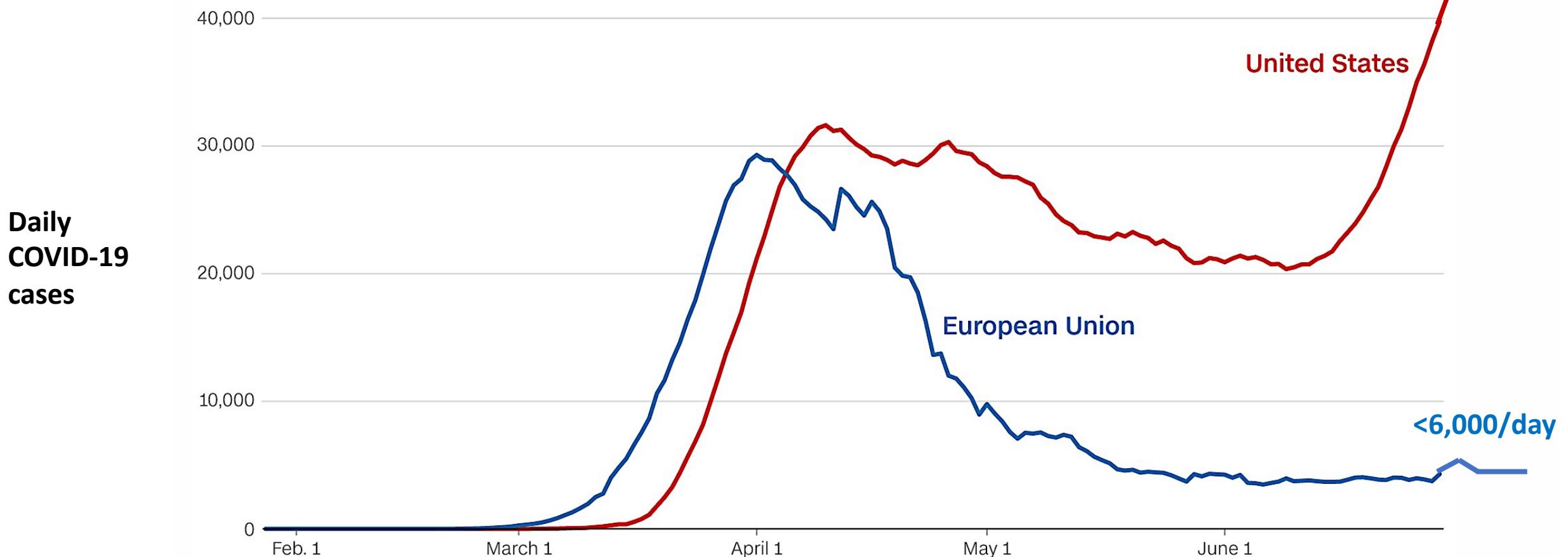


- Politics trumps (pun intended) science and medicine



>60,000/day

# The result...



Data from Johns Hopkins University Center for Systems Science and Engineering;  
Original chart by Byron Manley and Henrik Petterson, CNN; adapted by G. Petsko

# COVID-19 Effects

- Effect on the funding of science

**Big increase in COVID-19 related funding, but to whom? And disaster for hospitals, etc.**

- Effect on what research is done

**All COVID-19, all the time**

- Effect on the way research is carried out

**Increase in modeling and biostatistics, etc. – dry lab work will grow; but quality??**

- Effect on science education and training

**On-line seminars could be a great advance, like telemedicine; on-line courses, meh**

- Effect on the way research is disseminated

**The rise of the preprint = the fall of the boutique journal???**

- Effect on the way science and scientists are perceived

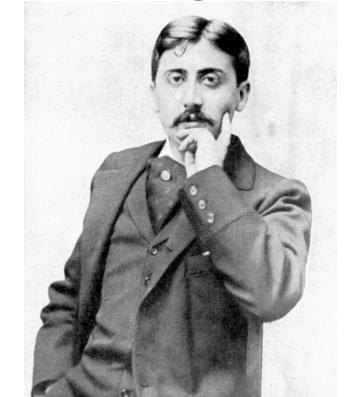
**Polarization of society extends to science**

# In conclusion:

**Instead of what our imagination makes us suppose and which we try to discover, life gives us something that we could hardly imagine.**

**As long as men are free to ask what they must, free to say what they think, free to think what they will, freedom can never be lost and science can never regress.**

**- Marcel Proust**



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**It's tough to make predictions, especially about the future.**

**The future ain't what it used to be.**

- Yogi Berra

