

# flourish

CDI IN BLOOM | **acdis 2023**  
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## Conducting Research in CDI

### **Wendy Arafles, MD, FAAP**

*CDI Medical Director;  
Pediatric Hospitalist*  
Phoenix Children's Hospital  
Phoenix, Arizona

### **Amy Sanderson, MD**

*CDI Physician Advisor;  
Pediatric Intensivist*  
Boston Children's Hospital  
Boston, Massachusetts

hcpro



## Presented By



**Wendy Arafles, MD, FAAP**, is the medical director of CDI at Phoenix Children's Hospital in Phoenix, Arizona. She has been a practicing pediatric hospitalist at her organization for 15 years, with a specific interest in children with medical complexity and technology dependence. Her medical career has been spent caring for high-acuity, high-complexity pediatric patients.



**Amy Sanderson, MD**, is a pediatric intensivist at Boston Children's Hospital in Boston, Massachusetts. She has been the physician advisor for the CDI program since its inception in 2014. She also serves as an assistant professor in anaesthesia at Harvard Medical School. Sanderson has presented at several national conferences, published scholarly articles on medical documentation, and contributed to the book *Pediatric CDI: Building Blocks for Success*. In addition, she is a founding member of the Pediatric Documentation Research Collaborative, a research group that focuses on documentation-related issues in pediatric hospitals.

## Pediatric Documentation Research Collaborative (PDRC)

Wendy Arafiles, MD, FAAP  
Phoenix Children's Hospital

Paola Dees, MD  
John Hopkins All Children's Hospital

Alyssa Riley, MD  
Dell Children's Medical Center

Ara Balkian, MD  
Children's Hospital Los Angeles

Corinna Foley, MBA  
Boston Children's Hospital

Amy Sanderson, MD  
Boston Children's Hospital

Daxa Clarke, MD  
Phoenix Children's Hospital

Jennifer Goodrich, MD  
Dell Children's Medical Center

Sheilah Snyder, MD  
Children's Hospital and Medical Center, Omaha

Katie Clouser, MD  
Hackensack University Medical Center

Lucinda Lo, MD  
Children's Hospital of Philadelphia

Diana Young, MD  
John Hopkins All Children's Hospital



3

## Learning Outcomes

- At the completion of this educational activity, the learner will be able to:
  - Identify the main types of research and the differences between research and quality improvement (QI)
  - Discuss how collaborating with others can strengthen your research project
  - Describe the steps to successfully coordinate your multi-institutional study

4

## What Is Research?

- Research vs. QI
- IRB
- Prospective vs. Retrospective
- Single institution vs. multiple institutions
- Various types

5

## Research vs. QI

### Research

- A systematic investigation, testing, and evaluation
- Designed to develop or contribute to generalizable knowledge



### Quality Improvement (QI)

- A systematic, data-guided activity designed to bring about immediate improvements in health delivery

<https://irb.research.chop.edu/quality-improvement-vs-research>

6

## Quality Improvement (QI)

- **Different from research**
  - Smaller scale than research
  - More useful for *local* application
  - **Lots of opportunity for publication!**
- Involves implementing small adjustments to an ongoing process to achieve iterative improvements
- Allows quick interventions and adaptations in the process of achieving a specific aim
- **Dependent upon**
  - An “expert team” rather than a team of experts
  - Defining the real problem and avoiding assumptions
  - Differentiating between a *change* vs an *improvement*
  - Repetitive cycles of study (PDSA = Plan, Do, Study, Act) after each small adjustment
  - Clear measurements and honest evaluation of outcomes

7

	Human Subjects Research	Quality Improvement
Purpose	designed to develop or contribute to generalizable knowledge	designed to implement knowledge, assess a process or program as judged by established/accepted standards
Starting Point	knowledge-seeking is independent of routine care and intended to answer a question or test a hypothesis	knowledge-seeking is integral to ongoing management system for delivering health care
Design	follows a rigid protocol that remains unchanged throughout the research	adaptive, iterative design
Benefits	might or might not benefit current subjects; intended to benefit future patients	directly benefits a process, system or program; might or might not benefit patients
Risks	may put subjects at risk	does not increase risk to patients, with exception of possible patients' privacy or confidentiality of data
Participant Obligation	no obligation of individuals to participate	responsibility to participate as component of care
Endpoint	answer a research question	improve a program, process or system
Analysis	statistically prove or disprove hypothesis	compare program, process or system to established standards
Adoption of Results	little urgency to disseminate results quickly	results rapidly adopted into local care delivery
Publication/Presentation	investigator obliged to share results	QI practitioners encouraged to share systematic reporting of insights

