Ambulance Drivers Can Do All That?

Mike Taigman, MS, General Manager, American Medical Response
Jonathan Washko, MBA, Asst Vice President, Center for Emergency Medical Services, Northwell Health
David M. Williams, PhD, Executive Director, Institute for Healthcare Improvement

Session Presenters

Mike Taigman, MS, Improvement Advisor
General Manager, Ventura County, CA
American Medical Response
California, USA

Jonathan Washko, MBA
Assistant Vice President, Center for Emergency Medical Services
Northwell Health
New York, USA

David M. Williams, PhD
Executive Director, Improvement Capability
Institute for Healthcare Improvement
Austin, Texas, USA
Today’s Plan

• What are we trying to accomplish?
  – Profile innovative opportunities to access mobile paramedics in support of Triple Aim efforts in the community

• How will we know a change is an improvement?
  – You will identify elements of paramedic care systems that support care in the community across populations
  – Experience diverse current use cases for paramedic care in populations
  – Identify opportunities in your own community

• What changes can we make that will result in improvement?
  – Case-based presentation of work on the ground
  – Collaborative discussion around needs and opportunities

What projects or groups of patients might benefit from partnerships with EMS?
Evolution of EMS

• Biblical references to resuscitation and transport
• 1793 – flying ambulances in the Napoleonic War
• 1800s – hospital-based ambulance bring sick people to hospital
• 1918 – WWI link between trauma injury and intervention

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- 2007 IOM EMS at the Crossroads
- Today – Community Paramedics
Quadruple AIM

Source: Military Health Service

Today’s EMS
Today’s EMS

What Can “Ambulance Drivers” Do?

• Traditional EMS Roles
  – Rapid response & mitigation of life-threatening situations (approximately 1% of our work)
  – Triage and treat based on clinical algorithms developed by the agency’s medical director or regional / state EMS authority
  – Carry advanced diagnostics and formulary
  – Transport to appropriate levels of acute / ED care
    • STEMI, Stroke, Trauma
  – Risk adverse practiced medicine in a FFS environment
What Can “Ambulance Drivers” Do?

• Thinking Differently – Our Curiosity Quotient
  – Repurpose assessment, diagnostic, treatment and formulary capabilities of EMS
  – Expand roles of existing EMS AND integrate and collaborate it into the existing continuum of care
  – Primary / urgent care on wheels
  – Leverage operations management expertise of EMS in mobile healthcare space for other clinical programs
    • EMS has many businesses within a business
  – Shift to risk tolerant practiced medicine in a risk based environment
  – Leverage technology (e.g. telemedicine, POC testing) to bring needed services together on demand
  – Care navigation, ED avoidance, re-admission avoidance

What can “Ambulance Drivers” Do?

Urgent / Post Acute / Primary Care Space (Repurposed from Acute Care Space):

<table>
<thead>
<tr>
<th>Diagnostics</th>
<th>Treatments</th>
<th>Formulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded Physical Assessment</td>
<td>Basic Airway Management</td>
<td>Magnesium Sulfate</td>
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<tr>
<td></td>
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<td>Ipratropium Bromide</td>
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<tr>
<td>SAO2</td>
<td>Suctioning</td>
<td>Solu-medrol</td>
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<td>Diazepam</td>
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<td>Blood Glucose</td>
<td>Medical Equipment Adjustment</td>
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<td>Fentanyl</td>
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<td>Burn Care</td>
<td>Metoprolol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diphenhydramine</td>
</tr>
<tr>
<td>Weight</td>
<td>Hemorrhage Control</td>
<td>Labetalol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midazolam</td>
</tr>
<tr>
<td>Vital signs</td>
<td>Invasive Tube Assessment</td>
<td>Ondasetron</td>
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<tr>
<td></td>
<td></td>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td>EKG Rhythm Interpretation</td>
<td>IV Catheter Placement &amp; Removal</td>
<td>Dextrose 50%</td>
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<tr>
<td></td>
<td></td>
<td>Lorazepam</td>
</tr>
<tr>
<td>12 Lead EKG</td>
<td>NS Tube Placement &amp; Removal</td>
<td>Albuterol</td>
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<td></td>
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<td>Antibiotics*</td>
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<td>Environmental Assessment*</td>
<td>Pain Management</td>
<td>Tetracaine</td>
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<td>Point of Care Testing*</td>
<td>Medication Administration</td>
<td>Naloxone</td>
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<td>Ultrasound*</td>
<td>In Home Assistance</td>
<td>Aspirin</td>
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<td>Psychological Assessments*</td>
<td>IV Fluids</td>
<td>Furosemide</td>
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<tr>
<td>High Utilization ID / RCA*</td>
<td>Mitigate In-home Risks*</td>
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<tr>
<td>Patient / Care Taker Education*</td>
<td></td>
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<tr>
<td>Transitional Care*</td>
<td>Care Plan Collaboration*</td>
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<tr>
<td>Care Navigation / Alternative Destinations*</td>
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</table>

