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The Principal and Nurse Perspective on Gaps in Asthma Care and Barriers to Physical Activity in New York City Schools: A Qualitative Study

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Abstract

Background—School officials and nurses play an important role in facilitating asthma management in schools. Little is known about their perspectives on in-school asthma management and barriers to physical activity (PA) at school.

Aims—The goal of this study is to explore school officials' and nurses' perspectives on asthma care and barriers to PA in children with asthma attending New York City schools.

Method—We conducted qualitative, semistructured interviews with 10 principals, 3 assistant principals, and 9 nurses in 10 Bronx, New York elementary schools. Sampling continued until thematic saturation was reached. Interviews were recorded, transcribed, and coded for common themes. The thematic and content review was subsequently used to analyze interview data. Emerging themes were discussed and agreed on by both investigators.

Results—Three main categories arose from the analysis: (1) procedures and policies around asthma management in school, (2) barriers to effective medication administration in school, and (3) barriers to PA in children with asthma.

Discussion—Participants identified gaps to in-school asthma management and barriers to PA participation: ineffective ways of identifying students with asthma; lack of written procedures for asthma management; difficulty in meeting the administrative requirements to administer asthma medication; lack of knowledge and training on asthma management for the parents, students, and school staff; parental limitation of children's PA; and schools not meeting the state physical education requirement.

Conclusions—Our findings suggest the need for policy reform on asthma management and PA in urban schools and should be considered in the design of future interventions.

Keywords

in-school asthma management; nurses; physical activity; principals; qualitative research

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Declaration of Conflicting Interests

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School principals and nurses are important stakeholders in facilitating asthma management in schools. Little is known about the school principals' and nurses' perspectives on asthma management and barriers to physical activity (PA) of school children with asthma. This is the first study to qualitatively assess the school principals' and nurses' perspectives on asthma management and barriers to PA in New York City (NYC) schools. Our research is an essential first step toward in-school asthma policy modification.

Asthma remains the most common pediatric chronic respiratory illness, affecting an estimated 7 million children in the United States (Akinbami et al., 2012). The relatively high prevalence of asthma (10.6%) falls within the 5- to 14-year-old age-group and disproportionately affects urban minority children of low socioeconomic status (Centers for Disease Control and Prevention [CDC], 2016b). In the Bronx, a largely low-income area in NYC, asthma prevalence and morbidity rates in children far exceed both the NYC and national rates (New York State Department of Health, 2013; Warman, Silver, & Wood, 2009).

Despite the efforts of the national authorities to increase the number of asthma-friendly schools nationwide, there remain relatively few policies on asthma management in schools in New York on the state level (CDC, 2015; U.S. Department of Health & Human Services [HHS], 2014). The New York State Education Department (NYSED) developed the guidelines for medication administration in schools based on a national policy (National Association of State Boards of Education, 2014; NYSED, 2015c). In NYC, a physician-completed Medication Administration Form (MAF) is required before the school nurse can administer asthma medication (New York City Department of Education [NYC DOE], 2014). However, less than a third of children have MAFs at school (Reznik, Bauman, Okelo, & Halterman, 2015). The NYSED requires elementary school students to participate in physical education (PE) for at least 120 minutes per week and at least three times per week (NYSED, 2015a). PA can markedly improve cardiopulmonary health and asthma symptom control (Carson et al., 2013; Dogra, 2013; Saguil & Okpokwasili, 2013). Three out of five children with asthma, however, tend to limit their PA (CDC, 2016a). The 2015 Report of the Office of the NYC Comptroller showed that schools in all five city boroughs do not meet the minimal NYS PE standards (Stringer, 2015).

In school, both principals and school nurses are important stakeholders in creating and maintaining an asthma management program (HHS & U.S. Department of Education, 2003). The purpose of this study was to explore the NYC principals' perspectives on asthma management and barriers to PA relative to those of the school nurses. This study is part of a larger project to design a school-based intervention to address barriers to asthma management and PA participation among inner-city children with asthma.

