Community Paramedicine

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Research Question

Do chronic health outcomes in elderly, rural populations improve after implementing community paramedicine programs?

Terminology I

Community Paramedicine (CP)

Emergency Medical Services (EMS)

Paramedic

Acute clinical care

Mobile Integrated health system (MIH)

Advanced Illness Management system (AIMS)

High-risk

Rural

Chronic Conditions

- Diabetes
- Heart disease
- Obesity
- Cancer
- Stroke
- Arthritis

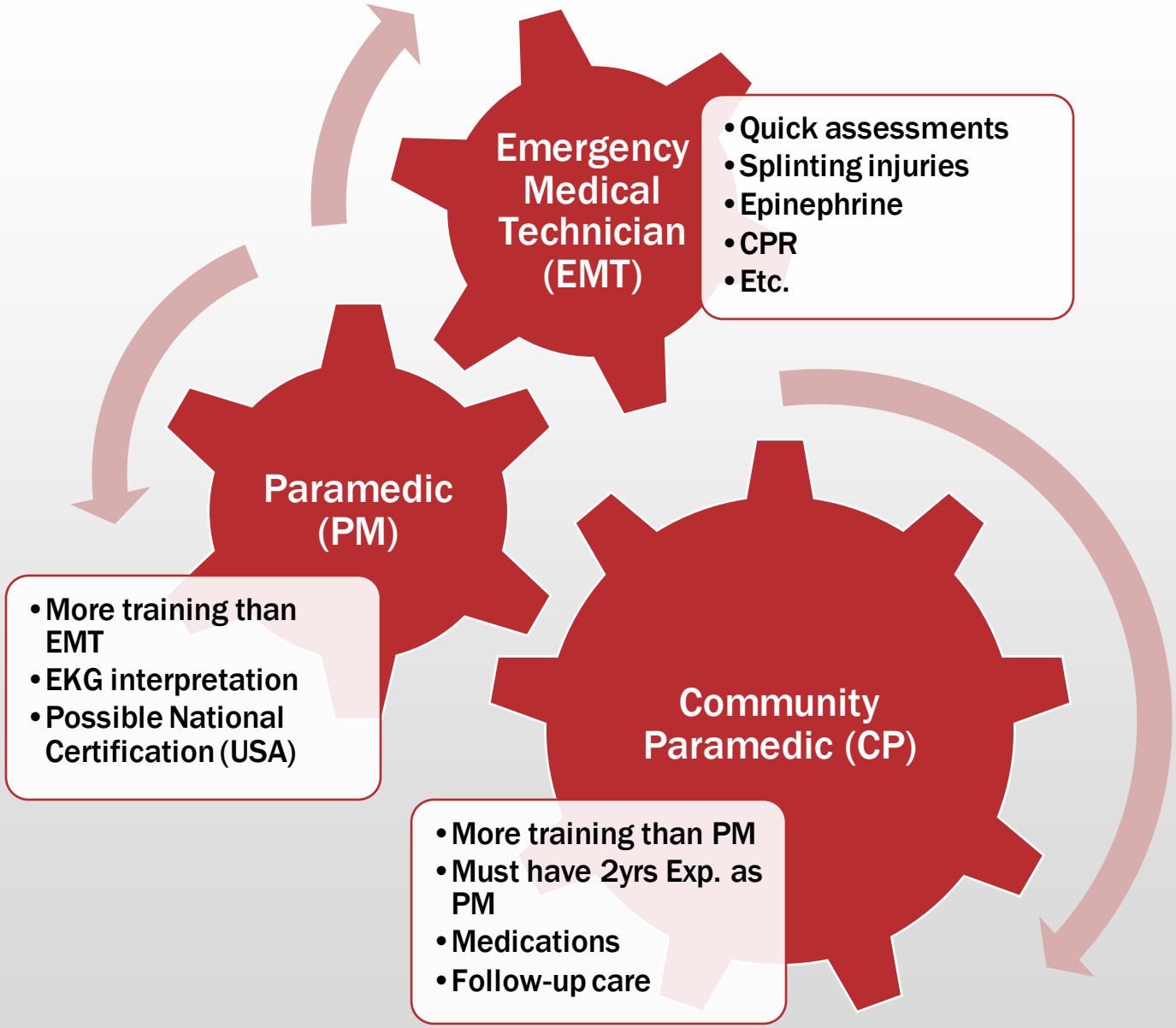
Acute Conditions

- Sore throat
- Runny nose
- Fever
- Sneezing
- Cough
- Diarrhea
- Ear pain
- Headache
- Rash
- Nausea

