Areas of Minnesota with both high diversity and poverty had twice the risk of health care amenable death.

Chronic heart disease was the leading cause of death in all high poverty areas, followed by treatable cancer and stroke.

High-poverty communities in Minnesota suffered additional productivity losses of over $114 million per year.

Policy Implications
This study adds to other evidence linking social determinants of health to life expectancy in a state that does comparably well in terms of residents living long and healthy lives.

Quantifying the economic burden of these disparities for high-risk communities points to an urgent need beyond the loss of emotional support, family integrity, and community history. Identifying areas with possible barriers to timely and effective health care allows citizens, policymakers, public health officials, and health care providers to further explore community needs.

Limitations
This observational study does not show a causal relationship between poverty, race, and premature death—only a suggestive contribution to premature death.

Productivity loss can be unpredictable and decedents could have died of other causes or achieved different income levels. Therefore, a discount rate of 3% was applied per year of life lost. Care should be taken when identifying mortality rates in specific census tracts to account for random variability in infrequent events, and rates with less than 20 events or a relative standard error of 23% or more are suppressed.

Acknowledgements
This research was funded by the Minnesota Department of Health. Stefan Gildemeister, Ahtila Simon, and Diane Rydzyn helped frame the project and provided ongoing support.
Clinics certified as Health Care Homes (HCHs) provided high-quality diabetes care to more patients than non-HCH clinics in Minnesota.

More HCHs diabetes patients took recommended statins and fewer HCHs patients used tobacco compared to patients at non-HCH clinics.

Results
Certified HCHs (n=304) had significantly higher optimal diabetes care rates (U=31,503, p<.000, r=.20) compared to non-HCHs (n=269). HCHs had significantly higher rates of recommended statin use (U=33,235, p<.000, r=.16) and significantly higher rates of tobacco-free patients (U=33,994, p<.000, r=.15). HCHs had higher optimal diabetes care rates in rural and small town areas of Minnesota (U=2,386, p<.011, r=.19) (HCHs n=55, non-HCHs n=118) and in urban and micropolitan areas (U=14,785,5, p<.000, r=.18) (HCHs n=251, non-HCHs n=151). HCHs also had significantly higher optimal diabetes care rates for Medicare patients (U=32,329, p<.000, r=.17) and Medical Assistance patients (U=30,698, p<.000, r=.20).

Implications
Diabetes management is challenging for patients and providers. Although differences between HCHs and non-HCH clinics were modest overall, they were consistent across the state. These results demonstrate that use of the HCH model is associated with more high-quality care for diabetic patients at Minnesota clinics. Through their emphasis on partnership and patient engagement, HCHs may be particularly well-suited to improving aspects of care that are moderated by patient-provider relationships and communication, such as statin use and tobacco avoidance. Future research should continue to investigate the relationship between PCMH-model clinics, patient engagement, and chronic condition management.

Limitations
This study does not demonstrate a causal relationship between HCH status and Optimal Diabetes Care rates. Other clinic or patient factors may influence diabetes care quality and HCH certification. This study is based on one year of HCH certification and Optimal Diabetes Care data.

More information:
Minnesota Statewide Quality Reporting and Measurement System
www.health.state.mn.us/data/hcquality
Minnesota Health Care Homes Program
www.health.state.mn.us/facilities/hchomes
Contact: Rachel.Cahoon@state.mn.us
Almost 200,000 Minnesotans are in the glitch – but only 6,100 purchase unsubsidized coverage in the individual market.

Table 1: Number of Minnesotans in the Family Glitch by Health Insurance Coverage, 2019

<table>
<thead>
<tr>
<th>Current Health Insurance Coverage</th>
<th>Population Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Market Coverage</td>
<td>6,100</td>
</tr>
<tr>
<td>ESI Coverage</td>
<td>170,000</td>
</tr>
<tr>
<td>Uninsured</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>186,100</strong></td>
</tr>
</tbody>
</table>

Source: Minnesota Department of Health and Human Services; used to determine poverty status and access to government programs.

