

Factors Impacting Utilization and Enrollment in a School-Based Telemedicine Program

2022 SBHA Annual Conference

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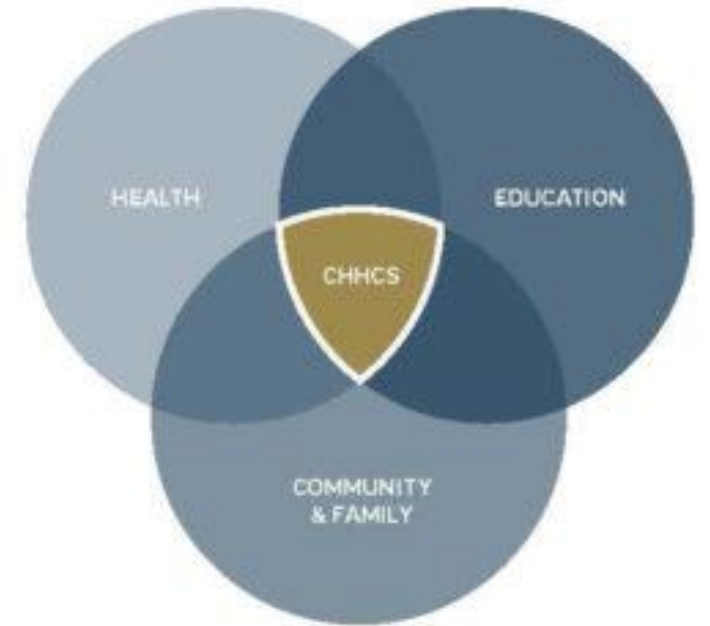
Disclosure

The presenters have NO financial disclosure or conflicts of interest with the presented information in this presentation.



Advancing School-Connected Strategies for Children's Health and School Success

The Center for Health and Health Care in Schools (CHHCS) is a nonpartisan policy, resource and technical assistance center with a history of developing school-connected strategies for better health and education outcomes for children. CHHCS partners with foundations, government health and education agencies, school districts, and providers across the country to support their school-connected initiatives.



Agenda

- Telemedicine Background
- Mid-Atlantic School District Telemedicine Evaluation
 - Program Overview
 - Cost-Benefit
 - Parent/Guardian Survey
 - Stakeholder Interviews
- Implications



Systematic Review of Telehealth Evaluations, 2006-2018

Planning	Delivery	Evaluation/Results Reporting	Long-Term Outcomes
<p><u>Program logic</u></p> <p><u>Setting characteristics</u></p> <p><u>Implementation strategy</u></p> <p><u>Partnership</u></p> <p><u>D&I study design</u></p>	<p><u>Reach</u> Telehealth utilization</p> <p><u>Adoption</u></p> <p><u>Evolution</u></p> <p><u>Implementation</u> Clinical care process</p> <p><u>Implementation Costs and Resources Expended</u></p>	<p><u>Effectiveness</u> Student health status improvement</p> <p><u>Broader consequences</u> Improved communication and collaboration</p> <p><u>External validity</u> School/ECE setting and population description</p> <p><u>Robustness</u></p> <p><u>Pragmatic Criteria (PRECIS)</u></p>	<p><u>Sustainability</u> <u>Evolvability</u> <u>Transportability</u></p> <p><u>Replication and Uptake</u></p> <p><u>Economic Evaluation</u> Cost-effectiveness or cost-benefit of telehealth</p>
<p>Cross-cutting Issues: <u>Multilevel context</u> <u>Multiple Stakeholder Perspectives:</u> Parent, provider, and school administrator perspectives <u>Societal Costs:</u> Parental missed work, missed school, transportation costs</p>			

Telehealth Evaluation Systematic Review, 2006-2018

Emerging evidence of positive effect on student health outcomes

Limited research on long-term outcomes at the individual or program levels

Limited research on adoption, successful implementation, or cost-effectiveness



Telehealth Growing Fast Prior to COVID

- SBHCs using telehealth grew from 7% in 2007-2008 to 19% in 2016-2017
- Over 1 million students in over 1800 public schools had access to an SBHC using telehealth in 2016-2017
 - 2% of students and nearly 2% of public schools in the United States
- Mostly rural implementation with hospital partners

Evaluation Methods



Program Overview for Current Evaluation

Medium-sized school district in the mid-Atlantic region

Pilot telehealth program implemented in 6 schools in partnership with the county health department, school district, county hospital, and private pediatric practices

- Grades pre-K-5
- 5 out of 6 schools received Title 1 funding



Program Overview for Current Evaluation

Enrollment and utilization of the telehealth service is voluntary; parents needed to enroll child prior to the first visit

Parental consent required before each telehealth consultation



Evaluation Objectives

Enrollment and Utilization

- What are the reasons for under-enrollment and under-utilization in the telemedicine program?
- What are ways to increase student enrollment and use of the telemedicine program?

Cost-Benefit Analysis

- To what extent does the telemedicine program reduce missed class time or absenteeism?
- To what extent does the telemedicine program reduce emergency department utilization?
- What are the associated costs and benefits of implementing the telemedicine program?



Cost-Benefit Evaluation

- Estimate reduction in absences associated with program
- Estimate incremental cost of program
- Convert absences prevented into monetary value
- Estimate net costs



Absence Evaluation

Quasi-experimental design comparing absences among students enrolled in the telemedicine program to a comparison group composed of students not participating in the telemedicine program

Negative binomial regression model accounting for clustering using generalized estimating equation (GEE) methods

Students in telemedicine schools who were not participating were included in the control group to maximize sample size

Control variables: gender, race/ethnicity, grade level, language spoken at home, free and reduced-price lunch eligibility, absences (fall 2014), and health suite visits (fall 2014).



Causal Inference with Quasi-Experimental Design and Administrative Data

2014

2015

2016

Students enrolled in telehealth (n=771)

O_1

O_2

O_3

Students not enrolled in telehealth (n=3,432)