Sources: https://www.webmd.com/

Terminology II

Distinctions between Chronic and Acute Conditions



Sources: https://www.cpc.mednet.ucla.edu/
https://www.health.state.mn.us/

Terminology III

Distinctions between CP, EMT and Paramedic

Background Information

- CP is a new emerging healthcare model that utilizes emergency medical services (EMS) to provide preventative and primary care in areas with inadequate access to health care
- Particularly important in rural areas and among the elderly population
- Specially trained paramedics go directly to the homes of patients to provide primary care treatment
- Community paramedicine programs will need to vary by location which could pose a challenge to implementation as all designs will need to be unique to the population
- CP programs decrease emergency calls, emergency department visits, and costs for patients and health departments
- Positive satisfaction rates from patients

Considerations with implementing Community Paramedicine

- Rural Communities
- Elderly Populations
- Chronic Diseases
- Economics
- Patient Satisfaction

Matching: Overview

Community Paramedicine Applied in a Rural Community (Bennett)

- Location: small, rural county in South Carolina
- Patients frequented the emergency room and had 1+ chronic diseases
- Evaluated if the CP program reduced emergency department visits and improved patient outcomes
- Measuring chronic health outcomes
  - Hypertension, diabetes, chronic heart failure, asthma, and chronic obstructive pulmonary disease (COPD)

Matching: Methods and Analysis

Quasi-experimental matching

Characteristics	CP Program Patients	Comparison Group
Average age	57.6 years	55.4 years
Percentage females in group	60.3%	47.2%
Percentage minorities in group	64.7%	47.5%
Hypertension	82.4%	86.4%
Diabetes	58.8%	38.4%
COPD	17.6%	14.4%
Chronic heart failure	2.9%	3.2%

- **Internal validity:** important to match groups closely
- **Confounding factors:** There was a slight increase in calls from the CP program patients… why?
- **External validity:** can be generalized to other rural areas with high chronic disease prevalence and high ED visits/calls

Matching: Results and Connection to Question

- Hypertensive patients decreased an average of 7.2 mmHg in systolic blood pressure and 4.0 mmHg in diastolic blood pressure
- Diabetic patients decreased blood glucose by an average of 33.7 mmol/L
- CP participants decreased ED visits by 58.7% and inpatient visits by 68.8%
- Comparison group increased ED visits by 4.0% and inpatient visits by 187.5%
- Shows that CP programs **do** improve chronic diseases

Table 3 CP Participants and Comparison Group Utilization Differences Summary

Metric	CP Participants	Comparison Group	*P* Values
% with an EMS call	48.5% reduction	56% increase	.0007
Time spent with EMS (in minutes)	36.8 minute decrease	16.8 minute decrease	.0008
Nonemergent EMS calls	100% decrease	225% increase	.5343
% of transports	7.9% increase	38.9% increase	<.0001
% of transports requiring higher level of care after enrollment	25.9% increase	50.7% increase	.0008
Time spent with EMS	25.2% decrease	11.6% decrease	.0008
Return to service time (in minutes)	22.1% decrease	8.2% decrease	.0006
% with an ED visit	58.7% decrease	4.0% increase	<.0001
% with an inpatient stay	68.8% decrease	187.5% increase	.0451
Inpatient days	15.7% decrease	162.5% increase	.0285
30-day readmission rate	41.2% decrease	35.9% increase	.0341

Survey: Overview

- Evaluation of selected CP programs based on the following questions:
  - (1) What are the organizational and service area characteristics of rural-serving CP programs?
  - (2) What are their goals, target populations, and services offered?
  - (3) How are programs integrated into community systems of health care and human services?
  - (4) What evidence are CP programs generating to demonstrate success at improving patient and population health, patient experiences of care, and reducing health care costs?