Methods and Data

Employee Premiums
- Average Employee Share of Premiums
- Single Coverage
- Family Coverage
- Employer Size

Minnesota Population
- Access to ESI (self/parent/spouse)
- Income (<FPG)
- Demographics
- Employer Size

In Family Glitch – all must apply
- Access to ESI through spouse/parent
- Income <$FPG
- Demographics
- Employer Size

Meet the Larson Family

Family Coverage through my spouse’s employer is MORE than 9.86% of our income. My spouse has affordable coverage, so we can’t get federal subsidies.

Single Coverage through my employer is LESS than 9.86% of our income. I have access to affordable coverage.

The Price Tag of Limiting Individual Market Benchmark Premiums to 9.86% of Income in Minnesota in 2019:

- Current Individual Market Coverage: $16.5 million
- Currently Uninsured: $5.6 million
- Current ESI Coverage: $132.3 million

Definitions

ESI: Employer Sponsored Health Insurance – health insurance coverage offered to employees (and in some cases their families) by employers. Employers pay, on average, 75% of premiums for single coverage, employees are responsible for the remaining premium and all cost sharing.

FPG: Federal Poverty Guidelines – annual income guidelines created by the United States Department of Health and Human Services, used to determine poverty status and access to government programs.

APTC: Advanced Premium Tax Credit – federal tax credit offered by the federal government to make individual market health insurance more affordable. The credits are based on income, and reduce a benchmark premium to a certain percentage of income; the percentage varies based on the FPG.

Unintended Consequences
- The Patient Protection and Affordable Care Act (ACA) provides tax credits to Americans with low and moderate incomes to purchase health insurance coverage on the individual market.
- To ensure employers do not drop coverage (in addition to the employer mandate), tax credits are not available to people who have access to affordable employer coverage.

What is Affordable ESI?
- Employer coverage is considered affordable if the employee share of single premiums is less than 9.86% of the employee’s income.
  - This does not consider family income, because an employer can’t determine family income.
  - Family premiums are generally 4 to 5 times as expensive as single premiums, and the employee share is generally a higher percentage of the total premiums.
  - Smaller employers, in particular, may choose to not subsidize family premiums, even if they do subsidize single premiums, due to the expense.

If an employee has access to affordable single coverage through an employer that also offers family coverage, his or her spouse and children are also considered to have access to affordable ESI under the ACA, even if the family premium is over 9.86% of income.

Access to affordable ESI is split evenly between parents and spouses for individual market enrollees and uninsured Minnesotans.

4 in 5 young adults (18 to 25) in the family glitch without ESI are eligible through their parents

Access to ESI for Minnesotans purchasing individual market coverage or who are uninsured, by age and family member with affordable ESI:

- Under 18: Parent ESI, 41.4%
- 18 to 25: Parent ESI, 38.4%
- 26 or older: Spouse ESI, 46.2%

Note: Totals to 100% Source: Minnesota Department of Health analysis of the 2017 Minnesota Health Access Survey (MNHA)
Are Inpatient Prices Linked Across Medicaid Managed Care and Commercial Markets? Evidence from the Minnesota All Payer Claims Database

Chris Frenier, Pamela Mink, PhD, Stefan Gildemeister

A large body of research exists on variation in the prices negotiated between health plans and hospitals. In Minnesota, about 84% of the state’s Minnesota Health Care Program (MHCP) enrollees are covered through private managed care plans that negotiate prices with hospitals and other providers. In this study we document variation in vaginal delivery prices in Minnesota’s public insurance programs and examine the relationship between delivery prices in Medicaid Managed Care (MMC) and the commercial insurance market.

**Background**
A large body of research exists on variation in the prices negotiated between health plans and hospitals. In Minnesota, about 84% of the state’s Minnesota Health Care Program (MHCP) enrollees are covered through private managed care plans that negotiate prices with hospitals and other providers. In this study we document variation in vaginal delivery prices in Minnesota’s public insurance programs and examine the relationship between delivery prices in Medicaid Managed Care (MMC) and the commercial insurance market.

**Objective**
1. Document the variation in MHCP vaginal delivery prices and compare the degree of variation to deliveries in the commercial insurance system.
2. Estimate the correlation between MHCP prices and commercial prices at the hospital and hospital-insurer level.

