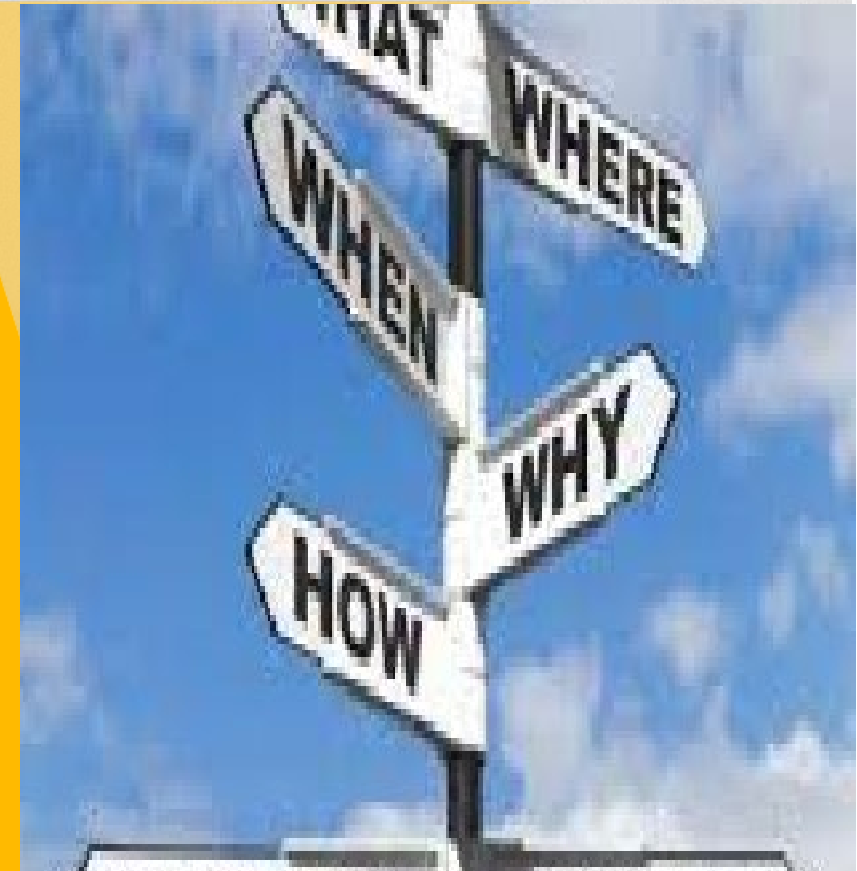# Configurative Comparative Methods for Health Services Research

Marie Smith, PharmD, FNAP

Henry A. Palmer Professor/Asst. Dean – Policy Partnerships

UConn School of Pharmacy

October 24, 2022

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Center for Pharmacy Practice Innovation (CPPI) Seminar

Center for Pharmacy Practice Innovation (CPPI) Seminar - 10/24/2022

Speaker(s): Marie Smith, PharmD, FNAP

Topic:

CPPI invites various health care professionals from around the country and globe to speak on issues relating to innovation in the health care space.

Please contact the Center for Pharmacy Practice Innovation to request a meeting password by clicking here.

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Meeting ID: : 972 0552 6057

Objective(s):
Location: NA
Specialties: Cardiovascular Disease, Endocrinology, Diabetes and Metabolism, Family Practice, General Practice, Nutrition, Pharmacist, Public Health, Academic/Research, Dietitians, Pharmacy Technician, Cardiology

Faculty Disclosures:
Marie Smith, PharmD, FNAP (Nothing to disclose - 10/11/2022)
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Teresa M Salgado, MPharm, PhD	Planning Committee	Nothing to disclose - 10/25/2021
Evan Sisson, Pharm.D., MSHA, BCACP, CDE, FAADE	Planning Committee	Nothing to disclose - 11/18/2021

Audience Participation questions

Please indicate your discipline:

A. Nurse

B. Pharmacist

C. Pharmacy student/resident/fellow

D. Physician

E. Other

Identify your <u>primary place of work:</u>

A. Outpatient clinic

B. Federally qualified health center

C. Physician office

D. Hospital inpatient unit

E. Emergency room/urgent care

F. Long-term/post-acute care facility

G. Academia

H. Retail pharmacy

I. Other

CHALLENGE: Best way to analyze an implementation project??

