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**Running Head:** Asthma Care in School-Based Telehealth Clinics

# **School Nurse Perception of Asthma Care in School-Based Telehealth**

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## **Abstract**

Objective: School-based telehealth (SBTH) offers an opportunity to overcome traditional barriers to providing comprehensive asthma care for children. Guided by an implementation science framework considering factors internal and external to the school setting, we characterized barriers and facilitators to asthma care within an existing SBTH program available in over 50 under-resourced South Carolina schools.

Methods: This cross-sectional study assessed barriers and facilitators to SBTH asthma care delivery using web-based surveys of school nurses, specifically addressing school implementation of

telehealth methods. Surveys evaluated practices and nurse and school-specific factors related to telehealth implementation including perceived barriers, organizational readiness and self-efficacy. Utilizers were schools who completed 1-10 average visits per month while non-utilizers completed less than 1 average visit per month. Descriptive statistics were performed to characterize perceptions in utilizers versus non-utilizers.

Results: Of 53 surveys distributed, 36 were completed (68% response rate). Commonly cited barriers included inadequate time due to competing tasks in both utilizers (65%) and non-utilizers (74%) as well as lack of caregiver involvement in care planning (94% of utilizers and 84% of non-utilizers). Of those utilizing specific, relevant telehealth services, schools scored high in perceptions of organizational readiness (n=24, mean: 24.5/30), self-efficacy (n=26, mean: 3.6/5) and comfort with identifying students eligible for SBTH (n= 26, mean: 3.5/5).

Conclusions: We identified inadequate nurse time and challenges engaging caregivers as key barriers to implementation of a school-based telehealth asthma program providing care to an under-resourced population. Addressing these barriers when expanding telehealth services may promote utilization of telehealth.

Keywords pediatrics; school; implementation; organizational readiness

## Introduction

Asthma is one of the most common chronic condition affecting children (1). In 2016 it was estimated that 6 million US children age 0-17 years had asthma (2). The incidence of Emergency Department (ED) visits and hospitalizations for childhood asthma remains high while visits in primary care settings have declined (3). In 2013 among children under 18 years of age, total direct costs of pediatric asthma were \$5.92 billion (4). Because asthma confers immense burden to

children, families and the health care system, innovative strategies are needed to deliver effective, patient-centric care to children with asthma (3, 5).

While effective management guidelines exist for the treatment of pediatric asthma, challenges exist in providing quality care to children. Poor medication adherence and presence of triggers lead to inadequate asthma control (6, 7). Deficiencies exist with access to care in rural and under-resourced areas (8, 9). This suggests a need for a more patient and parent-centric model of care to address medication adherence, avoidance of triggers and mitigation strategies in the home and school environment.

Children in the US spend a significant portion of their day in school, making this venue ideal for innovative, patient-centric health interventions (10). School-based health centers are clinics staffed by qualified healthcare professionals that provide health services in the school during school hours. Currently, there are over 2500 school-based health clinics in the United States (11). School-based asthma program interventions include improving access to clinicians including respiratory therapists, and specialists, asthma education programs, and direct observed therapy (12-14). Telehealth is increasingly an element of care included in these school-based health programs which has led increased symptom-free days, less healthcare utilization and improved quality of life (15-17). Typically, this involves a nurse or health care professional (telepresenter) located in a school connecting a student to a physician or midlevel practitioner (clinician) located at another site. The telepresenter uses peripheral tools to allow the clinician to perform key exam maneuvers. For example, a stethoscope allows for auscultation of the heart and lungs and a magnifying scope allows for visualization of eyes, throat and skin. (Figure 1)

School nurses are recognized key stakeholders in successful school-based health clinic programs. They often play an important role in communication between school staff, other medical providers and families, and are instrumental to school-based public health strategies (18-20). Studies have shown engaging school nurses in asthma case management is associated with improved

medication adherence, symptom monitoring and decreased disease burden (21, 22). However, optimizing the role of school nurses in school-based asthma care while balancing this duty with their day-to-day duties continues to be a challenge. Lack of time, education, and communication, particularly in rural areas, are cited as common barriers (23). In a survey of school nurses in both urban and rural areas, Carpenter et al. found that while most had some asthma training, school nurses in rural schools were much less likely to have received this support and almost all would have appreciated additional training (23).

