Outer and inner context of community pharmacies in a medication management services network

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Background:

- One in four Americans has multiple chronic conditions.
- In the U.S., there are numerous barriers to healthcare access for patients with multiple chronic conditions.
- In the U.S., patients with chronic illnesses visit the pharmacist far more frequently than their healthcare provider.

(Kaiser Family Foundation, 2017; WHO, 2018)

Background:
Community Pharmacy Enhanced Services Network (CPESN)

Started by Community Care of North Carolina

Is a medication management program in a community pharmacy setting

- Comprehensive medication review
- Conduct medication reconciliation after hospital discharge
- Optional medication management services

Is a population health management intervention

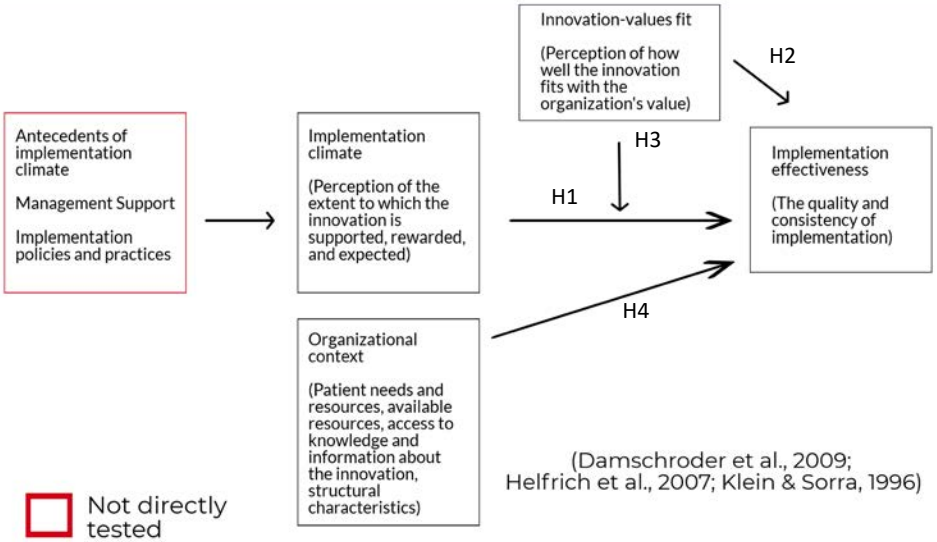
- Defined patient population
- Value-based payment model
- Focus on high-need, high-cost (HNHC) patients
- Develop and document care plan
- Coordinate care with other providers

(CPESN, 2016)

Study Objective:

To examine the outer and inner contextual factors that influence implementation effectiveness of a pharmacy-based medication management program (CPESN).

Conceptual model:
CFIR + Organizational Theory of Innovation Implementation



(Damschroder et al., 2009; Helfrich et al., 2007; Klein & Sorra, 1996)

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Study design

Study design: Cross-sectional (2016), mixed-methods approach

Unit of analysis: Pharmacy level

Sample: Community pharmacies participating in CPESN (n =191)

Data sources:

- Implementation survey (response rate: 71.3%)
- In-depth interviews (subset of 40 pharmacies)
- Program administrative data
- County-level, health ranking data

(RWJF, 2017)

Key Measures

Key Measures	Definition	Variable Type
Implementation Activity (Dependent Variable)	Implementation of ≥ 1 comprehensive medication review (CMR) for an attributed high-need, high cost (HNHC) patient.	Binary (0,1)
Program Reach (Dependent Variable)	Count of attributed HNHC patients receiving a CMR divided by the number of HNHC, attributed patients per pharmacy during a program quarter.	$\frac{\text{Count (CMRs for HNHC patients)}}{\text{Exposure (HNHC patients)}}$
Implementation Climate (Key independent variable)	Score on implementation climate scale measuring the extent to which NC-CPESN was supported, rewarded, and expected.	Continuous (Scale formed using factor analysis)
Innovation-values Fit (Key independent variable)	Score on innovation-values fit scale measuring the extent to which NC-CPESN fits with the values of the pharmacy and of the pharmacy profession.	Continuous (Scale formed using factor analysis)
Patient needs and resources	County-level clinical and social factors, 340B drug pricing program participation, rural location, and proportion of HNHC patients.	Varies
Available resources	Clinical pharmacist, total number of staff, presence of pharmacy students and residents.	Varies
Access to knowledge and information	Experience with NC-CPESN, past performance with NC-CPESN, participation in Medicare Part D Medication Therapy Management (MTM) program.	Varies
Structural characteristics	Organizational age, prescription volume, pharmacy type.	Varies