*Expanding roles as concept of leveraging EMS differently evolves
What can “Ambulance Drivers” Do?

**Acute Care / Pre-hospital Space (Traditional EMS Role):**

<table>
<thead>
<tr>
<th>Diagnostics</th>
<th>Treatments</th>
<th>Formulary</th>
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<tr>
<td>Same as Previous Slide</td>
<td>Advanced Airway Management (ALS)</td>
<td>Atropine</td>
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<td>BiPAP / CPAP</td>
<td>BiPAP / CPAP</td>
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<td>Severe Hemorrhage Control</td>
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<td>C-Spine Immobilization</td>
<td>Epinephrine</td>
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<td>Long Bone Splinting</td>
<td>Diltiazem</td>
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<td>RSI</td>
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<td>Etomidate</td>
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<td>Vecuronium</td>
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*Future Vision: Many see a bifurcation of EMS into Public Safety & Healthcare Based Roles*

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What Can “Ambulance Drivers” Do?

- **Data – Data – Data**
  - EMS data sets are rich in incident based data, clinical data, premise / GIS data, operational data, process data & financial data
  - EMS data sets are typically highly structured and leverage business rules for data collection reliability and consistency (NEMSIS)
  - Can be leveraged for hot spotting, specific population identification, capacity planning, RCAs, process improvement, clinical quality measurement, outcomes measurement, performance measurement, trending and so on
What Can “Ambulance Drivers” Do?

Excerpts from current innovations happening at American Medical Response and Northwell Health
Ventura County, California
Community Health/EMS Collaboration

Population Health

Triple AIM

Experience of Care  Per Capita Cost
Ventura EMS/Public Health
TB Partnership
AIM

Decrease the cost and improve the patient experience patients with TB in Ventura County.

Change = Improvement?

Cost to deliver DOT per patient will decrease by 50% and patients will feel like the system takes care of their needs.
Changes?

Have Community Paramedics provide Directly Observed Therapy (DOT) for people with TB in collaboration with the TB clinic.
<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Formulation</th>
<th>Chemical Structure</th>
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</thead>
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<tr>
<td>Isoniazid</td>
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<td><img src="image2.png" alt="Isoniazid Structure" /></td>
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<tr>
<td>Rifampin</td>
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<td><img src="image4.png" alt="Rifampin Structure" /></td>
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<tr>
<td>Ethambutol</td>
<td><img src="image5.png" alt="Ethambutol" /></td>
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<tr>
<td>Pyrazinamide</td>
<td><img src="image7.png" alt="Pyrazinamide" /></td>
<td><img src="image8.png" alt="Pyrazinamide Structure" /></td>
</tr>
</tbody>
</table>
40 Year Old Male

Pulmonary TB Smear
Negative
40 Year Old Male

Pulmonary TB Smear
Negative

Diabetic, poorly controlled with HgA1C 14

Alcoholic
40 Year Old Male

Pulmonary TB Smear Negative

Diabetic, poorly controlled with HgA1C 14

Alcoholic

Schizophrenia

Lives in shed behind house
TB Project

October 2012-November 2015

36 Patients Complete Treatment
1 MDR Patient

TB Project
Population

Weekends and Holidays

TB Project

Side Effects
Management

Population

Weekends and Holidays
Population
Weekends and Holidays
Side Effects Management
Identify/Monitor Toxicity