School-based telehealth (SBTH) has been shown to increase access to healthcare in rural areas (24). Additionally, it may improve the efficiency and sustainability of traditional school-based health programs by making a provider available to many schools on the same day (15, 25). Typical barriers to asthma care include access to a clinician during daytime hours, difficulty in obtaining medication and access to asthma education (26, 27). SBTH asthma care offers an opportunity to overcome these barriers to providing asthma care to children compared to the in-person clinic setting. The purpose of this study was to characterize school nurses' perceived barriers and facilitators to asthma care delivery in a SBTH program in order to focus future efforts of quality improvement.

## **Materials and Methods**

### ***Conceptual Framework***

This study was guided by implementation science principles to gain a better understanding of factors influencing SBTH implementation and guide identification of strategies to support telehealth utilization. We used the Exploration, Preparation, Implementation and Sustainment (EPIS) framework (28, 29) because it highlights a comprehensive set of internal and external contextual

factors that potentially influence implementation processes in a particular setting. This model was selected to guide data collection considering factors internal (e.g. resources, leadership, self-efficacy) and external (e.g. funding, district support) to the school.

## ***Setting***

At the time of survey distribution, SBTH was available in 66 South Carolina elementary schools, 91% of which primarily serve students who qualify for free or reduced-fee lunch and many are located in rural areas. This well-established SBTH program began as a pilot in two South Carolina counties and now increases access to healthcare to over 25 000 children across the state. Care is provided by connecting pediatric nurse practitioners, pediatricians and respiratory therapists to school nurses' offices using telehealth carts that combine Health Insurance Portability and Accountability Act - compliant two-way real-time audio-visual communication with electronic peripheral devices including exam camera and stethoscope. The program aims to overcome barriers to care for children in the most cost-effective way through acute care for common childhood illnesses and chronic disease management for asthma, attention-deficit/hyperactivity disorder and trauma. Both the acute and chronic disease management of asthma have been a particular focus of the program in an attempt to reduce absenteeism and avoid the high-cost care utilization patterns associated with poorly controlled disease. School nurses play a key role in the program by referring and telepresenting students for their acute or chronic care. In the case of asthma, children are identified either by the school nurse or through parent night events. After parental consent is obtained, then children and their parents meet with a school-based health clinician via telehealth to assess asthma severity, complete an asthma action plan, receive asthma education and arrange for appropriate medication to be ordered and given by the school nurse when appropriate. Whenever possible SBTH staff licensed practical nurses (LPN)s come to the school to telepresent these scheduled visits to reduce the time burden on the school nurse, however the school nurse's input remains highly valued. Telepresenting involves the nurse getting the student from class, obtaining

vitals and connecting via videoconferencing equipment to a clinician at an academic center. The telepresenter also manipulates peripheral tools to allow the clinician to auscultate lungs or view patient using a scope. The clinician to which the nurse is connecting can include a physician, nurse practitioner, respiratory therapist or other specialist. The program is specially aimed at areas of the state where children insured through Medicaid utilize the emergency department for asthma twice as much as expected, indicating poor disease control and lack of access to preventative care. In each school, telehealth provides some services at the school and the school nurse provides some services. The responses from the nurses regarding who provides the services at their school is shown in Table 2.

### ***Participants***

Out of the 65 nurses covering the 66 schools, the survey was distributed to a total of 53 eligible elementary school nurses. Nurses were eligible if they had a current position in a school in the state of South Carolina with a school-based health clinic and had been based in a school for at least one year. Ten nurses had not been in their current school for a full year so may not have been able to fairly assess school-based telehealth at their current school.

