30-Day Readmissions for Medicaid Patients: Final Results of State-Level Summary Data

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AHRQ Learning Network for Medicaid Medical Directors (MMDLN)
November 8, 2011
Purpose of the Analysis

- To examine data quality and completeness
- To provide benchmarks drawn from self-reporting State-level summary data
- To compare differences in readmission rates by patient demographics and type of health plans
- To assess level of variation among these States
Methods

Readmission Specifications

1. Event-based rather than person-based
   \(# \text{ of readmissions} \)/ \(# \text{ of total hospital admissions} \)

2. Calendar year of 2009 – extending backward and forward
   a 30-day window to capture associated index admissions
   and possible readmissions, respectively.

3. Exclusions:
   - dual eligible or age 65 and above
   - died (in hospital, at home, in a medical facility, or
     in an unknown place)

4. NOT counted as a separate admission:
   - transfer to another acute care hospital
   - transfer to another type of institution for inpatient care
   - interim billing
Patient Demographics:
1. Age
   - Newborn and Pediatric (<1, 1-12, 13-20)
   - Adult (21-44, 45-64)
2. Gender
3. Race/ethnicity
   White, Black, Hispanic, Asian/Pacific Island, Native American, Other, Unknown

Clinical Categories: Obstetric (OB) vs. Non-obstetric (non-OB)
Health Plan Types: FFS, PCCM, MCO
Physical Health (PH) vs. Behavioral Health (BH)
Major Diagnostic Categories (MDC)
Methods
Analysis

- Focus on 30-day readmissions only

- Aggregate the results for each of the 5 tables:
  - PH only, overall and by age group
  - PH only, by gender and race/ethnicity
  - PH and BH combined, overall and by age group
  - PH and BH combined, by gender and race/ethnicity
  - MDC

Presenting Physical Health (PH) results only

- Assess level of variation among these states for the overall readmission rate by each of the 4 populations (Ped_OB, Ped_nonOB, Adult_OB, Adult_nonOB)
Combining the 16 States who submitted data:

- In 2009, out of 1.8 million hospital admissions, a total of **152,021** were 30-day readmissions.

- Overall 30-day readmission rate was **8.3%**.

- Hospital payments for 30-day readmissions amounted to **$1.3 billion**, or **14%** of total payment for hospital care.
### Results

#### 30-Day Readmission Rates (including Physical Health only)

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>FFS/PCCM</th>
<th>FFS</th>
<th>PCCM</th>
<th>MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pediatrics (age 0-20 years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>5.2%</td>
<td>5.4%</td>
<td>5.0%</td>
<td>5.4%</td>
<td>5.0%</td>
</tr>
<tr>
<td>- Obstetric</td>
<td>3.3%</td>
<td>3.7%</td>
<td>4.2%</td>
<td>2.9%</td>
<td></td>
</tr>
<tr>
<td>- Non-obstetric</td>
<td>5.8%</td>
<td>5.3%</td>
<td>6.1%</td>
<td>5.5%</td>
<td></td>
</tr>
<tr>
<td><strong>Adults (age 21-64 years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>11.3%</td>
<td>12.3%</td>
<td>13.9%</td>
<td>13.5%</td>
<td>9.5%</td>
</tr>
<tr>
<td>- Obstetric</td>
<td>3.6%</td>
<td>4.7%</td>
<td>2.2%</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>- Non-obstetric</td>
<td>16.8%</td>
<td>16.9%</td>
<td>20.6%</td>
<td>15.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8.3%</td>
<td>8.9%</td>
<td>8.6%</td>
<td>9.4%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Number of states</td>
<td>16</td>
<td>15</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>
### 30-Day Readmissions by Major Diagnostic Category, Combining FFC/PCCM and MCO