O_1

O_2

O_3

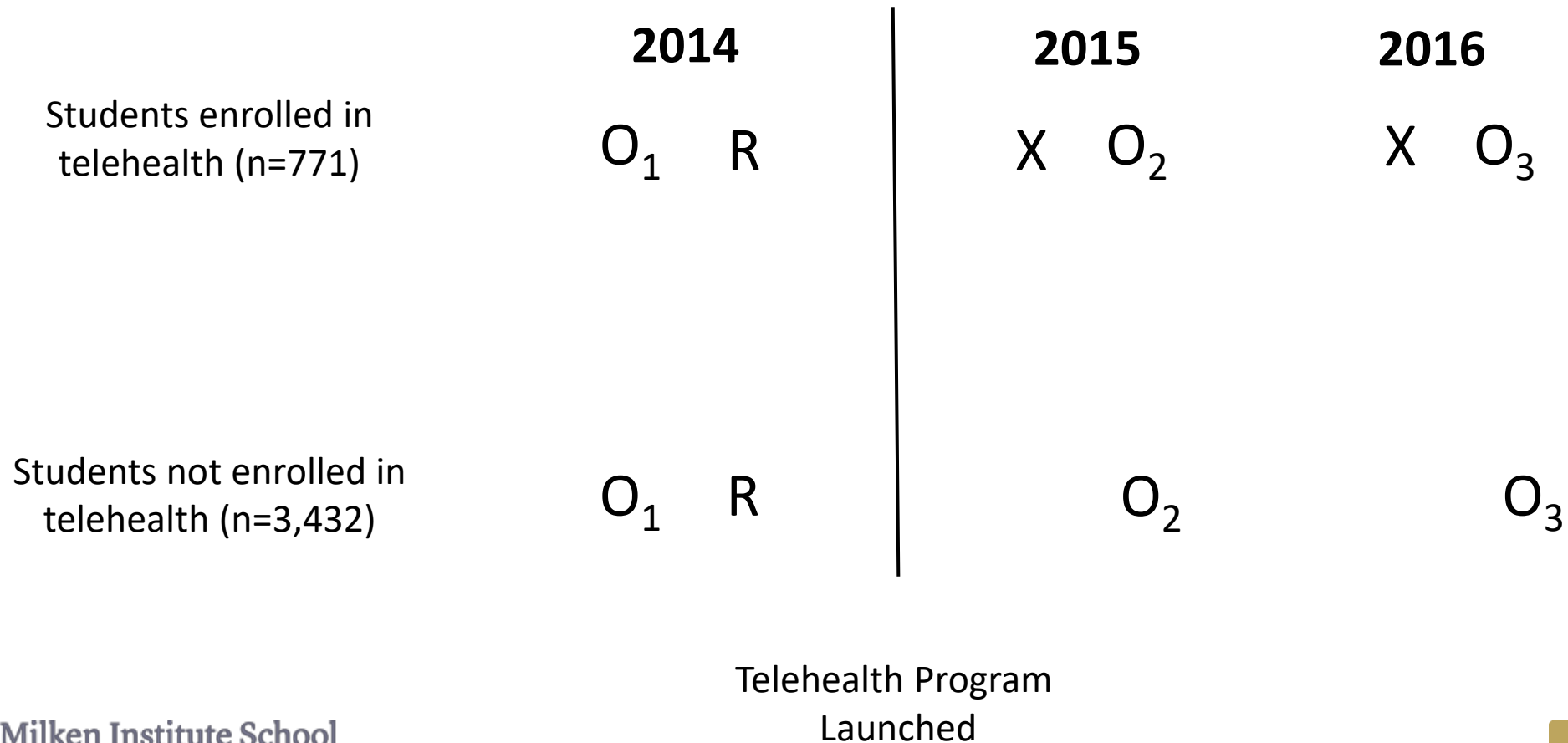


Causal Inference with Quasi-Experimental Design and Administrative Data

	2014	2015	2016
Students enrolled in telehealth (n=771)	O_1	O_2	O_3
	# of Absences # of Health Suite Visits	# of Absences	# of Absences
Students not enrolled in telehealth (n=3,432)	O_1	O_2	O_3
	# of Absences # of Health Suite Visits	# of Absences	# of Absences



Causal Inference with Quasi-Experimental Design and Administrative Data



Cost Evaluation

- All costs are reported in 2017 dollars.
- Fixed costs of the telemedicine program assigned to each student enrolled in the telemedicine program annually
 - Salary and benefits for program staff and administrators; telemedicine capital equipment amortized annually; and telemedicine equipment maintenance fees.
 - Overhead costs were not included.
- Without additional information on total healthcare utilization, we assumed that students would have gone to a physician outside of school. Therefore, we did not include the cost of the physician time
- Include parent time to attend the visit and parent time saved from not having to take their child to a physician



Cost-Benefit Analysis

- The time horizon for the evaluation is a single school year
- All benefits (parent time for informal care, absences, and additional class time missed) were converted into a monetary value using the mean regional wage for adults and the daily total education cost per child based on HCPSS current education budget for elementary schools
- The total cost of the health services and the cost savings from reduced parental time and absence time were summed to estimate the net cost per student in each program



Parent Guardian Survey Methods

- Survey questions asked about student health insurance coverage, health care access, program enrollment, and program utilization.
- Survey questions were available in both English and Spanish.
- Participants were to instructed complete one survey per household based on the experiences of their oldest child attending the school and to return the survey to the teacher or school nurse.
- Participation in the survey was voluntary and anonymous. Participants were provided a \$10 gift card for completing and returning the survey by the due date.
- Participants had the option to provide their name and phone number to participate in a follow-up phone interview.



Stakeholder Interview Methods

- Four semi-structured interview guides addressed areas of interest such as beliefs about the impact of health on academics, perceptions of the telemedicine program, promotion and enrollment strategies, and factors facilitating or impeding use of the program.
- A translated version of the parent semi-structured interview guide was available for Spanish-speaking respondents. Questions were modified during the interviews and probes were used as needed to elicit more information from participants.



Results

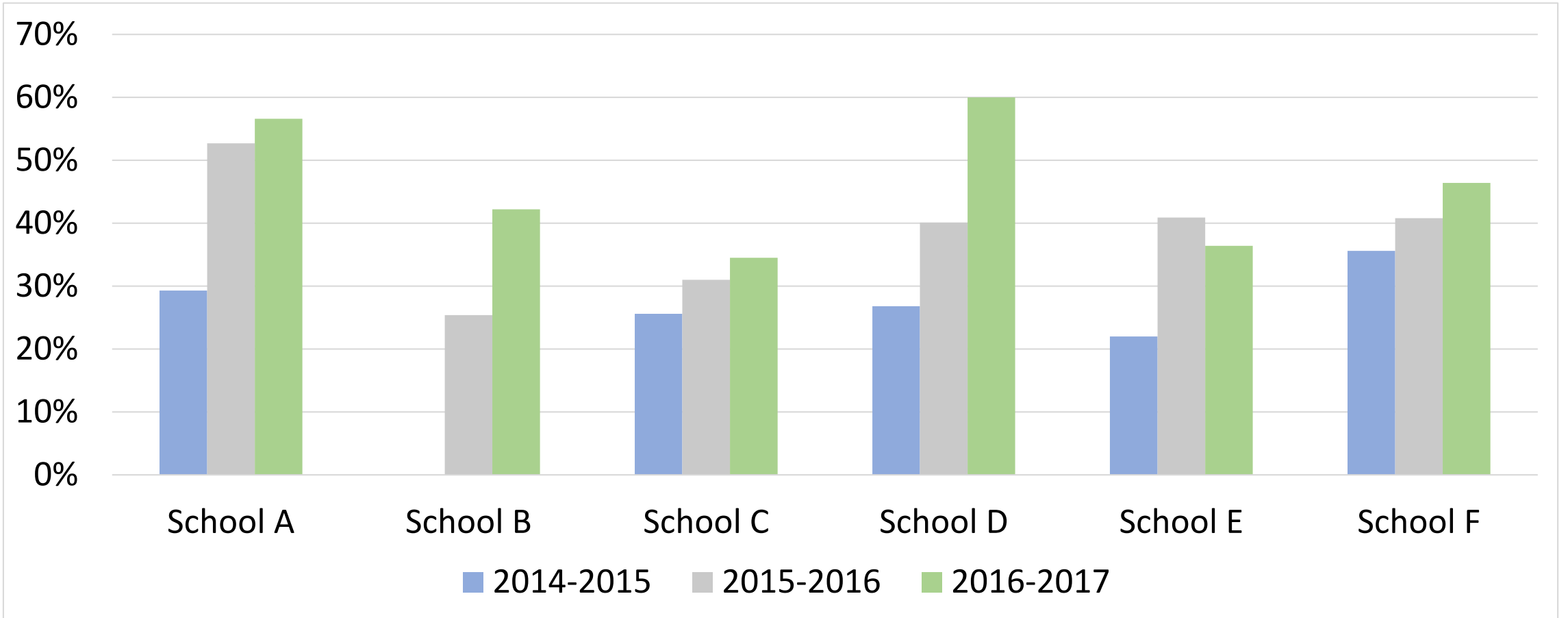


Demographics: Enrolled Students (n=1,434)