Method

We conducted a qualitative study using in-person interviews with school principals, assistant principals, and nurses in 10 Bronx, New York, elementary schools. Seven schools were randomly selected and approached by faxing a study invite letter followed by a meeting with the principal to further explain study details. Principals of these schools referred three other

schools for the study. None of the schools declined participation. The NYC DOE and university's institutional review board committees approved the study.

Participants

The in-person, 30- to 60-minute interviews were conducted and audiotaped with 10 principals, 3 assistant principals, and 9 school nurses. The assistant principals were included in the principal group, bringing the total to 13. We interviewed individuals in all three roles in three schools, just the principal in one school, and the nurse and principal in the remaining six schools. Criteria for study participation included the following: (1) employed at the school for at least 12 months and (2) current or past exposure to students with asthma. None of the approached individuals who met the inclusion criteria refused study participation, and all provided written informed consent before the interview. One of the school nurses did not meet the first criteria and was excluded from the study. All participants spoke English.

Materials and Procedure

After verifying the eligibility criteria, one author (MR) interviewed each principal, assistant principal, and nurse once between January and June 2011. The meetings took place on school premises, at a time and date convenient to the interviewees. No compensation was offered for the interviews. The interview guide (Table 1) used nondirective open-ended questions and more specific probes. Several questions were revised based on the first interview conducted in each group. Written field notes were taken during each interview. Thematic saturation was reached at Interviews 10 and 8 for principals and nurses, respectively. We conducted four additional interviews to confirm thematic saturation. Directly after the interview, the participants completed an oral survey of their demographic information, family asthma status, exercise practices, and years working in both the current school and the NYC schools. The study was guided by the phenomenological research tradition (Groenewald, 2004).

Data Analysis

All interviews were audio-recorded and professionally transcribed. Two coders (AC and MR) independently analyzed the transcripts and formulated separate codebooks for both the principals and nurses for key points within the text. The authors (AC and MR) discussed discrepancies between the codes and agreed on a master codebook, which was then used to independently code the interview transcripts. We used thematic and content analysis to analyze interview data and identified themes related to specific phrases (Joffe & Yardley, 2004). Salient themes were assessed based on both their perceived significance and the frequency of occurrence. Emerging themes were then analyzed and agreed on by both authors. We used methodological triangulation where results from the interviews and surveys (Reznik et al., 2015) produced similar results.

We used “verbal counting” methodology in which terms like *most*, *majority*, *many*, *some*, and *few* describe a number of participants based on the sample size (Table 2; Chang, Voils, Sandelowski, Hasselblad, & Crandell, 2009; Sandelowski, 2001).

Results

Participant Characteristics

Our final sample consisted of 13 principals and 9 nurses. Most of the interviewed principals and all the nurses were female, and the average time employed at the school was approximately 9 and 4 years, respectively (Table 3).

Interview Themes

The interviews produced 10 themes in three categories representing the common perspectives of principals and nurses on in-school asthma management and PA participation of children with asthma (Figure 1). The categories include (1) “There is no real procedure” (procedures and policies around asthma management in school); (2) “The nurse can’t just give the medicine” (barriers to effective medication administration in school); and (3) “They don’t want their kids in gym” (barriers to PA in children with asthma). Associated quotes are included in Tables 4, 5, and 6.

Category 1: “There Is no Real Procedure”: Procedures and Policies Around Asthma Management in School—There were three themes within the first category: (1) identification of students with asthma, (2) asthma medication administration, and (3) lack of formal school policies relating to acute asthma management.

Identification of students with asthma—There was no consensus among the principals and nurses on how children with asthma are identified in schools. The majority of principals and nurses agreed, however, that there is no written procedure on how to identify children with asthma and that in practice they most commonly found that information from communication with the parents (directly or through notes/school forms and teachers). Additionally, the majority of nurses claimed that they often first discover the child’s condition when an asthma attack occurs in school.

Quotes supporting the above statements include the following:

- “[We find out about asthma] based on the information that we gather when we’re registering them.”
- “Through the blue forms, well, the forms indicate what the child has or doesn’t have.”
- “Sometime the parents tell the teachers, teacher will inform me and, um, the 504.”
- “There was one child that [...] came in and stated that she had shortness of breath and that’s how I discovered that she was an asthmatic.”

