Mental Health Related Emergency Department Claims for Vermont Children

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These analyses, conclusions, and recommendations are solely those of the authors and are not necessarily those of the Green Mountain Care Board.

This presentation is a summary of a major project for the Department of Mental Health by Anita Wade, Vermont’s CSTE Applied Epidemiology Fellow 2017-2019.
Context for Project & Background
Context for Project

- Concern about children and youth in mental health (MH) crisis waiting in hospital emergency departments (EDs)
- Lack of data on children in EDs, especially those waiting on voluntary status
- Desire to understand clinical picture to inform:
  - policy / program development for the system of care
  - workforce development needs
- Ultimate goal to reduce use of EDs for MH crisis
Background

- 1 in 6 U.S. children aged 2–8 years (17.4%) were estimated to have a diagnosed mental, behavioral, or developmental disorder in 2016 (Cree, et al., 2018)

- Psychiatric visits accounted for 8-10% of all ED visits, 2011-2015 (Kalb, et al., 2019)

- 28% increase in psychiatric ED visits per 1000 youth between 2011-2015 (Kalb, et al., 2019)

- Emergency Departments are safety nets for people in crisis (Kalb, et al., 2019)
  - Presents many challenges
What does the use of EDs relating to mental health look like in Vermont?
What do we already know?

- Vermont Department of Mental Health (DMH) receives client-based information from Designated Agencies

**Served 11,052 children in Fiscal Year 2017**

- 1,170 clients received Emergency/Crisis Assessment, Support and Referral Services
- 2,601 Emergency/Crisis Services delivered
- 283 clients received Emergency/Crisis Bed Services
- 3,307 days of Emergency/Crisis Bed Services delivered
What do we want to know?

- What does the landscape of children’s mental health look like on a population level?
  - How frequently are children utilizing EDs for mental health related conditions?
  - What diagnoses are being reported on claims?

- Broader scope
  - What services do we need within the ED?
  - What services do we need before getting to the ED?
Methods
Overview

Choose data source
- Export data from the data warehouse

Link tables
- Link medical, diagnosis, provider and provider address tables

Create MH categories
- Use Clinical Classification Software to search for diagnoses of interest and categorize them

Analyze
- Age, sex, insurance type, diagnosis, location
Choosing the Right Data
Determining Appropriate Data Source

- Vermont data sources that include ED data:
  - All Payer Claims Database
  - Hospital Discharge Data
  - Syndromic Surveillance
  - Medicaid Claims

- Wants and needs for this project:
  - Records for every Vermont child that visited an ED
  - Ability to identify unique children
  - Ability to follow children across multiple years
  - Ability to see multiple diagnoses associated with a visit
And the winner is....

- Vermont’s All-Payer Claims Database
  - Vermont Health Care Uniform Reporting and Evaluation System (VHCURES)
  - Owned by Green Mountain Care Board
- Includes claims incurred and paid dates: 01/01/2007 – 09/30/2017
### VHCURES: The Pros and Cons

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Claims for a majority* of children that visited an ED</td>
<td>◯ Policy change for who is required to submit data to VHCURES resulted in loss of data</td>
</tr>
<tr>
<td>✓ Ability to identify unique children</td>
<td>◯ Limitations of claims data</td>
</tr>
<tr>
<td>✓ Ability to follow child longitudinally</td>
<td>◯ No time of admission to the ED</td>
</tr>
<tr>
<td>✓ Ability to see multiple diagnoses</td>
<td>◯ Complicated layout</td>
</tr>
<tr>
<td></td>
<td>◣ 20 data tables</td>
</tr>
<tr>
<td></td>
<td>◣ 59+ reference tables</td>
</tr>
</tbody>
</table>
Inclusion Criteria

- Primary, facility claims
  - Vermont residents
  - Under the age of 18
  - Visited an ED in VT or NH

- Flag variables
  - Emergency room = ‘Yes’
    - Revenue code in 0450-0459
    - Place of service code = ER
    - Procedure code in 99281-99289
  - Denied claim = ‘No’
Creating Mental Health Categories
International Classification of Diseases (ICD)

- Needed ICD-9-CM and ICD-10-CM categories
- Researched categorization methods
  - Reported in the literature
  - Previous surveillance indicator categories
  - Faces of Medicaid

