

### RESEARCH BRIEF

## Social Determinants of Health at Gillette Children's Specialty Healthcare

### PURPOSE OF THE STUDY

*The purpose of this study was to determine the prevalence of social determinants of health (SDoH; e.g., homelessness, food assistance, and economic and insurance status), differences in SDoH by demographic and diagnostic groups within Gillette Children's Minnesota patient population, and the relationship between patient SDoH, receipt of social support services, and patient medical complexity.*

### BACKGROUND & PURPOSE

There is increasing desire for research and clinical attention devoted to social determinants of health (SDoH) because of their demonstrable impact on healthcare outcomes (Braveman & Gottlieb, 2014). This research does not displace the significance of medical care, but rather situates SDoH among the vital list of factors that need to be considered when assessing and treating individuals and families.

The body of literature on SDoH is growing; however, there remain notable gaps. This is particularly true for children with medical complexity (CMC) – those children with chronic health conditions that affect multiple organ systems and significant functional limitations, high service utilization, and regular reliance on life-sustaining medical technology (Braveman, 2003; Cohen et al., 2011). Empirical evidence demonstrates CMC have “among the highest risk of all children for adverse medical, developmental, psychosocial, and family outcomes” (Kuo & Houtrow, 2016, p. 2). As a result, there remains a critical need to further understand the prevalence of SDoH for children with medical complexity and the relationship between those health factors and other variables of interest. In the absence of such knowledge, future healthcare systems may neglect to integrate this knowledge into program operations to the detriment of patient care.

Gillette Children's Specialty Healthcare is recognized internationally for its work with children who meet criteria for CMC, although not all children seen at Gillette and in this study meet such criteria.

Through this project we answered the following questions:

1. *What is the prevalence of SDoH within Gillette's Minnesota population?*
2. *What is the relationship between SDoH and healthcare-related factors?*



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## METHODS

*SDoH data from multiple state agencies were integrated with demographic and data for children seen at Gillette from 2016-2018 via Minn-LInK. We analyzed prevalence of SDoH and the relationship between number of SDoH, social work support services received, and medical complexity in this exploratory study.*

Through Minn-LInK, Gillette Children's Specialty Healthcare patient demographic and diagnostic data from 2016-2018 were matched with data from the Minnesota Departments of Human Services (DHS) and Education (MDE) (n = 34,098; see Table 1). Gillette demographic variables included age, gender, race, geographic residence location, insurance payer, and interpreter utilization. Diagnostic categories included neuromuscular condition, orthopedics, brain or spinal cord injury, epilepsy, cerebral palsy, and Chiari malformation or spina bifida or hydrocephalus. DHS data included Minnesota Family Investment Program (MFIP) receipt, Supplemental Nutrition Assistance Program (SNAP) receipt, children's mental health service receipt, child protective services involvement, and out-of-home placement. MDE data included special education service receipt (IEP, IFSP, or IIP), limited English proficiency, free or reduced price lunch eligibility, and homelessness. Variable frequencies and percentages were reported, and cross-tabulations were conducted to analyze SDoH differences by demographic and diagnostic categories. Chi-square tests were performed (e.g., Pearson Chi-square, Likelihood Ratio, Fisher's Exact Test, Linear-by-Linear association) to test for significant differences between groups at  $p < .05$ . Finally, bivariate Pearson correlation with two-tailed significance tests, excluding cases pairwise, were run to assess for associations between number of SDoH, social work support services, and medical complexity (i.e., number of established specialty providers).

## FINDINGS

*Findings revealed that a substantial proportion of children with medical complexity had documented SDoH – representing unique needs for which services were provided in Minnesota's child- and family-serving systems. Yet, these SDoH were not experienced equally by all children and families.*

*This information can help Gillette healthcare members understand SDoH prevalence within their patient population and better connect children and families to needed services to support their overall health and well-being.*

**Table 1. Demographic Characteristics of the Sample**

	Frequency	Percent
Total number of Participants	34,098	100%
<b>Gender</b>		
Male	17,375	51.0%
Female	16,712	49.0%
Unknown	11	0.0%
<b>Age Group</b>		
0-4 years	12,790	37.5%
5-11 years	10,446	30.6%
12-18 years	10,862	31.9%
<b>Geographic Location</b>		
7 county Metro	24,953	73.2%
Greater Minnesota	9,145	26.8%
<b>Payer</b>		
Commercial	23,230	68.1%
Government	10,034	29.4%
Self-Pay	834	2.4%
<b>Interpreter Used</b>		
Yes	2,286	6.7%
No	31,812	93.3%
<b>Race</b>		
Asian	1,885	5.5%
Black or African American	3,250	9.5%
Native American or Alaska Native	350	1.0%
Native Hawaiian/Pacific Islander	43	0.1%
White	24,854	72.9%
No response/Other	3,716	10.9%