Survey: Methods and Analysis

- Conducted 30-minute interviews with CP programs classified as serving rural, urban, or mixed rural and urban populations
- **Internal Validity:** CP programs are classified in terms of the population they serve, eliminating potential confounding factors of influence on health outcomes
- **External Validity:** Can be applied to larger sample sizes based on wide applicability in terms of the various populations served
- **Confounding Factors:** Survey results are entirely dependent on word of mouth, analyzes CP programs at one point in time

Survey: Goals vs. Results

Goals

- 90.3% of programs aimed to improve chronic disease management
- 83.9% of programs aimed to reduce ED visits
- 83.9% aimed to reduce hospital admission and readmission rates
- 83.5% aimed to reduce costs for patients
- 80.6% aimed to improve patient satisfaction
- 71% aimed to reduce usage of EMS
- 48.4% aimed to either decrease or increase outpatient visits or both

Results

- 85% of diabetic patients showed decreased blood glucose, 70% of hypertension patients showed decreased blood pressure, COPD patients saw a 91.6% decrease in ED admissions for shortness of breath
- 67% reported the same or better health status after the first CP visit
- 76% reduction in total hospital readmissions
- 37% reduced use for frequent EMS users
- 206 transports to ED avoided
- 50% reduction in ED usage by CP patients
- $8,500 accumulated in savings per CP patient
- Saved more than 33% more than it cost to operate a CP program
- Average satisfaction score is 4.9 out of 5 for CP programs
- 99% would recommend the program to others

Survey: Connection to Research Question

- Chronic health outcomes do improve
  - Urban and rural populations
  - Elderly population
- Compared to traditional EMS services, CP is a great alternative to seek care for non-life-threatening emergencies
- Cost- and time-saving benefits for both patients and hospitals

Observational Study: Overview

Community Paramedics Treat High Acuity Conditions In The Home: A Prospective Observational Study (Abrashkin)

- This study examined whether community paramedics can evaluate and treat, under the direction of a credentialed physician, high acuity medical conditions in the home within an advanced illness management (AIM) practice.

Observational study: Study Design

CONFOUNDING:

- Only individuals enrolled in the AIM program were eligible to participate and receive care through the CP program.

INTERNAL VALIDITY:

- As for enrolment criteria for the AIM program, individuals must be home-bound with at least two chronic conditions. Most enrollees are over age 65 years (average enrollee age during the study period was 84 years), have hospital and ED use in the year prior to enrollment and have multiple activities of daily living dependencies.

EXTERNAL VALIDITY:

- Can be applied to other populations with high chronic disease prevalence. Dementia, heart failure and asthma/chronic obstructive pulmonary disease were prevalent.

Patient characteristics	Number (%)
Chronic conditions	
Hypertension	819 (71)
Alzheimer's disease and related disorders or dementia	580 (50)
Pressure and chronic ulcers	488 (42)
Hyperlipidaemia	501 (43)
Depression	415 (36)
Heart failure	405 (35)
Asthma/chronic obstructive pulmonary disease and bronchiectasis	327 (28)
Rheumatoid arthritis/osteoarthritis	397 (34)
Atrial fibrillation	344 (30)
Diabetes	309 (27)
Chronic kidney disease	297 (26)
Stroke/transient ischaemic attack	178 (15)
Cancer	119 (10)
Osteoporosis	102 (9)

Source: Community Paramedics Treat High Acuity Conditions In The Home: A Prospective Observational Study (Abrashkin)

Observational study: Results

- 1159 individuals received 2378 CP responses over 4 years.
- 17.9% of all responses resulted in ED transport.
- Patient/caregiver satisfaction rates were high!

- This study demonstrates that a CP program can provide a safe and effective option for responding to and treating frail older adults in their home, avoiding transport to the ED and likely hospitalization.