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Analytic approach

1. The probability that a pharmacy completed a CMR for a HNHC patient [Implementation Activity]
   - Logistic regression (used to model binary outcomes)
2. The expected number of CMRs per HNHC patients [Program Reach]
   - Zero-truncated, negative binomial model (used to model count data with overdispersion and truncation at zero)
   - Treated number of HNHC patients as "exposure"

We used Stata (v.13) for the analysis.

Analytic Approach

Interviews were record, transcribed verbatim, and analyzed for themes using Dedoose (version 7.0).

Held de-briefs at regular intervals to discuss interview findings.

Codebook was developed based on CFIR and network ties theory and discussions from de-briefs.

Coding for first five transcripts was completed by research assistant and community pharmacist to come to consensus. Codebook was refined when disagreements occurred.

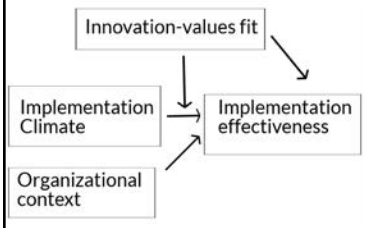
5 interview participants were consulted to review results (e.g., member-checking). (Lincoln & Guba, 1985)

Results

Characteristics	Implementers (n=113) Mean (SD) or %	Non-Implementers (n=78) Mean (SD) or %	Total (n=191) Mean (SD) or %	Range
Key independent variables				
Implementation climate	11.81 (3.0252)	3.55 (3.064)***	8.37 (5.087)	0-16
Innovation-values fit	13.55 (2.0218)	11.06 (3.99)***	12.51 (3.231)	0-16
Patient needs and resources				
Rural location	57.78	42.22	23.56	0-1
Clinical factors	31.94 (29.78)	39.63 (29.40)	35.08 (29.8)	1-100
Social factors	44.07 (30.8)	46.36 (33.17)	45.01 (31.8)	1-100
340B participation	69.12	30.88*	36.76	0-1
Proportion of high-risk patients	0.42 (0.14)	0.36 (0.18)**	0.40 (0.16)	0-0.87
Available resources				
Presence of a clinical pharmacist	86.49	13.51***	19.37	0-1
Total number of staff	12.83 (6.464)	11.53 (8.827)	12.30 (7.525)	1-40
Presence of pharmacy student or resident	92.86	7.14***	21.99	0-1
Access to knowledge and information				
Amount of experience with NC-CPESN (months)	34.37 (7.0546)	27.05 (7.96)***	31.38 (8.249)	12.1-44.7
Past performance with NC-CPESN	0.03 (0.04)	0.00 (0.00)**	0.02 (0.0)	0-0.31
Participation in Medicare Part D MTM	67.27	32.73***	86.39	0-1
Structural characteristics				
Independent pharmacy	57.83	42.17	43.46	0-1
Low prescription volume	56.06	43.94	34.55	0-1
Established pharmacy	45.13	30.77	39.27	0-1

Note: significance of t-tests or Pearson chi-square tests comparing implementers to non-implementers: * p<0.05, ** p<0.01, *** p<0.001

