Strategies to Achieve Alignment, Collaboration, and Synergy across Delivery and Financing Systems

Finance & Service Delivery Integration for Mental Illness & Substance Abuse

Research In Progress Webinar
Wednesday, October 18, 2017  12:00-1:00pm ET/ 11:00am-12:00pm CT

Funded by the Robert Wood Johnson Foundation
Welcome: Anna G. Hoover, PhD, RWJF Systems for Action National Coordinating Center, University of Kentucky College of Public Health

Finance & Service Delivery Integration for Mental Illness & Substance Abuse

Presenter: Michael S. Shafer, PhD, Professor, School of Social Work; Director, Center for Applied Behavioral Health Policy; & Affiliate Professor, School of Criminology & Criminal Justice, College of Public Service and Community Solutions, Arizona State University
michael.shafer@asu.edu

Commentary: Christopher D. Maxwell, PhD, MA, Professor, School of Criminal Justice, College of Social Science, Michigan State University
CMaxwell@msu.edu

Questions and Discussion: Moderated by Dr. Hoover
Michael S. Shafer, PhD
Professor, School of Social Work

Director, Center for Applied Behavioral Health Policy

Affiliate Professor, School of Criminology & Criminal Justice, College of Public Service and Community Solutions

Arizona State University
Michael.Shafer@asu.edu
Finance & Service Delivery Integration for Mental Illness & Substance Abuse

Michael S. Shafer, William Riley, George Runger, Kailey Love, Gevork Harootunian, Christina Boudreau, Varnika Angampally, Elsa Vazquez, Nicole Janich, Nick Buckley
WHAT’s OUR GOAL?

OUR GOAL IS TO DEMONSTRATE PROOF OF CONCEPT THAT INTER-OPERABILITY CAN BE ACHIEVED BETWEEN SILOED INFORMATION SYSTEMS.

OUR GOAL IS TO ASSESS THE IMPACT OF THESE INTEGRATED INFORMATION SYSTEMS UPON POLICY-MAKING DECISION MAKING PROCESSES.
FOUR AIMS

**AIM 1**: To create an *INTEGRATION QUOTIENT* for every individual enrolled in the RBHA network as SMI, GMHSA, or children.

**AIM 2**: To develop predictive models of psychiatric and general hospitalization based upon behavioral health and med/surg service utilization patterns observed prior to and following periods of hospitalization.

**AIM 3**: To develop predictive models of criminal justice systems involvement based upon behavioral health and med/surg service utilization patterns observed prior to, during, and following periods of CJ system involvement.

**AIM 4**: To transform our proof of concept analyses into visualizations that facilitate evidence-informed and actionable dialogue and decision-making between multi-sector policy-makers that can lead to a culture of health for Medicaid enrolled individuals experiencing behavioral health issues.
Linking Data Across Systems to Create Data-Informed Approaches to Create Better Health & Social Outcomes

- AHCCCS CLAIMS
- ADHS Hospital Discharge
- MCSO Jail Booking Roster
- Adult Probation Enterprise Tracking System
- Homeless Management Information System
FOUR AIMS

AIM 1: To create an \textit{INTEGRATION QUOTIENT} for every individual enrolled in the RBHA network as SMI, GMHSA, or children.

The \textit{INTEGRATION QUOTIENT} will express the total Medicaid claims on an individual, the relative proportion of those claims on behavioral health versus physical health services, and the composition of service procedures.
AHCCCS Total Claims
Maricopa County only, SFY 2015

AHCCCS Total Claims
Maricopa County only, SFY 2015

$80,000

$60,000

$40,000

$20,000

$0

Claims Deciles

1 2 3 4 5 6 7 8 9 10

$75,541.39

$61,364.01

$207.06

$5,400.38

$4,744.52
AHCCCS Claims, non-SMI, 5th decile

median claim per patient
% total claims
% of sample w/ > 1 claim

Physical Health,
$4,541,
84%
99.81%

Behavioral Health,
$337,
6%,
29.92%

Pharma,
$551,
10%,
78.56%
AHCCCS Claims, SMI, 5th decile

- Median claim per patient
- % total claims
- % of sample w/ > 1 claim

**Behavioral Health**, $2,155, 45%, 95.86%

**Physical Health**, $1,696, 36%, 96.88%

**Pharma**, $924, 19%, 85.07%
AHCCCS Claims, non-SMI, 10th decile

- Median claim per patient
- % total claims
- % of sample w/ > 1 claim

1. Physical Health, $73,055, 69%
2. Behavioral Health, $12,085, 11%
3. Pharma, $20,766, 99.99%

Behaviors in Top 10th Decile:
- Physical Health: $73,055, 69%
- Behavioral Health: $12,085, 11%
- Pharma: $20,766, 99.99%