<https://irb.research.chop.edu/quality-improvement-vs-research>

8

## What Is the Institutional Review Board (IRB) and What Does It Do?

- Group that has been formally designated to review and monitor biomedical research involving human subjects
- Has the authority to approve, require modifications of, or disapprove research projects
- Protects the rights and welfare of human research subjects

9

## When Is IRB Approval Needed for QI Activities?

- Seek to develop new knowledge rather than to assess the implementation of existing knowledge
- When the methodology employs a standard research design
- When the protocol is fixed with a rigid goal, methodology, population, time period
- When the funding for the activity comes from outside organizations
- When the risks from the intervention to participants are greater than minimal

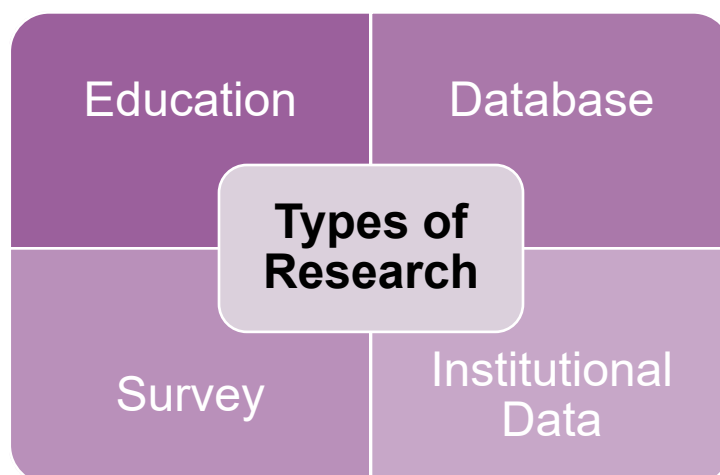
<https://irb.research.chop.edu/quality-improvement-vs-research>

10

## Prospective vs. Retrospective Research

	Prospective	Retrospective
Definition	Define the sample and measure variables before any outcomes have occurred	Define the sample and collect data after the outcomes have occurred
Pro	<ul style="list-style-type: none"> <li>Time sequence strengthens the possibility that a factor may cause an outcome</li> <li>Can measure variables completely and accurately</li> <li>Can decrease bias (i.e., recall bias)</li> </ul>	<ul style="list-style-type: none"> <li>Like prospective study, can establish that a variable preceded an outcome</li> <li>Less costly</li> <li>Less time-consuming</li> </ul>
Con	<ul style="list-style-type: none"> <li>Can be expensive &amp; inefficient</li> </ul>	<ul style="list-style-type: none"> <li>Limited control over the design of the approach to sampling the population</li> <li>Existing data may be incomplete, inaccurate or measured in ways that are not ideal for answering the question</li> </ul>

11



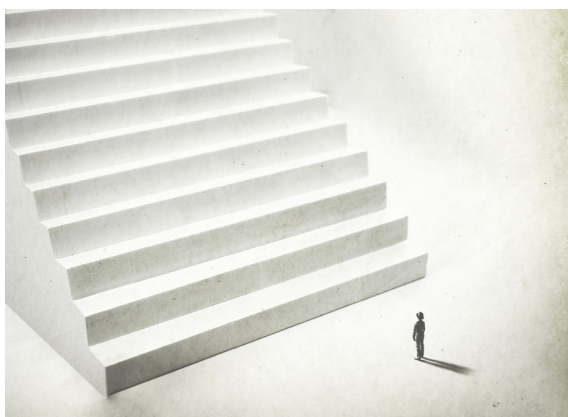
12

## Type of Research: Education

- Standardized Educational Session
  - Identify small number of educational CDI lessons
  - Identify Target Audience: Residents, Faculty, etc.
- Potential studies
  - Review documentation before and after education
  - Assess knowledge, confidence, perspectives
- Statistical comparison of pre/post results to determine if the educational session resulted in change in behavior