<table>
<thead>
<tr>
<th>Category</th>
<th>Share of all readmissions</th>
<th>Readmission rate</th>
<th>% Total hospital payment for readmissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>05-Mental Disorders</td>
<td>15%</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>11-Complications of Pregnancy, Childbirth, &amp; the</td>
<td>12%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>08-Diseases of the Respiratory System</td>
<td>10%</td>
<td>11%</td>
<td>16%</td>
</tr>
<tr>
<td>09-Diseases of the Digestive System</td>
<td>8%</td>
<td>14%</td>
<td>22%</td>
</tr>
<tr>
<td>07-Diseases of the Circulatory System</td>
<td>7%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>17-Injury &amp; Poisoning</td>
<td>7%</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>16-Symptoms, Signs, &amp; Ill-Defined Conditions</td>
<td>5%</td>
<td>16%</td>
<td>25%</td>
</tr>
<tr>
<td>03-Endocrine, Nutritional &amp; Metabolic, &amp; Immunity</td>
<td>5%</td>
<td>15%</td>
<td>22%</td>
</tr>
<tr>
<td>01-Infectious and Parasitic Diseases</td>
<td>4%</td>
<td>14%</td>
<td>19%</td>
</tr>
<tr>
<td>02-Neoplasms</td>
<td>3%</td>
<td>17%</td>
<td>22%</td>
</tr>
<tr>
<td>Total</td>
<td>76%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results

30-Day Readmission Rates by Age and Health Plan
(Physical Health only)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>FFS/PCCM</th>
<th>MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>3.5%</td>
<td>3.8%</td>
</tr>
<tr>
<td>1-12</td>
<td>9.0%</td>
<td>7.3%</td>
</tr>
<tr>
<td>13-20</td>
<td>7.6%</td>
<td>5.9%</td>
</tr>
<tr>
<td>21-44</td>
<td>9.1%</td>
<td>7.4%</td>
</tr>
<tr>
<td>45-64</td>
<td>17.6%</td>
<td>15.0%</td>
</tr>
</tbody>
</table>
Results

30-Day Readmission Rates by Gender and Health Plan (Physical Health only)

<table>
<thead>
<tr>
<th></th>
<th>Ped_FFS / PCCM</th>
<th>Ped_MCO</th>
<th>NonOB_FFS / PCCM</th>
<th>NonOB_MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5.3%</td>
<td>4.7%</td>
<td>16.7%</td>
<td>14.6%</td>
</tr>
<tr>
<td>Male</td>
<td>5.9%</td>
<td>5.4%</td>
<td>17.9%</td>
<td>16.2%</td>
</tr>
</tbody>
</table>
Newborns and Pediatrics: 30-Day Readmission Rates by Race/Ethnicity and Health Plan (physical health only)

<table>
<thead>
<tr>
<th></th>
<th>FFS/PCCM</th>
<th>MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>5.6%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Black</td>
<td>6.2%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Asian/P.I.</td>
<td>6.1%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Native American</td>
<td>6.2%</td>
<td>7.0%</td>
</tr>
</tbody>
</table>
**Obstetric Adults**: 30-Day Readmission Rates by Race/Ethnicity and Health Plan (physical health only)

<table>
<thead>
<tr>
<th></th>
<th>FFS/PCCM</th>
<th>MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White</strong></td>
<td>3.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>5.4%</td>
<td>4.2%</td>
</tr>
<tr>
<td><strong>Hispanic</strong></td>
<td>2.0%</td>
<td>1.9%</td>
</tr>
<tr>
<td><strong>Asian / P.I.</strong></td>
<td>2.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>Native American</strong></td>
<td>4.0%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>
Results

Non-Obstetric Adults: 30-Day Readmission Rates by Race/Ethnicity and Health Plan (physical health only)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>FFS</th>
<th>MCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>16.5%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Black</td>
<td>17.5%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>18.8%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Asian / P.I.</td>
<td>14.8%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Native American</td>
<td>19.6%</td>
<td>16.2%</td>
</tr>
</tbody>
</table>
State-Level Variation: FFS/PCCM

State FFS/PCCM 30-day Readmission Rates by Obstetric/Non-Obstetric and Age

- Obstetric, Pediatric
- Obstetric, Adult
- Non-obstetric, Pediatric
- Non-obstetric, Adult
State-Level Variation: MCO

State MCO 30-day Readmission Rates by Obstetric/Non-Obstetric and Age

- Obstetric, Pediatric
- Obstetric, Adult
- Non-obstetric, Pediatric
- Non-obstetric, Adult
Conclusions

- Feasible to produce benchmarks using state-level summary data submitted by individual states.