Clinical Classification Software (CCS)
- ICD-9-CM = Multi-level CCS 2015
- ICD-10-CM= Beta Multi-level CCS 2019.1
CCS Mental Health Categories

- Adjustment Disorders
- Anxiety Disorders
- Attention Deficit, Conduct and Disruptive Behavior Disorders
- Delirium, Dementia and Amnestic and Other Cognitive Disorders
- Developmental Disorders
- Disorders Usually Diagnosed In Infancy Childhood or Adolescence
- Impulse Control Disorders not Elsewhere Classified
- Mood Disorders
- Personality Disorders
- Schizophrenia and Other Psychotic Disorders
- Alcohol-related Disorders
- Substance-related Disorders
- Suicide and Intentional Self-inflicted Injury
- Screening and History of Mental Health and Substance Abuse Codes
- Miscellaneous Mental Health Disorders
Things to Keep in Mind
Caveats of VHCURES Data

- **October 1\textsuperscript{st}, 2015**
  - Switch from ICD-9-CM to ICD-10-CM

- **Spring 2016**
  - Court case resulted in a reduction of who is required to submit data
  - “Gobeille Decision”

- **September 30\textsuperscript{th}, 2017**
  - End of data to which VDH has access
Caveats of VHCURES Data … Impact of ICD-9-CM transition to ICD-10-CM

5.13 Suicide and intentional self-inflicted injury


October 1st, 2015

Switch from ICD-9-CM to ICD-10-CM

Spring 2016

Court case resulted in a reduction of who is required to submit data

“Gobeille Decision”

September 30th, 2017

End of data we currently have access to

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Caveats of Using VHCURES ... Impact of caveats on 2015, 2016 and 2017 data

1 Switch to ICD10 Oct. 2015
2 Gobeille Decision Apr. 2016
3 Data does not include Q4 2017
Results
### Vermont Pediatric Population

- **Average population in Vermont from 2009-2017** = 625,609
- **Population under the age of 18** = 123,246
  - **Range** (116,825-130,450)

#### Distribution of age groups (<18 years old)

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>30%</td>
</tr>
<tr>
<td>6 to 10</td>
<td>27%</td>
</tr>
<tr>
<td>11 to 13</td>
<td>18%</td>
</tr>
<tr>
<td>14 to 17</td>
<td>25%</td>
</tr>
</tbody>
</table>

- **Distribution of sex (n=123,246)**
  - **Female** = 63,429 (51%)
  - **Male** = 59,817 (49%)
How many ED claims were submitted to VHCURES each year?

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims without a Mental Health Diagnosis in Fields 1-6</th>
<th>Claims with a Mental Health Diagnosis in Fields 1-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>38,610</td>
<td>6.2%</td>
</tr>
<tr>
<td>2010</td>
<td>37,614</td>
<td>7.0%</td>
</tr>
<tr>
<td>2011</td>
<td>39,725</td>
<td>7.2%</td>
</tr>
<tr>
<td>2012</td>
<td>40,617</td>
<td>6.5%</td>
</tr>
<tr>
<td>2013</td>
<td>38,792</td>
<td>6.6%</td>
</tr>
<tr>
<td>2014</td>
<td>37,716</td>
<td>6.4%</td>
</tr>
<tr>
<td>2015</td>
<td>38,477</td>
<td>7.0%</td>
</tr>
<tr>
<td>2016</td>
<td>33,597</td>
<td>6.6%</td>
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<tr>
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1. Switch to ICD10 Oct. 2015
3. Data does not include Q4 2017
How many ED claims were submitted to VHCURES each year?

- **105,111** unique individuals had a claim from 2009 – Q3 2017
- **2,209** unique individuals had at least 1 claim with a primary mental health diagnosis
- **4,805** unique individuals had at least 1 claim with a mental health diagnosis in fields 1-6

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<td>2016</td>
<td>33,597</td>
<td>6,615</td>
</tr>
<tr>
<td>2017</td>
<td>7,7%</td>
<td>7,7%</td>
</tr>
</tbody>
</table>
In what state were services provided?