Asthma medication administration—Both the principals and nurses uniformly agreed that asthma medications should be handled by the nurse and that an updated MAF needs to be on file. Without the form the nurse is unable to administer the medication during an asthma attack, despite having it available in stock. In such cases, most principals and nurses agreed that they would call 911, the parents, or both. If called, the parents would be asked to

bring the medication or take the child home. The majority of the principals and a few nurses claimed that many children carry their own medication even though they are not supposed to.

Supporting quotes include the following:

- “[The nurse] is not permitted to administer anything unless the 504 is filled out.”
- “We’ve had a couple of kids that self-medicate [...] they bring the pumps to school for whatever reason.”
- “We would contact the nurse and as soon as we would call 911 and the parent would be also contacted.”

The lack of formal school policy relating to acute asthma episode

management—Most principals and nurses stated that either there is no written procedure on how to handle an acute asthma episode in school or that episodes are treated like any other medical emergency. Both groups agreed that the nurse handles all asthma attacks. The participants overwhelmingly based their answers on past experiences rather than actual written policies. Only two principals and two nurses said that there is a written procedure on how to handle an acute asthma attack in school.

Supporting quotes are the following:

- “There’s no real procedure.”
- “I have seen some very severe cases in which I’ve had to be called to the nurse’s office and the emergency, 911 had to be contacted and students have had to be taken to the hospital.”

Category 2: “The Nurse Can’t Just Give the Medicine”: Barriers to Effective Medication Administration in School

—There were four themes within the second category: (1) difficulties associated with maf collection, (2) difficulty of communicating with the parents, (3) complete reliance on the nurse in case of an emergency, and (4) lack of staff training on asthma.

The difficulties associated with MAF collection—Most principals and all nurses agreed that the main barrier to effective treatment of asthma in school is the requirement of a valid MAF on file before a nurse can administer medication to a child. They stated that not all parents provide the MAF, despite repeated requests by the nurses or school administration. Additionally, some nurses stated that the MAF has to be updated and resubmitted each school year, that it does not cover summer school, and that the form acquisition process is an administrative challenge. In case of a missing MAF, interviewees considered taking the child to the hospital or attempting to contact the parents to be problematic.

Supporting quotes include the following:

- “Although we have given parents forms to either bring their pumps to school and signing over a release to us, so the doctor gives a second pump here. That’s not being followed through.”
- “I explained to her that I need the 504 here in school so this way I can give her the medicine [...] She still hasn’t brought the 504 in.”

Difficulty of communicating with the parents—The majority of nurses and some principals found communicating with the parents to be challenging and that contacting them in case of an emergency was often difficult. Some principals and most nurses reported that there are children who have undiagnosed asthma or have asthma about which the school is not informed by the parents. Many participants said that they either send written notes or verbally communicate with the parents to inform them that their child experienced asthma symptoms in school. They did not discuss if the parents chose to or knew how to act on this information.

Quotes supporting these comments are the following:

- “Having phone contact with parents is a challenge; having working numbers is a challenge; parents having a working phone is a challenge; parents being able to answer the phone when they’re at work.”
- “And I do try to speak to parents, but sometimes parents are very hard-headed and, you know, sometimes we just have to comply with the parents.”

Complete reliance on the nurse in case of an emergency—Both principals and nurses agreed that the nurse would be contacted and expected to assist in case of any medical emergency, including an asthma attack. Many nurses were conflicted about not being able to administer medication during an attack without the MAF on file and expressed feelings of helplessness, frustration, and fear. Many nurses complained about their workload.

Quotes that reflect these concerns are the following:

- “I mean, you should go and sit in the nursing suite for an hour—unbelievable. It’s busier than any emergency room.”
- “I feel helpless because you in a job that you supposed to be helping people ... helping especially little children.”
- “We would get the child to the nurse ASAP, who would make a determination as to whether it could be handled here, so to speak, if the child had medication here to be administered to him or whether EMS needed to be contacted for transport to a hospital.”