- Overall, PCCM had the highest readmission rates, followed by FFS. MCO had the lowest readmission rates.

- Behavioral health (i.e., mental disorders and substance abuse) contributed the most to the total number of readmissions.

- Non-obstetric adults age 45-64 years had the highest readmission rate.

- Readmission rates were higher for men than for women.
Conclusions

Racial/ethnic differences:

- Native Americans had the highest readmission rate among Newborns and Pediatrics.

- Among obstetric adults, Blacks had the highest readmission rate, followed by Native Americans and Whites. Hispanics and Asian/P.I. had much lower rates.

- Among non-obstetric adults, readmission rates were higher for Native Americans, Blacks, and Hispanics.

- The pattern of racial/ethnic disparities varied by OB and Non-OB, and by the type of health plan.
Conclusions

State-level variation:

- The variance between the lowest and the highest ranged from three to seven-fold difference.
- The amount of variation was also greater for non-OB patients than for OB patients.
Acknowledgements

- Joanna Jiang, Ph.D., Center for Delivery, Organization and Markets, Agency for Healthcare Research and Quality (AHRQ) for lead analysis.
- Ed Hock at Social and Scientific Systems, Inc. (SSS) for detailed examination of each State’s data and excellent programming assistance.
- 16 States that contributed State-level summary data (AL, AR, AK, CO, CT, IA, ME, MA, MN, NH, OK, PA, SC, TN, TX, WA).
- David Kelley, M.D. and Judy Zerzan, M.D. for leadership on the MMDLN readmissions workgroup and input to this analysis.
- Katherine Griffith at AcademyHealth for handling data submissions by individual States and for putting together State-level rates for analysis of variation.
NICU Regionalization in Texas

Michael E. Speer, MD
Background

Distribution of gestational age categories

US, 2008

- Not preterm is greater than or equal to 37 weeks gestation.
- Preterm is less than 37 completed weeks gestation.
- Very preterm is less than 32 completed weeks gestation.
- Moderately preterm is 32-36 completed weeks of gestation.

Source: National Center for Health Statistics, final natality data.

Background: Very preterm birth
US, 1998-2008

Source: National Center for Health Statistics, final natality data.
Background: Very preterm birth
Texas, 1998-2008

Source: National Center for Health Statistics, final natality data.
Background: Texas NICU Beds

Overall NICU bed increase = 84 percent:

1998   1,365
2009   2,510

Background: Births in Harris County

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Overall % Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60,061</td>
<td>61,067</td>
<td>63,325</td>
<td>63,411</td>
<td>65,410</td>
<td>66,707</td>
<td>67,131</td>
<td>11%</td>
</tr>
</tbody>
</table>

[http://soupfin.tdh.state.tx.us/cgi-bin/birthoc2](http://soupfin.tdh.state.tx.us/cgi-bin/birthoc2). Accessed on 9/15/11
Background: Neonatal deaths - Texas

Texas, 1996-2006

Source: National Center for Health Statistics, final natality data.

A neonatal death occurs in the first 28 days of life.
Maternal Mortality Ratio 2005-2006
Number of maternal deaths to 100,000 live births

<table>
<thead>
<tr>
<th>Location</th>
<th>2005</th>
<th>2006</th>
<th>2010 goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris County</td>
<td>19.4</td>
<td>15.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Texas</td>
<td>31.3</td>
<td>22.3</td>
<td>7.0</td>
</tr>
<tr>
<td>USA</td>
<td>15.6</td>
<td>15.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Canada</td>
<td>13.3</td>
<td>7.0</td>
<td>3.3</td>
</tr>
<tr>
<td>2010 goal</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
</tbody>
</table>
Background: Outcome

• Logistic regression analysis was used to compare the risk-adjusted outcomes of 3769 singleton infants born at or before 32 weeks' gestation, who were admitted to 17 Canadian NICUs during 1996-1997: Outborn vs. inborn