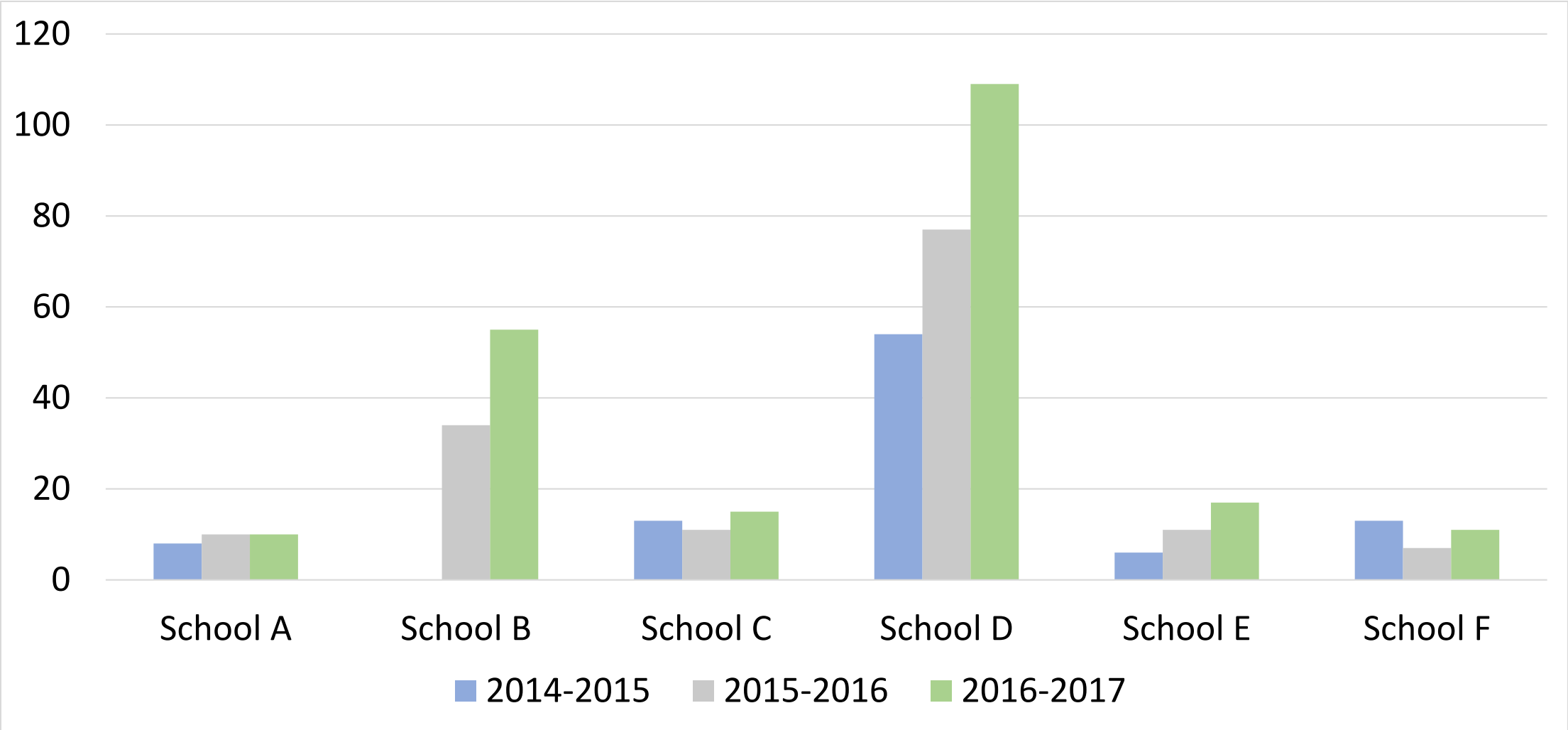
- Grades K-5 each represented 14-18% of student enrollment
 - Few enrolled students represent PK (3.7%)
- Enrolled students were racially and ethnically diverse
 - 40% Black
 - 34% White
 - 10% American Indian
 - 8% Asian
 - 8% 2+ races
 - 25% Hispanic
- 55% of enrolled students qualified for free/reduced school meals
- 71% spoke English, 20% Spanish and 9% spoke other languages



