What is the Potential of Community Paramedicine to Fill Rural Health Care Gaps?

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Acknowledgement & Disclaimer

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Community Paramedicine (CP) has been promoted as a strategy to help rural communities, which frequently experience significant health care disparities and service gaps.

CP addresses the Institute for Healthcare Improvement’s Triple Aim:

- Improve patient experiences of care
- Improve population health
- Reduce health care costs

...and a fourth aim (the “Quadruple Aim”*):

- Improving the work life of health care providers

Study Aims

Improve our understanding of CP programs that serve rural communities:

1. Organizational characteristics
2. Goals, target populations, and services offered
3. Integration into community systems of health care and human services
4. Evidence to demonstrate success
Methods

1. We compiled a list in December 2014 of 86 CP programs using articles, reports, presentations, and Web searches.
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2. We identified program and service area ZIP codes, classifying them using Rural-Urban Commuting Area (RUCA) codes.

3. We conducted structured interviews (about 30 minutes) with 36 program leaders (100% response):
   - 31 programs serving rural communities
   - 5 urban programs that had generated evidence on outcomes
Final sample

- Super rural (13): 42%
- Rural (10): 32%
- Both rural and urban (8): 26%
EMS organization type

- Stand-alone/Third Service: 45%
- Hospital-based: 32%
- Fire department-based: 16%
- Other: 7%
Program characteristics

Service area population:

- 35,000 (median), from 1,950 to 2.3 million

Time CP program in operation:

- 29 months (median), from 2 months to 13 years

Staffing:

- 7 community paramedics each providing 0.4 FTEs (median), from 1-60 persons and 0.1-10.0 FTEs
Funding*: More than 3/4 were self-funded only or relied on a single external funding source.

*Programs could report multiple funding sources

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-funded</td>
<td>58%</td>
</tr>
<tr>
<td>Health care provider</td>
<td>32%</td>
</tr>
<tr>
<td>Federal government</td>
<td>13%</td>
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<tr>
<td>State government</td>
<td>13%</td>
</tr>
<tr>
<td>Local government</td>
<td>13%</td>
</tr>
<tr>
<td>Foundation/charitable trust</td>
<td>10%</td>
</tr>
<tr>
<td>Insurer/health plan</td>
<td>7%</td>
</tr>
</tbody>
</table>

*Programs could report multiple funding sources
## Program goals and the Triple Aim

<table>
<thead>
<tr>
<th>Goal</th>
<th>Improve patient experience</th>
<th>Improve population health</th>
<th>Reduce costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve patient satisfaction with care</td>
<td>*</td>
<td></td>
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<tr>
<td>Improve management of chronic disease</td>
<td></td>
<td>*</td>
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<tr>
<td>Prevent falls in the elderly</td>
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<tr>
<td>Increase/decrease outpatient visits*</td>
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<td>*</td>
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<tr>
<td>Increase immunizations</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Prevent traumatic injury</td>
<td></td>
<td>*</td>
<td>*</td>
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<tr>
<td>Reduce hospital admissions or readmissions</td>
<td></td>
<td>*</td>
<td>*</td>
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<tr>
<td>Reduce ED visits</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Reduce EMS/health care costs</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Reduce EMS use/transportations</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Refer or transport to alternative destinations</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Reduce inpatient length of stay</td>
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</tbody>
</table>

*Programs aim to connect patients to appropriate care, which can mean increasing or decreasing outpatient visits.*
Program goals

- Improve management of chronic disease: 90%
- Reduce hospital admissions or readmissions: 84%
- Reduce emergency department visits: 84%
- Reduce EMS/health care costs: 84%
- Improve patient satisfaction with care: 81%
- Reduce EMS use/transports: 71%
- Prevent falls in the elderly: 71%
- Increase/decrease outpatient visits: 48%
- Increase immunizations: 36%
- Refer or transport to alternative destinations: 19%
- Reduce inpatient length of stay: 16%
- Prevent traumatic injury: 13%
- Other: 23%
Target populations