  - Adjusted for perinatal risks and admission illness severity

Background: Outcome

• Outborn infants: Less mature and sicker and had a higher risk of

  - Death (adjusted odds ratio [OR] 1.7, 95% confidence interval [CI] 1.2, 2.5),
  - Grade III or IV intraventricular hemorrhage (adjusted OR 2.2, 95% CI 1.5, 3.2),
  - Patent ductus arteriosus (adjusted OR 1.6, 95% CI 1.2, 2.1),
  - Respiratory distress syndrome (adjusted OR 4.8, 95% CI 3.6, 6.3), and
  - Nosocomial infection (adjusted OR 2.5, 95% CI 1.9, 3.3),

Background: Outcome

• Literature Review: 41 publications

  - Hospital level @ birth and neonatal/predischarge mortality for ≤1500 g (VLBW) or ≤32 weeks' gestation (VPT)

    • Birth @ Level III vs. Lower Level facility (Level I or II)

    • Increased odds of death for

      • VLBW infants (38% vs 23%; adjusted OR, 1.62; 95% confidence interval [CI], 1.44-1.83) and
      • VPT infants (15% vs 17%; adjusted OR, 1.55; 95% CI, 1.21-1.98)

Background: Outcome

• Examine gestational age-specific, risk-adjusted outcomes of 2962 singleton infants who were born at <32 weeks of gestation: Outborn vs. Inborn

  - @ <26 weeks’ gestation: Higher outborn mortality rates (odds ratio, 2.2) and ≥grade 3 intraventricular hemorrhage (odds ratio, 2.1)

  - @ 27 to 29 weeks of gestation: Higher outborn incidence of chronic lung disease (odds ratio, 1.7).

  - @ 30-31 weeks gestation: No difference

## Background: Place of Birth & Outcome

### United States

<table>
<thead>
<tr>
<th>IVH</th>
<th>Over All</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inborn</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>25.4%</td>
<td>3.7%</td>
</tr>
<tr>
<td>^</td>
<td>-</td>
<td>10.5%</td>
</tr>
<tr>
<td><strong>Outborn</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>61.8%</td>
<td>23.5%</td>
</tr>
<tr>
<td>^</td>
<td>-</td>
<td>19.3%</td>
</tr>
</tbody>
</table>

Guidelines for Perinatal Care*

- Definitions for both obstetrics & neonatal care
  - Level II: Specialty – Obstetricians, pediatricians, & sometimes neonatologists
    - Has an established triage system to identify high risk obstetric patients (including gestational age, <32 weeks’)
    - Short term ventilation; CPAP
    - Moderate, short term illnesses
    - Ability to stabilize severely ill neonates before transfer to a specialty or subspecialty facility.
  - Hospitals with specialty-level obstetrical services are not encouraged to provideneonatal intensive care.

*AAP & ACOG. 6th Ed. 2007
Guidelines for Perinatal Care*

• Definitions for both obstetrics & neonatal care
  - Level III: Subspecialty (Intensive care) – Maternal fetal medicine specialists, neonatologists
    • IIIA
      - Comprehensive care for neonates >28 weeks’ gestation & BW >1000 grams
      - Provide sustained conventional mechanical ventilation
      - Can perform minor surgical procedures (e.g., central line placement, inguinal hernia repair)

*AAP & ACOG. 6th Ed. 2007
Guidelines for Perinatal Care*

• Definitions for both obstetrics & neonatal care
  
  • IIIB
    - Care for neonates <28 weeks’ & BW <1000 grams
    - Sustained advanced mechanical ventilation
    - Advanced imaging & interpretation on an urgent basis (e.g., CT, MRI, echocardiography)
    - On site access to full range of pediatric subspecialists
    - Pediatric surgical subspecialties and pediatric anesthesia on site or @ a closely related institution to perform major surgery

* AAP & ACOG. 6th Ed. 2007
Guidelines for Perinatal Care*

• Definitions for both obstetrics & neonatal care

• IIIC
  - All of the capabilities of IIIB; plus,
  - ECMO
  - Open heart surgery for repair of complex, congenital heart disease