13

## Education Research: Challenges



- Getting a large enough sample size
- The logistics of pre/post surveys
  - Getting an adequate response rate
- The logistics of assessing knowledge
  - Pre/post survey
  - Questions imbedded in educational session
- Chart reviews to assess documentation
  - Time-consuming

14

## Type of Research: Database

- *US News & World Report*
- Internal databases
- Adult databases
  - WHO
  - CMS
  - Vendors
- Pediatric databases
  - PHIS
  - Solutions for Patient Safety



15

## Database Research: Pediatric Hospital Information Systems (PHIS)

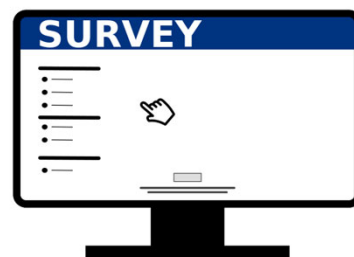
- Pediatric Hospital Information Systems (PHIS)
- 52 children's hospitals
- Data repository for all hospital data
  - Financial
    - DRGs, charges
  - Administrative
  - Clinical
    - Lab, Treatment, Radiology, Pharmacy, etc.
    - Diagnoses, Procedures
    - Level of care (IP, Obs, ED, Amb)

16



## Type of Research: Survey

- Who are your subjects?
  - Broad vs. narrow scope
- What is the typical response rate for your subjects?
  - If too low, may not be able to publish
- Open-ended vs. close-ended questions
- Electronic, snail mail, in person
  - Electronic: Survey Monkey, Redcap



[https://commons.wikimedia.org/wiki/File:Online\\_Survey\\_Icon\\_or\\_Logo.svg](https://commons.wikimedia.org/wiki/File:Online_Survey_Icon_or_Logo.svg)

17

## Surveys: Potential Pitfalls

- Ambiguous or complex questions
- Questions that are not discreet (ask more than one thing in a single question)
- Technical jargon
- Insufficient options
- Overlapping choices

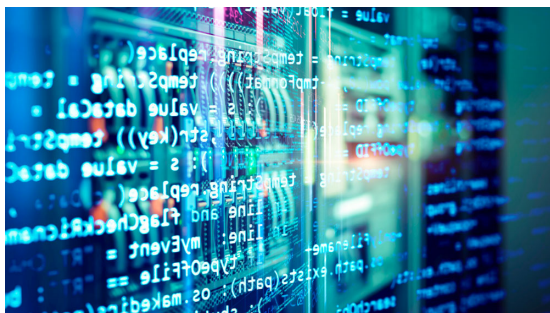
18

## Surveys: Tips

- Search the literature for existing surveys that can be used or adapted (with permission & citation if study published)
- Pilot testing: ask those not in study population to read through survey as if taking it
  - Clarity, face validity, participant burden, layout
- Engage a statistician: determine outcomes & sample size
- Increase response rate
  - Incentives: must not be too large
  - Automated reminders for non-responders
- Embed in educational session

19

## Type of Research: Institutional Data

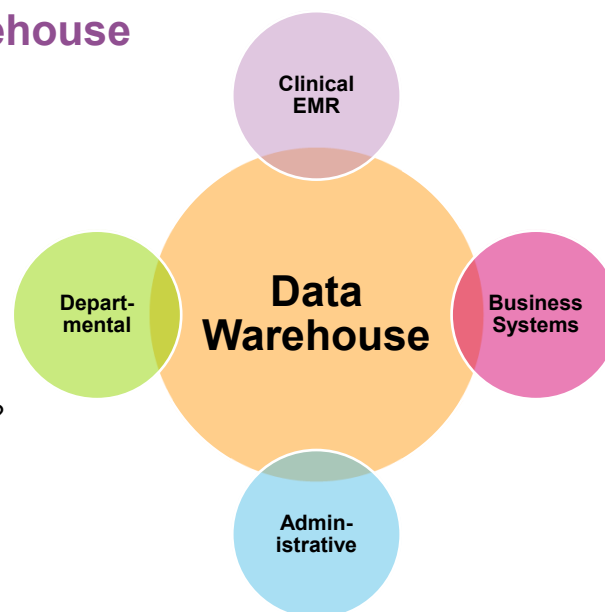


- Using data and information from your internal systems to conduct research
- Primary methods:
  - Internal data warehouse analysis
  - CDI software reports
  - Chart review