Program Enrollment, 2014-15 to 2016-17



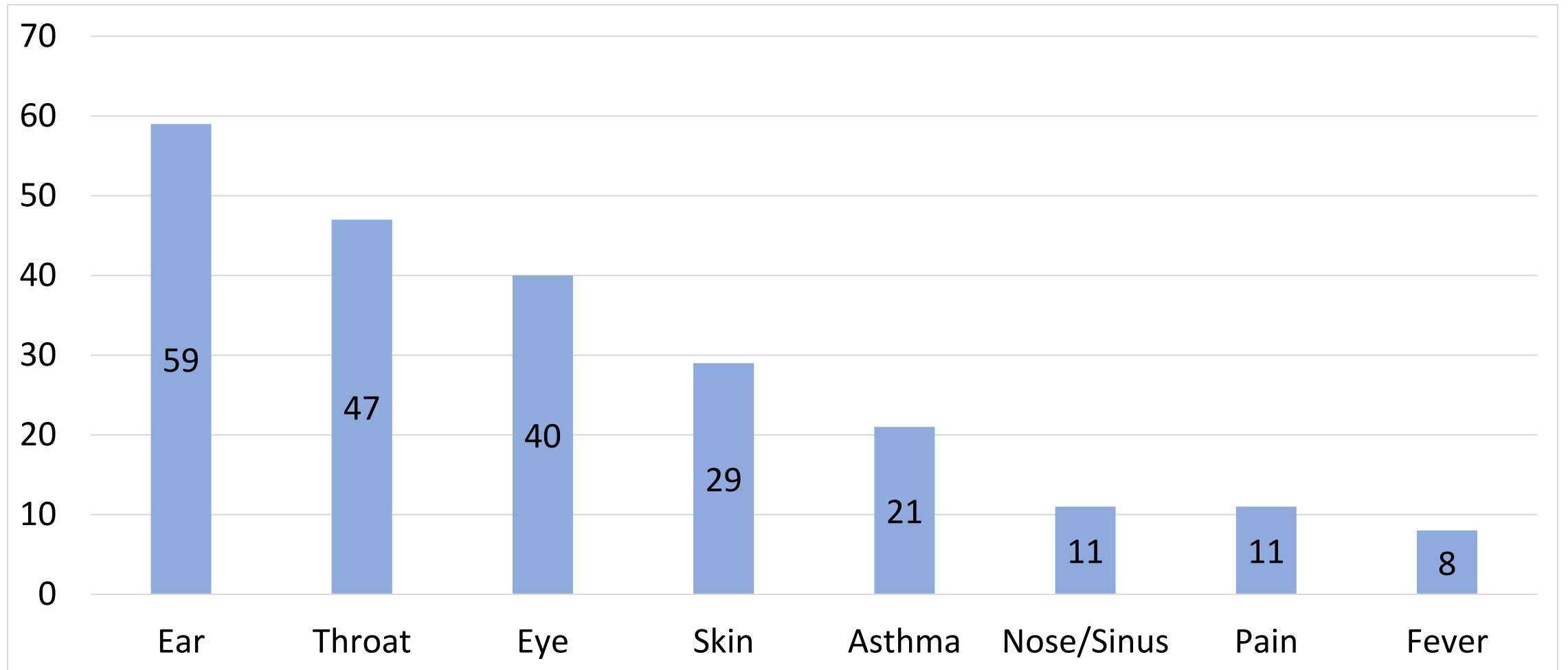
Telemedicine Visits, 2014-15 to 2016-17



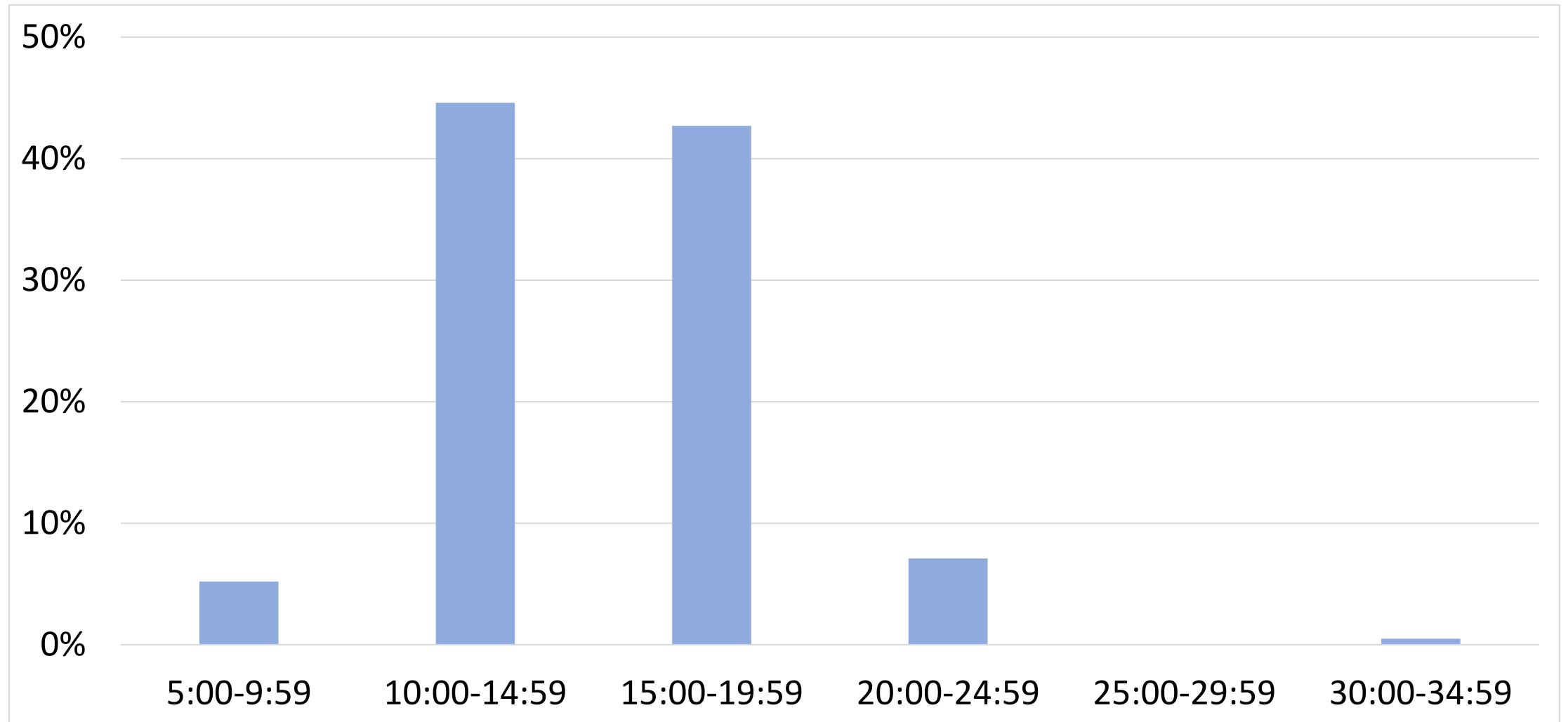
Program Utilization, 2016-17

- 217 total telemedicine visits
- 178 unique students participated in a telemedicine visit
 - 84% – 1 visit
 - 11% – 2 visits
 - 5% – 3 visits
- The majority (88.5%) were connected with a provider at the local hospital, not pediatrician practices

