

Today's Presentation



Conducting Research using Electronic Health Record Data

Amanda G. Kennedy, PharmD, BCPS



Conducting Research using Electronic Health Record Data

Amanda G. Kennedy, PharmD, BCPS
I have no conflicts of interest.

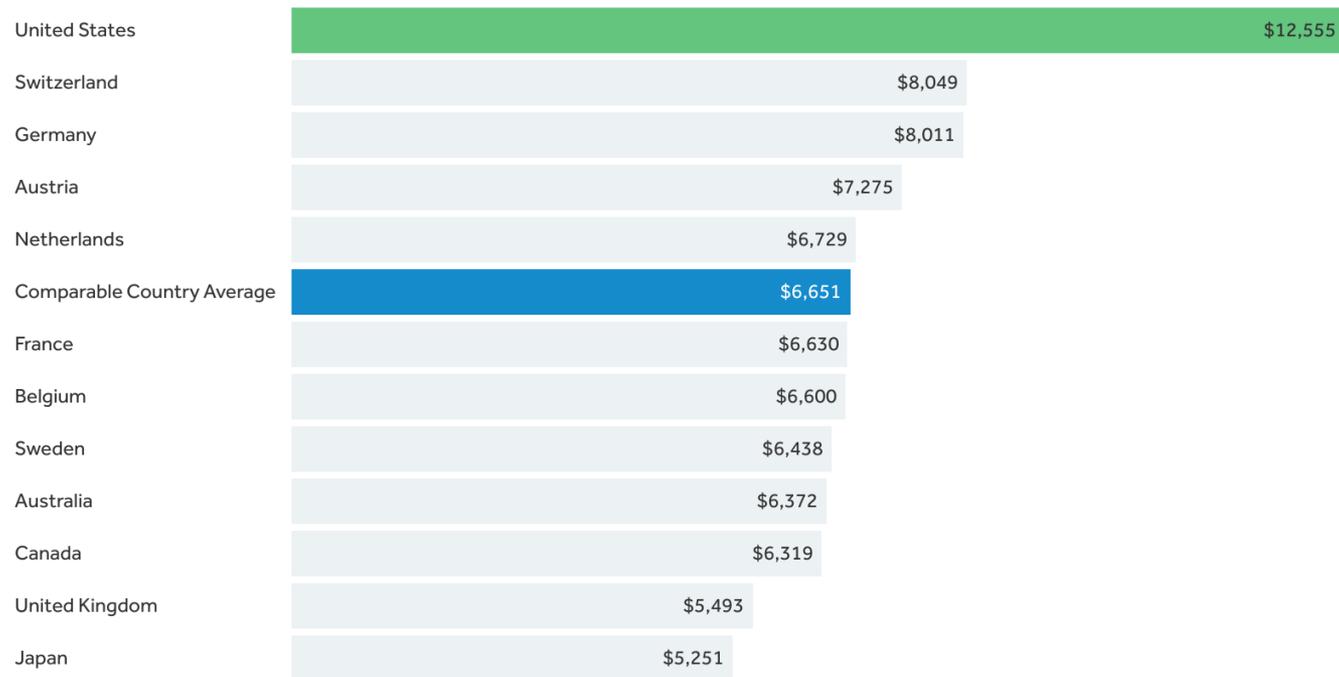
April 24, 2024



Why should we care about research (and quality improvement) when we are already too busy?

We spend **twice as much** per person on health than other wealthy countries

Health expenditures per capita, U.S. dollars, 2022 (current prices and PPP adjusted)