20

## Institutional Data: Data Warehouse

- Repository for all data within your organization
- Easy way to ask questions of your organization's data for an analysis or to narrow your study population
- Example idea:
  - How many patients were discharged with malnutrition (based on coded data)?
  - How many patients were discharged with a consult by the Nutrition team?
  - Analysis on how these intersect



21

## Institutional Data: Chart Review

- Start with the question you're trying to answer
- Assess what you'd need in order to answer the question
- Get data to determine cases in your study population
- Pick a representative sample from your analysis to assess your question
  - Need to review enough charts to be generalizable
  - Need to review charts across the spectrum (e.g., different seasons, different specialties)
  - Enlist a statistician to ensure you have enough cases in your sample
- Ensure it is reviewed from multiple viewpoints (e.g., CDIS plus coder)
- Determine how much time your CDIS can devote to this

22

## Research in CDI

- **Why do it?**
  - Improve processes
  - Educate others and disseminate information
  - Advance personal academic portfolio
  - Advance the field of CDI
- **Why multiple institutions?**
  - Size of study population (power)
  - Breadth of impact
  - Personal growth and education
  - Develop relationships

23

## Picking Your Topic

- Turning current projects into “research”
  - Already doing projects
  - Adds some work
  - Get credit for work
- Other people’s presentations/abstracts (e.g., ACDIS poster sessions)
- Your hospital’s presentations (e.g., nursing posters, quality posters)
- Look at papers in the field and see what studies they referenced

24

## How to Coordinate a Research Project

**Start with an idea!**

**Collect co-investigators**

**Identify a project leader**

**Schedule regular meetings**

25

## How to Coordinate a Research Project

**Identify specific aims/objectives of study**

**Determine specific investigative methods**

**Navigate institutional IRBs**

**Identify publication potential**

26

## What Is the Peer-reviewed Process?



- Articles written by experts and reviewed by other experts in the field
- Addresses three areas:
  - Quality
  - Relevance
  - Importance

27

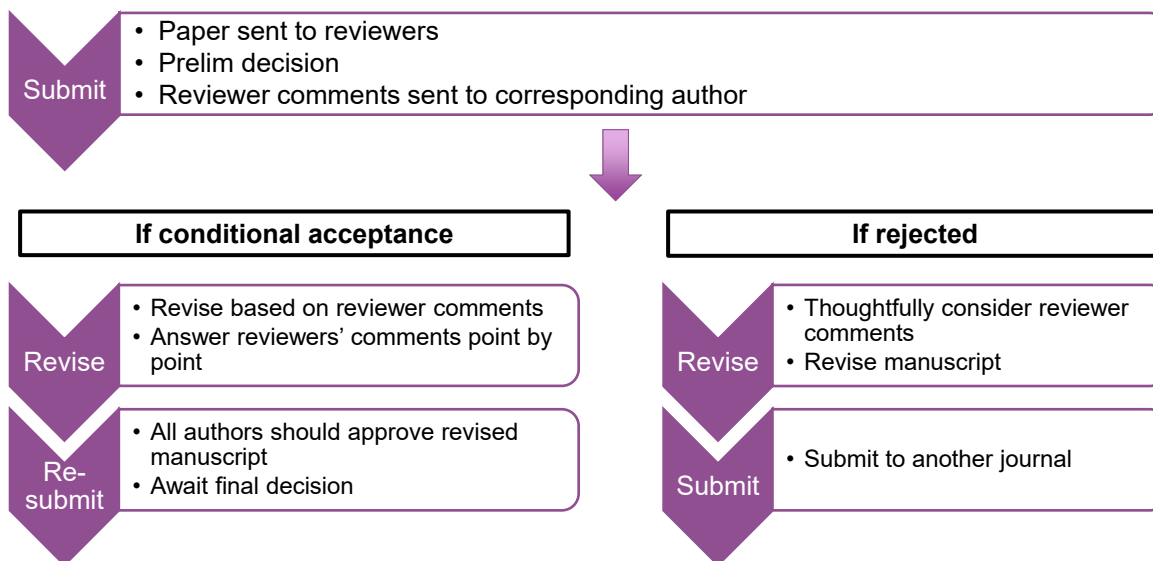
## Typical Publication Cycle

- Project leads determine publication worthiness
- Determine which journals are most likely to publish based on content
- Determine lead and secondary authors
- Lead author drafts publication for review by secondary authors
- Revisions ensue
- Approvals secured
- Submission to publication