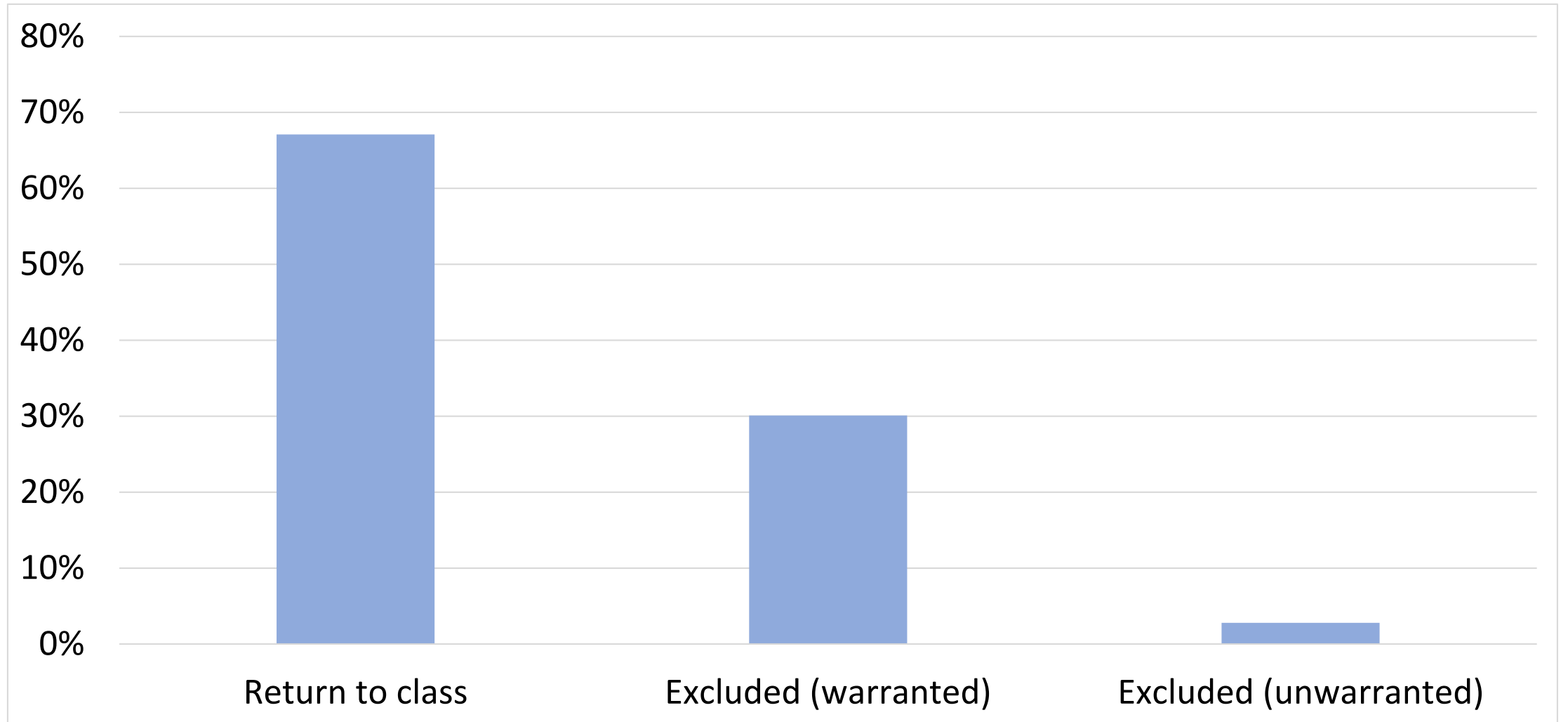
Diagnoses, 2016-17



Length of Visit (in Minutes), 2016-17



Return-to-Class Determination, 2016-17



Lost/Missed Telemedicine Visits, 2015-16 (n=130)

- 44.6% – Parent declined visit
- 22.3% – Technology issue
- 12.3% – Nurse unable to contact parent
- 7.7% – Provider unavailable
- 3.8% – Health suite staff shortage
- 3.1% – Parent unable to enroll at time of visit
- 3.1% – Provider declined visit



Impact on Absences

Table 3. Mean per Student Absences and Health Suite Visits by Telehealth Status, 2015–2017 School Years.

	Standard health suite			Telehealth		
	Students	Absences	Health suite visits	Students	Absences	Health suite visits
2015–2016	3,372	7.20	8.30	758	6.64	6.64
2016–2017	2,438	7.81	7.62	596	7.32	8.39

Students enrolled in the telemedicine program were absent 7.7% ($p=0.025$; 95% CI: 1.0%, 14%) fewer days (0.60 days) per year than non-telemedicine students,



Monetizing Absence Prevention

- The value of a lost school day was estimated based on the \$10,280 annual cost of education divided by 180 school days, or \$57.11 per absence
- The value of the parent or caregiver time per day of absence was estimated to be \$263.20.
- Two hours of teacher time to help student catch up cost \$85
- Total cost per absence was \$405.16.



Program Implementation Costs

Table 4. Program Costs.

Resource	Unit	Cost per unit	Total units per year	Total cost
Equipment and supplies				
School telehealth carts annualized capital expenditure (\$22,000 per cart) ^a	Per school	\$4,803.81	6	\$28,823
School workstation maintenance	Per school	\$7,800	6	\$46,800
School annual hosting fee	Per school	\$5,000	6	\$30,000
Hospital workstation annualized capital expenditure (\$5,000)	Per hospital	\$1,091	1	\$1,091
Hospital provider workstation maintenance	Per hospital	\$3,000	1	\$3,000
Physician office annual licensing fee	Per practice	\$750	2	\$1,500
Ongoing clinical supplies	Per system	\$1,363	1	\$1,363
Lab permit	Per school	\$75	6	\$450
Printing and envelopes	Per system	\$2,032	1	\$2,032
Equipment and supplies subtotal				\$115,059
Staff time				
Nurse time	Per visit	\$15.06	217	\$3,268
Half-time program administrator	Per system	\$54,132	1	\$54,132
Half-time administrative assistant without full benefits (FICA included)	Per system	\$16,663	1	\$16,663
Staff subtotal				\$74,063
Total				\$189,122
Scenario analysis^b				
Reduced school annual hosting fee	Per school	\$199	6	\$1,194
New stethoscope licensing fee	Per system	\$2,856	1	\$2,856
Reduced hospital and physician office license fee	Per site	\$199	3	\$597
Scenario analysis equipment and supplies subtotal				\$88,206
Scenario analysis total				\$162,269

^aCapital expenditures were annualized assuming 5 useful life years and a 3% discount rate for an annualization factor of 4.5797.

^bThe hosting and licensing fees were substantially reduced in the 2018–2019 school year. We ran a scenario analysis with these lower costs.

Cost-Benefit Estimate

- Total cost of \$189,122
- The program led to an estimated total benefit of \$384,995 (95% CI: \$60,416; \$687,479)
- Annual net benefit of \$195,873 (95% CI: -\$128,706; \$498,357)



Parent/Caregiver Surveys

- Paper surveys administered May-June 2017
- Questions in both English and Spanish
- Parents/caregivers were instructed to complete 1 survey per household based on the experiences of their oldest child attending the school
- Participants were provided \$10 gift card
- Participants had the option to provide their name and phone number for a follow-up interview
- Sent home with approx. 2,5000 students attending the 4 participating schools