- Chronically ill: 90%
- Post-discharge: 81%
- Frequent EMS users: 65%
- Elderly: 48%
- Mental health: 23%
- Alternate destination, minor illness: 19%
- Uninsured: 16%
- Hospice: 16%
- Substance/alcohol abuse: 16%
- Children: 10%
- New parents: 6%
- Other: 45%
Patient referral sources and destinations

- **Primary care facilities**: 0% referral, 70% referred, 23% both.
- **Hospitals**: 19% referral, 55% referred, 10% both.
- **Other physician groups**: 29% referral, 19% referred, 13% both.
- **Social service agencies**: 7% referral, 19% referred, 29% both.
- **Home health**: 3% referral, 39% referred, 10% both.
- **Hospice**: 10% referral, 13% referred, 16% both.
- **911 dispatch**: 16% referral, 7% referred, 13% both.
- **General public/self referrals**: 32% referral, 0% referred, 0% both.
- **Law enforcement agencies**: 16% referral, 10% referred, 7% both.
- **Mental health care facilities**: 7% referral, 7% referred, 19% both.
- **Skilled nursing facilities**: 7% referral, 10% referred, 13% both.
- **Addiction treatment centers**: 3% referral, 0% referred, 16% both.
- **Urgent care**: 10% referral, 0% referred, 10% both.
- **Other EMS agencies**: 10% referral, 3% referred, 3% both.
- **Other**: 19% referral, 7% referred, 7% both.

Legend:
- Blue: Only receives patient referrals from...
- Black: Both receives patient referrals from and refers patients to...
- Green: Only refers patients to...
## Program services

### Assessment services

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check vital signs</td>
<td>100%</td>
</tr>
<tr>
<td>Check on patient/physical assessment</td>
<td>97%</td>
</tr>
<tr>
<td>Conduct home safety/fall risk assessment</td>
<td>94%</td>
</tr>
<tr>
<td>Administer EKG</td>
<td>94%</td>
</tr>
<tr>
<td>Monitor weight/dietary needs</td>
<td>87%</td>
</tr>
</tbody>
</table>

### Laboratory services

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test blood glucose</td>
<td>94%</td>
</tr>
<tr>
<td>Draw blood</td>
<td>65%</td>
</tr>
<tr>
<td>Other laboratory services</td>
<td>29%</td>
</tr>
</tbody>
</table>
Program services (continued)

**Preventive care services**

- Preventive care for chronic conditions: 90%
- Administer vaccines: 45%
- Other preventive care services: 23%

**Acute care services**

- Basic wound care: 68%
- Minor medical procedures/treatments: 26%
**Program services** (continued)

<table>
<thead>
<tr>
<th>Other services</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication inventory/compliance</td>
<td>90%</td>
</tr>
<tr>
<td>Discharge instruction explanation/compliance</td>
<td>87%</td>
</tr>
<tr>
<td>Coordinate patient care</td>
<td>77%</td>
</tr>
<tr>
<td>Link to healthcare/other community resources</td>
<td>74%</td>
</tr>
<tr>
<td>Respiratory services</td>
<td>65%</td>
</tr>
<tr>
<td>Behavioral health services</td>
<td>26%</td>
</tr>
</tbody>
</table>
Of programs aiming for each goal, how many are measuring?

- Improve patient satisfaction with care: 92%
- Reduce hospital admissions or readmissions: 85%
- Reduce emergency department visits: 85%
- Refer or transport to alternative destinations: 83%
- Reduce inpatient length of stay: 80%
- Reduce EMS use/transports: 77%
- Reduce EMS/health care costs: 77%
- Increase/decrease outpatient visits*: 67%
- Improve management of chronic disease: 64%
- Prevent traumatic injury: 50%
- Prevent falls in the elderly: 55%
- Increase immunizations: 55%

*Programs aim to connect patients to appropriate care, which can mean increasing or decreasing outpatient visits.
Evaluation findings are promising but preliminary!