**Methods**
**Sample**
Medicaid Managed Care and commercial admissions for vaginal delivery between 2012-2015.

**Price Measures**
- Adjusted Admission Price - plan paid amount plus cost-sharing (for commercial admissions) adjusted for patient & clinical factors.
- Hospital Price - Regression adjusted hospital price across all insurers.
- Hospital-insurer price index - Regression adjusted price paid by an insurer at a hospital.

**Price Correlations Between Medicaid and Commercial Insurance**

**Key Findings**

**Figure 1**
- Medicaid Managed Care admissions exhibited similar price variation to commercial admissions. Both distributions have a coefficient of variation (standard deviation/mean) of 0.23.
- The two distributions have a substantial region of overlap where MMC admissions were more expensive than commercial admissions.

**Figure 2**
- Hospital prices show less variation – the coefficient of variation for MMC prices is 0.13.
- Nearly all hospitals receive higher prices from MMC than traditional Medicaid (the red dashed line).

**Figures 3 and 4**
- There is no significant correlation between commercial and Medicaid delivery prices at hospitals.
- This suggests that “cost shifting” explanations for high commercial prices are unlikely – lower public reimbursement is not associated with higher private prices.
- There is a negative but non-significant relationship between the price an insurer pays to a hospital for MMC deliveries and commercial deliveries. The slope of the line is -0.5.

**Discussion**
Health plan negotiated provider prices appear to vary substantially in Minnesota’s Medicaid Managed Care program. Understanding the role of bargaining and market power between insurers and hospitals may be important for states that deliver Medicaid benefits through private insurers.

More research to examine the ways in which Medicaid Managed Care and commercial prices are linked will be valuable toward better understanding the dynamics between insurers and hospitals that participate in both markets.
Potentially Preventable Readmissions in the Minnesota All Payer Claims Database, 2012-2015

Astrid Knott, Pamela Mink, and Stefan Gildemeister
Health Economics Program, Minnesota Department of Health, St. Paul, MN

Research Objective
Readmissions have been used as a quality measure in various settings including in Medicare’s Hospital Readmission Reduction Program (HRRP), but studies are usually limited to subsets of the population. Our goal is to describe potentially preventable readmissions (PPR) across payers (Medicare, MN State Programs including Medicaid and MinnesotaCare, Commercial) in Minnesota over time.

Background
Readmissions within 30 days of discharge are common. There are planned readmissions (for follow-up procedures) and unplanned readmissions. A proportion of the unplanned readmissions might be preventable with improvements in care coordination, communication across the delivery system, and discharge planning.

Reducing readmissions has been a goal of hospitals and payers following the introduction of penalties under Medicare’s Hospital Readmission Reduction Program (HRRP). In Minnesota the Reducing Avoidable Readmissions Effectively (RARE) Campaign developed and implemented a wide range of strategies to reduce readmissions. The campaign estimates that approximately 7,900 readmissions were prevented from 2011 to 2013.

A variety of tools exist to evaluate readmissions, including CMS’ all cause readmission measure looking at observed to expected readmissions for specific medical conditions.

Methods
Data source: Minnesota All Payer Claims Database (MN APCD).

Study population: All important discharges for insured Minnesota residents in the MN APCD for federal fiscal years (October-September) 2012, 2013, 2014, and 2015 (11 months plus 1 month randnecked)

Outcome of interest: PPR after hospitalization identified using the PPR Grouper (3M™ Health Information Systems).

Data analysis: We used the PPR Grouper (3M™ Health Information Systems) to identify PPR within 30 days after an initial hospitalization. Rates of observed to expected PPR were calculated for each payer. Expected counts were adjusted for each DRG and severity of illness combination (indirect standardization) using IFY 2011 data.