28

## Submission Steps



29

## Usual Manuscript Format

- Title and authors
- Abstract
- Introduction
- Methods
- Results
- Discussion and conclusions
- References
- Tables/Figures



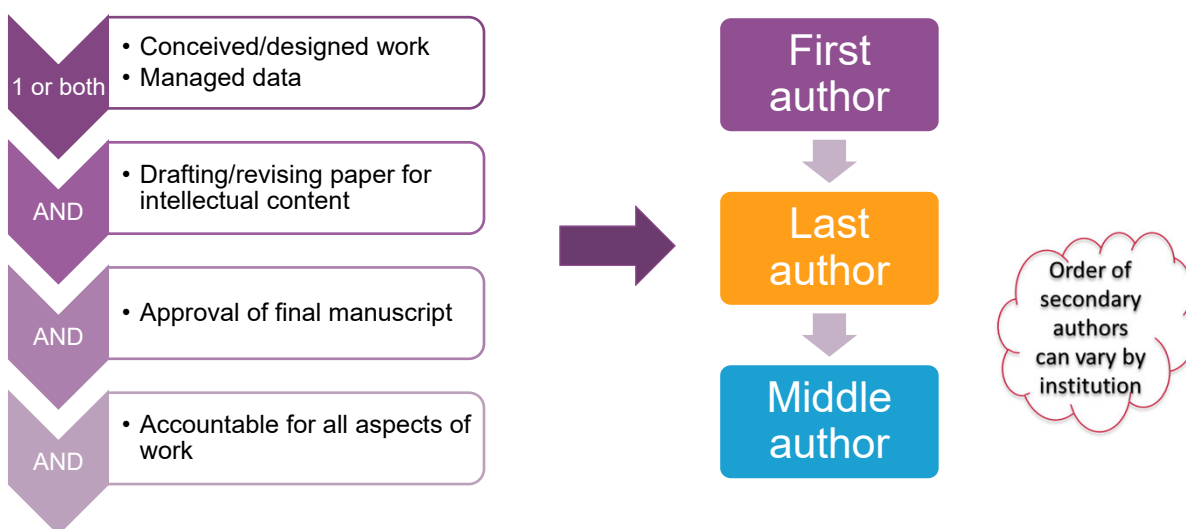
30

## Choosing a Journal

- Who is your audience and what do they care about?
  - Clinicians
  - Other health professionals
  - Medical educators
  - Administrators
- Start with journals with highest impact factor
  - <https://www.scimagojr.com/journalrank.php?category=2701>
  - <https://impactfactor.weebly.com/>
- Expect rejection and re-submissions!

31

## Assigning Authorship



32



## Acknowledgement

- Contributors who do not meet all 4 criteria of authorship should be acknowledged
  - Must get permission to include in acknowledgment section
- This person will be associated with the article



33

## Ongoing Research Projects

### PHIS study

Compare the rate of diagnoses documentation across 5 children's hospitals pre-/post- CDI program implementation

### Education study

Compare pre-/post- documentation educational intervention

- ✓ Confidence
- ✓ Knowledge

34

## PHIS Study

- Queried the Pediatric Health Information System (PHIS) database, pre/post-CDI
- 6 children's hospitals
- Identified conditions for which shifts in documentation would have positive impacts
  - Chronic respiratory failure vs. oxygen dependence in patients with BPD
  - Malnutrition vs. FTT in patients with anorexia nervosa
  - Dysphagia vs. gastrostomy/jejunostomy tube dependence in patients with aspiration
- Higher impact diagnosis documentation increased post-CDI

35

## Education Study

- Compilation of all CDI education slides from 5 institutions into one presentation
  - Added CHLA later in process
- Important questions:**
  - What is our goal?
  - Who is our intended audience?
  - When will we present this?
  - How do we measure outcomes?
  - Why is this study meaningful?