### ***Survey Instrument***

The web-based survey evaluated nurse and school-related factors related to telehealth implementation. The survey consisted of 64 questions including demographic information, asthma care services provided at the school directly by nurses and/or through telehealth, perceived barriers to telehealth program delivery and attitudes about program implementation (organizational readiness, self-efficacy and comfort in identifying students). Demographic questions included sex, race/ethnicity, age, time as a nurse, time as a school nurse, time in current position, average number of asthma telehealth visits per month, number of students at school, number of students with asthma at school and number of students that nurse treats with asthma at school. Participants rated the extent

to which they perceived a set of 19 barriers in carrying out the telehealth asthma program (not a barrier, minor barrier, moderate barrier, major barrier). Barriers were mapped to the EPIS model to include inner and outer factors related to SBTH, such as parental factors, personnel and time resources, financial considerations, technology and communication factors and school leadership. Branching logic was used to present an additional set of questions regarding facilitator only if the respondent selected that telehealth provided at least one of the services listed in Table 2.

Organizational readiness was assessed using an adapted version of the 5-item Organizational Readiness to Change Instrument (30). Participants reported their level of agreement (strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree) about their school-based health center's ability to carry out a set of activities necessary for implementation of a new program (e.g. coordinate tasks, handle challenges, keep track of progress). One item from the original survey was adapted for better fit in the school setting to cover the management of administrative tasks. The Cronbach's alpha in the current study was 0.93. A single item assessed self-efficacy, the nurses' confidence in their ability to effectively participate in the school-based asthma telehealth program (not at all confident, slightly confident, moderately confident, very confident, extremely confident). Finally, a single item was used to assess nurse comfort in identifying students for the program (not at all comfortable, somewhat comfortable, moderately comfortable, very comfortable).

### ***Study procedures***

The survey was sent electronically to the nurses in a web-based platform using Research Electronic Data Capture. The survey was open for 5 weeks (11/11/19 – 12/16/19) with weekly reminders sent out to nurses to complete. A nominal gift card valued at \$10 was sent electronically to the nurses who completed the survey to compensate them for their time.

### ***Statistical Analysis***

Descriptive statistics were performed on demographic variables as well as whether asthma care services were provided by both telehealth and the school nurse, by the school nurse independently, by telehealth independently, or not at all. Schools were classified as “non-utilizers” if they performed on average less than one asthma visit per month or “utilizers” if they performed on average one or more asthma visit per month. Asthma visits included any visit for initial diagnosis, on-going management or acute exacerbation. We considered any response of a barrier whether mild, moderate or severe, as a positive endorsement of a barrier. In an exploratory analysis, we compared the proportion endorsing barriers between the utilizers and non-utilizers using Fisher’s exact test. The mean, standard deviation, median and interquartile range of each of the school’s composite readiness score, self-efficacy score and commitment score were determined. All analyses were performed using Statistical Analysis Software (SAS version 9.4).

### ***Study Approval***

The Medical University of South Carolina certified this to be quality improvement and did not require Institutional Review Board review.

### **Results**

Of the 53 surveys distributed, 36 were completed (68% response rate). The characteristics of the school nurse survey respondents, schools and students are shown in Table 1. Most school nurses were female and non-Hispanic White and had been in their current school nurse position for a mean of 4.5 years. Of the 36 programs represented by the nurses, 19 programs completed no asthma visits or less than 1 average visit per month for asthma using telehealth (“non-utilizers”) while 17 programs completed 1–10 average visits per month for asthma using telehealth (“utilizers”). An

analysis comparing the schools of survey responders and survey non-responders showed there was no statistical difference in number of students in school or rurality.

### ***Service Provision***

Schools provided most of the components of care either using only the school nurse, only with telehealth or through both services (Table 2). Some schools did not provide asthma management follow-up visits (11%) or deliver controller medicines daily to students (11%). Both telehealth and the school nurse provided acute care for students experiencing asthma symptoms (47%) and instruction on inhaler technique (50%). Forty-seven percent of nurses independently identified students with asthma without telehealth. Forty-seven percent of nurses reported that telehealth directly provided asthma management follow-up visits, independent of the nurse.