TB Project

Experience
DOT just before bed

Population
Weekends and Holidays
Side Effects Management
Identify/Monitor Toxicity
TB Project

**Population**
- Weekends and Holidays
- Side Effects Management
- Identify/Monitor Toxicity

**Experience**
- DOT just before bed
- Food, Shelter, diabetes self-care

**TB Project**

**Population**
- Weekends and Holidays
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**Experience**
- DOT just before bed
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- Completion Celebrations
TB Project

Population
Weekends and Holidays
Side Effects Management
Identify/Monitor Toxicity

Experience
DOT just before bed
Food, Shelter, diabetes self-care
Completion Celebrations

Cost
Dispense not Deliver

Clinic staff OT = 0
Estimated savings of $40,000
AIM

Keep hospice patient’s who have 911 called in the hospice system by decreasing the % of patient’s transported by 50% by August 2016.
Change = Improvement?

Percentage of 911 hospice calls that result in transport to the hospital will decrease.

Changes?

Train our CPs using hospice RN curricula.

Move physician guidance from EMS physician to hospice physician.
56 Year Old Woman

911 Call for a fall

Stage 4 Lung CA with new brain tumor
56 Year Old Woman
911 Call for a fall
Stage 4 Lung CA with new brain tumor
Daytime caregiver
Lives Alone
Hospice
 Population
Right Now Care
Plans

Hospice

Hospice Retains
Control
Hospice Experience

Compassion in Action

Population

Right Now Care Plans

Hospice Retains Control

Calm Grief Support
Hospice Experience
Compassion in Action
Calm Grief Support
Wishes Honored

Population
Right Now Care Plans
Hospice Retains Control

Cost
No Transport or ED
$3,500 x 30 cases = $105,000
Hospice

**Population**
- Right Now Care Plans
- Hospice Retains Control

**Experience**
- Compassion in Action
- Calm Grief Support
- Wishes Honored

**Cost**
- No Transport or ED
- $3,500 x 30 cases = $105,000
- Hospice Benefit Maintained

---

**Chronic Homeless Healthcare Partnership**
AIM

Stabilize the most vulnerable of the medically ill chronically homeless in Ventura County 1 patient at a time.

Change = Improvement

The number of EMS calls, emergency department visits, and hospital admissions for each person will decrease.
Changes

Create a cross disciplinary team to actively support and care for people one at a time.
44 Year Old Man

In one year
57 911 Calls

49 ED Visits to County Hospital
44 Year Old Man

In one year
57 911 Calls
49 ED Visits to County Hospital
9 Hospitalizations – 7 in the ICU

Homeless

57 EMS Transports, 49 ED Visits
9 hospitalizations prior year
Homeless

57 EMS Transports, 49 ED Visits
9 hospitalizations prior year

Post Intervention

Housed

2 EMS Transports and 2 ED Visits
in the last 10 months

Homeless
Population
Housed

Population
Housed
Condition’s Stabilized

Homeless

Homeless

IHI Triple Aim
Homeless

**Population**

- Housed
- Condition’s Stabilized
- Wraparound Services

**Experience**

- Housing First
Homeless Experience

Population
- Housed
- Condition’s Stabilized
- Wraparound Services

Housing First Customized for Me

Cost

Out of the Ambulance, Hospital, Jail, Street Cycle
Homeless Experience

*Housed*

Condition’s Stabilized

Wraparound Services

Cost

Out of the Ambulance, Hospital, Jail, Street Cycle

$1,012,000 in billing avoided

Ventura County Ambulatory Care/EMS COPD Partnership
AIM

Decrease exacerbations, 911 calls, ED visits, and readmissions for people with stage 3 or 4 COPD by 50% during year 1.

Change = Improvement

911 Calls
ED Visits
Readmissions
Reduced
Changes

Stage 3 and 4 patients discharged to paramedics facilitate self-care skills including medication compliance, trigger reduction, and physician follow-up.