Lack of staff training on asthma—Most principals and nurses agreed that no formal asthma training is provided to the school staff. Despite this lack of training, the majority of principals, but only one nurse, believed that the teachers are adequately prepared to handle an asthma attack in their classrooms.

Some examples include the following:

- “[The teachers] don’t feel comfortable I don’t believe, no. And it’s not their job to feel comfortable”
- “Teachers who have children of their own with asthma are more comfortable than the teachers who have little or no experience with asthma.”
- “I don’t think any one feels comfortable because you know we’re not trained in dealing with some of those issues.”

Category 3: “They Don’t Want Their Kids in Gym”: Barriers to Physical

Activity in Children With Asthma—There were three themes within the third category: (1) activity level modification for children with asthma, (2) asthma attacks during gym or recess, and (3) the schools are not meeting the state minimum PE requirement.

Activity level modification for children with asthma—Most principals and many nurses stated that parents sometimes try to limit their children’s participation in PE class or recess if the child has asthma. The majority of principals agreed that they tend to comply with the parents’ requests in the short term, but a doctor’s note would be needed to permanently exclude a child from PE. The majority of participants said that the child with asthma, the PE teacher, the nurse, or the parent can all choose to limit the child’s level of activity.

Participants’ statements supporting these comments include the following:

- “Their parents’ impression of asthma is that it restricts your life, lifestyle and your activities.”
- “If the child says that they can’t participate and there’s a note, then they don’t participate.”
- “The parents don’t let them play. This is for their overall health it’s not good.”

Asthma attacks during gym or recess—The majority of both principals and nurses mentioned that many of the past episodes of asthma exacerbation in school were associated with physical exertion during PE class or recess. Most nurses discussed administering medication before exercise, but none of the principals mentioned this. The nurses talked about not being able to administer preexercise medication to the children who need it as students skip the preexercise medication dose when they feel they “don’t need it.”

Supporting quotes include the following:

- “The flare-ups are usually in the spring because as the kids go outside, all of them go out cause the weather is nice.”
- “I had a student came to me after playing gym complaining his chest was tight.”

The schools are not meeting the state minimum PE requirement—Only 1 out of 10 schools in our study was in compliance with the state minimum requirement of 120 minutes of PE per week or three periods per week. Most classes had PE class once a week, and some principals mentioned that not all classes have regularly scheduled PE. We found

that the unstructured recess time is often used in lieu of formal PE instruction. This was largely due to the schools' lack of the necessary facilities and teaching staff.

Examples include the following:

- “Sometimes some kids will go [to gym] twice a week and then some of them will only go once a week.”
- “Not all [classes participate in PE]. There are too many classes to all be ... and I only have one gym teacher.”

Discussion

We identified several barriers that may contribute to the lack of proper in-school asthma management and the unnecessary limitation of PA participation of children with asthma. Barriers included inconsistency in identifying children with asthma, lack of knowledge of in-school medication administration policies, and lack of written policies on asthma management. Parental communication was also notably difficult as parents frequently were unresponsive, lacked knowledge about asthma, and were noncompliant with NYC guidelines (e.g., MAF submission). Additionally, schools lacked asthma-specific training programs for staff.

Our finding that NYC schools struggle with systematically identifying children with asthma is consistent with other studies (Penza-Clyve, Mansell, & McQuaid, 2004; Snow, Larkin, Kimball, Iheagwara, & Ozuah, 2005). A 2001 survey of principals, teachers, counselors, and nurses at five Bronx elementary schools found that 22% of children with asthma “fall between the cracks” and are never formally identified by the schools (Snow et al., 2005). Fourteen years later, only 26% of students with physician-diagnosed asthma in four different Bronx elementary schools were identified using a school-defined methodology (e.g., NYC Board of Education health examination forms and MAFs; Reznik et al., 2015). The same study found that only 27% of the identified children had a valid MAF on file and that 15% of caregivers were unaware of the form. The lack of caregiver awareness is concerning since the MAF is often used as a primary way of identifying students with asthma.

