Gaining a Comprehensive Understanding of Behavioral and Mental Health Service Utilization through Data Integration

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Introduction. Beyond instrumentation, and the determination of actionable needs for children and youth seeking or receiving behavioral and mental health services, there are several micro and macro factors that impact these children and youth’s (including their families’) access to and utilization of services (Sarvet et al., 2010). Therefore, knowledge and understanding of contextual factors and service utilization trends and patterns are essential (Andersen, 1995; Burns et al., 1995; Sarvet et al., 2010).

Although data to develop such knowledge may exist, it is often siloed or structured in ways that do not easily allow for meaningful interpretations and inferences to be made (Bruns, Coldiron & Hensley, 2017). To illustrate this premise, this presentation uses a combination of heterogeneous and disparate data (both quantitative and qualitative) to engender an understanding of the contextual factors impacting children and youth’s utilization of behavioral and mental health services in Indiana from 2004 to 2016.

Method. Descriptive case study (Yin, 2014; Zainal, 2007). The current data available for children/youth receiving state-funded behavioral and mental health services in Indiana offers limited information about the children, the quality of the services, and the outcomes (Karikari & Walton, 2017). Examining the current data alone, one may assume that there is an improvement in mental health service utilization. However, that assumption is inaccurate (Karikari & Walton, 2017). There are important questions that remain unanswered about service utilization. For e.g:

- Overall, how many children need services, and how many are getting the needed services?
- What are the presenting cases/conditions for these children/youth?
- What is the socio-economic status of the children/youth and/or their families?
- Where are they located/living – in rural or urban areas?

Data Integration. Data integration is a structured process (Arrison & Weidman, 2010; Dyché & Levy, 2006; Gyamfi & Williams, 2017). A variety of data integration approaches exist, e.g. the federation approach, and the extract, transform, load (ETL) approach (Arrison & Weidman, 2010; Dyché & Levy, 2006; Gyamfi & Williams, 2017).

We used the ETL approach. Data of different formats/structures were pulled from a variety of sources, and converted into a common format (Arrison & Weidman, 2010). These included:

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uninsurance rates data (Alker & Chester, 2014), child population data (Annie E. Casey Foundation, 2017), and behavioral health barometer data (Substance Abuse and Mental Health Services Administration, SAMHSA, 2015).

Data integration served as a critical tool in producing insights on the population of children/youth receiving services (Karikari & Walton, 2017). In a general sense it enhanced the understanding of the service utilization trends (Karikari & Walton, 2017). Metaphorically, it was like improving the quality of a grainy/pixelated picture.

**Summary.** From the data gathered, we know that it is just about a third (1/3) of kids in Indiana actually get the mental health services they need. What happens to the two-thirds or 70%? Again, from the data, for e.g. looking at the CANS data, we get an idea of the services being provided to children/youth and families.

From the accumulated information, it is quite clear that multiple factors may be impacting service utilization – e.g. uninsurance rates, cultural and linguistic competency challenges, etc (Alker & Chester, 2014; Bussing & Gary, 2012; VanDyke, 2017). Some insight is also gained about the challenges in the service system, and the areas needing improvement. Further, we are able to make inferences about the possible impact of policy decisions on service utilization over the years.

**Limitation.** The approach is not designed for understanding the unique or individual situations of children/youth utilizing services.

**Recommendations.** Attention needs to be given to how services and service-use is determined and structured (Orme & Combs-Orme, 2012). It is important to consider if assessment tools/systems such as the Child and Adolescent Needs and Strengths (CANS, Lyons, 2009) are capturing/providing adequate information about children’s clinical profiles and relevant psychosocial and behavioral domains to inform treatment planning and policy recommendations (Bloom, Fischer & Orme, 2009; Orme & Combs-Orme, 2012). Additionally, service providers must ensure fidelity in their assessments to guarantee that accurate information is collected? (Domitrovich & Greenberg, 2000).

Besides the children/youth, focusing on caregivers is also important. The extant literature suggests that variables/factors such as parent stress, subjective/perceived need for services by caregivers/decision makers impact service utilization (Brannan, Heflinger & Foster, 2003; Bussing & Gary, 2012).

Developing and/revising data sharing protocols among agencies can enhance access to information and allow for effective planning and the provision of services to children/youth (Burton, Walton, Byrd & Huston, 2017). When agencies are on the same page, the provision of services can be better and more effectively coordinated (Burns et al., 1995; Garland, Hough, Landsverk & Brown, 2001).
References


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Objectives

1. Discuss importance of using existing information, e.g. child and youth mental health service utilization and CANS information, to support planning, to monitor progress, and to improve outcome.