20/31 programs had generated outcome data

13 (42%) programs provided the study team their evaluation outcomes.

Most evaluations were internal and informal:

• One longitudinal case-control design; otherwise no control groups or other rigorous methods
## Evaluation findings

<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Number of programs reporting</th>
<th>Aggregate outcomes</th>
<th>Selected individual program outcomes reported</th>
</tr>
</thead>
</table>
| Reduce hospital admissions/readmissions              | 8                            | 655 avoided (N=5)  | - 76% reduction in total hospital readmissions  
|                                                      |                              |                    | - 44% reduction in readmissions for heart failure patients  
|                                                      |                              |                    | - 41% reduction in readmissions for CP patients  
|                                                      |                              |                    | - 0 readmissions in the first two quarters of 2015  |
| Reduce EMS/healthcare costs                          | 8                            | $7,461,981 savings (N=7) | - $8,500 savings per CP patient  
|                                                      |                              |                    | - $1.5 million savings through transport to alternate destinations  
|                                                      |                              |                    | - CP program saved 33% more than it cost to operate  |
| Reduce EMS use/transports                             | 6                            | 1,428 avoided (N=5) | - 37% reduced use for top 15 frequent EMS users  
|                                                      |                              |                    | - 206 transports avoided  |
## Evaluation findings

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<th>Selected individual program outcomes reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce emergency department (ED) visits</td>
<td>5</td>
<td>1,552 avoided (N=3)</td>
<td>• 1,121 avoided</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 58.7% reduction in avoidable visits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 50% reduction in ED usage by CP patients</td>
</tr>
<tr>
<td>Improve patient satisfaction with care</td>
<td>3</td>
<td>--</td>
<td>• Mean satisfaction scores exceeded 4.9/5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 99% would recommend the program to someone else</td>
</tr>
<tr>
<td>Increase or decrease outpatient visits\textsuperscript{b}</td>
<td>2</td>
<td>178 prevented (N=2)</td>
<td>• 11 wound dressing changes at home may have prevented office visits</td>
</tr>
<tr>
<td>Increase immunizations</td>
<td>2</td>
<td>327 vaccinations (N=2)</td>
<td>--</td>
</tr>
</tbody>
</table>
### Evaluation findings

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<thead>
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</thead>
<tbody>
<tr>
<td>Improve management of chronic disease</td>
<td>2</td>
<td>--</td>
<td>· 85% of diabetic patients decreased blood glucose; 70% of hypertension patients decreased blood pressure; COPD patients decreased ED admissions for shortness of breath by 91.6%</td>
</tr>
<tr>
<td>Improve quality of life</td>
<td>2</td>
<td>--</td>
<td>· 67% of patients same/better health status as at first CP visit; 59% same/fewer physical limitations</td>
</tr>
<tr>
<td>Prevent falls in elderly/traumatic injury</td>
<td>2</td>
<td>--</td>
<td>· 7% increase on standardized quality of life instrument</td>
</tr>
<tr>
<td>Refer/transport to alternative destinations</td>
<td>1</td>
<td>502 transports (N=1)</td>
<td>· $1.5 million savings through transport to alternate destinations</td>
</tr>
<tr>
<td>Reduce inpatient length of stay</td>
<td>0</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
Conclusions and implications for rural-serving CP programs

<table>
<thead>
<tr>
<th>Question</th>
<th>Summary</th>
</tr>
</thead>
</table>
| Can programs meet the Triple Aim? | - High patient satisfaction  
- Potential to shift costs from more to less expensive settings  
- Appropriate care where vulnerable patients live has potential to improve health. |
| Impact on the workforce? (Quadruple Aim) | - More study needed. (Note: some programs use volunteers.) |
| Integration or competition? | - Many programs were well integrated into health and human services systems. |
| Does CP work? | - We need more evidence to show that CP is safe, effective, and economical. |
| Is CP sustainable? | - CP programs (many self-funded) need evidence to demonstrate value and improve long-term sustainability. |
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