To address the difficulty of identifying children with asthma a valid alternative could be a self-administered caregiver survey, which in the past identified 74% more cases of asthma than did the school methodology (Reznik et al., 2015). Other studies have supported the use of a parent questionnaire as a relatively effective tool for asthma identification that can be used to determine children in need of further evaluation (Brito et al., 2000; Jones et al., 2004). A list that identifies children with asthma distributed to all relevant school staff may be an effective way of sharing the necessary information and minimizing the inefficiencies of doing so through informal means. However, this option could be in violation of the Health Insurance Portability and Accountability Act of 1996 (HHS, 2013) regulations and the schools must obtain all the needed permissions and ensure the safety of disseminated information.

Despite the NYSED guidelines on asthma medication administration, we found that there is confusion regarding the policies on children possessing asthma inhalers in school.

According to the NYSED guidelines, a written permission given by both the physician and the child's parent is required for the child to be permitted to carry his or her own asthma medication in school (NYSED, 2015c). In NYC this information can be collected on the MAFs (NYC DOE, 2014). Our findings may be less surprising considering the fact that the 52-page NYSED guidelines on medication administration in schools do not even mention "asthma" or "MAF" in the body of the document and leave the actual policy creation to the individual schools (NYSED, 2015b).

We found that NYC schools lack documented policies on asthma management. Rather, the reported "procedures" are loosely based on past experiences. This finding is consistent with our prior study, in which only one third of the interviewed teachers reported having a written policy in their school (Cain & Reznik, 2016). In this study, we found that often the schools mistakenly used administrative mechanisms, such as the MAFs, as a de facto "policy." Even though the law mandates that children with chronic illnesses need to be accommodated by public schools under Section 504 of The Rehabilitation Act, the NYC Board of Education still lacks formal policies on asthma management. The overwhelming dependence on the nurses' assistance in an asthma emergency could also present a problem in the context of the shortage of school nurses (Guttu, Engelke, & Swanson, 2004). The student to nurse ratio in NYC schools is 1:1007 (Toppo, 2009) although the recommended ratio is 1:750 (National Association of School Nurses, 2016).

Our findings indicate that there is a need for both a statewide policy on asthma management in schools and a system of accountability for individual schools. A formal policy on the proceedings and responsibilities of all parties involved could increase efficiency and eliminate the informal guidelines prevalent in many schools, increasing the success of asthma treatment in school. It could also diminish the complete reliance on the nurses, providing guidance when the nurse is not available.

We found that a great number of children with diagnosed asthma do not have a valid MAF in school and would not be effectively assisted during an acute asthma attack. The schools struggle with getting the parents to submit the MAF annually. The challenges of finding effective ways of communication with the parents have been the topic of other papers and are a hindrance to effective school asthma management (Bruzze et al., 2010; Reznik et al., 2015). The importance of MAF submission should be further emphasized to the caregivers. However, the process requiring annual submission of an updated MAF could be improved to account for the administrative and logistical difficulty of the process. Secure electronic transmission of the MAF between providers and the schools should be considered to improve the process. Additionally, even though the NYS allows standing orders for administration of epinephrine in NYC schools without a student-specific medical order on file, there is no equivalent state law for albuterol administration (NYSED, 2015b). Changes to policy allowing for standing orders for non-patient-specific Albuterol administration in schools in case of emergency should be considered in light of the parent-school communication difficulties found in this and other studies (Bruzze et al., 2010; Reznik et al., 2015).

The PA participation of children with asthma is often limited at the behest of their parents or other involved parties. The benefits associated with participation in PA for children with asthma (Carson et al., 2013; Dogra, 2013; Saguil & Okpokwasili, 2013) do not translate to parental awareness and support. Preventing exercise-induced asthma (EIA) with preexercise bronchodilator administration is an effective way of managing asthma symptoms (HHS, 2014) and should be used in schools on a larger scale. There is also still much work to be done to ensure school compliance with the NYS PE requirements. Over 32% of NYC schools (including 59% of elementary schools) lack a full-time, certified PE teacher, and 28% lack a “dedicated fitness space” (Stringer, 2015). Areas with high concentration of these schools correlated with the highest childhood obesity rates (one of the highest being in the Bronx; Stringer, 2015). Lack of conditioning associated with limited PA and high body mass index of many of the children can make it challenging for the PE teachers to distinguish shortness of breath on exertion from EIA. With difficulties such as limited budget, outdated facilities, and overcrowding, schools may benefit from incorporating PA into a classroom setting.