Table 1: Potentially Preventable Readmissions – by Payer, 2012-2015

<table>
<thead>
<tr>
<th>Payer</th>
<th>Year</th>
<th># Only Admission</th>
<th># Index Admission</th>
<th>Total Index Adm. &amp; Only Adm.</th>
<th># PPR</th>
<th>Risk adjusted PPR rate</th>
<th>Actual to Expected PPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>2012</td>
<td>117,526</td>
<td>6,122</td>
<td>123,648</td>
<td>7,453</td>
<td>7.9%</td>
<td>0.96</td>
</tr>
<tr>
<td>Commercial</td>
<td>2013</td>
<td>112,581</td>
<td>5,842</td>
<td>118,423</td>
<td>6,919</td>
<td>7.6%</td>
<td>0.95</td>
</tr>
<tr>
<td>Commercial</td>
<td>2014</td>
<td>99,869</td>
<td>4,765</td>
<td>104,634</td>
<td>5,719</td>
<td>7.0%</td>
<td>0.88</td>
</tr>
<tr>
<td>Commercial</td>
<td>2015</td>
<td>97,441</td>
<td>4,560</td>
<td>102,001</td>
<td>5,421</td>
<td>6.7%</td>
<td>0.86</td>
</tr>
<tr>
<td>Dual</td>
<td>2012</td>
<td>28,329</td>
<td>7,261</td>
<td>35,590</td>
<td>9,899</td>
<td>13.4%</td>
<td>1.62</td>
</tr>
<tr>
<td>Dual</td>
<td>2013</td>
<td>27,741</td>
<td>6,725</td>
<td>34,466</td>
<td>9,122</td>
<td>12.4%</td>
<td>1.55</td>
</tr>
<tr>
<td>Dual</td>
<td>2014</td>
<td>35,854</td>
<td>6,320</td>
<td>42,174</td>
<td>8,610</td>
<td>12.4%</td>
<td>1.56</td>
</tr>
<tr>
<td>Dual</td>
<td>2015</td>
<td>26,441</td>
<td>5,742</td>
<td>32,183</td>
<td>7,951</td>
<td>10.9%</td>
<td>1.41</td>
</tr>
<tr>
<td>Medicare</td>
<td>2012</td>
<td>95,898</td>
<td>8,919</td>
<td>104,817</td>
<td>10,512</td>
<td>8.3%</td>
<td>1.01</td>
</tr>
<tr>
<td>Medicare</td>
<td>2013</td>
<td>97,217</td>
<td>8,567</td>
<td>105,784</td>
<td>10,106</td>
<td>7.7%</td>
<td>0.96</td>
</tr>
<tr>
<td>Medicare</td>
<td>2014</td>
<td>93,676</td>
<td>8,127</td>
<td>101,803</td>
<td>9,788</td>
<td>7.6%</td>
<td>0.96</td>
</tr>
<tr>
<td>Medicare</td>
<td>2015</td>
<td>85,026</td>
<td>8,584</td>
<td>93,610</td>
<td>10,219</td>
<td>7.4%</td>
<td>0.95</td>
</tr>
<tr>
<td>MN State Programs</td>
<td>2012</td>
<td>62,891</td>
<td>5,241</td>
<td>68,132</td>
<td>7,157</td>
<td>8.4%</td>
<td>1.01</td>
</tr>
<tr>
<td>MN State Programs</td>
<td>2013</td>
<td>61,822</td>
<td>4,961</td>
<td>66,783</td>
<td>6,770</td>
<td>7.8%</td>
<td>0.98</td>
</tr>
<tr>
<td>MN State Programs</td>
<td>2014</td>
<td>66,617</td>
<td>5,389</td>
<td>72,006</td>
<td>7,359</td>
<td>7.9%</td>
<td>0.99</td>
</tr>
<tr>
<td>MN State Programs</td>
<td>2015</td>
<td>71,688</td>
<td>5,690</td>
<td>77,378</td>
<td>7,675</td>
<td>7.5%</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Source: MDH analysis of MN APCD data