% of total claims: 96.18%

% of sample w/ > 1 claim: 72.80%
AHCCCS Claims, SMI, 10th decile

- Behavioral Health, $39,980, 58%, 99.46%
- Physical Health, $14,220, 20%, 99.59%
- Pharma, $15,142, 22%, 95.18%

median claim per patient
% total claims
% of sample w/ > 1 claim
AHCCCS Claims Integration Quotient

BH Claims/PH Claims

For people with serious mental illness in the 5th decile, for every dollar claimed for Physical Health services, $1.28 was claimed for Behavioral Health services.

For people without a serious mental illness in the 10th decile, for every dollar claimed for Physical Health services, $.02 cents was claimed for Behavioral Health services.
AHCCCS Claims Analysis
Median per Patient Claim Value by Disease Code

- Blood & Blood Forming
- Digestive System
- Circulatory System
- Endocrine, Nutrit. Metab. Immun.
- Genitourinary System
- Infectious & Parasitic
- Injury & Poisoning
- Musculoskeletal/Connective
- Neurotic Disorders
- Psychotic Disorders
- Respiratory System
- Skin & Sub-Cutaneous
- Substance Abuse

[Bar chart showing median claim values for different disease codes with bars for SMI and Non-SMI categories]
AHCCCS Claims Analysis
Median per Patient Claim Value by Procedure Code

Medical Devices
Respiratory Therapy
Physical Therapy
DME & appliances
Non Emerg. Trans
Speech Hearing Therapy
Dental
Personal Care Services
Radiology
Rehabilitation
Pharmacy
Emerg. Transport
Home Health Nurse
Mental Health
Surgery
Respite care services
Outpatient Fees
Hospice Inpatient
Medicine
Hospice Home
SNF
Inpatient Hospital
Assisted Living

SMI  Non-SMI
FOUR AIMS

AIM 2: To develop predictive models of psychiatric and general hospitalization based upon behavioral health and med/surg service utilization patterns observed prior to and following periods of hospitalization.

- Focused analysis on high cost/high utilizers
- Analysis of pre- and post-hospitalization service patterns
AHCCCS Claims Analysis
ED Claims

Median Claims Per Patient

- **median # claims**: 8 Non-SMI, 5 SMI
- **BH claims**: 2 Non-SMI, 2 SMI
- **PH claims**: 8 Non-SMI, 5 SMI

Median Claims Value Per Patient

- **median $ claims**: $1,245 Non-SMI, $473 SMI
- **BH claims**: $429 Non-SMI, $54 SMI
- **PH claims**: $1,205 Non-SMI, $417 SMI
AHCCCS Claims Analysis

Inpatient Claims

Median Claims Per Patient

<table>
<thead>
<tr>
<th>Category</th>
<th>SMI</th>
<th>Non-SMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median # Claims</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>BH Claims</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>PH Claims</td>
<td>8</td>
<td>6</td>
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</table>

Median Claims Value Per Patient

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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<tbody>
<tr>
<td>Median $ Claims</td>
<td>$6,868</td>
</tr>
<tr>
<td>BH Claims</td>
<td>$2,171</td>
</tr>
<tr>
<td>PH Claims</td>
<td>$6,692</td>
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</table>