### ***School-Based Asthma Care Delivery Barriers***

Some barriers were highly endorsed by both utilizers and non-utilizers (Table 3). Inadequate time due to competing tasks was cited as a barrier in both utilizers (65%) and non-utilizers (74%). Additionally, a lack of caregiver (parent/guardian/family) involvement in care planning was cited as a barrier with 94% of utilizers and 84% of non-utilizers. Few nurses cited timeliness of telehealth staff response and State Department of Education support as barriers. Results were stratified between utilizers and non-utilizers, though the proportion endorsing each barrier was not significantly different between the two groups. The biggest discrepancy in reported barriers between utilizers and non-utilizers was in obtaining data related to student health needs (65% among utilizers vs 37% of non-utilizers) as well as adequate quality of internet connectivity (35% of utilizers vs 53% among non-utilizers).

### ***Organizational Facilitators***

We found that that among the 24 nurses who answered all of the questions regarding organizational readiness, self-efficacy and comfort with identifying students with asthma, the scores were generally high with little variability (Table 4). Of the 24 nurses who responded, the mean score for organizational readiness was 24.2 out of a possible 30. Of the 26 nurses who responded, the mean score for self-efficacy and comfort was 3.6 and 3.5, respectively, out of a possible 5. Because of the small number of responses and lack of variability, analysis of contributing factors was not performed.

## Discussion

In this survey study, we sought to determine the key barriers and facilitators perceived by school nurses to providing asthma care in a state-wide SBTH clinic guided by implementation science principles, both in programs that were utilizing asthma telehealth care and those who were not. These schools are primarily in low-income rural communities and are generally designated as medically under-resourced. We found that inadequate nurse time and challenges in engaging caregivers were the most commonly cited barriers. Additionally, nurses uniformly endorsed that their schools had high degrees of organizational readiness, comfort and self-efficacy. School nurses play an integral role in implementation of SBTH. It is vital to understand their perspective on barriers and facilitators to uptake of asthma care delivered via SBTH.

The barriers noted by both utilizers and non-utilizers of asthma care in the SBTH setting were in the same domains. Specifically, both groups noted barriers of parental engagement and personnel, time and location resources. This makes it likely that interventions to address these barriers will improve utilization in both groups. It also suggests the need to further explore reasons non-utilizers don't use the service. These schools may need interventions more tailored to their needs to promote utilization. Alternatively, these schools may not have a need for asthma telehealth due to factors we have not yet evaluated.

The most commonly reported barrier was engaging caregivers in their child's asthma care, specifically with obtaining consent and caregiver involvement in care planning. This highlights the need for program designers to strive for a more patient- and family-centric model that is convenient and efficient. Other school-based programs for mental health and nutrition have encountered similar challenges with engaging parents but also highlighted how their engagement promotes success of programs (31, 32). Because both traditional clinic visits and school-based clinics are only available during parental working hours, innovative strategies are needed to involve parents without adding additional burden on parents or school nurses. Telehealth platforms that allow parents to connect at a setting convenient for them could be effective. Mobile health asthma self-management programs have been shown to be favorably viewed by parents as a means of managing routine maintenance and monitoring and may improve asthma control and promote engagement in SBTH asthma programs (33, 34).

Inadequate nurse time was also commonly cited as a barrier to providing asthma care through SBTH. A similar study assessing school nurses' perceived barriers to implementing strategies for food allergy prevention and management found that though they felt the strategies would be helpful, time was a significant implementation barrier (35). This may indicate that while nurses recognize the benefits of these care programs, competing demands limit their participation. While costly, deploying telepresenters to schools to assist in presenting patients to remote clinicians may help ease the burden conferred upon school nurses. Because telehealth allows one clinician to complete visits from patients at multiple schools without traveling between them, some of the telepresenter cost may be mitigated by this efficiency. Formal cost-effectiveness analyses are needed to inform these programmatic decisions.

Despite identifying key barriers, many school nurses reported high levels of confidence in organizational readiness, a high degree of self-efficacy and high levels of comfort in identifying students with asthma. This is supportive of school-based health's goal not only to treat students but also to empower school nurses and teachers to be knowledgeable and confident in caring for students

with asthma (36). Other school-based asthma programs have been successful in empowering nurses with knowledge, comfort in management and self-efficacy (37, 38). Because schools self-select into the SBTH program, nurses responding to this survey, regardless of level of utilization of the asthma program, may have more support in place than schools that have not chosen to participate in telehealth. Future studies should focus on barriers to participation in SBTH among those schools have not opted into the program.