Source: Community Paramedics Treat High Acuity Conditions In The Home: A Prospective Observational Study (Abrashkin)

Observational study: Relevance to Research Question

A. The community paramedicine visit decreased the burden or stress I felt as a caregiver

B. My goals for medical care were accounted for in the treatment plan.

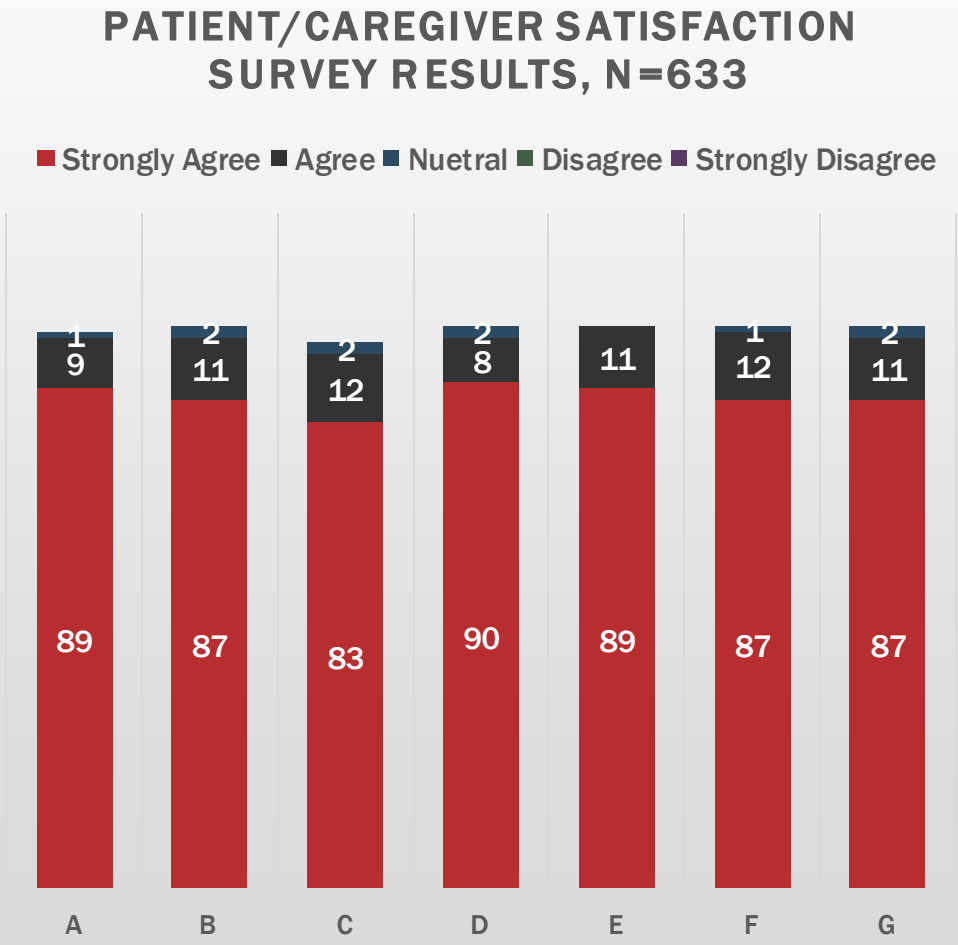
C. The community paramedicine program helped me stay safely at home.

D. Overall, I was satisfied with my community paramedicine experience.

E. I would use the community paramedicine service in a future medical emergency.

F. The community paramedics delivered high quality services and care.

G. I trusted the community paramedic's evaluation of my medical condition.



Source: Community Paramedics Treat High Acuity Conditions In The Home: A Prospective Observational Study (Abrashkin)

Diff-In-Diff: Development of CP in Rural Areas

1. Preliminary work
    1. Work with out of State partners
    2. Multidisciplinary task force
    3. State of Wi compliance procedures
    4. Recruitment
2. Seven-month long study
3. Implemented CP in a rural community
4. Saw significant declination of health services