2. Highlight the challenges of limited/disparate data.

3. Promote understanding of children/youth’s mental health service utilization through data integration.
Introduction

- Assessments represent “one” piece of a complex puzzle.

- Micro and macro factors impact children/families’ access and utilization of mental and behavioral health services.

- Available data is often siloed.

- Effective integration of heterogeneous and disparate data can facilitate a proper understanding of factors that impact service utilization.

Children and Youth's Mental Health Services Utilization: Aggregated (2004-2016)

(Karikari & Walton, 2017)
Children and Youth's Mental Health Services Utilization by Gender (2004-2016)
Percentage of Mental Health Service Utilization by Gender (2004 – 2016)

- Females: 41%
- Males: 59%
Interpreting the Graph

• The graph suggests an overall increase in number of children/youth receiving state-funded services over a 12-year period, 2004 to 2016.

• Behavioral health service utilization increased from 25,521 children in 2004 to 54,024 children in 2016.

• Service utilization was consistently higher for males (compared to females).
Mental Health Service Utilization: Disaggregated (2004 – 2016)
Mental Health Service Utilization 13 -17 Years Group

(Karikari & Walton, 2017)
Mental Health Service Utilization (0-12 Years Group) (2004 – 2016)

- Am_Indian/Alaskan_Natv
- Asian
- Black/African-American
- Natv_Hawaiian/Other Pac. Islander
- White
- Hispanic
- Multiracial
- RaceUnknown

FEDERAL MENTAL HEALTH BLOCK GRANT YEAR

Percentage of Mental Health Service Population by Ethnicity
0-12 Years Group (2004 – 2016)

- White: 69.87%
- Asian: 4.38%
- Black/African-American: 4.71%
- Natv_Hawaiian/Other Pac. Islander: 3.09%
- Hispanic: 0.32%
- Am_Indian/Alaskan_Natv: 0.28%
- Natv_Hawaiian/Other Pac. Islander: 0.01%
- Multiracial: 17.34%
Percentage of Mental Health Service Population by Ethnicity
0 - 12 Years Group (2004 – 2016)
Percentage of Mental Health Service Population by Ethnicity
13-17 Years Group (2004 – 2016)
Percentage of Mental Health Service Population by Ethnicity
13-17 Years Group (2004 – 2016)
Interpreting the Graph

- Examination of service utilization in an aggregated format can obscure relevant details.
- The disaggregated data provides more detailed and insightful information of service utilization patterns.
- There are seeming disparities and differences in service utilization for children/youth based on the following:
  - gender
  - different age groups
  - races/ethnicities
Unanswered Questions

- Prevalence of mental health problems by gender, age, and race/ethnicity and the state’s overall level of diversity.
- The data covers a very limited number of measures.
- Contextual and historical factors that provide some background to the trends/patterns are missing.
Data Integration
Definition

- Attempts to gain a unified or comprehensive understanding of an issue or phenomenon by curating heterogeneous and disparate data.

- Insights are being derived from the links and associations found between various types of data acquired from different modalities.

(Arrison & Weidman, 2010; Doan et al., 2012; Dyché & Levy, 2006; Gyamfi & Williams, 2018)
Metaphor of the Grainy/Pixelated Image

With the data available, the current image/picture of service utilization is grainy.

The goal is to achieve greater clarity and understanding of service utilization through data integration.
Data Integration - Approaches

- Federation – posing queries irrespective of the geographic distribution/location and/or differences in the interface of data systems.

- Extract, Transform, and Load (ETL) – requires the extraction of data from different sources and conversion into a common format.

(Arrison & Weidman, 2010)
Federation

The way the Google search engine works is a good illustration of Federation. Google pulls and pools data from places all over the globe irrespective of the geographic location of the data sources/sites.
Federation – e.g. EBSCOhost Databases
Extract Transform Load (ETL)

Level 1: Extract

Level 1: Extract

Level 2: Transform

Level 3: Load
Key Points

- Data Discovery - finding sources of data.

- Data Exploitation – effectively aggregate the information to produce knowledge or facilitate understanding of a phenomenon.

- Clarity about the parameters of each data set.
  - Units of measure, algorithms, understated assumptions, IRB requirements, etc.

(Arrison & Weidman, 2010; Doan et al., 2012; Gyamfi & Williams, 2018)
Challenges

- Large amount of data.
- The paucity of data standards.
- Poor interoperability between databases.
- The need to ensure compliance with ethical, privacy, and regulatory norms.