Addressing identified barriers to implementation when expanding telehealth services may promote higher utilization and improved care. While participants reported high self-efficacy in carrying out the telehealth program and high organizational readiness in their schools, key barriers to implementation of a SBTH asthma program were identified. Programs should be designed and innovative strategies should be developed to ease the burden on these key stakeholders: school nurses and caregivers. This should include robust, intentional communication strategies between caregivers, nurses and health care providers. Tools, such as mobile applications or web portals, as well as optimized workflow with staffing support (ex. telepresenters) are needed. Successful school-based asthma programs have led to increased symptom-free days and less healthcare utilization, it follows that strengthening these programs through addressing barriers will improve asthma care (15).

There are some limitations to our study. This study was performed in the state of South Carolina in one well-established SBTH program. Though a geographically diverse range of schools were included, the study had a small sample size. The findings may not be representative of other smaller or less-established programs or to programs in other states with different socioeconomic and demographic compositions. Additionally, only school nurses were surveyed in this study. It would be valuable to explore in a future study the perceived barriers and facilitators of children, parents, school administrator and telehealth staff. There may be selection bias in the respondents to the survey as those who were more engaged in programs may be more likely to respond. Although the responses were anonymous, because the survey was introduced by nurse leadership, the nurses may have responded in way that would be favorable to the program rather than how they truly felt. Lastly,

although it seems domains of barriers were similar between utilizers and non-utilizers, the study may not have been powered to detect a difference.

In conclusion, this study has identified key barriers and facilitators to successful implementation of asthma care in SBTH clinics. Parental and school leadership engagement are key drivers of success. As more school and health care system partnerships form to implement pediatric care in the school setting, an understanding of key drivers of successful implementation is paramount. Future studies should address novel ways to engage caregivers whose children receive asthma care through SBTH programs such as employing mobile health technology to facilitate communication. Concurrent with this study, our team is qualitatively assessing schools in anticipation of deploying a mobile application to assist parents in managing their child's asthma by relaying real-time data to the SBTH program. The children in these schools need and deserve high quality medical care for their asthma. SBTH is one strategy to bring preventative care directly to children in areas where it is most needed.

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**Table 1.** Demographics of Nurse Respondents, Students and Schools (*n* = 36 respondents).

| Variable                                             | Category                  | Statistic    | Value          |
|------------------------------------------------------|---------------------------|--------------|----------------|
| Sex                                                  | Female                    | N (%)        | 35 (97.2%)     |
| Race/Ethnicity                                       | White, non-Hispanic       | N (%)        | 27 (75%)       |
|                                                      | White, Hispanic or Latino |              | 1 (3%)         |
|                                                      | Black                     |              | 8 (22%)        |
| Age                                                  | 25-34                     | N (%)        | 5 (13.9%)      |
|                                                      | 35-44                     |              | 10 (27.8%)     |
|                                                      | 45-54                     |              | 12 (33.3%)     |
|                                                      | 55-64                     |              | 8 (22.2%)      |
|                                                      | 65+                       |              | 1 (2.8%)       |
| Time as a nurse (years)                              |                           | Median (IQR) | 22 (12.5-30)   |
| Time as a school nurse (years)                       |                           | Median (IQR) | 7.5 (3.0-13.5) |
| Time in current school as nurse (years)              |                           | Median (IQR) | 4.5 (2.0-4.5)  |
| Average number of asthma telehealth visits per month | 0                         | N (%)        | 19 (52.8%)     |
|                                                      | 1-5                       |              | 13 (36.1%)     |
|                                                      | 6-10                      |              | 4 (11.1%)      |
| Number of students at school                         |                           | Mean (STD)   | 415.9 (177.4)  |
| Number of students with asthma at school             |                           | Mean (STD)   | 39.4 (32)      |
| Number of students with                              |                           | Mean (STD)   | 16.2 (15.4)    |

|                                       |  |  |  |
|---------------------------------------|--|--|--|
| asthma that nurse treats at<br>school |  |  |  |
|---------------------------------------|--|--|--|

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**Table 2.** Provision of Components of Asthma Care in School-Based Care ( $n = 36$ ).