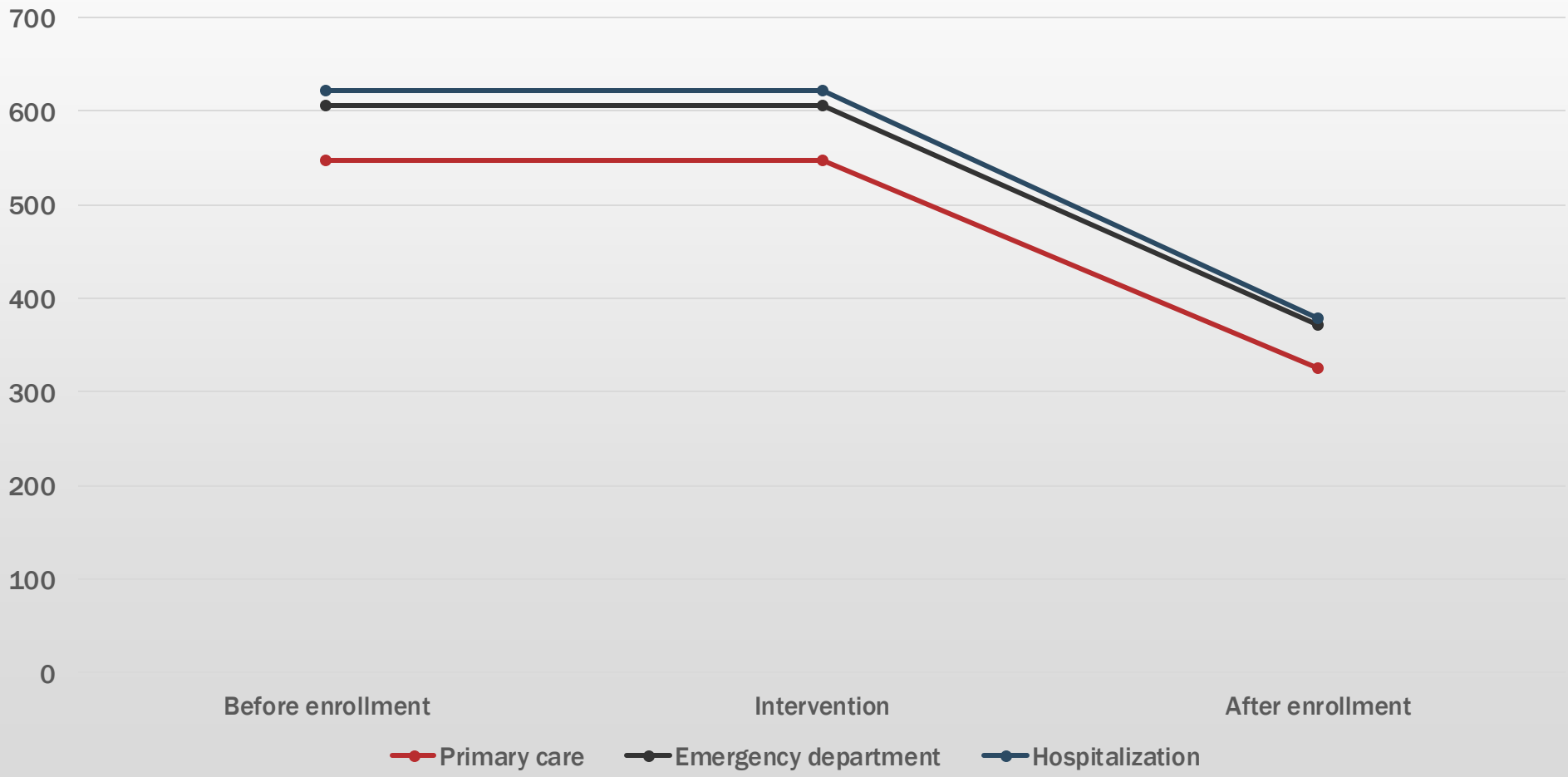
Source: https://www.wisconsin.com/wisconsin/counties/eauclaire.php