Non-SMI

SMI

$1,477

$1,405

$493
**Encounter Timeline – 5^{th} decile**

*A lower decile means lower costs and a lower rank means higher total costs.*

<table>
<thead>
<tr>
<th>Rank</th>
<th>Gender</th>
<th>Age</th>
<th>Integration Quotient</th>
<th>Total Claims Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>45</td>
<td>$1.64</td>
<td>$5,867.18</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>53</td>
<td>$0.66</td>
<td>$5,866.85</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>41</td>
<td>$0.35</td>
<td>$5,864.31</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>58</td>
<td>$0.00</td>
<td>$5,862.18</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>56</td>
<td>$0.49</td>
<td>$5,861.21</td>
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**Encounter Timeline – 10th decile**

<table>
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<th>Rank</th>
<th>Gender</th>
<th>Age</th>
<th>Integration Quotient</th>
<th>Total Claims Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>28</td>
<td>$0.18</td>
<td>$1,429,580.30</td>
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<tr>
<td>2</td>
<td>F</td>
<td>19</td>
<td>$170.29</td>
<td>$257,197.07</td>
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<tr>
<td>3</td>
<td>F</td>
<td>35</td>
<td>$0.14</td>
<td>$228,492.98</td>
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<tr>
<td>4</td>
<td>M</td>
<td>34</td>
<td>$3.45</td>
<td>$218,103.77</td>
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<tr>
<td>5</td>
<td>F</td>
<td>40</td>
<td>$20.18</td>
<td>$215,274.58</td>
</tr>
</tbody>
</table>

*A lower decile means lower costs and a lower rank means higher total costs.*
FOUR AIMS

AIM 3: To develop **predictive models of criminal justice systems involvement** based upon behavioral health and med/surg service utilization patterns observed prior to, during, and following periods of CJ system involvement.

- Focused analysis on **frequent flyers**
- Analysis of **pre- and post-booking service patterns**
- Analysis of **concurrent service patterns** (probation & behavioral health services)
# Criminal Justice Systems Involvement – Jail Bookings

<table>
<thead>
<tr>
<th>Arrests/Booking (smi only)</th>
<th>mean</th>
<th>median</th>
<th>max</th>
<th>rates per 1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-study period</td>
<td>1.6</td>
<td>1</td>
<td>11</td>
<td>103</td>
</tr>
<tr>
<td>study period</td>
<td>1.48</td>
<td>1</td>
<td>10</td>
<td>86</td>
</tr>
<tr>
<td>post study period</td>
<td>2.07</td>
<td>1</td>
<td>16</td>
<td>149</td>
</tr>
</tbody>
</table>
Criminal Justice Systems Involvement – Probation Risk Assessments

% of Medicaid Claimants with a Probation Risk Assessment

- Non-SMI
  - Low OST: 11%
  - Medium OST: 80%
  - High OST: 10%

- SMI
  - Low OST: 27%
  - Medium OST: 69%
  - High OST: 4%

0.88% of non-SMI
8.47% of SMI
## Multi-Systems Involvement

All Medicaid Claimants in Maricopa County
SFY 2015, n = 326,678

<table>
<thead>
<tr>
<th></th>
<th>Non-SMI claimants</th>
<th>SMI claimants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>67.51%</td>
<td>49.23%</td>
</tr>
<tr>
<td>Inpatient</td>
<td>46.03%</td>
<td>26.85%</td>
</tr>
<tr>
<td>Jail Bookings</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Probation</td>
<td>.88%</td>
<td>8.47%</td>
</tr>
<tr>
<td>HMIS</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
AIM 4: To transform our proof of concept analyses into visualizations that facilitate evidence-informed and actionable dialogue and decision-making between multi-sector policy-makers that can lead to a culture of health for Medicaid enrolled individuals experiencing behavioral health issues.
ASU Decision Theater
Conclusions/Discussion

Compared to people who are not SMI, patients with SMI found to:

– Generate comparable total health care claims value up through the 5\textsuperscript{th} decile
– Generate markedly lower value health claims at deciles 6 – 10
– Receive significantly more behavioral health care
– Receive significantly less physical health care
– Experience less ER/ED services
– Experience less inpatient care
Next Steps

- Re-evaluate the metric for creation of strata/deciles
- Evaluate relationships between patient characteristics and claim patterns
- Replicate analysis for GMHSA/Children’s
- Continue analysis and linking with other data sets already in possession
- Secure additional data sets
- Create and evaluate visualization platforms for multi-system policy dialogues
- Secure additional funding (RWJ or NIMH) to bring to statewide scale
Christopher D. Maxwell, PhD, MA
Professor, School of Criminal Justice,
College of Social Science
Michigan State University
CMaxwell@msu.edu