## SDoH Prevalence Among Children with Medical Complexity

Descriptive analyses were conducted by dividing the patient population into categories of interest (e.g., demographic, diagnostic, and state and county variables of interest) so the prevalence of SDoH within groupings could be assessed. The outcomes of this effort helped to produce an understanding of the diverse needs of Gillette's patients and the range of services they have accessed to address those needs by demographic and diagnostic category. As an independent specialty health care institution who specializes in the treatment of children with complex medical conditions, this is information that has previously been unknown and helps to create a deeper understanding of the diverse needs of patients and their families. Furthermore, these data provide evidence for the value of adding more robust systems of support within health care systems and through state and federally funded programs and the importance of cultivating strong community partnerships.

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**KNOWLEDGE OF THESE PATIENT CHARACTERISTICS IS VALUABLE TO ALL MEMBERS OF THE HEALTHCARE TEAM. PATIENTS AND THEIR FAMILIES WILL OFTEN REFRAIN FROM DISCLOSING INFORMATION BECAUSE THEY FEEL UNCOMFORTABLE SHARING IT OR THEY MAY FEEL IT IS IRRELEVANT TO THEIR MEDICAL CARE. AS SUCH, HEALTHCARE PROVIDERS MAY NOT KNOW THAT THE PATIENT IN THEIR CLINIC ROOM IS HOMELESS, OR THAT THE FAMILY STRUGGLES FINANCIALLY, OR THAT THE LAST PROVIDER THEY WORKED WITH MADE A REPORT TO CHILD PROTECTIVE SERVICES DUE TO SUSPECTED PHYSICAL ABUSE.**  
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**Table 2. Diagnostic or Condition Categories of Sample**

	Frequency	Percent
Total number of participants	34,098	100%
Body Dysfunction	11,874	34.8%
Neuromuscular Condition	4,117	12.1%
Orthopedics	25,859	75.8%
Brain Injury/Spinal Cord Injury	3,226	9.5%
Genetic Neurodevelopmental	8,608	25.2%
Epilepsy	2,180	6.4%
Craniofacial	9,877	29.0%
Cerebral Palsy	2,500	7.3%
Chiari/Spina Bifida/Hydrocephalus	1,700	5.0%

**Table 3. Prevalence of Social Determinants of Health (SDoH) Among Sample**

Variable	Frequency	Percent
MFIP	4,013	11.8%
SNAP	7,794	22.9%
MFIP or SNAP	8,095	23.7%
Out-of-Home Placement	912	2.7%
Free or Reduced Price Lunch	8,955	26.3%
Homelessness	1,296	3.8%
IEP at Any Time	12,190	35.7%
Early Childhood/Kindergarten Disabled	9,922	29.1%
Any IEP, IFSP or IIIP	11,629	34.1%
Limited English Proficiency	2,019	5.9%
Children's Mental Health Services	2,260	6.6%
Child Protection Involvement	3,890	11.4%
Neglect Non-Medical	2,740	8.0%
Medical Neglect	637	1.9%
Physical Abuse	1,849	5.4%
Sexual Abuse	796	2.3%
Mental Injury and Emotional Harm	270	0.8%

Diagnostic or condition categories (i.e., neuromuscular condition, orthopedics, brain or spinal cord injury, epilepsy, cerebral palsy, and Chiari or spina bifida or hydrocephalus) for children receiving treatment and services through Gillette are presented in Table 2. As can be seen in Table 2, a large proportion of children at Gillette have multiple diagnoses, and are therefore represented in more than one diagnostic category.

As seen in Table 3, a substantial proportion of children with medical complexity at Gillette had documented SDoH – representing unique needs for which services were provided in Minnesota's child- and family-serving systems. Approximately one out of every four Gillette families accessed either MFIP or SNAP benefits (23.7%), more than a third (35.7%) of Gillette children received public school educational support services (i.e., IEP, IFSP, or IIIP), and

more than a quarter (26.3%) of Gillette children benefited from free or reduced price meals. Fewer children received other kinds of services, including children's mental health services (6.6%), out-of-home placement (2.7%), and child protection services (11.4%). Knowledge of these patient characteristics is valuable to all members of the healthcare team. Patients and their families will often refrain from disclosing information because they feel uncomfortable sharing it or they may feel it is irrelevant to their medical care. As such, healthcare providers may not know that the patient in their clinic room is homeless, or that the family struggles financially, or that the last provider they worked with made a report to Child Protective Services due to suspected physical abuse. The findings from this study do not provide information on individual children; however, the information helps healthcare members at Gillette to realize how prevalent such concerns are within their patient population and opportunities to create pathways to connect children and families to needed services that may support their overall health and well-being.