Diff-In-Diff: Development of CP in Rural Areas

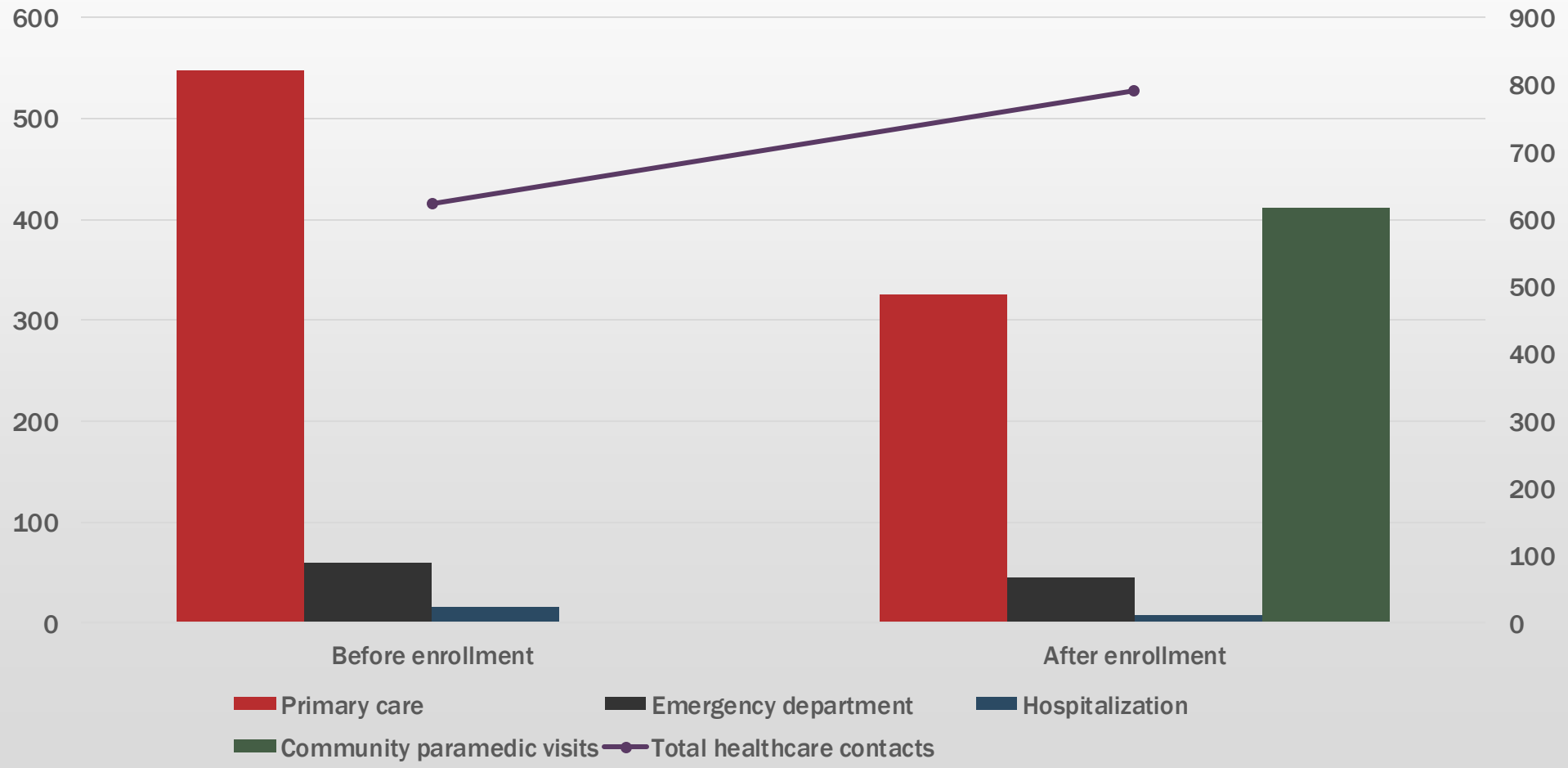
1. Validity
    1. External
    2. Ethics
    3. Internal
    4. Ecological

Source: https://www.wisconsin.com/wisconsin/counties/eauclaire.php

Diff-In-Diff: Development of CP in Rural Areas



Diff-In-Diff: Development of CP in Rural Areas



Consumer Prospective's of CP (Martin)

Improved Primary Care

- "It's fantastic for me because it means somebody is checking on me. My doctor is an hour and a half drive away"
- "They are trying to keep an eye on the seniors up here... If we need anything we can always call down to them"