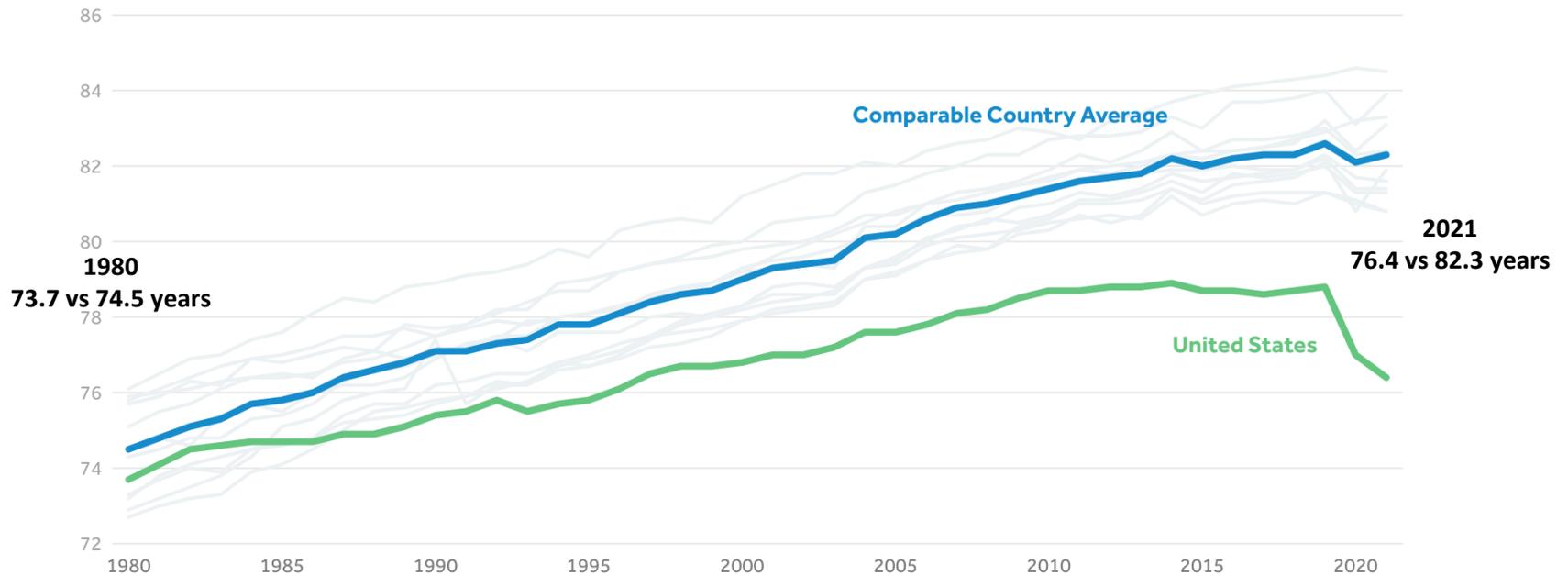


Notes: Data from Australia, Belgium, France, Japan, Switzerland, and the U.S. are estimated. Data from Austria, Canada, Germany, the Netherlands, Sweden and the United Kingdom are provisional.

Source: KFF analysis of OECD data

... but we don't live as long

Life expectancy at birth, in years, 1980-2021



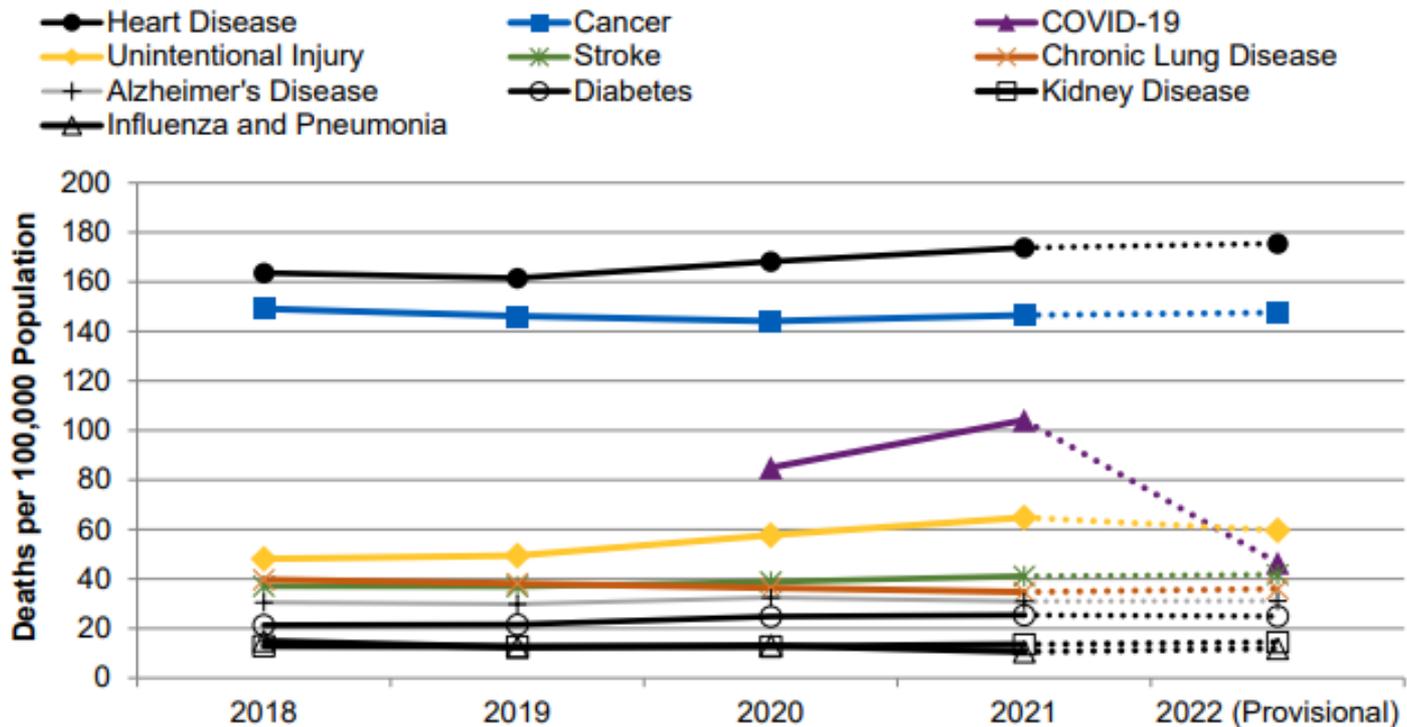
Notes: Comparable countries include Australia, Austria, Belgium, Canada, France, Germany, Japan, the Netherlands, Sweden, Switzerland, and the U.K. See Methods section of "How does U.S. life expectancy compare to other countries?"