- Pediatric ED Visits:
  - VT: 8%
  - NH: 92%
  - Total: 303,248

- Pediatric Mental Health Related ED Visits:
  - VT: 7%
  - NH: 93%
  - Total: 20,554

- Diagnosis fields 1-6 were searched for a mental health related diagnosis code.
Sex Distribution, Pediatric Emergency Department Claims, 2009 – Q3 2017

Claims without a Mental Health Diagnosis in Fields 1-6

Claims with a Mental Health Diagnosis in Fields 1-6

Average Vermont Pediatric Population

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims without Mental Health Diagnosis</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>Claims with Mental Health Diagnosis</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Average Vermont Pediatric Population</td>
<td>49%</td>
<td>51%</td>
</tr>
</tbody>
</table>
Rate of Pediatric Mental Health Related Emergency Department Claims by Sex

Diagnosis fields 1-6 were searched for a mental health related diagnosis code
Age Distribution, Pediatric Emergency Department Claims, 2009 – Q3 2017

Claims without a Mental Health Diagnosis in Fields 1-6

- ≤5: 44%
- 6-10: 20%
- 11-13: 13%
- 14-17: 23%

Claims with a Mental Health Diagnosis in Fields 1-6

- ≤5: 5%
- 6-10: 14%
- 11-13: 18%
- 14-17: 63%

Vermont Pediatric Population

- ≤5: 30%
- 6-10: 27%
- 11-13: 18%
- 14-17: 25%


color codes:
- Blue: ≤5
- Green: 6-10
- Gray: 11-13
- Orange: 14-17
Diagnosis fields 1-6 were searched for a mental health related diagnosis code
Age and Sex, Pediatric Emergency Department Claims, 2009 – Q3 2017

Claims without a Mental Health Diagnosis in Fields 1-6

- ≤5: 20%
- 6 to 10: 20%
- 11 to 13: 46%
- 14 to 17: 41%

Claims with a Mental Health Diagnosis in Fields 1-6

- Female: 53%
- Male: 19%
  - ≤5: 21%
  - 6 to 10: 8%
  - 11 to 13: 16%
  - 14 to 17: 72%
Age and Sex, Pediatric Emergency Department Claims, 2009 – Q3 2017

Claims without a Mental Health Diagnosis in Fields 1-6

- Male: 20% ≤5, 20% 6 to 10, 46% 11 to 13, 41% 14 to 17
- Female: 20% ≤5, 20% 6 to 10, 46% 11 to 13, 41% 14 to 17

Claims with a Mental Health Diagnosis in Fields 1-6

- Male: 53% ≤5, 19% 6 to 10, 21% 11 to 13, 8% 14 to 17
- Female: 72% ≤5, 3% 6 to 10, 16% 11 to 13, 13% 14 to 17

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### Distribution of Insurance Type for Pediatric Emergency Department Claims, 2009 – Q3 2017

#### Claims without a Mental Health Diagnosis in Fields 1-6

- Commercial: 27%
- Public: 73%

#### Claims with a Mental Health Diagnosis in Fields 1-6

- Commercial: 21%
- Public: 79%

#### Vermont Pediatric Population

- Commercial: 46%
- Public: 50%
- Medicare: 1%
- Military: 1%
- Uninsured: 2%

Distribution of Insurance Type for Pediatric Emergency Department Claims, 2009 – Q3 2017

Claims without a Mental Health Diagnosis in Fields 1-6
- 27% Commercial
- 73% Public

Claims with a Mental Health Diagnosis in Fields 1-6
- 21% Commercial
- 79% Public

Vermont Pediatric Population
- 50% Self-funded

Vermont Household Insurance Survey: 2018 Report
- Self-reported
- Weighted data from 3,002 households (n=7,193 Vermonters)
Mental Health Claims by Category
## Top 5 Mental Health Categories, 2009 - Q3 2017

<table>
<thead>
<tr>
<th>Primary Diagnosis</th>
<th>Percent</th>
<th>Diagnosis Fields 1-6</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mood disorders</td>
<td>29%</td>
<td>Attention deficit, conduct, and disruptive behavior disorders</td>
<td>28%</td>
</tr>
<tr>
<td>2 Anxiety disorders</td>
<td>17%</td>
<td>Mood disorders</td>
<td>25%</td>
</tr>
<tr>
<td>3 Attention deficit, conduct, and disruptive behavior disorders</td>
<td>14%</td>
<td>Anxiety disorders</td>
<td>22%</td>
</tr>
<tr>
<td>4 Suicide and intentional self-inflicted injury</td>
<td>10%</td>
<td>Screening and history of mental health and substance abuse codes</td>
<td>19%</td>
</tr>
<tr>
<td>5 Adjustment disorders</td>
<td>8%</td>
<td>Suicide and intentional self-inflicted injury</td>
<td>18%</td>
</tr>
</tbody>
</table>
Rate of Pediatric Mental Health Related Emergency Department Claims Using Diagnosis Fields 1-6