BCH	CHOP	HOPKINS	OMAHA	PCH
Why CDI why write notes	Why CDI Translate med record	Why CDI Doc'n and Quality	Why CDI why write notes	Why CDI
Payment models: FFS vs bundled	APR-DRG: how assigne DRG selection	Payment models: FFS vs bundled	SOI/ROM, CMI	Payment models: FFS vs bundled
Hosp vs Prof billing	SOI/ROM SOI ranking	CC/MCC and SOI/ROM CMI		Hosp vs prof billing
Impact: hospital \$ non-reimbursable svcs	CMI: how calculated CMI ranking	Ex of documentation: SOI/ROM differences DRG assignment diff.		
ICD10 coding PDX & SDX	Coding: what can/not be used from EHR	Coding: what can/not be used from EHR	Coding: what can/not be used from EHR	Coding: what can/not be used from EHR
	ICD10 coding Ex. Of coder choices			What is ICD coding
Instead of...consider Do not use	Able vs Unable to code Use this...not that	Able vs Unable to code		
Take-home points Tips for H&P, PN	Dx's Specificity Link dx to pathogenesis Link every order to dx	Clinical ex: Linking language Acute/Chronic ICD10 Dx's Present on Adm	Clinical ex: sepsis b-litis (not "RSV") resp fail BPD (not "CLD") Renal fail vs AKI Sx's and Epilepsy Injuries	Clinical ex: sepsis PNA resp fail BPD (not "CLD") Pancyto ABLA HF
word count	Unclear dx	Avoid... Specificity Poisoning: intent	DM type I/II, controllable Non-compliance Malnutrition	Immune suppr Malnutrition Appy+abscess

36

## Research is...

- A way to make a difference in a field
- A way to connect with colleagues
- A learning opportunity
- Time-consuming
- Challenging
- Inefficient
- Frustrating
- Very rewarding!!



## Lessons Learned

- Engage resources needed from other teams up front
  - Coding
  - Statistician
  - Physicians in subject matter areas
  - Analytics (Can you get the data you want so your study method is reliable?)
- Don't allow scope creep!
  - There are many interesting findings in these studies
  - Pick the one item up front you're trying to measure and stick to it
  - The other items can be topics for your next study
- Budget staff time accordingly so you know how much time is needed away from chart review

## Lessons Learned

- Pick projects that fit within the goals of your organization so you can build support and traction for what you discover
- Even if a study doesn't have the expected results, it can:
  - Inform the field
  - Help engage clinicians
  - Provide support for changes in operations
- Think about your target audience and post-research marketing in advance of your effort
- Based on the type of research selected, your timelines will be different.
  - Database research can be shorter if you target your idea whereas chart review might need more time

39

## Challenges in Multi-Institutional Research

- Scheduling meetings
  - Time zone issues
  - Busy schedules
- Different resources at different institutions
- How do you measure your specific outcome?
- More than one group in institution doing education about same topic
  - Conflicting approaches/material
  - Need to break down silos

40

## Maintaining Momentum

- **Project Leader's #1 responsibility is to maintain enthusiasm for the project**
  - \*\*Inspire passion to keep study a priority\*\***
  - Keep the project moving along
  - Schedule meetings
  - Hold team members accountable
  - Remind individuals about assigned tasks
  - Keep everyone involved
- **Project Leader has to delegate tasks**
  - Whole project is too much for one person
  - Tap individuals' strengths and resources
  - Set clear expectations of what needs to be done, by whom, and by when
- **Assign one person to take meeting minutes**
  - Complete right away before details are forgotten
  - Circulate the minutes
    - Keep everyone updated
    - Include those not able to attend
  - Re-circulate the minutes before the next meeting
    - Re-focus everyone to project
    - Minimize repetition in the next meeting

**A collaborative & supportive group adds positive energy**

41

## IN BRIEF: Take-Home Points

- Trust each other ... But also remind each other!
- Be patient with scheduling
- Be realistic with timelines
- Budget extra time for situations out of your control (e.g., IRB process, journal submission process)

**Have fun – there is so much to learn from each other!**

42



## Thank you. Questions?

[waraffles@phoenixchildrens.com](mailto:waraffles@phoenixchildrens.com)  
[amy.sanderson@childrens.harvard.edu](mailto:amy.sanderson@childrens.harvard.edu)

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