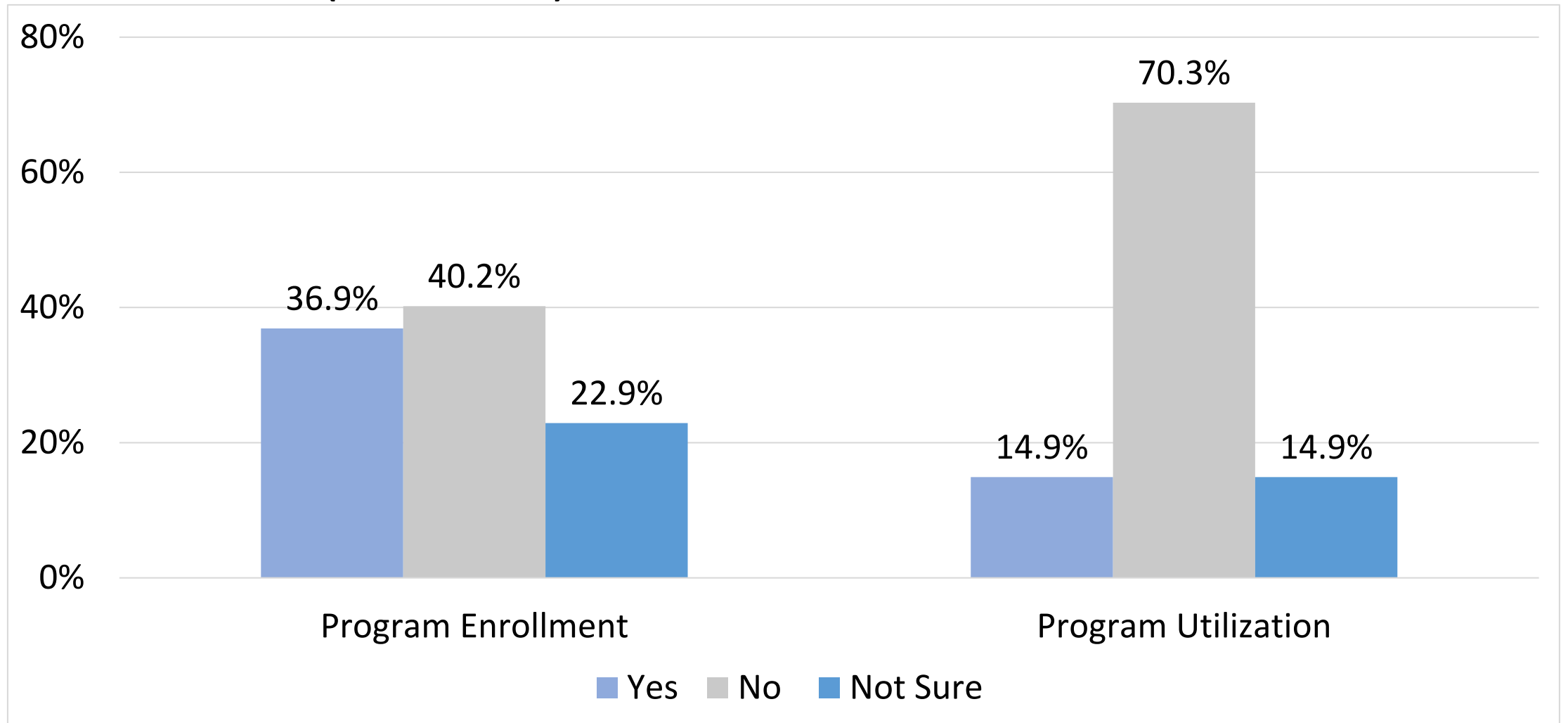


Survey Responses

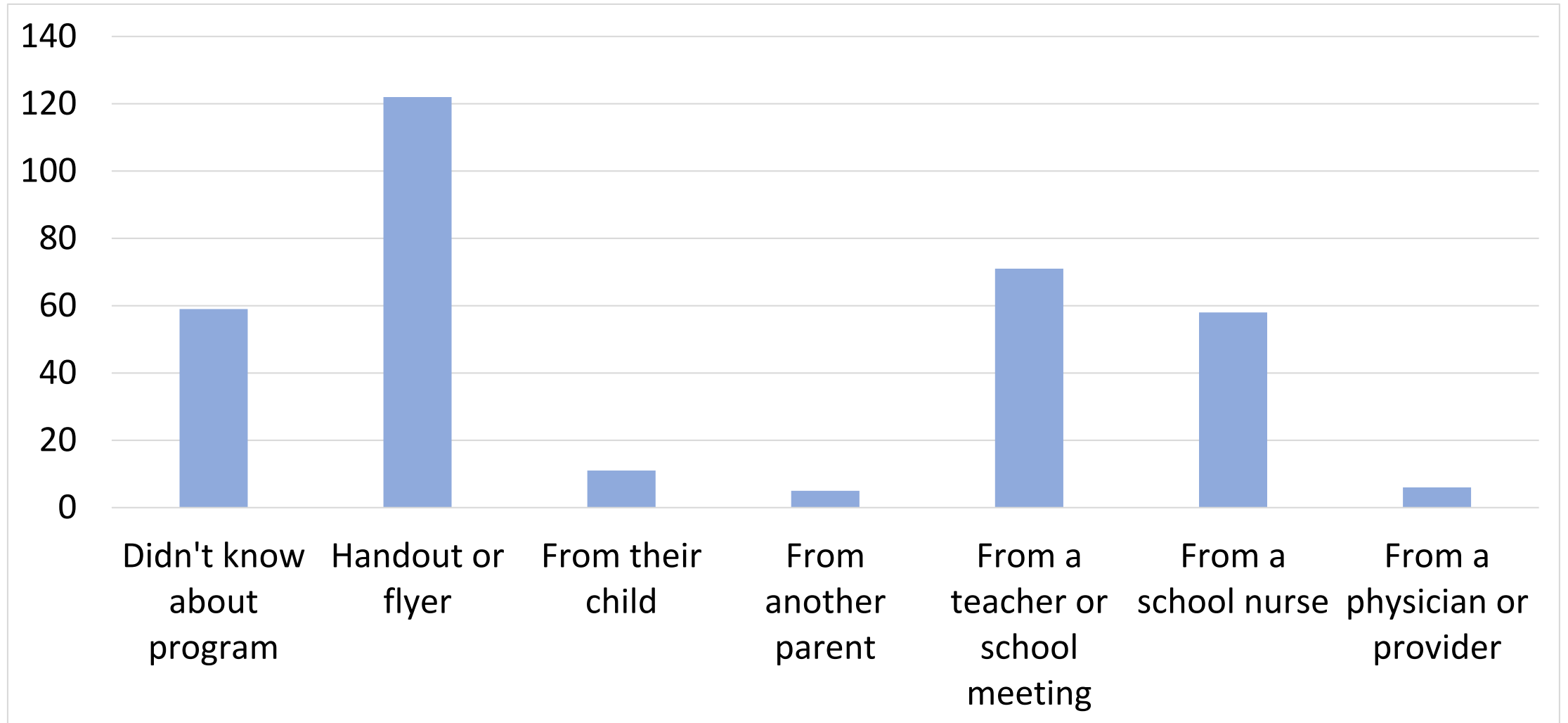
- Total of 255 parent/caregiver respondents
- Response rate varied by school from 19 to 130 returned surveys
- 85% of completed surveys were in English
- When their child is sick on a school day, parents reported most likely...
 - Take the child to a doctor (83.7%)
 - Treat the child at home (54.4%)
 - Take their child to urgent care or clinic (32.9%)
- 13.9% of parents reported they would send their child to school when sick
- 14.3% of parents reported they would take their child to the emergency department