- Randomized control trial is not possible in many implementation projects

- Regression analysis may be insufficient; <u>causation logic models</u> can produce additional findings to understand how implementation conditions/factors work together and link to outcomes

- Mixed methods – quantitative and qualitative

- Edward Miech – Regenstrief Institute/VAMC, Indiana; Michael Baumgartner - Univ of Bergen, Norway

METHODOLOGY   **Open Access**

Coincidence analysis: a new method for causal inference in implementation science

Check for updates

Rebecca Garr Whitaker[1], Nina Sperber[2], Michael Baumgartner[3], Alrik Thiem[4], Deborah Cragun[5], Laura Damschroder[6], Edward J. Miech[7], Alecia Slade[8] and Sarah Birken[9*]

Abstract

Background: Implementation of multifaceted interventions typically involves many diverse elements working together in interrelated ways, including intervention components, implementation strategies, and features of local context. Given this real-world complexity, implementation researchers may be interested in a new mathematical, cross-case method called Coincidence Analysis (CNA) that has been designed explicitly to support causal inference, answer research questions about combinations of conditions that are minimally necessary or sufficient for an outcome, and identify the possible presence of multiple causal paths to an outcome. CNA can be applied as a standalone method or in conjunction with other approaches and can reveal new empirical findings related to implementation that might otherwise have gone undetected.

Methods: We applied CNA to a publicly available dataset from Sweden with county-level data on human papillomavirus (HPV) vaccination campaigns and vaccination uptake in 2012 and 2014 and then compared CNA results to the published regression findings.

Results: The original regression analysis found vaccination uptake was positively associated only with the availability of vaccines in schools. CNA produced different findings and uncovered an additional solution path: high vaccination rates were achieved by either (1) offering the vaccine in all schools or (2) a combination of offering the vaccine in some schools and media coverage.

Conclusions: CNA offers a new comparative approach for researchers seeking to understand how implementation conditions work together and link to outcomes.

Keywords: Coincidence analysis, Configurational comparative methods, Causal inference, Comparative analysis

"QCA" Qualitative comparative analysis
Case configuration models
Coincidence analysis (CNA)
Fuzzy logic models

Allow for analysis of multiple cases with complex, multifactorial elements such as intervention strategies or components and features of a local context

CNA is *"a configurational comparative method of causal inference and data analysis that groups causes into bundles that are jointly effective and placing them on alternative causal routes to their effects"*

RESEARCH

Factors influencing primary care organization commitment to technical assistance for pharmacist clinical services integration

Mary Mulrooney, Marie Smith*, Diana M. Sobieraj, Brenda Shipley, Edward J. Miech

ARTICLE INFO

ABSTRACT

Background: While technical assistance (TA) has been utilized by primary care organizations (PCOs) for electronic health record installation and medical home recognition, little is known about PCOs' use of TA to optimize pharmacist clinical services and integration in team-based care or population health programs. In 2019, the Connecticut Office of Health Strategy's State Innovation Model Program funded a no-cost TA initiative for 9 PCOs to initiate and/or advance pharmacist clinical services.

Objective: To assess organizational, operational, and pharmacist factors that influenced PCO commitment to the TA program.

Methods: During the TA program, data were collected from multiple sources including PCO demographic data; discussions and meetings with PCO medical, pharmacy, and administrative leaders; on-site workflow observations; and pharmacist coaching sessions. Configurational comparative methods were applied using the data collected during the TA program. Candidate factors were identified and calibrated on the basis of the researchers' knowledge of the TA program, organizational readiness for change models, implementation science frameworks, and published literature. Each candidate factor was iteratively assessed until 13 factors were selected and calibrated by independently assigning each factor a dichotomous value across PCOs. Calibration differences between the researchers were discussed until consensus was reached. Solutions were modeled using the Coincidence Analysis (cna) package in R and RStudio (RStudio, PBC).