- Adjustment disorders
- Anxiety disorders
- Attention deficit, conduct, and disruptive behavior disorders
- Delirium, dementia, and amnestic and other cognitive disorders
- Developmental disorders
- Disorders usually diagnosed in infancy, childhood, or adolescence
- Impulse control disorders not elsewhere classified
- Mood disorders
- Personality disorders
- Schizophrenia and other psychotic disorders
- Alcohol-related disorders
- Substance-related disorders
- Suicide and intentional self-inflicted injury
- Screening and history of mental health and substance abuse codes
- Miscellaneous mental health disorders

Rate per 1,000 Claims
Specific Mental Health Categories

https://tenor.com/view/almost-there-almost-gif-6009178
# Count of Pediatric Mental Health Related Emergency Department Claims by Sex

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety Disorders</td>
<td>1926</td>
<td>2919</td>
</tr>
<tr>
<td>Attention Deficit, Conduct and Disruptive</td>
<td>2102</td>
<td>4080</td>
</tr>
<tr>
<td>Behavior Disorders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mood Disorder</td>
<td>1884</td>
<td>3702</td>
</tr>
<tr>
<td>Suicide and Self-Inflicted Injury</td>
<td>1285</td>
<td>2664</td>
</tr>
</tbody>
</table>
Distribution of Pediatric Mental Health Related Emergency Department Claims by Age and Sex

Claims with an Anxiety Disorder Diagnosis in Fields 1-6

<table>
<thead>
<tr>
<th>Age Group</th>
<th>≤5</th>
<th>6 to 10</th>
<th>11 to 13</th>
<th>14 to 17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>73%</td>
<td>18%</td>
<td>19%</td>
<td>22%</td>
<td>57%</td>
</tr>
<tr>
<td>Male</td>
<td>8%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Claims with an Attention Deficit, Conduct and Disruptive Behavior Disorder Diagnosis in Fields 1-6

<table>
<thead>
<tr>
<th>Age Group</th>
<th>≤5</th>
<th>6 to 10</th>
<th>11 to 13</th>
<th>14 to 17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>47%</td>
<td>27%</td>
<td>23%</td>
<td>32%</td>
<td>38%</td>
</tr>
<tr>
<td>Male</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Claims with a Suicide and Intentional Self-Inflicted Injury Diagnosis in Fields 1-6

<table>
<thead>
<tr>
<th>Age Group</th>
<th>≤5</th>
<th>6 to 10</th>
<th>11 to 13</th>
<th>14 to 17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>78%</td>
<td>20%</td>
<td>9%</td>
<td>17%</td>
<td>74%</td>
</tr>
<tr>
<td>Male</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Claims with a Mood Disorder Diagnosis in Fields 1-6

<table>
<thead>
<tr>
<th>Age Group</th>
<th>≤5</th>
<th>6 to 10</th>
<th>11 to 13</th>
<th>14 to 17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>81%</td>
<td>16%</td>
<td>18%</td>
<td>7%</td>
<td>72%</td>
</tr>
<tr>
<td>Male</td>
<td>2%</td>
<td>9%</td>
<td>2%</td>
<td>9%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Distribution of Claims by Age and Sex: Anxiety

Claims with an Anxiety Disorder Diagnosis in Fields 1-6

- 73% ≤5
- 18% 6 to 10
- 19% 11 to 13
- 22% 14 to 17

- 1% Female
- 2% Male

Claims with an Attention Deficit, Conduct and Disruptive Behavior Disorder Diagnosis in Fields 1-6

Claims with a Suicide and Intentional Self-Inflicted Injury Diagnosis in Fields 1-6

Claims with a Mood Disorder Diagnosis in Fields 1-6
Claims with an Anxiety Disorder Diagnosis in Fields 1-6