Source: KFF analysis of OECD and U.K. Office for Health Improvement and Disparities data

...and we aren't healthy

Chronic conditions contribute to 7 of the 10 leading causes of death.

Ten leading causes of death, based on age-adjusted mortality, United States, 2018-2022



Source: Centers for Disease Control and Prevention, Web-based Injury Statistics Query and Reporting System (WISQARS), 2018-2022. <https://www.cdc.gov/injury/wisqars/index.html>.

Note: Mortality data for 2022 are based on provisional estimates.

Which U.S. Population Groups Experience Cancer Health Disparities?

According to the National Cancer Institute, cancer health disparities in the United States are adverse differences in cancer measures such as number of new cases, number of deaths, cancer-related health complications, survivorship and quality of life after cancer treatment, screening rates, and stage at diagnosis that exist among certain population groups including:

Individuals belonging to different ancestry, race, or ethnicity



Individuals of low socioeconomic status



Individuals who lack or have limited health insurance coverage



Residents in certain U.S. geographic locations, such as rural areas, or territories, such as Puerto Rico and Guam



Members of the sexual and gender minority communities



Certain immigrants, refugees, or asylum seekers



Individuals with disabilities



Adolescents and young adults



Elderly



It is important to note that some populations may carry even a higher burden of cancer because they simultaneously fall into more than one of these categories.

...and
care is
variable

Caring about research means...

Research can be intimidating



Find partners in your practice



Switch your mindset from “research” to “project”

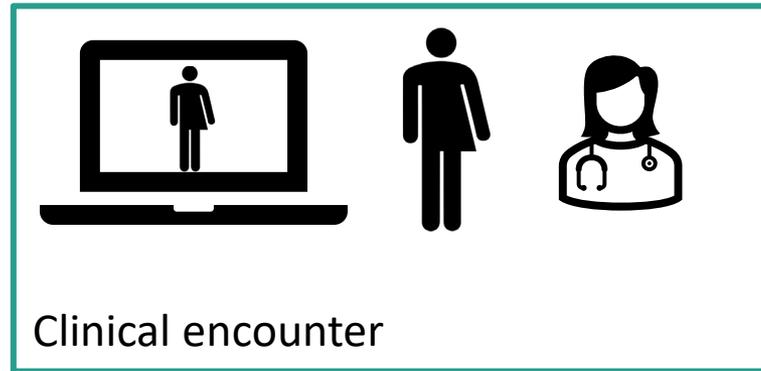
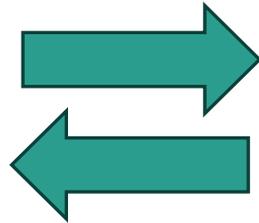


Collaborate with outside mentors if no one around you has experience (e.g. NNE-CTR!!)