## Relationship Between SDoH and Healthcare-related Factors

Chi-square tests were performed (e.g., Pearson Chi-square, Likelihood Ratio, Fisher's Exact Test, Linear-by-Linear association) to test for significant differences in the prevalence of social determinants of health across demographic and diagnostic groups. Not surprisingly, analyses revealed differences in the prevalence of social determinants of health among demographic and diagnostic groups (see Supplemental Table A). For example, compared to Gillette patients living in the 7 county metro area, children living in Greater Minnesota were 1.5 times more likely to have received MFIP or SNAP benefits, two times more likely to have been in out-of-home placement, 1.2 times more likely to receive any education support services, six times more likely to receive county-based children's mental health services, and 2.2 times more likely to be involved with child protection. Trends like these are evident between geographic location, payer, interpreter, and racial groups and between diagnostic categories. While outside of the scope of the current study, future analyses could work to better understand the factors that contributed to those differences.

Analyses also revealed statistically significant relationships between SDoH and social work support ( $p < .001$ ), SDoH and medical complexity ( $p < .000$ ), and social work support and medical complexity ( $p < .000$ ; See Supplemental Table B). Results indicate that as children have more SDoH, they tend to be seen more often by a Gillette social worker and have more established specialty providers. Furthermore, those with more social work contacts tend to have an increased number of established specialty providers.

## Conclusion

Our study sought to better understand the prevalence of SDoH in Gillette's pediatric patient population. Findings supported a more concrete understanding of health factors impacting children and families at Gillette and revealed differences in SDoH which may affect some children and families more than others. We also identified significant relationships between SDoH, social work services received through Gillette, and the medical complexity of children.

Study outcomes are valuable to diverse audiences, most notably healthcare organizations seeking to demonstrate the importance of gathering patient social health data to support holistic and comprehensive models of care. This study should also be of interest to insurance providers, government-funded social support service providers, and educators (e.g., those providing MFIP, SNAP, and child protective services, and public school providers) as children with medical complexity are often dually involved in these systems and because their involvement in these systems is likely highly influential to their overall health and well-being (e.g., mental and physical health, educational success). Moreover, it illustrates the important trend toward value-based reimbursement models to promote individual organizations' further commitment to supporting diverse patient needs.

Population health researchers often study relationships between determinants of health, which include medical, social, public health, environmental and genetic, and the health outcomes these determinants can impact in adults. Further research within pediatric populations, like this project, will advance important research in this under-represented population. For example, the Minnesota Departments of Human Services and Education seek to equitably provide services to children across the state. Future research could investigate outcomes illuminated in this study like the increased utilization of county-based children's mental health services, child protective services, out-of-home placement, MFIP or SNAP, and free or reduced price lunch for children living in rural areas. Similar differences in service receipt exist based upon insurance payer, language needs, race, and medical condition. Research literature points toward increased vulnerability of families living in rural areas due to limited resource infrastructures (Pindus, 2001). Government providers can find value in understanding how these and similar disparities exist in Minnesota, most notably those with medical complexity in this study. Due to the limited research available on CMC, this study provides a foundational understanding of social health factors affecting CMC in Minnesota that can be informative to others working with similar populations and those seeking to provide resources to those children and their families.

## References

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## LIMITATIONS

*This study did not investigate the relationship between SDoH and Gillette patient outcome data to better understand whether such factors impact patient short- and long-term outcomes. Furthermore, although this study illuminated differences in SDoH between demographic and diagnostic groups and associations between related variables, it did not provide any explanation about why such differences and associations exist. Future research can aim to understand how these factors impact children's outcomes and the value of receiving valuable social services.*

**The Center for Advanced Studies in Child Welfare (CASCW)** is a resource for child welfare professionals, students, faculty, policy-makers, and other key stakeholders concerned about child welfare in Minnesota. **Minn-LInK** is a unique collaborative, university-based research environment with the express purpose of studying child and family well being in Minnesota using state administrative data from multiple agencies.

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