Sense of Security and Support

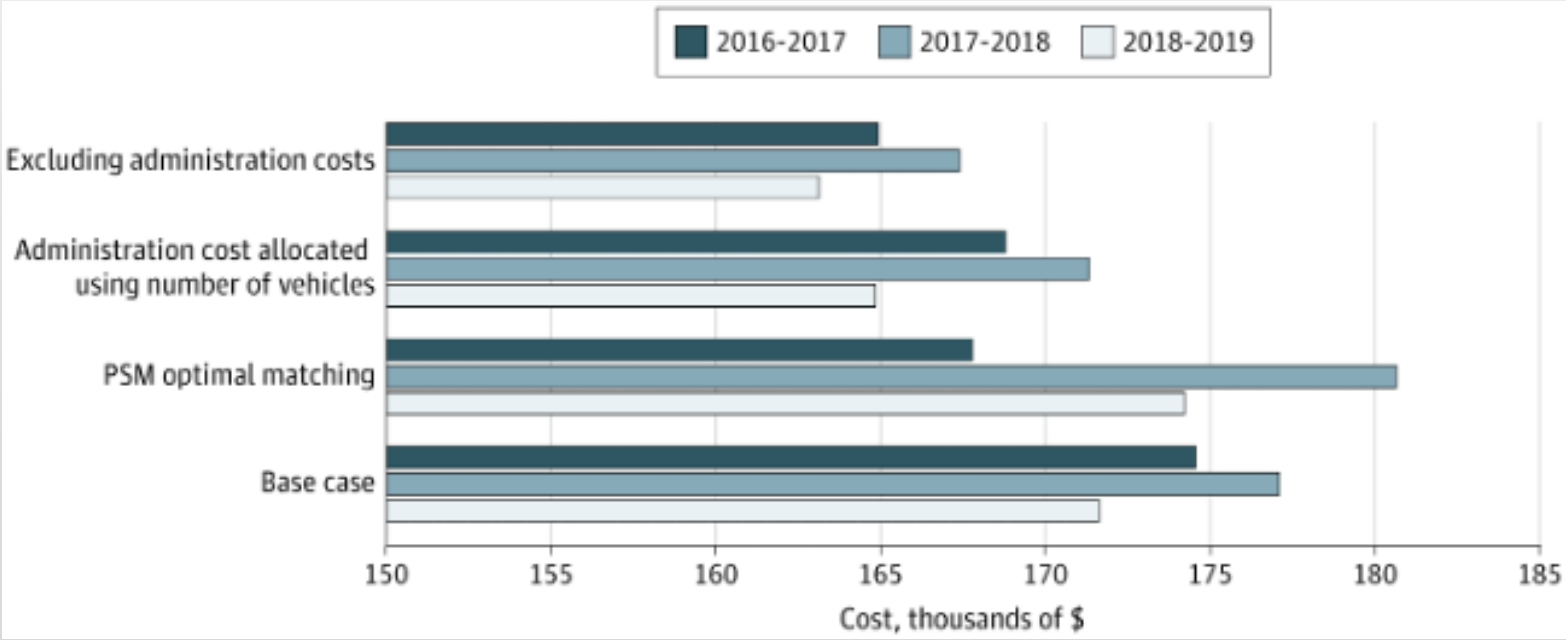
- "It gives me peace of mind and it's a wonderful support system. It gives you a sense of security and comfort"
- "It makes it possible for my mom to stay at home... She's happier; she's doing better here than I think she would ever in long term care"

Increased Education

- "Well, it's helped me to understand more about my health. I think it's a lifeline and has helped me to become familiar with the health programs that are out there. "

Propensity Score Matching (Xie) - Economics

- 1740 calls done by CP vs matched scores for EMS
- $163-$183 Thousand difference
- 45%-50% reduction in Er transports



1) Increased health outcomes
   - Chronic Conditions
   - Elderly
   - Rural

2) Economics
   - Cost to EMS agencies
   - Cost to Consumers

3) Consumer Perspectives

Conclusion I

Summary of Main Findings

Conclusion II

Future research ideas

Community Alternative Response Emergency Services

Madison's CP – C.A.R.E.S

- Similar programs in USA
  - STAR in Denver
  - CAHOOTS in Eugene, Oregon

- Different Roles/Providers
  - Madison CP + Mental health worker
  - Behavioral focused CP

- Various Trainings outside of EMS Scope
  - Suicide Prevention
  - De-escalation
  - Cultural Competency and more