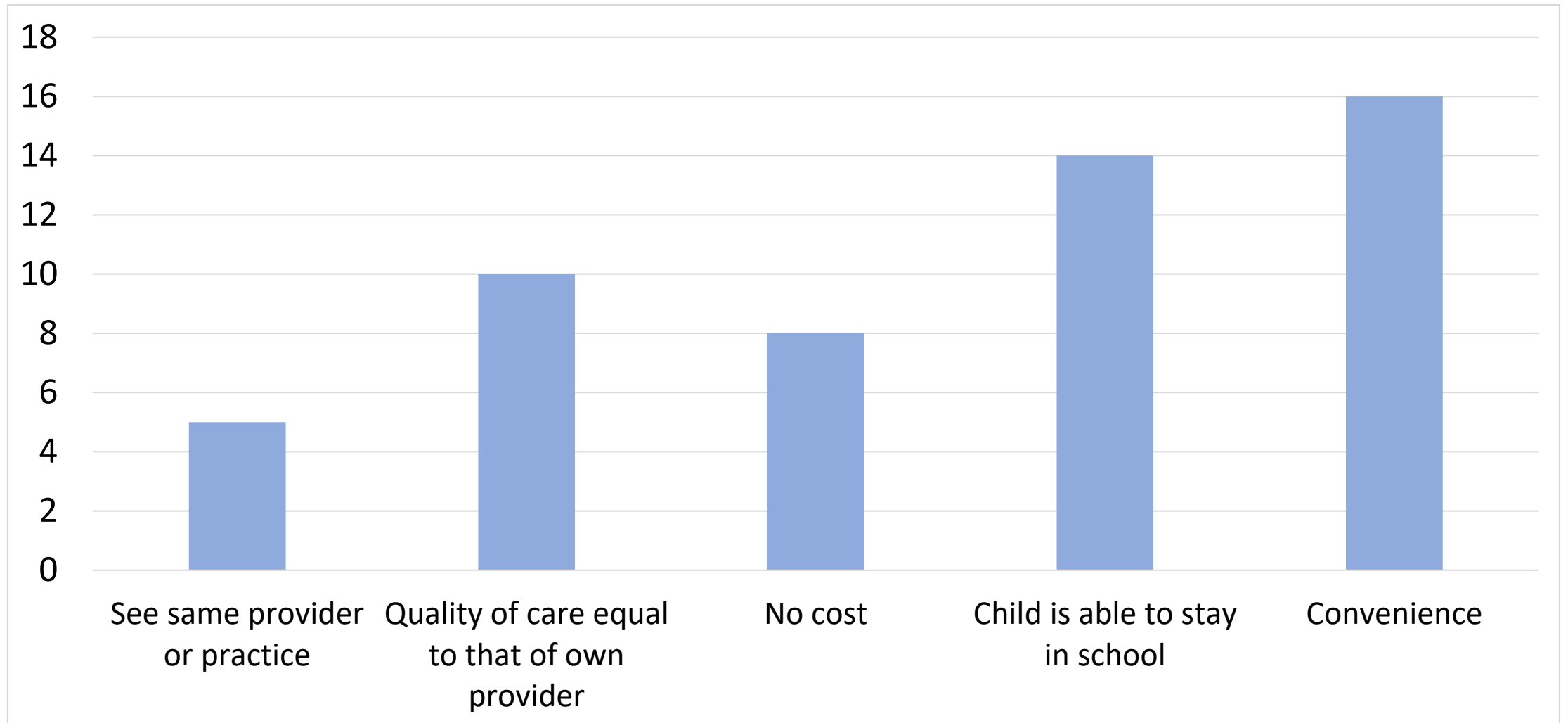
Parent-reported enrollment and utilization, 2016-17 (n=252)



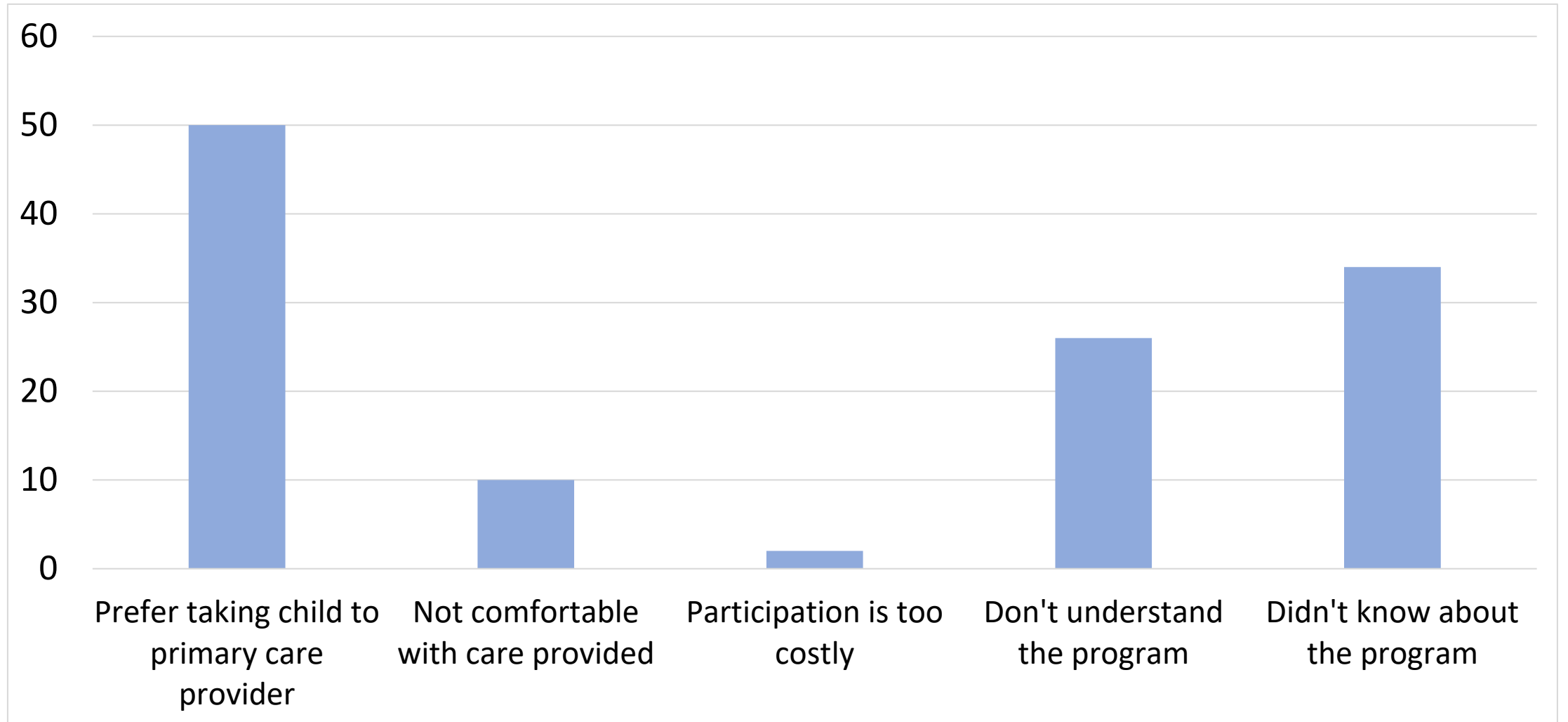
Parent Awareness of Program (n=251)



Reasons for Enrolling (n=22)



Reasons for Not Enrolling (n=96)



Stakeholder Interviews

- 20 parents/caregivers
 - 4 interviews conducted in Spanish
 - All 4 participating schools were represented
- 6 school nurses
- 6 principals
- 13 participating health providers from the local hospital or private practice



Top Benefit 1: Convenience for Parent

Parent

For convenience. If they work all week and their job isn't as flexible as mine is, then they may say... I have to work Monday through Friday. It's hard for me to get off. This would be, this works for me better.

