Mental health services in Seattle School-Based Health Centers:
A Quantitative Analysis of Utilization Patterns

Summary of Report

During the summer of 2017, under the mentorship of School-Based Partnerships and Assessment, Policy Development, and Evaluation (APDE) staff, a Ph.D. candidate intern cleaned and analyzed clinical encounter data from 25 school-based health centers (SBHCs) operating in Seattle, Washington. Analysis aimed to help Public Health—Seattle & King County (PHSKC) staff develop an understanding of the students that were receiving mental health services from Seattle SBHCs, as well as main clinical diagnoses for which they were being seen. This analysis also shed light on how patterns of mental health service utilization varied across student demographic and academic factors. This analysis (in tandem with a subsequent qualitative analysis of coding patterns among Seattle SBHC mental health providers undertaken in spring 2017) provides a richer, more complete picture of the mental health scope of service among SBHCs in Seattle Public Schools (SPS).

Background

School-based health centers (SBHCs) are a widespread national model for education sector healthcare delivery with a proven track record for reducing disparities in health service accessibility.\(^1\)\(^-\)\(^9\) They represent a partnership between schools, community health, and mental health centers to increase healthcare access for ethnically, socioeconomically, and clinically diverse students. In Seattle, SBHCs offer comprehensive on-site health services in 25 school buildings (elementary through high school) staffed by a multidisciplinary team of health professionals providing safe, age-appropriate, high quality, evidence-based, culturally competent care. SBHCs are operated by a variety of healthcare agencies (“sponsors”) including Federally Qualified Health Centers, non-profit hospitals, and health maintenance organizations. Services include drug and alcohol counselling, reproductive care, health education, and comprehensive preventative services such as immunizations and well-child checks. SBHCs in Seattle are primarily funded by the City of Seattle Families and Education Levy, which has been voter approved since 1990.

SBHCs collect detailed encounter-level clinical data including International Classification of Diseases (ICD) diagnosis codes, Current Procedural Terminology (CPT) procedure codes, and demographic information, which are reported to Public Health—Seattle & King County (PHSKC) for the purposes of contract monitoring and system-level program analysis. This quantitative analysis of Seattle school-based mental health services aims to better understand mental health service utilization patterns in the 2015-16 schoolyear, answering the questions:

1. Who is being served?
2. What mental health diagnoses are students seen for?
3. What utilization patterns can be observed across demographic groups and groups with academic risk factors?
Methods

Clinical service reports from 25 SBHCs were collected for encounters occurring between September 2015 and June 2016. Data was extracted from sponsor agencies’ Electronic Medical Records (EMRs) and submitted to PHSKC through HIPAA-compliant, encrypted pathways. In order to create an analytical file, extensive data processing was undertaken. The data were restructured to one line per visit per clinical export, appended to form one combined file for the year, and de-duplicated. Data fields were cleaned and recoded and two analytical datasets were produced: a visit-level file and a student-level file. All cleaning and analysis was done using R statistical computing software. Academic and demographic data for students served by SBHCs during this time period were collected through a data-sharing partnership with Seattle Public Schools. Using a client-level identifier (student IDs), this academic and demographic data was linked to the clinical service reports.

Using the scientific literature as well as guidance from academic partners, ICD-9 CM and ICD-10 CM diagnosis codes were used to develop mental health case definitions. ICD-9 CM case definitions were initially developed and these were cross walked to the ICD-10 CM system. All diagnosis fields (not just the primary diagnosis field) were used to develop case definitions. From there, descriptive analysis of mental health outcomes broke the data down by demographic and academic risk factors using Chi-Square tests in R.

Results

In the 2015-16 schoolyear, the 25 Seattle SBHCs served close to 8,000 students for medical and/or mental health services, which accounts for nearly 40% of the enrolled students in these schools. These 8,000 students received approximately 40,000 visits in this year. The majority of students were served in high schools and 58% were female.

Figure 1: Breakdown of total students served
Of the 40,000 visits provided in school year 2015-16, 44% were for mental health services. This is where analysis was focused. Analysis aimed to profile students utilizing SBHC mental health services and observe how representative they are of the enrolled student population at schools with SBHCs.

**Who is being served?**

**Demographics**

Figure 2 outlines the proportion of students enrolled at schools with SBHCs (represented in blue) as compared to students accessing mental health services at those SBHCs (represented in yellow) based on demographic categories (Note: ELL represents English Language Learners). Distributions between mental health clients served by SBHCs and the entire student body at those schools are fairly symmetrical among school type and across race. Two statistically significant findings were that females and non-ELL eligible students are over-represented among students receiving SBHC mental health services relative to enrolled students at those schools with SBHCs.