(Arrison & Weidman, 2010; Doan et al., 2012; Gyamfi & Williams, 2018)
Our Integration Framework

- National Data
- State Data
- Delphi
Broader Mapping of Our Data Integration Framework

Legend
1 = SAMHSA
2 = CMHS
3 = CANS
4 = MEDICAID eligibility & claims data
5 = KIDSCOUNT DATA (Casey Foundation; IYI)
6 = FSSA/DMHA Directors/Staff
7 = Other State/Community Partners
8 = Youth & Families

- American Indian and Alaska Native: 3.24%
- Asian: 1.59%
- Black/African American: 10.97%
- Hispanic: 9.09%
- Native Hawaiian and Other Pacific Islander: 0.20%
- White: 74.87%
- Multiracial: 0.03%

(Annie E. Casey Foundation, 2017)

(Annie E Casey Foundation, 2017)
Percentage of TAY (18-20) Participation in DMHA Funded Treatment Services over Time by Gender, Race, & Ethnicity (MHBG URS Tables, US Census)
Uninsurance Rates for Children
2008 - 2015

(Alker & Chester, 2016)
Primary Household Language

<table>
<thead>
<tr>
<th>Primary Household Language</th>
<th>Medicaid Member Children</th>
<th>% of All Medicaid Children</th>
<th>Medicaid MH Children</th>
<th>% of All MH Children</th>
<th>MH % of Medicaid</th>
<th>Avg. Annual MH Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 English</td>
<td>664,006</td>
<td>89.77%</td>
<td>122,899</td>
<td>91.08%</td>
<td>18.5%</td>
<td>$ 2,602</td>
</tr>
<tr>
<td>2 Spanish</td>
<td>35,991</td>
<td>4.87%</td>
<td>2,287</td>
<td>1.69%</td>
<td>6.4%</td>
<td>$ 1,105</td>
</tr>
<tr>
<td>3 Not Available</td>
<td>32,063</td>
<td>4.33%</td>
<td>9,551</td>
<td>7.08%</td>
<td>29.8%</td>
<td>$ 5,603</td>
</tr>
<tr>
<td>4 Burmese</td>
<td>6,375</td>
<td>0.86%</td>
<td>141</td>
<td>0.10%</td>
<td>2.2%</td>
<td>$ 946</td>
</tr>
<tr>
<td>5 Armenian</td>
<td>683</td>
<td>0.09%</td>
<td>42</td>
<td>0.03%</td>
<td>6.1%</td>
<td>$ 1,403</td>
</tr>
<tr>
<td>6 Chinese</td>
<td>332</td>
<td>0.04%</td>
<td>7</td>
<td>0.01%</td>
<td>2.1%</td>
<td>$ 472</td>
</tr>
<tr>
<td>7 Somalian</td>
<td>83</td>
<td>0.01%</td>
<td>7</td>
<td>0.01%</td>
<td>8.4%</td>
<td>$ 266</td>
</tr>
<tr>
<td>8 Other</td>
<td>71</td>
<td>0.01%</td>
<td>6</td>
<td>0.00%</td>
<td>8.5%</td>
<td>$ 191</td>
</tr>
<tr>
<td>9 Vietnamese</td>
<td>41</td>
<td>0.01%</td>
<td>1</td>
<td>0.00%</td>
<td>2.4%</td>
<td>$ 32</td>
</tr>
<tr>
<td>10 Rumanian</td>
<td>26</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 French</td>
<td>18</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Japanese</td>
<td>4</td>
<td>0.00%</td>
<td>1</td>
<td>0.00%</td>
<td>25.0%</td>
<td>$ 10,107</td>
</tr>
<tr>
<td>13 Polish</td>
<td>1</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>739,694</td>
<td>100.0%</td>
<td>134,942</td>
<td>100.0%</td>
<td>18.2%</td>
<td>$ 2,787</td>
</tr>
</tbody>
</table>

- NA (Not Available) are those with no Primary Household language in the data, 77% of which were Receiving Adoption Assistance and 18% of which were Title IVE foster children, with 7% miscellaneous other aid categories

- Several languages (Chinese, Somalian, Vietnamese, etc.) may be more significant from a Medicaid perspective, but had very few identified MH children.

(VanDyke, 2017)
National & State Teen Mental Illness Prevalence & Participation in Treatment

- **Nationally**: 12.5% of adolescents experienced an episode of major depression (MDE); 39.3% received treatment.

- **Indiana**: 12.2% of Indiana teens experienced MDE 2013-2014; 37.6% received treatment.