| Component of Care                                    | Both nurse and telehealth provide this service | Telehealth provides the service independent of nurse | Nurse provides the service independent of telehealth | Service not provided at school |
|------------------------------------------------------|------------------------------------------------|------------------------------------------------------|------------------------------------------------------|--------------------------------|
| Acute care for students experiencing asthma symptoms | 17 (47%)                                       | 5 (14%)                                              | 14 (39%)                                             | 0 (0%)                         |
| Identify students with asthma                        | 12 (33%)                                       | 5 (14%)                                              | 17 (47%)                                             | 2 (6%)                         |
| Assessment of asthma severity <sup>a</sup>           | 11 (31%)                                       | 8 (22%)                                              | 15 (42%)                                             | 2 (6%)                         |
| Development of a treatment plan                      | 10 (28%)                                       | 12 (33%)                                             | 12 (33%)                                             | 2 (6%)                         |
| Instruction on inhaler technique                     | 18 (50%)                                       | 4 (11%)                                              | 14 (39%)                                             | 0 (0%)                         |
| Counseling on trigger avoidance                      | 16 (44%)                                       | 6 (17%)                                              | 9 (25%)                                              | 3 (8%)                         |
| Asthma management follow-up visits (non-acute care)  | 6 (17%)                                        | 17 (47%)                                             | 9 (25%)                                              | 4 (11%)                        |
| Delivery of controller medications daily to students | 1 (3%)                                         | 5 (14%)                                              | 26 (72%)                                             | 4 (11%)                        |

<sup>a</sup>Row percentile may be >100% due to rounding.

**Table 3.** Perceived Barriers to Providing School-Based Telehealth Asthma Care (*n* = 36).

| Potential Barrier                                           | Of Utilizers <sup>a</sup> ,<br>Number<br>(Proportion)<br>Endorsing as<br>Barrier <sup>c</sup><br>( <i>n</i> = 17) | Of Non-utilizers <sup>b</sup> ,<br>Number (Proportion)<br>Endorsing as<br>Barrier <sup>c</sup> ( <i>n</i> = 19) | p-value <sup>d</sup> |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Parental Factors</b>                                     |                                                                                                                   |                                                                                                                 |                      |
| Lack of parent/guardian/family involvement in care planning | 16 (94%)                                                                                                          | 16 (84%)                                                                                                        | 0.61                 |
| Challenges obtaining parent/guardian consent for visits     | 14 (82%)                                                                                                          | 14 (74%)                                                                                                        | 0.70                 |
| Lack of parent/guardian trust in telehealth                 | 10 (59%)                                                                                                          | 12 (63%)                                                                                                        | 1.0                  |
| <b>Personnel, Time and Location Resources</b>               |                                                                                                                   |                                                                                                                 |                      |
| Adequate school nurse availability                          | 9 (53%)                                                                                                           | 8 (42%)                                                                                                         | 0.74                 |
| Adequate time (due to competing tasks)                      | 11 (65%)                                                                                                          | 14 (74%)                                                                                                        | 0.72                 |
| Availability of staff to coordinate care                    | 8 (47%)                                                                                                           | 9 (47%)                                                                                                         | 1.0                  |
| Designated space for telehealth visit                       | 6 (35%)                                                                                                           | 8 (42%)                                                                                                         | 0.74                 |
| Adequate tele-presenter availability                        | 3 (18%)                                                                                                           | 1 (5%) <sup>e</sup>                                                                                             | 0.33                 |
| <b>Financial Considerations</b>                             |                                                                                                                   |                                                                                                                 |                      |
| Adequate financial resources                                | 4 (24%)                                                                                                           | 7 (37%)                                                                                                         | 0.48                 |
| Reimbursement for services                                  | 4 (24%)                                                                                                           | 2 (11%)                                                                                                         | 0.39                 |
| <b>School support</b>                                       |                                                                                                                   |                                                                                                                 |                      |
| School staff awareness                                      | 9 (53%)                                                                                                           | 8 (42%)                                                                                                         | 0.74                 |
| School team views about the value of                        | 6 (35%)                                                                                                           | 5 (26%)                                                                                                         | 0.72                 |