Table 2: Top 10 DRGs for PPR Chains, 2015

<table>
<thead>
<tr>
<th>Rank DRG</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Septicemia &amp; Disseminated Infections</td>
<td>1,374</td>
<td>5.59</td>
</tr>
<tr>
<td>2  Major Depressive Disorders &amp; Other/Unspecified Psychoses</td>
<td>1,049</td>
<td>4.27</td>
</tr>
<tr>
<td>3  Heart Failure</td>
<td>979</td>
<td>3.98</td>
</tr>
<tr>
<td>4  Pneumonia</td>
<td>733</td>
<td>2.98</td>
</tr>
<tr>
<td>5  Bipolar Disorders</td>
<td>643</td>
<td>2.62</td>
</tr>
<tr>
<td>6  Chronic Obstructive Pulmonary Disease</td>
<td>642</td>
<td>2.61</td>
</tr>
<tr>
<td>7  Schizophrenia</td>
<td>609</td>
<td>2.48</td>
</tr>
<tr>
<td>8  Alcohol Abuse &amp; Dependence</td>
<td>510</td>
<td>2.08</td>
</tr>
<tr>
<td>9  Cardiac Arrhythmia &amp; Conduction Disorders</td>
<td>499</td>
<td>2.03</td>
</tr>
<tr>
<td>10  Pulmonary Edema &amp; Respiratory Failure</td>
<td>445</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Source: MDH analysis of MN APCD data

Table: Top 10 DRGs for PPR Chains, 2015

<table>
<thead>
<tr>
<th>Rank DRG</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Septicemia &amp; Disseminated Infections</td>
<td>1,374</td>
<td>5.59</td>
</tr>
<tr>
<td>2  Major Depressive Disorders &amp; Other/Unspecified Psychoses</td>
<td>1,049</td>
<td>4.27</td>
</tr>
<tr>
<td>3  Heart Failure</td>
<td>979</td>
<td>3.98</td>
</tr>
<tr>
<td>4  Pneumonia</td>
<td>733</td>
<td>2.98</td>
</tr>
<tr>
<td>5  Bipolar Disorders</td>
<td>643</td>
<td>2.62</td>
</tr>
<tr>
<td>6  Chronic Obstructive Pulmonary Disease</td>
<td>642</td>
<td>2.61</td>
</tr>
<tr>
<td>7  Schizophrenia</td>
<td>609</td>
<td>2.48</td>
</tr>
<tr>
<td>8  Alcohol Abuse &amp; Dependence</td>
<td>510</td>
<td>2.08</td>
</tr>
<tr>
<td>9  Cardiac Arrhythmia &amp; Conduction Disorders</td>
<td>499</td>
<td>2.03</td>
</tr>
<tr>
<td>10  Pulmonary Edema &amp; Respiratory Failure</td>
<td>445</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Source: MDH analysis of MN APCD data

Results
PPR rates varied by payer (Table 1). Commercial payers had the lowest risk adjusted PPR rate, followed by Medicare and MN state programs. Admissions for dual eligible beneficiaries had the highest PPR rate. PPR rates declined over time for all payers.

Chronic conditions (septicemia, heart failure, pneumonia, COPD, cardiac arrhythmia) feature prominently in the top 10 DRGs for PPR chains (Table 2). However, a number of mental health and substance abuse diagnoses are also present. In 2015, 83.2% of PPR chains consisted of 2 admissions (index admission plus one PPR), 11.9% of 3, 3.1% of 4, and 0.9% of 5 or more.

Conclusions:
The results mirror findings for other readmission measures, namely the decline of all-cause readmissions in Medicare’s HRRP.

Declining rates of PPR across all payers indicate that quality improvement initiatives at the federal, state, and hospital level have been successful at lowering PPR.

Further efforts need to be monitored for unintended consequences in light of evidence that lower readmission rates might come at the expense of higher mortality rates and increasing numbers of observation stays and ED visits.

Implications for Policy or Practice:
Quality improvement efforts at various levels have been successful in lowering PPR, but we have to ascertain that improvement in these process measures results in care improvements that benefit patients.

Past efforts to reduce readmissions have focused on medical conditions. Next steps for Minnesota might focus on the four mental health and substance use disorders in the top ten DRGs associated with PPR. For quality improvement efforts at all levels (hospital, state, national) it will be important to show that lower readmission rates are not due to inappropriate substitution of services (observation stays, extended ED stays) and do not result in deleterious health outcomes (mortality). Analysis of state APCDs may contribute to answering the substitution question.