**Figure 2**: Comparison of student characteristics between SBHC mental client clients and total school enrollment at those schools with SBHCs

---

**Academic risk factors**

When it comes to academic risk factors, relative to percentages for all students enrolled at schools with SBHCs, students accessing SBHC mental health services are significantly more likely to have two or more disciplinary actions, have a grade point average (GPA) of 2.0 or below, or have had ten or more absences.
in the school year. Findings in this area were statistically significant across all three academic risk factors.

**Figure 3:** Comparison of student academic risk factors between mental client clients and total school enrollment at schools with SBHCs

<table>
<thead>
<tr>
<th>Academic Risk Factor</th>
<th>Mental Health Clients</th>
<th>Enrolled Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2+ Disciplinary Actions</td>
<td>14%</td>
<td>3%</td>
</tr>
<tr>
<td>0-1 Disciplinary Actions</td>
<td>86%</td>
<td>97%</td>
</tr>
<tr>
<td>GPA 2.0 and below</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>GPA 2.001 and above</td>
<td>75%</td>
<td>87%</td>
</tr>
<tr>
<td>10+ Absences</td>
<td>65%</td>
<td>26%</td>
</tr>
<tr>
<td>&lt; 10 Absences</td>
<td>35%</td>
<td>74%</td>
</tr>
</tbody>
</table>

**What are students seen for?**

Among middle and high school students receiving mental health services at Seattle SBHCs, anxiety, depression, and reaction disorder were found to be the leading diagnostic groups. Of these clients, 13% received one or more anxiety-related diagnoses, followed by 11% for depression, and 8% for reaction disorders. Since all diagnosis fields were used, these percentages are not mutually exclusive (i.e. the same students could be represented in more than one of these diagnoses). Among students served, there was frequent comorbidity, meaning that students receiving a diagnosis of anxiety, for instance, commonly had co-occurring diagnoses such as depression.

**Figure 4:** Percent of middle/high school SBHC mental health clients receiving diagnoses in the identified diagnostic categories
Overall, among elementary through high school students, SBHC mental health visits in school year 2015-16 were most commonly addressing anxiety and reaction disorder.

**Patterns in mental health service utilization**

By further analyzing student- and encounter-level data, variation in the service dosage across diagnostic categories was also observable, allowing distinction between ongoing and short-term care in SBHCs. Anxiety, depression, and reaction disorder diagnoses were assigned to many students at SBHCs and were treated with ongoing care for an average of six visits per student. Other less common diagnoses such as autism and attention deficit hyperactivity disorder (ADHD) had similar patterns of ongoing care, with greater counts of visits per student on average. Rare but serious diagnoses such as substance abuse or bipolar had fewer average visit counts per student, indicating they may have been identified at the SBHC but referred for ongoing care in the community.

Note that the figure below aims to visualize the distinction between ongoing and short-term mental healthcare based on the data in this analysis though treatment terms are not part of these diagnosis case definitions.

**Figure 5:** Utilization patterns by visit count per client and client percentage
Key Findings and Discussion

1. **Relative to enrolled student body, a higher proportion of SBHC mental health services users in schoolyear 2015-16:**
   - a. Were female
   - b. Had two or more disciplinary actions
   - c. Had GPA of 2.0 and below
   - d. Had ten or more absences during the schoolyear

   These findings raise questions about how to ensure outreach and services are serving male students proportionate to their mental health needs. It also highlights a common connection between low academic achievement and poor mental health\(^1\), while demonstrating that SBHCs are reaching students at greater risk for academic failure, as judged by school attendance, grades, and disciplinary involvement. Further supports and training for providers and staff on how best to identify and address these issues are an area to explore.

2. **People of color are represented proportional to their composition in the student body**

   Historically, communities of color have less access to healthcare and in particular, African American youth are more likely to have unmet mental health care needs than are white youth.\(^2\)

   Given this, our finding demonstrating proportional representation of students of color is encouraging and provides continued motivation for SBHCs to provide culturally and linguistically sensitive outreach, services, and related staff training and support.