*Behavioral Health Barometer, V 4 (SAMHSA, 2015, 2017)*
CANS/ANSA: Indiana

(Walton & Harrold, 2016)
Indiana’s Assessment Tools

- CANS – Child and Adolescent Needs and Strengths (Lyons, 2009)

- Indiana utilizes 2 CANS Tools
  - **Birth to 5 years** (Contains 59 required questions and 41 extension module questions)
  - **5 – 17 years** (Contains 66 required questions and 97 extension module questions) *Can be used up to 22 years old if developmentally appropriate*
Use of the CANS & ANSA

• Behavioral health (DMHA) providers and child welfare (DCS) staff use the tools for engagement, assessment, and planning, and progress monitoring

• The DMHA uses the CANS and ANSA:
  • To determine/recommend level of treatment
  • As an eligibility component for MRO and the 1915i programs
  • To measure outcomes

• DCS uses the CANS for evaluation and determining recommended level of behavioral health services, support referrals for treatment, levels of placement and set foster care/adoption rates
Reliable Change over Time for Children & Youth  
Statewide, n = 93,931, e = 114,579 as of 11/09/2016

<table>
<thead>
<tr>
<th></th>
<th>Functioning</th>
<th>Strengths</th>
<th>Behavioral Needs</th>
<th>Risks</th>
<th>Caregiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Change</td>
<td>35,229</td>
<td>15,956</td>
<td>26,928</td>
<td>23,287</td>
<td>20,179</td>
</tr>
<tr>
<td>Negative Change</td>
<td>16,980</td>
<td>27,829</td>
<td>15,684</td>
<td>17,349</td>
<td>18,333</td>
</tr>
<tr>
<td>No Change</td>
<td>62,342</td>
<td>70,753</td>
<td>71,918</td>
<td>73,890</td>
<td>74,158</td>
</tr>
</tbody>
</table>

Consumers: 93,931  
Consumers w/Positive Change: 57,866  
Percent Improved: 61.60%

Selected Filters: Statewide, T1=Baseline, T2=Latest, SED, Closed Episodes; Graph presents data from 04/03/1993 to 11/08/2016. This report measures change over time by using the average (mean) and reliability information to calculate statistically significant change in each CANS or ANSA domain (Improved, Maintained, or Worsened). The number and percentage of individuals who experienced reliable improvement over time is reported. Additionally, for each assessment domain, the number of individuals who experienced positive, negative, or no change is reported. n = number of individuals; e = number of episodes.
Key Interventions over Time for Children & Youth

Statewide, n = 564, e = 571 as of 07/21/2017

Selected Filters: Statewide, T1=Baseline, T2=Latest. **State Fiscal Year 2017, SED, Closed Episodes, High Fidelity Wraparound**; Graph presents data from 08/07/2007 to 06/30/2017. This report presents a dashboard of the most frequently identified behavioral health symptoms or risks (plus adjustment to trauma) and the most frequently identified functional needs for this population. For each item, the first bar reports the percentage actionable needs (rated 2 or 3) at Time 1 (T1), and the second bar reports the percentage at Time 2 (T2). The numeric percentage reflects change from T1 to T2. n = number of individuals; e = number of episodes.
Strength Development over Time for Children and Youth

Statewide, n = 564, e = 571 as of 07/21/2017

Selected Filters: Statewide, T1=Baseline, T2=Latest, State Fiscal Year 2017, SED, Closed Episodes, High Fidelity Wraparound; Graph presents data from 08/07/2007 to 06/30/2017. This report measures change in usable strengths (rated 0 or 1) over time. It shows the percentage of usable strengths at Time 1 (T1) and Time 2 (T2). The numeric percentage reflects change from T1 to T2. n = number of individuals; e = number of episodes. Indiana Family & Social Services Administration, Division of Mental Health & Addiction, DARMHA.
Reliable Improvement over Time for Children & Youth
Statewide, n = 591, e = 598 as of 07/28/2017

Consumers: 591
Consumers w/Positive Change: 381
Percent Improved: 64.47%

Selected Filters: Statewide, T1=Baseline, T2=Latest, State Fiscal Year 2017, Closed Episodes, High Fidelity Wraparound. Graph presents data from 08/07/2007 to 06/30/2017. This report measures change over time by using the average (mean) and reliability information to calculate statistically significant improvement in each CANS domain. The number and percentage of individuals who experienced reliable improvement over time is reported. Additionally, for each assessment domain. n = number of individuals; e = number of episodes.
Service Utilization Summary and Recommendations Based on the Data Integration Framework
Summary

- Access. Only about 1/3 of children/youth in need of MH services received treatment…not going as well as trends suggested.
- Combining data resources improves understanding of access, engagement and outcomes for child mental health services
- Identify successes and gaps in the service system.
- Indications of both the expected and unanticipated effects of policy decisions.
Recommendations

• Examining the definition and parameters of mental health services.
• Reviewing assessment tools/modalities.
• Focus on relevant domains such as functional impairment and parent stress, subjective/perceived need for services by caregivers/decision makers.
• Developing data sharing protocols to enhance data integration to produce new insights.
References


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