76 Year Old Man
Stage 3 COPD
COPD

Population

Increased Self-Care Skills

Decreased Triggers

COPD

Population

Increased Self-Care Skills

Decreased Triggers

Experience

In My Home

Customized
COPD

Population
Increased Self-Care Skills
Decreased Triggers

Experience
In My Home
Customized

Cost
Readmission Reduction

Mobile Integrated Healthcare - Community Paramedicine
Increasing Access To Care 24/7 For Seniors With Chronic Disease
Problem Statement

- Older adults with multiple chronic diseases face challenges accessing traditional outpatient care
- They often forego care until the point of medical crisis, when they call 911.
- This results in unwanted hospitalizations and unsustainable costs
- Increasingly healthcare providers are responsible for these cost and quality outcomes spurring innovation across the care continuum

Traditional Pathway:

Up to 52% of 911 phone calls may be the result of non-emergent exacerbations of chronic conditions or psychosocial problems that would be better served in the primary care setting.

Dale J et al, Qual Saf Health Care, 2004
Our Solution – Care Solutions

Introduction to Care Solutions

Care Solutions is the health system’s care management organization, responsible for clinical and financial performance of all risk based contracts. Portfolio include participation in the following national, regional, and local initiatives:

• **National Medicare Innovation**
  - Bundled Payments for Care Improvement (BPCI)
  - Pioneer Accountable Care Organization
  - Medicare Shared Savings Program (MSSP)
  - Independence at Home (IAH)

• **New York State Medicaid Redesign**
  - New York Health Home
  - New York Delivery System Reform Incentive Payment (DSRIP) Program

• **Commercial Health Insurance Payers**
  - Value-based Contracts

• **Regional Programs**
  - Healthy Transitions Program
  - Community Paramedicine
Background – Center for Emergency Medical Services (CEMS)

- Established in 1993, CEMS provides air and ground BLS, ALS, SCT, CCT and 911 services
- Largest health system based ambulance service in New York Metropolitan area and one of the largest in the United States
- Duly accredited by the Commission on Accreditation of Ambulance Services (CAAS) and the National/International Academics of Emergency Dispatch, Accredited Center of Excellence (ACE)
- 600+ Emergency Medical Technicians and Paramedics with over 110 available response units across New York City, Nassau, and Suffolk
- Utilizes Medical Priority Dispatch System with Advanced Life Support

Background – House Calls Program

- The House Calls Program is an advanced illness management model that serves more than 1,000 frail, homebound patients with multiple chronic conditions and functional impairment (Queens, Nassau, Suffolk)
  - Interdisciplinary teams of physicians, nurse practitioners, and social workers deliver home-based primary and palliative care
  - Medical coordinators schedule appointments and help patients with durable medical equipment, labs, and home services
- Nationally recognized on-demand clinical model dedicated to reducing unwanted hospitalizations:
  - Same- and next-day appointment scheduling to address urgent issues
  - Night and weekend on-call schedule
  - Healthix alerts when hospitalizations occur
Background – House Calls Program Census

**House Calls Patients, N=961**

- Median Age: 86
- Average Age: 19
- Oldest: 110
- Youngest: 19
- 70% Female
- 30% Male

= 10 Patients

*Nassau, Suffolk and Queens counties

* June 2015 Census

**Background – House Calls Program Demographics**

**House Calls Stats**

- Attrition: 33% of annually (death and discharge)
- Death at Home: 72% of patients who died, died at home
- Activities of Daily Living: 63% of patients have 5 – 6 ADL dependencies

**HCC Categories**

- Pressure Ulcer: 31%
- Dementia: 28%
- Diabetes: 28%
- Specified Heart Arrhythmias: 17%
- Chronic Obstructive Pulmonary Disease: 15%
- Protein-Calorie Malnutrition: 14%
- Chronic Kidney Disease: 12%
- Quadriplegia: 12%
- Vascular Disease: 11%
- Seizure Disorders and Convulsions: 10%

* June 2015 Census
What is Community Paramedicine?