- 73% ≤5
- 18% 6 to 10
- 19% 11 to 13
- 22% 14 to 17
- 57% Male

Distribution of Claims by Age and Sex: Anxiety
Distribution of Claims by Age and Sex: Attention Deficit, Conduct & Disruptive Behavior

Claims with an Attention Deficit, Conduct and Disruptive Behavior Disorder Diagnosis in Fields 1-6

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td>≤5</td>
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<td>32%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Distribution of Claims by Age and Sex: Suicide & Self-Harm

Claims with a Suicide and Intentional Self-Inflicted Injury Diagnosis in Fields 1-6

- ≤5: 78%
- 6 to 10: 20%
- 11 to 13: 17%
- 14 to 17: 74%

Female: 98%
Male: 91%
Distribution of Claims by Age and Sex: Mood Disorders

Claims with a Mood Disorder Diagnosis in Fields 1-6

- ≤5: 81%
- 6 to 10: 16%
- 11 to 13: 18%
- 14 to 17: 72%

Female: 2%
Male: 9%
Key Highlights from VHCURES, 2009-Q3 2017

- 22,000+ Claims related to MH using diagnosis fields 1-6
  - 6.8% of ED Claims
  - 4,000+ Unique Children
- MH claims were:
  - 79% Public Insurance*
  - 51% for females
  - 63% for 14 – 17 years
- Distribution of age groups differed by sex of child
- Top 3 MH categories:
  - Mood disorders
  - Anxiety disorders
  - Attention deficit, conduct, and disruptive behavior disorders
The general proportion of claims related to mental health was consistent over time (6.2-7.7%).

Counts of specific mental health categories varied over time.

Final Thoughts

Limitations

Claims data

Caveats of the last 3 years of data
- ICD-9 to ICD-10 transition
- Loosing self-funded enrollees

Using Beta version of CCS for ICD-10
Future Considerations

- Raises many more questions
  - Readmission
  - Geographic location of patient
  - Procedure codes
  - Comparison with other VT data sources...

- Policy & practice implications
Policy and Practice Implications

- Understand scope of problem beyond anecdotal experience
- Informs workforce development/training on specific practices to address clinical presentation of youth (e.g., DBT)
- Mobile Response and Stabilization Services (MRSS) proposal
The Need for Mobile Response and Stabilization Services (MRSS) in Vermont: From Reactive to Responsive

Better outcomes in both cost and quality of care are achievable through community-based initiatives that redefine the meaning of “crisis” and address and stabilize behaviors prior to escalation to the level of requiring inpatient care.

~SAMHSA
In Vermont, we would like to take a proactive approach rather than waiting for a tragedy to drive system change. We know we are not immune to tragedy and we need to have the right resources in place to do all we can to reduce the likelihood of one happening in our state.

Other states instituted Mobile Response and Stabilization Services in response to a major tragedy such as a school shooting or pending legal action under EPSDT.
Figure 4: Rate of mental health related claims per 1,000 emergency department claims by sex. Diagnosis fields 1-6 were searched for a mental health related diagnosis code. Claims restricted to Vermont children under the age of 18 that visited an emergency department in Vermont or New Hampshire.

Source: Vermont Health Care Uniform Reporting and Evaluation System (VHCURES)
How is MRSS different than traditional crisis services?

- Mobile Response and Stabilization Services provide more **upstream services**.
- A mobile face-to-face response is provided to a **family-defined crisis** to provide support and intervention for a child/youth and their family, **before** emotional and behavioral difficulties escalate.
Core Components of MRSS

- Crisis is defined by the caller, not the provider – a “Just Go!” approach
- Face-to-face mobile response to location preferred by the family
- On-site/in-home assessment, de-escalation, crisis planning, resource referral
- Brief follow up stabilization services, case management
- MRSS Team consists of:
  - Team coordinator/ clinical director
  - Licensed or license-eligible clinician
  - Behavioral Specialist or Family Peer Services Worker
  - Access to a psychiatrist or APRN under the supervision of a psychiatrist
- Centralized Call Center (strongly recommended)
- Data tracking and performance measurement reporting
Acknowledgments

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  - Dr. Laurin Kasehagen, CDC/VDH/VDMH and Dr. Patsy Kelso, VDH
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Thank you!
References