3. **SBHC mental health services most commonly treat depression, anxiety, and reaction disorder**

   This finding helps PHSKC and sponsor agencies better describe the degree of intervention and intensity of services most commonly provided in SBHCs (defined as Tier 2 services) and extrapolate how they best interact with other Tier 1 and Tier 3 interventions in schools and communities. Tier 1 includes preventive programs (positive behavioral and intervention supports for all students) and early detection, such as universal screenings.\(^3\)

   Students requiring Tier 3 services have more severe behavioral/mental health conditions that require more intensive individual treatment that is beyond the scope of SBHCs.\(^4\) SBHCs play an important intermediary role between Tier 1 and 3 in the prevention and treatment of moderate mental health disorders (such as anxiety and depression) in children and adolescents, this practice being reflective in the utilization patterns observed in this analysis.

4. **The gender gap between students receiving mental health services at SBHCs in Seattle has decreased steadily between schoolyear 2009-2010 and 2015-2016**

   SBHCs in Seattle have historically served more females than males (as highlighted in this analysis). Many hypotheses exist to explain this, including a similarity effect.\(^5\) SBHC frontline
staff (medical providers, mental health providers, clinic coordinators, and health educators) in Seattle are almost exclusively female, so male students may not feel as comfortable or inclined to access services. Efforts to support a workforce more reflective of the clients served may aid in reducing this gap over time.

5. Middle and high school SBHC mental health clients:
   
   a. With GPA above 2.0 were more likely to have an anxiety diagnosis compared to their peers with GPA of 2.0 or below
   
   b. Who are ELL-eligible were less likely to have a depression diagnosis compared to their non-ELL eligible peers.

Though intriguing, these findings raise more questions than they answer. In subsequent qualitative analysis of mental health coding practices in Seattle SBHCs, providers indicated that they experience cultural differences in the manifestation of mental health symptoms in students that have grown up outside of the US. In tandem with literature on the impacts of cultural experiences in the assessment and diagnosis of mental health conditions, this may contribute to our understanding. Further analysis is needed to fully understand what factors may be contributing to these findings.

Limitations and Future Directions

Limitations of this analysis included sparse literature on diagnostic categorization for ICD-10 CM codes at the time of analysis (as the transition from ICD-9 CM was very recent) and a dearth of information on provider referrals for students receiving ongoing or short-term mental health services in the community. Furthermore, 20% of students receiving SBHC mental health services were not linkable to academic outcome data due to missing or incorrect student identifiers. These students were excluded from academic factor analysis. Additionally, the clinical data does not clearly distinguish between primary, secondary, or other subsequent diagnoses in a single visit. This limits our ability to differentiate between diagnoses that prompted the visit and diagnoses that were noted during the visit that may be ancillary to the chief complaint. The attendance metric also included excused and unexcused absences, some of which may have been a function of visiting the SBHC for services. Absences for SBHC visits were indistinguishable. For elementary, analysis on the services they received and their association with academic and clinical characteristics was inconclusive due to the small population size of students served. Lastly, there was no socioeconomic status measure or geographic data available to supplement this analysis.

The primary limitation of this analysis was that among mental health visits in 2015-2016, 44% included only circumstantial diagnoses. Circumstantial diagnoses represent situations or problems (i.e. ‘homelessness’) that influence health but are not in and of themselves a specific clinical mental health disorder. If used together with a mental health disorder code (as classified by the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5), circumstantial codes deepen a provider’s understanding of the ways in which the mental health disorder affects the student. However, when used by themselves, circumstantial diagnosis codes are more ambiguous, as it is not always clear how or if they relate to other mental disorders. Therefore, they cannot be given diagnostic classifications and
were excluded from the analyses of treatment pattern utilization. The 44% of visits with only circumstantial diagnoses leave PHSKC unable to classify the needs of the students who receive these codes. A supplemental qualitative analysis was undertaken in spring 2017 to address this question. Combined, these two analyses will inform the Seattle and King County school-based health center system as mental health practice and coding guidelines are refined. This is timely as the system is expanding to include three new comprehensive school-based health centers in three new schools districts in the 2017-18 schoolyear thanks to funding from the Best Starts for Kids Levy, which was passed by King County voters in November 2015.