Results: Of the 9 PCOs, 4 committed to participating in the TA program. Only 1 factor, the presence of a hired pharmacist, consistently distinguished PCOs that committed from those that did not, with 100% coverage and 80% consistency.

Conclusion: PCO commitment to participate in the TA program was best explained by the factor of already having hired a pharmacist. These results can inform future efforts to engage PCOs in TA, primary care policy initiatives, and future research to understand factors influencing PCO success with pharmacist clinical services integration.

First pharmacy article to use configurational comparative methods (CCM)

Journal of the American Pharmacists Association, Vol 62, Issue 5, 1564 – 1571 (Sept 1, 2022)

Background

- <u>Technical assistance (TA) services</u> (i.e., offering targeted support to address a need or problem) have been utilized by primary care organizations for electronic health record installation and medical home recognition.
  - ❖ on-site training and facilitation, webinars, workflow mapping, online learning community, etc.

- Few primary care organizations understand how to:
  - ❖ optimize pharmacist clinical services integration,
  - ❖ select high-value pharmacist clinical services, and
  - ❖ evaluate the impact/value of pharmacist clinical services in the primary care setting.

- Little is known about primary care organizations using TA to optimize pharmacist clinical services, roles, and integration in team-based care practice models.

Objectives

In 2019, the Connecticut State Innovation Model Pharmacy TA Program contracted with UConn SoP to offer 9 primary care organizations (PCOs) a no-cost, tailored, strategic approach to initiate and/or advance clinical pharmacist services. Only 4 of the 9 eligible PCOs committed to the Pharmacy TA program.

1. **Identify the organizational, operational, and pharmacist factors that may have influenced the PCOs' decisions to opt-in or opt-out of the Pharmacy TA Program.**

2. **Determine which identified factor(s) led to the PCOs' commitment to participate in the Pharmacy TA Program.**

Methods

1. Identify the candidate factors (e.g., organizational, operational, and pharmacist factors) that may have influenced the PCOs' decisions to opt-in or opt-out the Pharmacy TA Program.

Data Sources: PCO demographics; discussions with PCO medical, pharmacy, and administrative leaders; team workflow sessions; and pharmacist coaching sessions.

2. Refine and calibrate candidate factors:

- refine exact wording to align with the intention of the desired outcome

- use iterative process to select most pertinent factors based on organizational readiness for change and implementation science frameworks

- researchers independently calibrated each factor assigning a dichotomous value across all PCOs (e.g., factor weighting between 0 and 1)

- calibration differences between the researchers were discussed until consensus

3. Create "truth table" and apply calibrated 13 factors across all 9 PCOs

FACTORS	PRIMARY CARE ORGANIZATION								
	A	B	C	D	E	F	G	H	I
Outcome: Commitment to participating in the Pharmacy TA Program	1	0	1	0	0	0	1	0	1
Participated in introductory meeting	1	1	1	1	1	1	1	0	1
Had hired a pharmacist on staff at time of commitment*	1	0	1	0	0	1	1	0	1
Identified medical leadership champion on staff	1	0	1	0	1	1	0	0	1
Identified executive administrative leaders on staff	1	0	1	1	0	1	1	0	1
Identified clinical pharmacist leader on staff	0	1	1	1	1	0	1	0	0
Had competing organizational | leadership change priorities	0	0	0	1	0	1	0	0	1
Had competing operational priorities	0	1	0	0	1	0	0	0	0
Had already started clinical pharmacist return on investment | impact analysis	0	0	1	0	0	1	0	0	0
Had organizational capacity to generate business intelligence reports	1	1	1	0	0	1	0	0	1
Had prior practice-level experience with clinical pharmacist	1	0	1	0	1	1	0	0	0
Key leaders had prior experience with Research Team for pharmacy implementation services	1	0	0	0	0	1	0	0	0
Key leader responsible for commitment was present at initial meeting	1	0	1	1	1	0	0	0	1
Values: 0=NO; 1=YES * 0=INTENTION TO HIRE/DESIGNATE PHARMACIST									