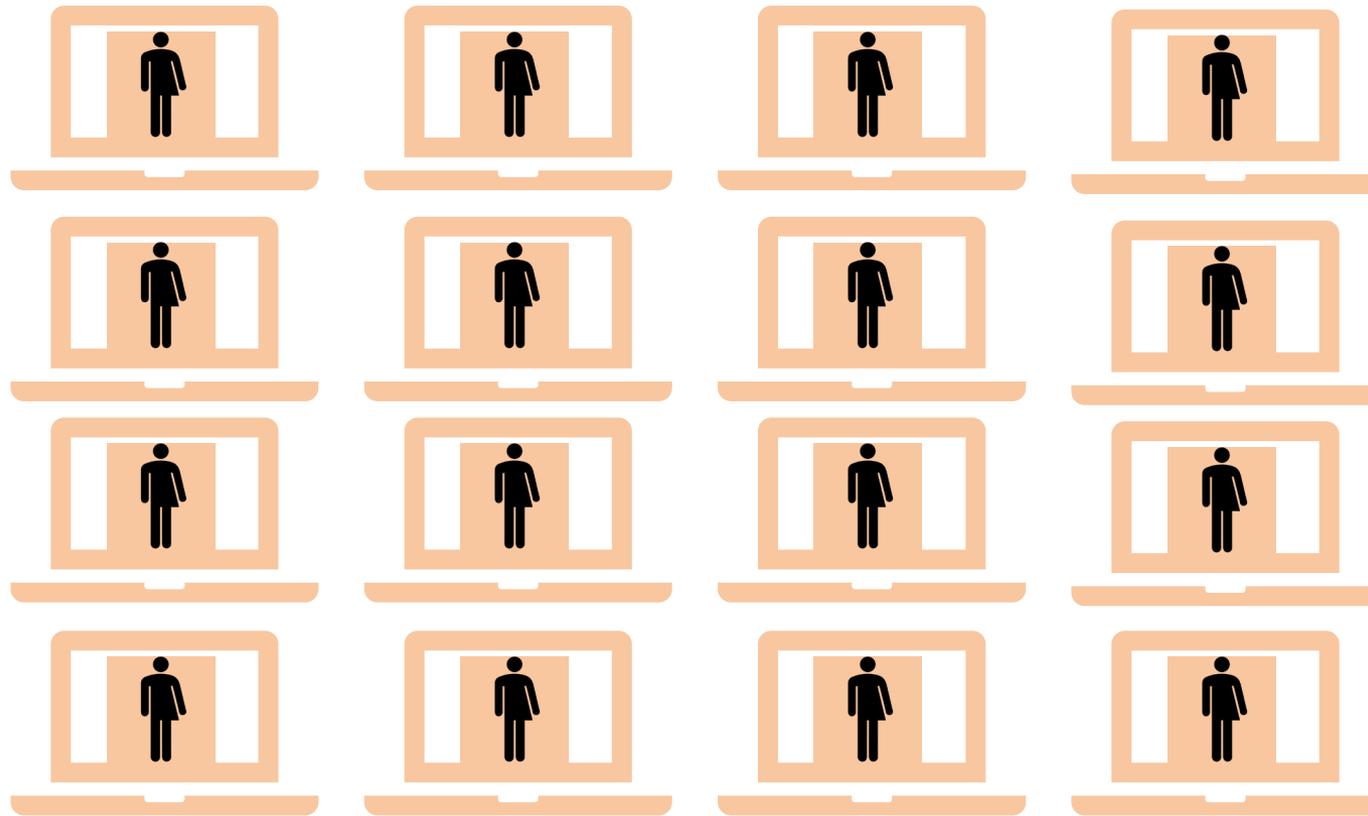
How can we leverage everyday tools from clinical care for research purposes?

Think about your clinical data with a patient



- Patient characteristics (demographics)
- Diagnoses
- Labs
- Medications
- Visits

Now think about ALL of your clinical data



Now think about ALL of your clinical data





CLINICAL PRACTICE



MEDIA (BREAKING
NEWS)



SOCIAL MEDIA



PEER DISCUSSIONS



ATTENDING
CONFERENCES



READING THE
LITERATURE



TEACHING AND
PRECEPTING



SELF-REFLECTING

Where to look for research questions

Taking a “FINER” approach to research questions

Feasible (for *you* and your team)

Interesting (to *you*)

Novel

Ethical

Relevant (to *others*)

Taking a “FINER” approach to research questions

Feasible (for *you* and your team)

Interesting (to *you*)

Novel

Ethical

Relevant (to *others*)

These are the characteristics of an actionable research question!

“FINER” Descriptions

F {

Prioritizing an EHR project

F easible (for *you* and your team)

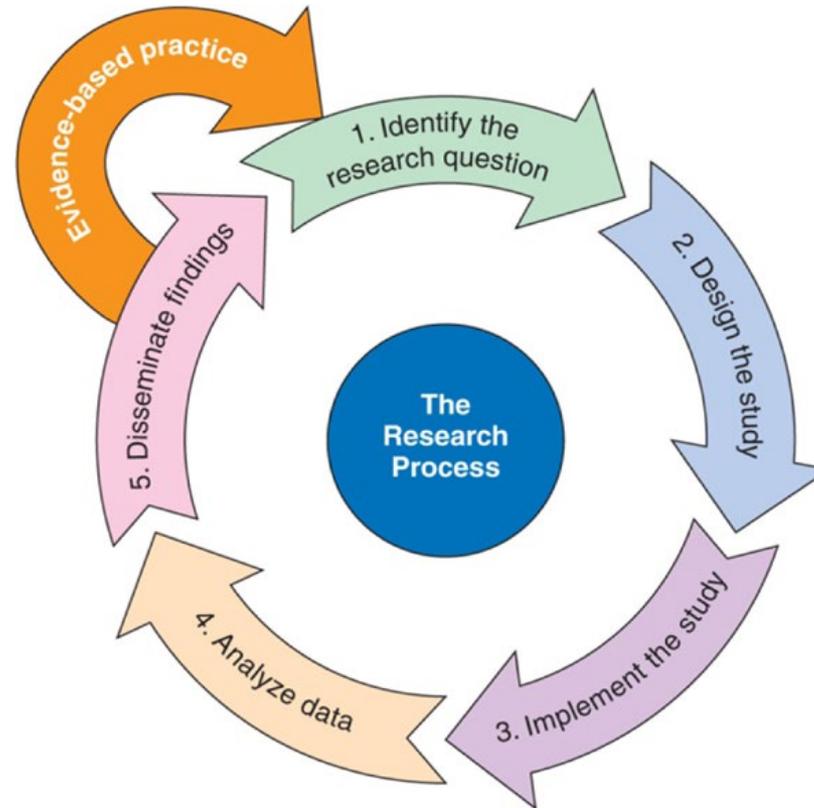
I nteresting (to *you*)