|                                                                    |          |                      |      |
|--------------------------------------------------------------------|----------|----------------------|------|
| school-based telehealth                                            |          |                      |      |
| Leadership within the school                                       | 3 (18%)  | 3 (16%)              | 1.0  |
| <b>Technology and Data</b>                                         |          |                      |      |
| Adequate quality of internet connectivity                          | 6 (35%)  | 10 (53%)             | 0.34 |
| School Information Technology support/collaboration                | 5 (30%)  | 6 (32%)              | 1.0  |
| Obtaining data related to student health needs                     | 11 (65%) | 7 (37%)              | 0.18 |
| <b>Communication Between University Telehealth Team and School</b> |          |                      |      |
| Timeliness of telehealth staff response                            | 0 (0%)   | 2 (11%)              | 0.49 |
| <b>School Leadership Support</b>                                   |          |                      |      |
| School district leadership                                         | 4 (24%)  | 2 (11%)              | 0.39 |
| State Department of Education support                              | 2 (11%)  | 2 (12%) <sup>e</sup> | 1.0  |

<sup>a</sup>Utilizers are those who report one or more visit monthly on average.

<sup>b</sup>Non-utilizers are those who report less than one visit monthly on average.

<sup>c</sup>Respondents reported barrier as mild, moderate or major.

<sup>d</sup>All statistical comparisons were made using Fisher's Exact test.

<sup>e</sup>Out of 18 respondents, one respondent did not answer question.

**Table 4.** Facilitators of Providing School-Based Telehealth Asthma Care.

|                                                                                                                                                                  | Mean | Standard<br>Deviation | Median | Interquartile<br>Range |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------|--------|------------------------|
| Organizational Readiness ( $n = 24$ ) <sup>a</sup>                                                                                                               | 24.2 | 5.4                   | 24.5   | 23 – 28.5              |
| How confident are you that you can effectively participate in your school's telehealth-based asthma care services? ( $n = 26$ ) <sup>b</sup>                     | 3.6  | 1.1                   | 4      | 3 – 4                  |
| How comfortable do you feel identifying students in your school that would be eligible for the school-based asthma telehealth program? ( $n = 26$ ) <sup>c</sup> | 3.5  | 0.7                   | 4      | 3 – 4                  |

<sup>a</sup>Organization Readiness includes 5 questions each with a 1-6 Leikert scale. The range of possible scores was 5 to 30.

<sup>b</sup>This question was based on a 1–5 Leikert scale with 1 = Not at All Confident to 5 = Extremely Confident.

<sup>c</sup>This question was based on a 1–5 Leikert scale with 1 = Not at All Comfortable to 5 = Very Comfortable.

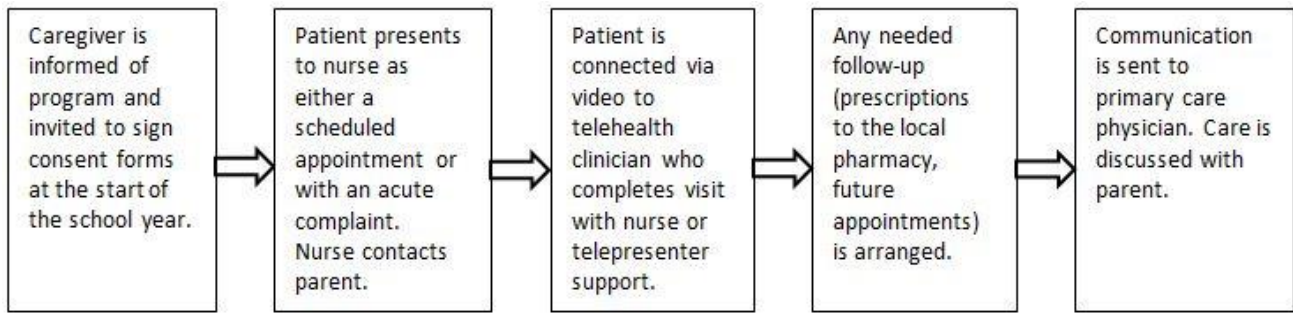


Figure 1. Process of School-based Health.

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