Results



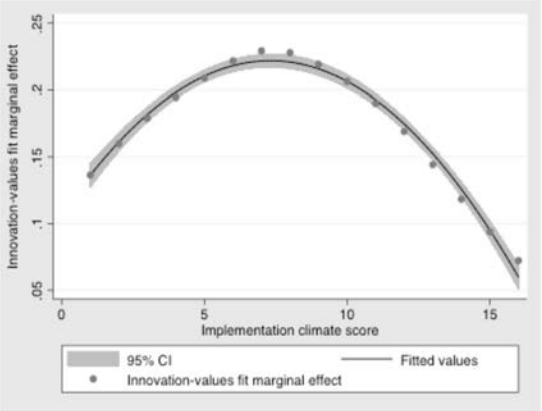
Characteristics	Equation 1: Binary Outcome (Implementation Activity) AME (SE)	Equation 2: Positives (Program Reach) AME (SE)
Key independent variables		
Implementation climate	2.65 (1.85 X 10^{3})***	5.05 (1.5)**
Innovation-values fit	2.17 (1.041 X 10^{3})*	11.79 (3.170)***
Patient needs and resources		
Rural location	-0.77 (0.016)	-12.81 (4.658)**
Clinical factors	-0.04 (3 X 10^{6})	-0.14 (0.11)
Social factors	-0.06 (3 X 10^{6})	-0.10 (0.10)
340B participation	5.70 (3.50 X 10^{3})*	12.80 (5.760)*
Proportion of high-risk patients	0.00 (0.00)	—
Log of high-risk patients	—	(exposure)
Available resources		
Presence of a clinical pharmacist	9.86 (4.75 X 10^{3})*	32.33 (10.670)***
Total number of staff	-0.31 (2.6 X 10^{3})	-1.98 (0.550)***
Presence of pharmacy student or resident	6.86 (6.37 X 10^{3})	14.55 (7.273)
Access to knowledge and information		
Amount of experience with NC-CPESN (months)	0.43 (1.3 X 10^{3})**	1.57 (0.610)***
Past performance with NC-CPESN	0.46 (1.3 X 10^{3})***	0.10 (0.031)***
Participation in Medicare Part D MTM	18.73 (6.246 X 10^{3})**	28.05 (13.83)*
Structural characteristics		
Independent pharmacy	4.14 (2.02 X 10^{3})*	0.43 (5.6)
Low prescription volume	1.08 (0.032)	7.23 (7.21)
Established pharmacy	2.02 (0.015)	4.14 (7.46)
Alpha	—	0.56 (7.08 X 10^{3})**
Constant	-21.04 (4.79)***	-14.03 (1.383)***
Observations	180	104

Significance of hurdle regression: * p<0.05, ** p<0.01, *** p<0.001

Results

To examine how the effect of innovation-values fit changes over different values of implementation climate (i.e., moderation effect).

Plot of innovation-values fit and implementation climate score for implementation activity



Results

Theme: Inter-organizational relationships

Facilitators to Implementation	Barriers to Implementation
• Pre-existing relationships with primary care providers • Participation in other interventions that require care coordination across primary care providers and pharmacies	• Some primary care providers were not familiar with pharmacists' role in medication management • Some pharmacies did not believe it was within their job role to proactively reach out to primary care providers

Results

Theme: Implementation Climate

Facilitators to Implementation	Barriers to Implementation
• Creating reward systems to support implementation • Having consistent messages from top and middle managers about expected participation	• Having top and middle managers frame implementation as "a requirement" • Having unclear role expectations for staff participation

Limitations

First, since we measured implementation climate, innovation-values fit, and implementation effectiveness at the same time, we cannot establish the causal order. Additional longitudinal studies are needed.

Second, the generalizability of our findings is limited by: (1) only having data at one time point; (2) conducting the study in one region, North Carolina.

Third, our measures of implementation effectiveness (e.g., implementation activity and program reach) do not assess other important aspects of implementation effectiveness such as fidelity of CMR delivery.

Discussion

Our study supported the use of the organizational theory of innovation implementation effectiveness in a community pharmacy setting.

Our study supported the hypothesis that innovation-values fit directly and indirectly affects implementation effectiveness, which has not been tested previously in a healthcare setting.

The qualitative findings echoed similar results--suggesting that implementation climate was important.

We found certain factors in the outer context (e.g., patient needs and resources) were not associated with effective implementation.

The qualitative findings also suggest that the quality of inter-organizational partnerships may be a significant predictor of implementation effectivness, which was not included in the quantitative model.

(Helfrich et al., 2007; Klein & Sorra)

Future Research

Develop quantitative measures of inter-organizational partnerships (e.g., number and strength) and assess whether these measures are associated with effective implementation.

Examine whether alignment across top- and middle- management support for innovation affects implementation effectiveness.

Examine whether effective implementation is associated with improvements in patient outcomes.

(Helfrich et al., 2007; Klein & Sorra)

Thank you

Please feel free to contact me with any questions you might have:

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