Novel

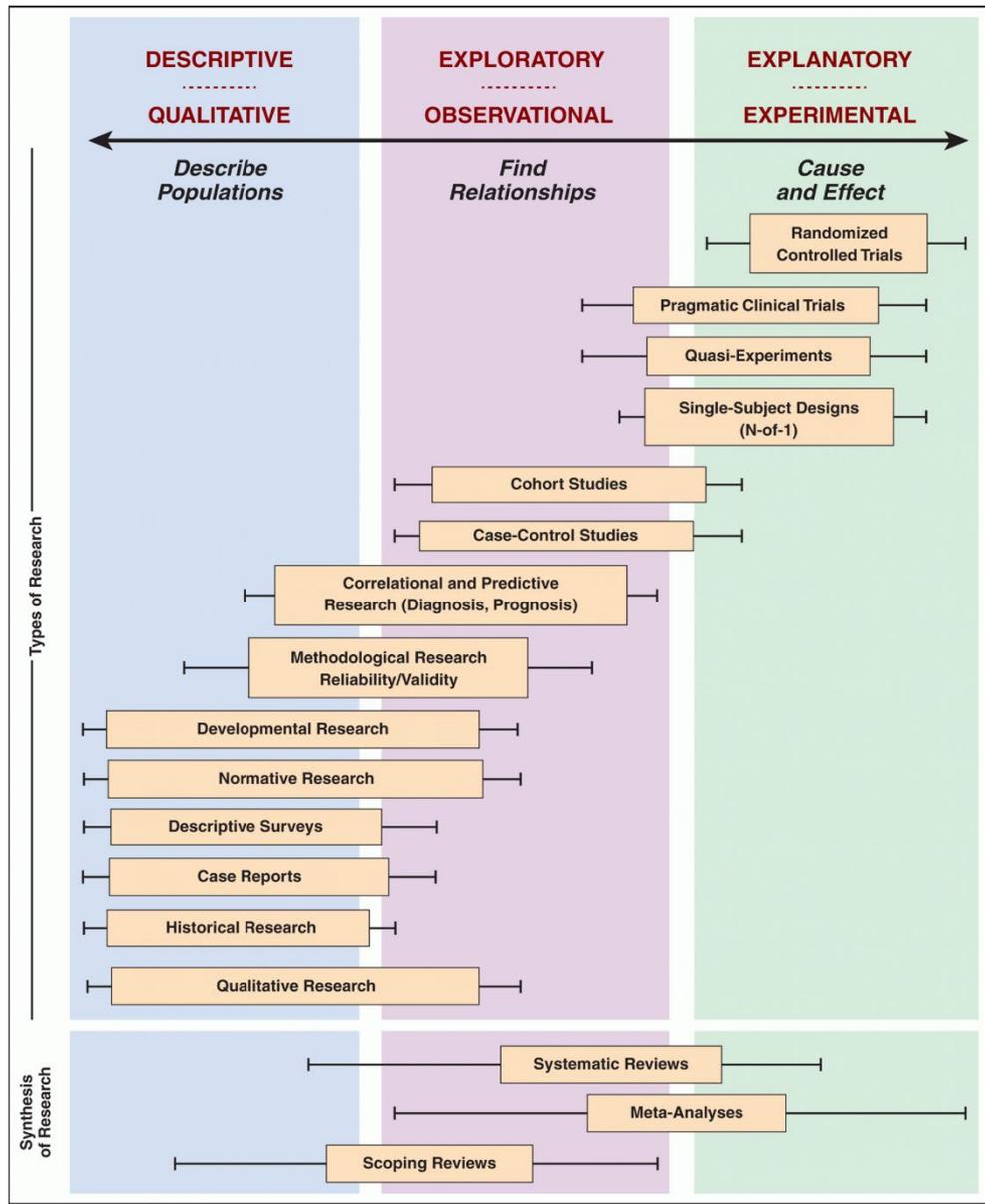
E thical

R elevant (to *others*)

What is the Research Process?



Source: Leslie G. Portney: Foundations of Clinical Research: Applications to Evidence-Based Practice, Fourth Edition Copyright © F. A. Davis Company. All rights reserved.