- A 24/7, on-demand clinical response for medically frail seniors living in the community
- A transformation of the critical care paramedic workforce into *physician extenders* through telemedicine-guided consultation with primary care physicians
- An effective means of:
  - providing a meaningful clinical response within the hour
  - increasing patient, caregiver, and provider satisfaction
  - decreasing care costs

Program Growth to Date

- October 31, 2013: Community Paramedicine launched for House Calls population.
- September 2014: Community Paramedicine response enhanced by adding video conferencing, with grant funding from the Verizon Foundation.
- August 2015: Program further enhanced by beginning to distribute Personal Emergency Response (PERS) Units units to the highest-risk patients.
Community Paramedicine Workflow

Provides urgent in-home response at all hours of day and night through utilization of the marginal capacity of CEMS and Clinical Call Center

**Evaluation + Treatment of Clinical Exacerbations**

**Exacerbations that can be stabilized or treated include:**

- Patient or caregiver request for help: Paramedics can provide primary and secondary physical exams, including vital signs, blood glucose, EKGs, and environmental assessment.

- Heart failure exacerbation: Paramedics can provide intravenous diuretics.

- Cardiac conditions: Paramedics can provide 12-lead EKG diagnostics to help rule out myocardial infarction and can provide treatments for angina and arrhythmias.

- Respiratory crisis: Paramedics can provide oxygen and/or nebulizers.

- Pain management crisis: Paramedics can provide medication such as morphine and other pain relief medications.

- Future direction: Behavioral health crisis - Paramedics can deescalate, screen for alcohol and illegal substances, provide anxiolytic medications, provide telemedicine consultation with behavioral health specialists, and facilitate navigation to appropriate behavioral health services.
Wireless Video Integration

Integration of secure wireless video conferencing into the Community Paramedicine response:

- Clinical Call Center launches a secure WebEx video conference for the paramedic in-the-field and OLMC
- Enhances the “physician extender” capacity of the paramedic in-the-field
- Allows for “eyes and ears” on the patient

Launched in September 2014, physicians stated that video conferencing enhanced their evaluation of the patient in 80% of cases.

Community Paramedicine Results

- From October 2013 to May 2015, 831 CP responses were deployed.
- Average Community Paramedic response time is 22 minutes. Average time on scene is 65 minutes.
- 81% of CP responses resulted in a meaningful change in medical management
- Only 23% of cases resulted in transport to the ED setting, as compared to a 90% transport rate across CEMS generally.
- For those that were transported to the ED, 61% were considered “non-avoidable”
- 86% of patient satisfaction survey respondents state they would have turned to ED for care.
- CP resulted in documented cost savings of $3.8M in avoided admissions, ED visits, and ambulance transports.
Reasons for Community Paramedicine Visits

- 23.6% for Chief Complaint
- 17.9% for Hypertensive crisis
- 15.2% for Neurological symptoms
- 10.1% for Cardiac-related issues
- 6.5% for Diabetic status
- 6.3% for Gastrointestinal
- 4.4% for Injuries/trauma
- 4.4% for Death pronouncement
- 2.9% for Blood
- 2.1% for Sleep
- 1.8% for Mental health
- 1.5% for Other
- 1.4% for Eye
- 1.1% for Emergency/unknown
- 1.1% for Gastrointestinal
- 0.8% for Joint pains
- 0.6% for Allergic reaction
- 0.3% for Vasopressin
- 0.3% for Defibrillation

Based on 664 CP visits between January 1, 2014 – April 30, 2015

Procedures and Medications Administered

**Procedures Performed by Community Paramedics**

- 12-Lead EKG: 939
- Pulse Oximetry: 713
- ALS assessment: 433
- IV established: 184
- CO2 Monitoring: 83
- IV fluid infusion: 27
- Bleeding controlled: 16
- Splinting: 3
- Cold therapy: 2
- CPAP: 2
- Defibrillation: 1
- CPR: 1

**Frequency of Medication Administration by Community Paramedics**

- Oxygen: 115
- Sodium Chloride: 102
- Albuterol: 54
- Atrvent: 44
- Morphine: 38
- Furaoamide: 25
- Zofran: 17
- Solu-Medrol: 12
- Aspirin: 6
- Atropine: 5
- Dextrose 50%: 5
- Epinephrine: 4
- Labetalol: 4
- Metoprolol: 3
- Diltiazem: 3
- Diazepam: 3
- Midazolam: 2
- Glucagon: 2
- Sodium bicarbonate: 2
- Narcan: 2
- Nitroglycerin: 2
- Vasopressin: 1
Physician Survey Responses: Medical Management

Did the information provided by the Community Paramedicine evaluation change your medical management?