Questions and Discussion
### Archives

http://systemsforaction.org/research-progress-webinars

### Upcoming

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>Thursday, November 2</td>
<td>12-1pm ET/ 9-10am PT</td>
<td><strong>Testing a Community Complex Care Response Team to Improve Geriatric Public Health Outcomes</strong></td>
<td>Carolyn E. Ziminski Pickering, PhD, MSN, BSN, University of Texas Health Science Center, San Antonio; and Christopher Maxwell, PhD, School of Criminal Justice, Michigan State University</td>
</tr>
<tr>
<td>Wednesday, November 15</td>
<td>12-1pm ET/ 9-10am PT</td>
<td><strong>Implementing a Culture of Health Among Delaware’s Probation Population</strong></td>
<td>Daniel J. O’Connell, PhD, and Christy Visher, PhD, Department of Criminal Justice, Center for Drug &amp; Health Studies, University of Delaware</td>
</tr>
<tr>
<td>Wednesday, December 6</td>
<td>12-1pm ET/ 9-10am PT</td>
<td><strong>Housing for Health: Cross-Sector Impacts of Supportive Housing for Homeless High Users of Health Care</strong></td>
<td>Ricardo Basurto Davila, PhD, MS, Chief, Policy Analysis Unit, LA County Dept. of Public Health and Corrin Buchanan, MPP, Program Manager, Housing for Health, LA County Dept. of Public Services</td>
</tr>
</tbody>
</table>
Thank you for participating in today’s webinar!

For more information about the webinars, contact:

SystemsforAction@uky.edu
111 Washington Avenue #201, Lexington, KY 40536
859.218.2317
www.systemsforaction.org
**Speaker Bios**

**Dr. William Riley** is a Professor in the School for the Science of Health Care Delivery at Arizona State University, where he teaches process engineering, health finance, and health care quality and safety design. He previously served as the Associate Dean for the School of Public Health at the University of Minnesota and currently serves as the Director of the National Safety Net Advancement Center. Dr. Riley brings 25 years of senior executive experience in health care organizations, including serving as President and CEO of Pacific Medical Center in Seattle, Washington; CEO of Aspen Medical Group in St. Paul, Minnesota; Senior Vice President at Blue Cross Blue Shield of Minnesota in St. Paul; and Senior Vice President of St. Paul-Ramsey Medical Center/Ramsey Clinic. Dr. Riley's research areas include quality improvement and patient safety, with several nationwide and international projects currently underway. He is the author of more than 60 articles related to quality management, patient safety and health care management, and has co-authored two books on performance improvement in health care. A past chair of the Public Health Accreditation Board, Dr. Riley serves on several boards, including the Fairview Physicians Associates (FPA), an affiliate of Fairview Health Systems.

**Dr. Michael Shafer** is a professor in the School of Social Work at Arizona State University’s College of Public Service and Community Solutions where he also holds affiliate appointments in the Center for Health Information Research and the School of Criminology and Criminal Justice. Dr. Shafer is the founding director of the Center for Applied Behavioral Health Policy which has, for the past 25 years, conducted cutting edge research on the adoption and implementation of innovative practices in behavioral health care. Dr. Shafer has authored more than 40 peer-reviewed research articles and generated more than $45 million in grants and contracts that target capacity building and innovation in behavioral health services.

**Dr. George Runger** is Chair of the Department of Biomedical Informatics (BMI) and the International School of Biomedical Diagnostics and Professor in the School of Computing, Informatics, and Decision Systems Engineering at Arizona State University. He researches analytical methods for knowledge generation and data-driven improvements in systems. He focuses on machine learning for large, complex data, and real-time analysis, with applications to processes, surveillance, decision support, and population health. Previously, he was a senior engineer and technical leader for system improvements and analytics projects at IBM. He reviews for journals in the area of machine learning and statistics and he is currently the department editor for healthcare informatics for IIE Transactions on Healthcare Systems Engineering.