Types of Research

Synthesis of Research

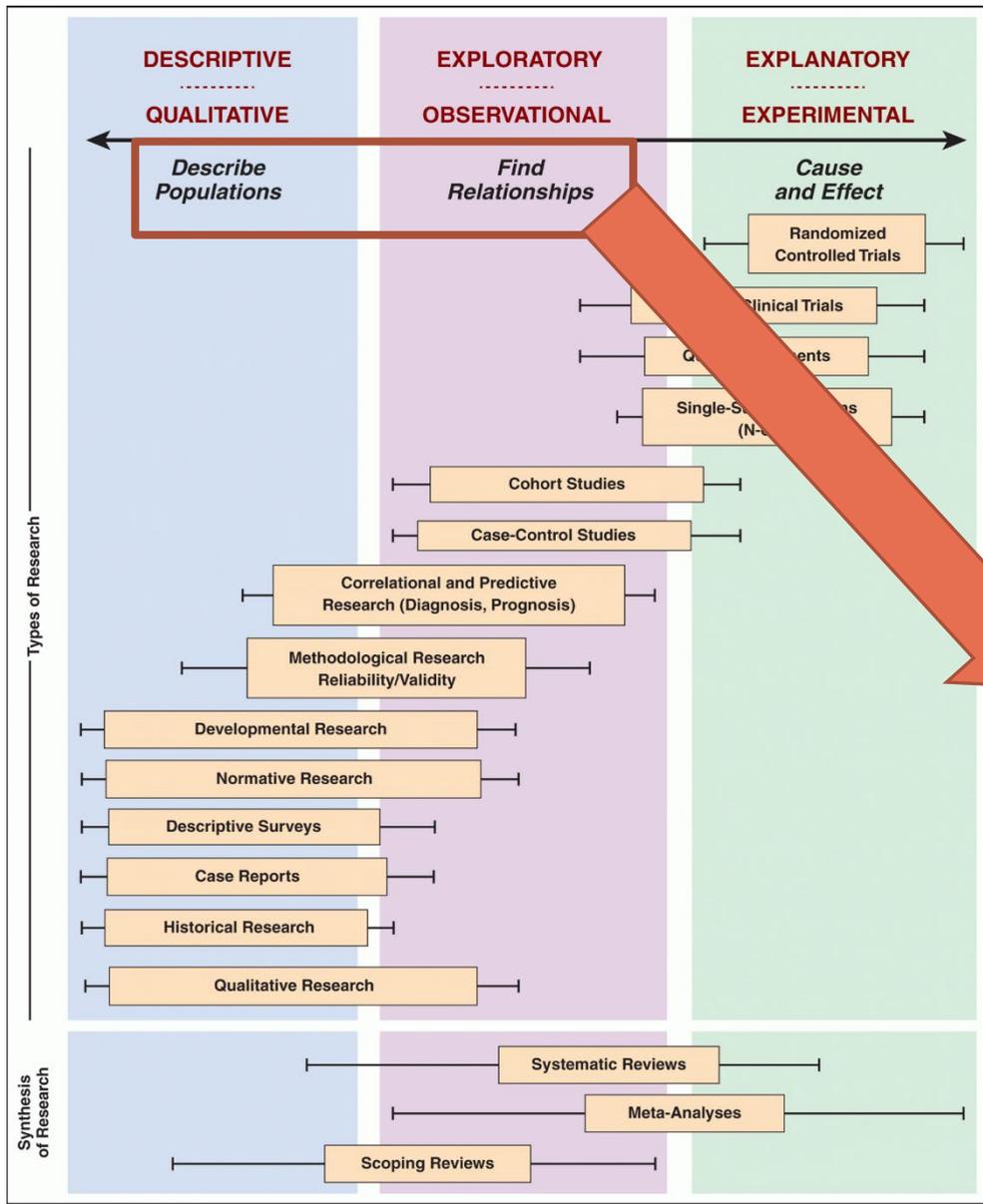
Source: Sarah G. Portney, Foundations of Clinical Research: Applications to Evidence-Based Practice, Fourth Edition. Copyright © F. A. Davis Company. All rights reserved.

IMPROVEMENT

IMPLEMENTATION

Translating evidence into practice

Quality improvement methodology (PDSA cycles, Lean, etc.)



IMPROVEMENT

IMPLEMENTATION

Translating evidence into practice

Quality improvement methodology
 (PDSA cycles, Lean, etc.)

Generally the most feasible designs IF using existing data (e.g. Epic)

Source: Sarah G. Portney, Foundations of Clinical Research: Applications to Evidence-Based Practice, Fourth Edition. Copyright © F. A. Davis Company. All rights reserved.

Framing the question with PICO

Population or problem

Intervention or independent (predictor)

Comparison or control group

Outcomes

Framing the question with PICO

This framework will help you write a basic protocol or methods for your project

Who is eligible for the study? Which records will you look at?