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4. Run Coincidence Analysis modeling software

- Coincidence Analysis ("cna") package in R and R studio

- Identify solution(s) with high consistency and coverage with no model ambiguity

  - Consistency = % of cases covered by the solution with outcome present
  - Coverage = % of cases explained by the solution

References

Ambuehl M, Baumgartner M. cna: causal modeling with coincidence analysis. R package version 3.2.0; 2021.

Thiem A. Conducting configurational comparative research with qualitative comparative analysis: a hands-on tutorial for applied evaluation scholars and practitioners. Am J Eval. 2017;38(3):420-433.

Results

Presence of Commitment to Pharmacy TA Program

- 4 of the 9 PCOs committed to participating in the TA program (i.e., "1" in Truth Table)

- CCM found that <u>one factor</u>, *the presence of a hired pharmacist at the time of commitmen*t, <u>distinguished PCOs that committed</u> to receive the TA services from those that did not.

- Solution had <u>100% coverage </u>(4 of the 4 PCOs that committed to the TA program had a hired pharmacist) and <u>80% consistency</u> (4 of the 5 PCOs with a hired pharmacist committed).

Absence of Commitment to Pharmacy TA Program

- 5 of the 9 PCOs did not commit to the TA program (i.e., "0" in Truth Table)
  - o 4 PCOs expressed *intention to hire or designate* a pharmacist yet had medical leadership changes, competing change management projects
  - o 1 PCO *had hired a pharmacist* yet did not commit to participate in the TA program; undergoing a merger and acquisition by a large health-system

- CCM found that <u>one factor</u>, ***the intention to hire/designate a pharmacist,*** <u>distinguished PCOs that did not commit</u> from those that did.

- Solution had <u>80% coverage</u>(4 intended to hire/designate pharmacist out of the 5 PCOs that did not commit) and <u>100% consistency </u>(4 of the 4 PCOs that did not commit 4 lacked a hired pharmacist).

Conclusions

1. The <u>presence of a hired pharmacist was the most influential factor</u> for primary care organization commitment to a pharmacy technical assistance program for optimizing the clinical pharmacist's role and services.

2. <u>Other factors may be important</u> yet not unique enough for the CCM analysis: PCO leadership, PCO capability to generate quality and patient outcome reports, and PCO's prior practice-level experience with pharmacist clinical services.

3. CCMs are a <u>suitable method</u> to analyze <u>implementation science</u> research
   - multiple, complex factors may be jointly present in order for the outcome to be present
   - multiple paths can lead to the same outcome

4. CCMs may be more appropriate than traditional regression methods for:
   - small sample size
   - each case is a whole entity rather than deconstructing the case into individual components to analyze in relation to a dependent variable.

Questions??

Technical assistance services include the following strategies:

A. on-site training and facilitation

B. curbside consults

C. collaborative practice agreements

D. CE programs

CE Question

Configurational Comparative Methods should be considered for data analysis that involves:

A. Complex and unique structures that can influence implementation
B. Small sample sizes
C. Presence of simultaneous and multiple factors that can affect an outcome
D. All of the above

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Meeting ID: : 972 0552 6057

Objective(s):
Location: NA
Specialties: Cardiovascular Disease, Endocrinology, Diabetes and Metabolism, Family Practice, General Practice, Nutrition, Pharmacist, Public Health, Academic/Research, Dietitians, Pharmacy Technician, Cardiology

Faculty Disclosures:
Marie Smith, PharmD, FNAP (Nothing to disclose - 10/11/2022)
Download Handout

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Date/Time: 10/24/2022 12:00:00 PM

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