Limitations:
• Claims data only show diagnosed and treated conditions. Only services paid for by insurance are submitted to the MN APCD.
• MN APCD covers claims for approximately 89% of Minnesotans with coverage. Not included are the uninsured and certain Medicaid populations in Minnesota, VA, Workers’ Comp, Insurers with a small footprint in Minnesota.
• No socioeconomic data available, therefore, could not evaluate the impact of socioeconomic on readmissions.

Acknowledgments: We thank 3M™ Health Information Systems for technical support.

Contact: astrid.knott@state.mn.us
Assessing the Impact of Direct to Consumer Telemedicine on Quality, Utilization, and Spending

Jiani Yu1,2, BA, Peter Huckfeldt2, PhD, Pamela Mink1, PhD, Jean Abraham2, PhD
1. Health Economics Program, Minnesota Department of Health
2. Department of Health Policy and Management, University of Minnesota

Introduction

Telemedicine: the use of telecommunications technology to remotely diagnose and treat patients

Direct to Consumer (DTC) Telemedicine:
- Type of telemedicine visit
- Also known as an online clinic visit or an e-visit
- Patient-initiated medical evaluation

Study Design
- Data: 2009-2014 health care claims from the Minnesota All Payer Claims Database (MN APCD)
- State repository of de-identified health care claims data, containing integrated medical, pharmacy claims, plan enrollment data from public and commercial payers
- Limited to commercially insured population
- Identified 30-day episodes of care initiated by a DTC telemedicine visit or an in-person visit

Research Questions
1. How do DTC telemedicine initiated episodes of care differ in episode-level quality outcomes relative to in-person services?
   - Focus on Urinary Tract Infections (UTIs)
   - Any antibiotics, guideline concordant, episode-level quality

Table 1. Selected Summary Statistics in the Pre Period (2009-2010)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>40.06</td>
<td>39.05</td>
</tr>
<tr>
<td>Probability of High User (mean)</td>
<td>9.49</td>
<td>8.34</td>
</tr>
<tr>
<td>Number of chronic conditions (mean)</td>
<td>1.62</td>
<td>1.26</td>
</tr>
<tr>
<td>Lives in a metropolitan area (mean)</td>
<td>59.07</td>
<td>64.19</td>
</tr>
<tr>
<td>Obesity (mean)</td>
<td>34.02</td>
<td>38.63</td>
</tr>
<tr>
<td>Bipolar disorder (mean)</td>
<td>0.92</td>
<td>0.51</td>
</tr>
<tr>
<td>Congestive heart failure (mean)</td>
<td>1.69</td>
<td>2.62</td>
</tr>
<tr>
<td>COPD (mean)</td>
<td>0.40</td>
<td>0.64</td>
</tr>
<tr>
<td>Depression (mean)</td>
<td>10.28</td>
<td>22.83</td>
</tr>
<tr>
<td>Diabetes (mean)</td>
<td>6.05</td>
<td>10.42</td>
</tr>
<tr>
<td>Osteoarthritis (mean)</td>
<td>19.72</td>
<td>12.50</td>
</tr>
<tr>
<td>Ischemic heart disease (mean)</td>
<td>8.63</td>
<td>9.89</td>
</tr>
<tr>
<td>Persistent asthma (mean)</td>
<td>16.64</td>
<td>11.04</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disorder (mean)</td>
<td>12.43</td>
<td>18.44</td>
</tr>
<tr>
<td>Low back pain (mean)</td>
<td>18.23</td>
<td>15.65</td>
</tr>
</tbody>
</table>

Empirical approach: Difference-in-differences (DiD) instrumental variables model

Instrument: expanded coverage of DTC telemedicine services in Minnesota among a subset of insurers starting in 2010

Impact: Episodes of care for enrollee population of payers expanding coverage of DTC services (first mover DTC payers)

Control: Episodes for enrollees of payers that did not expand coverage

3. Nationwide Adult Medicaid CAHPS. Health Care Experiences of Adults with Disabilities
References:
3. Nationwide Adult Medicaid CAHPS. Health Care Experiences of Adults with Disabilities