Population or problem

Intervention or independent (predictor)

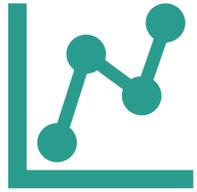
These are the records of people who do not have the predictor or risk factor of interest

Comparison or control group

Outcomes

This is the variable that defines how things turn out (e.g. cardiac events, reduced visits, improvements in care)

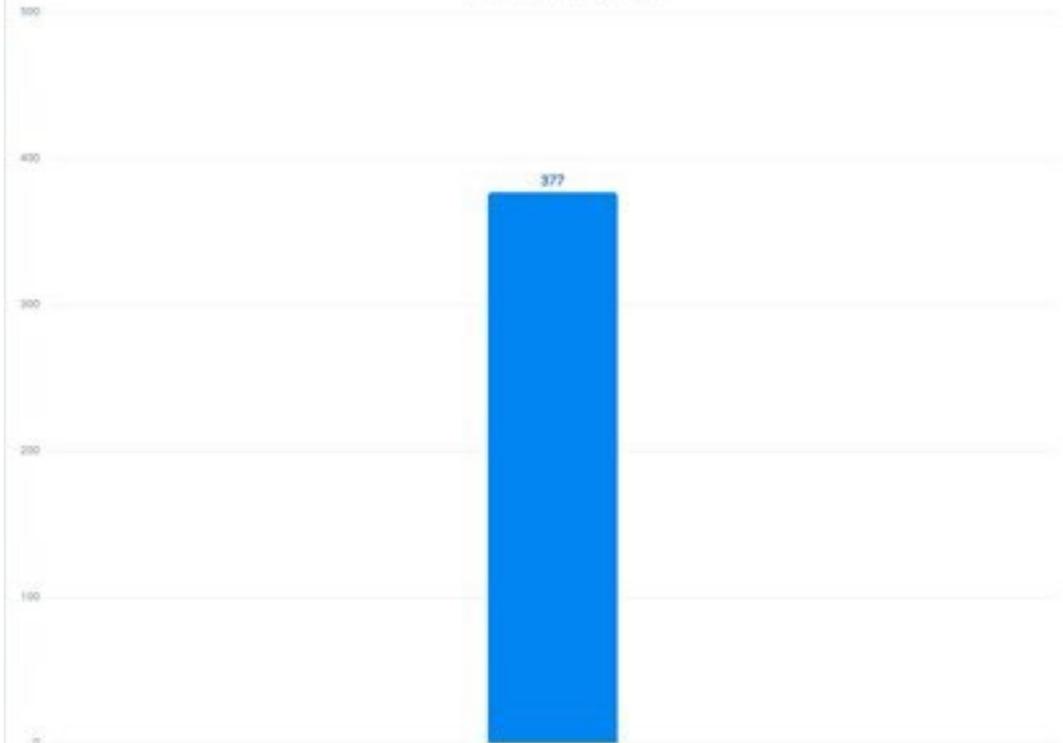
Which variable do you want to start with? This is often a risk factor (e.g. high blood pressure), characteristic (e.g. on a certain medication), or natural group (e.g. patients who saw the co-located behavioral therapist)



Goals:

Number of Patients

Between 1/1/2021 and 12/31/2021



Tools for
Success:
SlicerDicer

Tools for Success: Redcap

      Variable: sex

Gender identity:

- Female
- Male
- Transgender Female/Male-to-Female
- Transgender Male/Female-to-Male
- Genderqueer/Neutral
- Other
- Choose not to disclose

[reset](#)

[Add Field](#) [Add Matrix of Fields](#) [Import from Field Bank](#)

      Variable: dob

Date of birth (M-D-Y):  [Today](#) M-D-Y

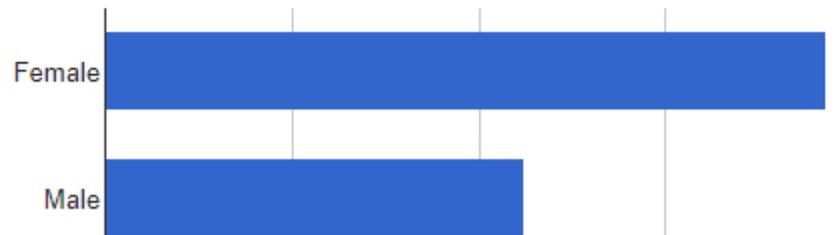
[Add Field](#) [Add Matrix of Fields](#) [Import from Field Bank](#)