Acknowledgements

The data cleaning and primary analysis for this project were undertaken by University of North Carolina Ph.D. candidate, Elizabeth (Libby) McClure during an internship with Public Health—Seattle & King County (PHSKC) during the summer of 2016 under the mentorship of Aley Joseph Pallickaparambil and Kaetlin Miller. Further program support from PHSKC was provided by Amy Laurent, Eva Wong, and Sara Rigel, as well as from Bryan Davis with the King County Department of Community and Human Services. We thank Sara Maupin and staff from Kaiser Permanente Washington (formerly Group Health Cooperative) as well as those from other SBHC sponsor agencies in Seattle whose services were the focus of this work. Staff from the City of Seattle Department of Education and Early Learning and Seattle Public Schools were instrumental in supplying academic data in support of this analysis. Lastly, we would like to thank Kelly Whitaker and Aaron Lyon from the University of Washington for their partnership and for their contributions of their expertise to this analysis.

References


24. Lu FG, Lim RF, Mezzich JE. Issues in the Assessment and Diagnosis of Culturally Diverse Individuals. Network of Care | Los Angeles County.
# Appendix A

## ICD-9 CM and ICD-10 CM Mental Health Diagnosis Case Definitions

<table>
<thead>
<tr>
<th>Included ICD-9 CM Codes</th>
<th>Included ICD-10 CM Codes</th>
<th>Categorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>314.0-314.9</td>
<td>F90.0-F90.9</td>
<td>ADHD</td>
</tr>
<tr>
<td>300.0-300.9, 309.21, 313.83</td>
<td>F30.5, F40.0-40.9, F41.0-F41.9, F42.0-F42.9, F43.0-F43.2, F43.9, F44.0-F44.9, F45.0-F45.2, F45.8-F45.9, F48.1, F48.8-F48.9, F68.11, F68.8, F93.0, F93.8, F99.0</td>
<td>Anxiety</td>
</tr>
<tr>
<td>313.83-313.9</td>
<td>F93.9, F94.1, F94.8, F98.8-F98.9</td>
<td>Attachment Disorder</td>
</tr>
<tr>
<td>299.0-299.9</td>
<td>F84.0-F84.9</td>
<td>Autism</td>
</tr>
<tr>
<td>296–296.16, 296.4–296.89</td>
<td>F30.1-F30.4, F30.8, F31.0-F31.9, F32.8</td>
<td>Bipolar</td>
</tr>
<tr>
<td>296.2–296.39, 311, 296.9–296.99</td>
<td>F31.1, F32.0-F32.5, F32.9, F33.0-F33.9, F34.2, F34.8, F39.0</td>
<td>Depression</td>
</tr>
<tr>
<td>315–315.9, 317–319</td>
<td>A31.8-A31.9, F70.0-F73.0, F79-F89.0, H93.25, R48.0</td>
<td>Developmental Disorder</td>
</tr>
<tr>
<td>307.1, 307.5–307.53</td>
<td>F50.0-F50.9, F98.2-F98.3</td>
<td>Eating Disorder</td>
</tr>
<tr>
<td>307.6, 307.7, 787.6</td>
<td>F98.0-F98.1</td>
<td>Elimination</td>
</tr>
<tr>
<td>312–313.82</td>
<td>A31.2, F63.0-F63.9, F91.1-F91.9, F94.0</td>
<td>Externalizing</td>
</tr>
<tr>
<td>307–307.0, 307.2–307.49, 307.7, 307.8, 310–310.9, 316</td>
<td>A31.0, F07.0-F07.9, F45.4, F48.2-F48.7, F51.0-F51.9, F54.0, F95.0-F95.9, F98.4-F98.5, G44.2, R15.0-R15.9</td>
<td>Miscellaneous</td>
</tr>
<tr>
<td>301–301.9</td>
<td>A30.1, F21.0, F34.0-F34.1, F60.0-F60.9, F68.12, F69.0</td>
<td>Personality Disorder</td>
</tr>
<tr>
<td>290–295.95, 297–298.9</td>
<td>F01.5-F06.8, F10.1-F10.9, F11.1-F20.9, F22.0-F29.9, F53.0</td>
<td>Psychosis</td>
</tr>
<tr>
<td>308–309.2, 309.22–309.8, 309.82–309.9</td>
<td>A30.8, A30.9, F43.8, F59.9, R45.7</td>
<td>Reaction Disorder</td>
</tr>
<tr>
<td>302–302.9</td>
<td>A30.0, F52.0-F52.8, F64.1-F66.0, R37.0</td>
<td>Sexuality Disorder</td>
</tr>
<tr>
<td>303–305.93</td>
<td>A30.3, F10.0-19.9, F55.2</td>
<td>Substance Abuse/Dependence</td>
</tr>
</tbody>
</table>