School nurse

The parents tend to really like it because they don't have to necessarily leave work, or if we have a lot of parents that work far away where it takes them a while to get everything situated to be able to come to school. It gets that appointment done before they're event at the school so it's a good time saver for them

Principal

I think a lot of parents that used it were working parents. I think they utilized it because it allowed them to stay at work and their child still to be seen.

Medical provider

I think it's really helpful, especially for working parents. If they have a child who is sick at school and we get to see them they don't have to get off work. Most of the time, when we get a call, we can take care of the problem just through the telehealth system. Most of the time, there nothing extra to do.

Top Benefit 2: Limits Time Out of School

Parent	<i>I think it would reduce absences, because at least they have an opportunity to be seen very quickly, be treated, and then be evaluated and return to class.</i>
School nurse	<i>Probably the most successful are rashes that I've seen because things that are not contagious and we can put some hydrocortisone on their and make them comfortable, they can stay in school. They feel good, they're comfortable now, no fever, they're back in class.</i>
Principal	<i>Let's say a child comes to the health room. Their eyes are red and, as a nurse, she might think, "Oh this could be just they're rubbing their eyes or they have allergies, or it could be pink eye and I'm not sure the difference between the two..." Let's say they access the doctor and the doctor's like, "No, it's not pink eye..." they can go back to class, then they haven't missed any instruction.</i>
Medical provider	<i>I think every student has a potential of benefitting because if a student develops an earache or a sore throat or pink eye or a stomachache, instead of the nurse requiring that student to go home and see their doctor, the medical care can be given in the school setting. And if it's determined that the child doesn't have to miss school, the child goes right back to the classroom. The child doesn't miss school.</i>

Communication Efforts

- The top methods for learning about the telemedicine enrollment was through registration and enrollment, flyers sent home, at school events, and through support staff.
- Spanish-speaking parents were unable to name as many communication and outreach methods as compared to English-speaking parents.
- Parents who were members of the PTA were more aware of a sustained communication effort at their school.



Communication Efforts

On the front line is our registration secretary. Every child that registers in the school, so all new students in Pre-K and in kindergarten, and any new student to the school, gets a registration packet. The telehealth pamphlet, all the information is in there... I think people see it in their packet and I don't know if they feel like—I don't know if they read it and know it's an option or feel like it's a requirement, but we get a lot of those back, filled out and completed. But we've followed up with—at school events, we have signs that they can come to the health room and learn about it. I've done demonstrations on the telehealth cart and things like that for people who had questions. Email—we've sent out school-wide emails. And then, of course, one-on-one telephone calls. If I have someone who's not enrolled and they possibly need it, then we have a discussion over the phone. – School Nurse

Perceived Reasons for Low Enrollment

- Parent lack of program understanding and awareness
- Parent preference to visit own provider or treat at home
- Parent distrust of providers and/or technology
- Parent unable to complete and/or return enrollment forms (busy or lazy)
- Parent education and literacy level and language barriers
- Parent confusion about insurance billing and payment
- Parent belief that program is for uninsured and/or low-income students
- Parent privacy concerns



Perceived Reasons for Low Utilization

- Low utilization as a result of low enrollment
- Limited use for prevalent health conditions presenting at wellness center
- Low utilization by school nurse
- Parent preference to visit own provider or treat at home
- Students not visiting Wellness Center
- Nurse unable to contact parents to provide consent for child's visit



Top Challenges

School nurse

- Technology issues
- Nurse staffing
- Limited impact on reducing absences due to presenting health condition

Principal

- Technology issues
- Nurse staffing

Medical provider

- Technology issues
 - Delayed or missed visits
 - Adds to emergency department load
 - Nurse training issues
-

Challenges: Technology

School nurses, principals, and providers most frequently reported technology issues as a challenge

And if your equipment isn't working right, then that might be a couple of calls to IT to try and troubleshoot the problem. It can turn into a mess. I mean, so much so that there are times I've had to just cancel the visit and call the parent and say I can't do the visit. – School Nurse

Part of my issue with utilization here is that more than several times the computer didn't work. And I think it was about eight times this school year that that happened. And that happens once and a family loses trust; we're done. – Principal

I think it's been rare that I've just been able to log in and have everything work perfectly. Usually, there's some issue that makes it less than ideal. – Medical Provider



Challenges: Training and Technology Use

- A number of providers linked technology challenges to nurse training problems on using the equipment on the school side.
- One provider noted that they had no technology challenges with nurses with high utilization, but that nurses with low utilization had difficulty properly utilizing the equipment.



Challenges: Missed Visits

- Difficulty contacting the family
- Difficulty getting an immediate visit with the medical provider
 - Patient scheduling
 - Hospital emergency department capacity



Challenges: Communication

- Some principal concern with expectations that the nurses promote the program after school hours
- All interviewees from the hospital stated that they do not promote the program to patients

“That’s up to the nurses in the schools and I think the principals. We don’t do the promotion.” – Medical Provider



Implications

Program Recommendation #1: Promotion

- Send monthly reminders in electronic newsletters
- Mail brochures to parents
- Increase frequency of information in backpack folders
- Hold special meetings to explain the program to parents and incentivize participation (free food)
- Promote program at PTA meetings
- Promote enrollment when nurse contacts parents for illness
- Provide stipend to nurses for promotion at school events
- Correct misperceptions on program eligibility and clarify billing
- Promote directly to students
- Promote stories of successful use
- Promote in the pediatrician's office
- Provide list of participating physicians



Program Recommendation #2: Program Delivery

- Improve relationships and interactions between providers and school nurses
- Create templates and guidance documents to prepare school nurses before telemedicine visits
- Increase training to nurses, particularly at schools with low utilization
- Address problems with EHR and telehealth technology



Program Recommendation #3: Enrollment and Utilization

- Develop a system of online program enrollment, versus paper forms
- Improve the enrollment form language to make shorter and less complex
- Eliminate the requirement to secure parental consent for each visit
- Use medical interpreters or bilingual medical staff due to language barriers



Program Recommendation #4: Expansion

- Extend existing acute condition services
 - Administering flu tests
 - Giving doctors the ability to order a range of over-the-counter treatments for allergies, allergic eye symptoms, and upset stomach
- Augment the current model to focus on chronic conditions
- Add ADHD and mental health services to the model

We have a school psychologist, but when this gets beyond the school psychologist into the more medical mental health world, there's nothing. You have to call Mobile Crisis and have the police come out and put the child in a police car in handcuffs. - School Principal



Program Recommendation #5: Expand Provider Base

- Expand provider participation by surveying parents to know which primary care physicians are commonly used
- Recruit these providers to be part of the telehealth program.

I think the biggest challenge is parents wanting to use their own doctors. But if their child's doctor was part of it, then, I mean, I would think that that – because that seems to be the barrier that has been indicated to me – I would think that we would be able to enroll more families. – School Principal



Summary

- Telemedicine program we evaluated resulted in a net benefit to society when the value of parent and teacher time is included
- Program reception was generally positive across key groups, but with areas of implementation improvement
- High enrollment does not equate to high utilization
- Technology and communication major challenges
- Mental health needs not addressed yet