Tools for Success: Redcap

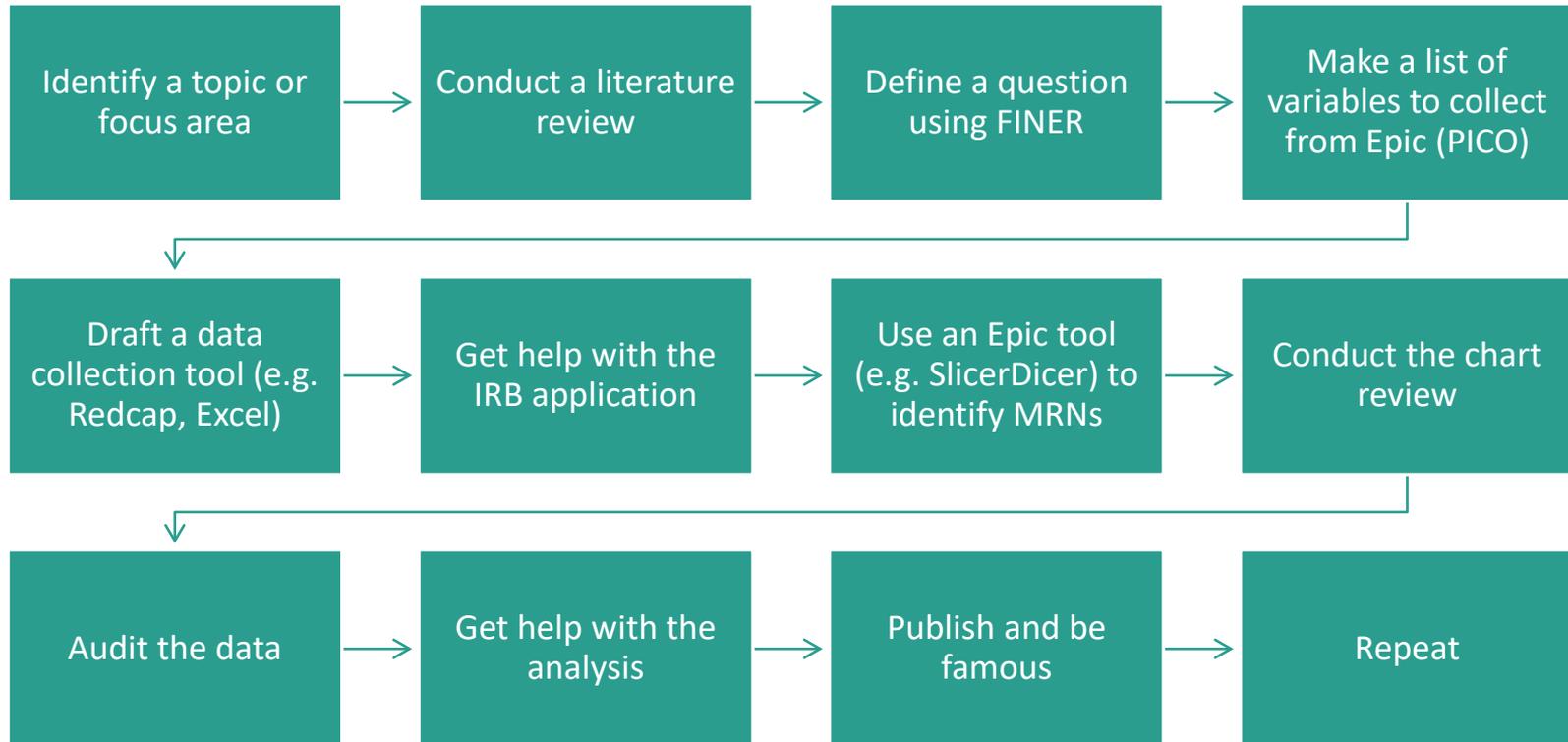
Gender identity: (*sex*) [Refresh Plot](#) |

Total Count (N)	Missing*	Unique
307	63 (17.0%)	4

Counts/frequency: Female (193, 62.9%), Male (112, 36.5%), Transgender Female/Male-to-Female (0, 0.0%), Transgender Male/Female-to-Male (0, 0.0%), Genderqueer/Neutral (1, 0.3%), Other (0, 0.0%), Choose not to disclose (1, 0.3%)



Steps to a chart review project



Scholarship
is possible
with EHR
studies!

FULL TEXT ARTICLE

Incidence of transaminitis in adults with cystic fibrosis taking elexacaftor/tezacaftor/ivacaftor



Marci Wood, Faith Babowicz, Amanda G. Kennedy, Martine Antell, Elizabeth Gilhooly, Bradley J. Tompkins and Sheela S. Reddy

Journal of the American Pharmacists Association, 2023-05-01, Volume 63, Issue 3, Pages 920-924, Copyright © 2023 American Pharmacists Association®

Research Article | Open Access

Volume 2022 | Article ID 6246150 | <https://doi.org/10.1155/2022/6246150>

[Show citation](#)

Navigating the Debate on Managing Large (≥ 4 cm) Thyroid Nodules

Samantha N. Steinmetz-Wood ,¹ Amanda G. Kennedy ,² Bradley J. Tompkins,² and Matthew P. Gilbert ¹

[Show more](#)

Quality improvement opportunities exist for *Helicobacter pylori* treatment and confirmatory testing



Natalie Rodriguez, Amanda G. Kennedy, Bradley J. Tompkins, Jocelyn VanOpdorp, Jason Heffley and Eric Ganguly

Clinics and Research in Hepatology and Gastroenterology, 2021-09-01, Volume 45, Issue 5, Article 101720, Copyright © 2021 Elsevier Masson SAS

EHR/Chart Review Projects

STRENGTHS

Efficient if you have good access to data (i.e. data have already been collected)

Cost (typically low)

Quick (if you partner with an analyst)

Hypothesis-generating

Often make great projects for people new to research

WEAKNESSES

Cannot prove causality – potential for confounding

Inefficient for rare outcomes

Limited control over sampling and measurement (e.g. we only have what is available – poor info on social determinates of health, substance use, occupation, adherence, etc.)