- "The clinical picture changed between the dr's call and the paramedics eval, allowing me to confidently advise to keep pt home."
- "Pt had acute bronchitis, was able to get 1st dose of steroids by CPmedic IM, get neb treatment. If not for those treatments, would have been hard for patient to stay safely at home, as he was refusing to go to hospital."
- "CPmedic was able to keep pt home by giving IVF for hyperglycemia and assessing probable location of infection to allow correct antibiotics to be given. Also was able to check fingertick and identify that pt, who does not have diabetes, [just] had [an] extremely high glucose level."
- "Pt with hyperkalemia, was able to get 12 lead EKG and then to stay home with aggressive medication management, was able to see EKG by video conference."

* Data from Aug 2014 – August 2015.

Physician Survey Responses: ED Avoidance

If the Community Paramedicine evaluation had not been available, would you have advised the patient to go to the ER?

- "Was able to give IV pain meds and nausea meds without sending pt to ER, which is where she usually goes when she is having the symptoms she was experiencing today."
- "I originally was going to have the patient stay home, but then found that she was somnolent and hypoxic so I sent her to the hospital for further evaluation."
- "Having the unassuring EKG and vitals helped me talk to the family about pt's prognosis. It greatly helped to have a person there evaluating the patient in real time when guiding the family's medical decision making - they elected to keep pt home and to call hospice but pt expired while the medic was in the home. Pt's family felt comforted after the pt expired that they had decided to keep him home anyhow and that they had all the information provided by the CPmedic."
Patient Survey Results

- Overall, I was satisfied with my CP experience. 149 (90%) Strongly Agree, 13 (8%) Agree, 19 (11%) Neutral, 15 (9%) Disagree, 18 (11%) Strongly Disagree.
- I would use the CP service in a future medical emergency. 144 (87%) Strongly Agree, 19 (11%) Agree, 15 (9%) Neutral, 19 (11%) Disagree, 13 (8%) Strongly Disagree.
- The Community Paramedics delivered high-quality services and care. 146 (88%) Strongly Agree, 19 (11%) Agree, 15 (9%) Neutral, 19 (11%) Disagree, 13 (8%) Strongly Disagree.
- I was satisfied with how the on-call House Calls provider and Community Paramedics managed my medical issues. 146 (88%) Strongly Agree, 15 (9%) Agree, 19 (11%) Neutral, 19 (11%) Disagree, 13 (8%) Strongly Disagree.
- My goals for medical care were accounted for in the treatment plan. 141 (85%) Strongly Agree, 18 (11%) Agree, 19 (11%) Neutral, 19 (11%) Disagree, 13 (8%) Strongly Disagree.

"We are extremely satisfied with the experience. The paramedics were reassuring, intelligent, and caring. We more than strongly agree with every evaluative statement."

Collaborative Discussion

What projects or groups of patients might benefit from partnerships with EMS?
Practical Improvement Science in Healthcare: 
A Roadmap for Getting Results

- IHI and HarvardX have created a free, 6-week MOOC that starts on January 20, 2016
- Expert faculty: Don Goldmann, Dave Williams, Don Berwick, Karen Baldoza, and Amy Reid
- Learners have the option to earn 6 CEUs for $99 upon course completion

www.ihi.org/ph556x

Thank You

Mike Taigman, MS, Improvement Advisor
General Manager, AMR Ventura County, CA
Mike.taigman@amr.net

Jonathan Washko, MBA
Assistant Vice President, Center for Emergency Medical Services
jwashko@nshs.edu

David M. Williams, PhD
Executive Director, Improvement Capability Institute for Healthcare Improvement
dwilliams@IHI.org