* AAP & ACOG. 6th Ed. 2007
Regionalization:

In the best of all possible worlds:

• **Goal**: Improve both the physical and neurological outcome of VLBW & ELBW babies

  - 80% of VLBW/VPT babies deliver in a facility with obstetric and neonatal expertise to provide the appropriate level of care (Level III NICU)

  - 90% of ELBW babies deliver in a facility with obstetric and neonatal expertise to provide the appropriate level of care (Level IIIB or IIIC NICU)
Regionalization: Data Elements

• Pre-intervention
  - Ascertain location and identity of specific hospitals where VLBW/VPT & ELBW babies are currently delivered
  - Identify all self-reported Level IIA, IIB, IIIA, IIIB, and IIIC NICUs in Texas
    - Use AAP Level of Care criteria to determine accuracy of self-report
  - Match specific hospital of birth and level of NICU service for all VLBW/VPT & ELBW babies
  - Hospitals receiving transfers will report the percentage, the appropriateness and timeliness of any maternal or neonatal transfer received during given 30 day periods
Regionalization: Data Elements

• Monitoring
  - Peer review
    • ELBW deliveries that occur outside Level IIIB or IIIC NICU facilities;
    • VLBW/VPT deliveries that occur outside Level III facilities
  - Developmental follow-up of all ELBW born 6 months prior and 6 months after implementation of HTB regionalization program
  - Monitor all new NICUs as to Level of Perinatal Care offered
  - Peer review all inter-facility transfers by a team of peers from both facilities

• Post-Intervention
  - Same as pre-intervention
Regionalization: Assessment Tools

• Coordinating Center
  • Standardize regionalization of perinatal services
    - Standard definitions and guidelines for levels of maternal and infant care that are consistently utilized
  • Optimize effective regionalization of perinatal care
  • Population based perinatal linked data system
    - E.g. – vital statistics, disease registries, hospital discharge data
  • Fundamental to identify and monitor perinatal outcomes
Regionalization: Assessment Tools

- Coordinating Center
  - Develop statewide collaborative database such as
    - California Perinatal Quality Collaborative (CPQCC)
    - Ohio Perinatal Quality Collaborative (OPQC)
  - Utilize Vermont Oxford Network (VON) Texas data as a starting point for VON participating hospitals
Regionalization: Communication

• Focus on reaching partners and key public leaders
  • Targeted messages
    - 2 to 3 clear messages
  • Utilize social media for public
  • Branding for hospital NICU Level of Care
  • Transparent public distribution of individual hospital data
Regionalization: Implementation

- Develop, dissemination, collection, and analysis of data
  - Disseminate recommendations regarding NICU level of care criteria to all stakeholders (professional societies, governmental agencies, payers, and the general public)
  - Achieve buy-in and endorsement by obstetrical care providers, professional societies, hospitals and payers
  - Develop systems that would identify a delivery falling outside accepted criteria for delivery of the less than 32 0/7th weeks’ gestation or less than 1,500 grams infant to generate an automatic peer-review.
Regionalization: Implementation

- Develop patient education that would commence early in pregnancy, and be reinforced throughout pregnancy
  
  • The importance of avoiding delivery of a baby less than 32 weeks’ gestation or less than 1,500 grams in a hospital that does not have an appropriate level NICU

- Track and report deliveries that occur in inappropriate settings prior to 32 0/7th weeks gestation or BW less than 1,500 grams, as determined by peer review

- As a priority, The Joint Commission/Det Norske Veritas develop standards to measure whether deliveries are in an appropriate setting
Regionalization: Sustainability

• Run in Period over 2 Years
  - Acquisition of data specific to provider, practice group, hospital, and hospital chain that is collected and reported in an ongoing fashion.
  - All outliers have mandated peer review.
  - The data is published or otherwise available to the public and payers
  - Review Level of Care criteria (OB & Neonatal) every 3 years
Regionalization: Scalability

• Demonstration Project?
  - Urban or Rural?

• State-wide?
  - Buy-in from major players would ensure success and accelerate implementation and sustainability
    • DSHS
    • HHSC
    • Major Payers
    • TJC/DNV