- Works to builds relationship with the community

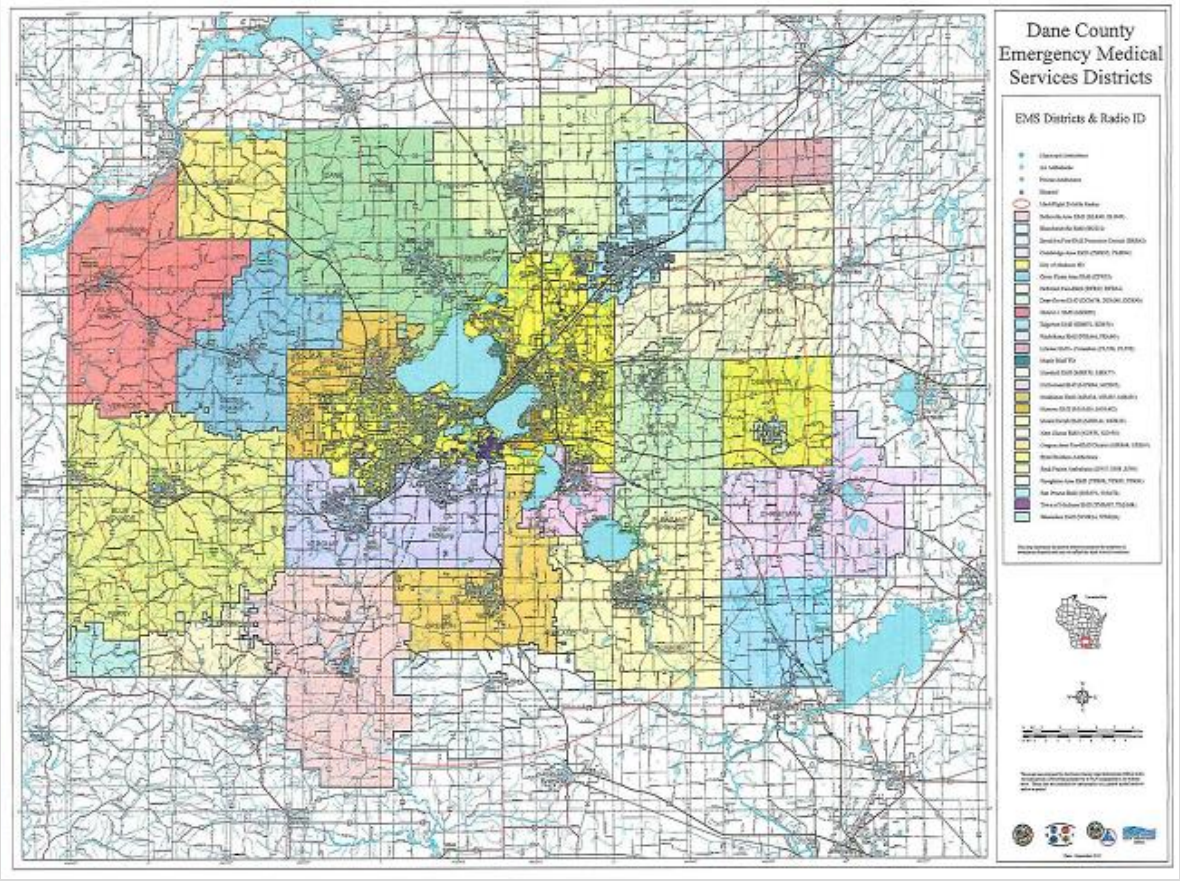
- Keeps individuals out of ER and Jail

CITY OF MADISON
Cares
COMMUNITY ALTERNATIVE RESPONSE EMERGENCY SERVICES

Real World Example

Waunakee Area EMS and Ryan Brothers Ambulance (RBA)

- **Waunakee responds to 2000+ calls per year (~5 per day)**
- **Overuse of EMS**
  - **Consequences…**
    - **Missed Calls (~220 per year)**
    - **Increased response time – Mutual Aid**
- **RBA CP responds to non-emergent calls**
  - **Waunakee can respond to 911 calls**



Any questions?

Source: https://lwlies.com/articles/frasier-defining-1990s-sitcom/

Discussion Questions

What surprises you the most about the US's implementation of CP?

Do you think similar model could benefit a less rural area? Why?

How might we leverage technology to limit the amount of responsive care while promoting the level preventative care?

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Thank you!

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