Without formal asthma training for the school staff, it is surprising that the majority of principals believed that the teachers feel confident handling an asthma attack in the classroom. This claim was in contrast to the findings of our prior study where we observed that the majority of teachers felt unprepared in case of an emergency (Cain & Reznik, 2016). This discrepancy could stem from the principal’s interest in presenting the preparedness of the school staff in the best light and their lack of direct involvement in asthma care of the schoolchildren. Increasing staff asthma knowledge could potentially alleviate these anxieties. It could also help PE teachers better distinguish shortness of breath on exertion due to deconditioning from EIA. Educating the parents and children on benefits of sports and on how to prevent EIA could increase child PA participation and caregiver compliance with the NYC DOE regulations.

Study Limitations

This study had a few limitations. The study was conducted in Bronx, New York, elementary schools, and we may not be able to generalize the conclusions to other schools in different communities. While the interviews were conducted in 2011, our finding on NYC DOE and national policies are based on information available to us in years 2016 and 2017. Furthermore, the narrow application of the inclusion criteria might have resulted in an overly homogenous sample, resulting in premature data saturation point. The conclusions about school management and barriers to PA are based on the points of view of principals and nurses. Despite these limitations, our study revealed new information about the perceived barriers to effective asthma management and PA participation for children with asthma.

Implications for Policy and Practice

Our findings suggest that there are several ways to improve school asthma management and child participation in PA. These include the following:

1. Improving the process of identifying children with asthma using caregiver questionnaires

2. Providing caregiver education about importance of MAFs and child PA participation
3. Establishing a formal NYS policy addressing asthma management, medication administration, and asthma education in schools; the schools would be accountable for the effective implementation of the policy
4. Improvement and automation of the MAF acquisition and renewal processes
5. State policy amendment allowing for standing orders for non-patient-specific albuterol administration in case of emergency
6. Implementation of school PA programs, thereby improving compliance with the NYS PE requirement

Our findings will inform the development of an intervention focused on addressing the identified barriers to in-school asthma management and PA participation as well as policies specific to in-school asthma management in accordance with the national standards.

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Figure 1.
Categories and themes relating to asthma management in New York City schools.
Note. MAF = Medication Administration Form; PE = physical education.

Table 1**Nurse and Principal Interview Guides.**

Nurse interview guide	
1	What has your experience been with asthma in students at the school? (probe: frequency, severity, change over time)
2	Have you been called to assist students with asthma? Please describe the most recent episode.
3	Have you had a student who had an acute asthma attack? If yes, please describe what happened. How was it handled? Where was the student at the time of the attack? What was he or she doing immediately before the attack?
4	Have you encountered a student who had an asthma attack during or after gym? Recess? If yes, what happened and how it was handled? (Out of 10 students that you have last seen with complaint of asthma symptoms, how many of them were related to participation in a gym class?) If no, what would happen if a student developed an acute asthma attack during gym class? Please describe what would happen. What would you do?
5	How school staff should communicate with you about health concerns they have about a student with asthma? Is there a procedure in place? How often is this procedure followed?
6	In your experience, do the students with asthma participate in gym or are they excused? If they participate, do they reduce the amount of physical activity because of asthma? Who makes this determination to modify or reduce the amount of physical activity for students with asthma? Gym teacher, nurse, student's doctor? Please describe the modification.
7	Do they take medication before or after gym class? Why or why not? Who decides that a student needs to take the pump? Do they actually take the pump before gym?
8	Have you encountered parents raising concerns about their children's asthma?
9	Have you encountered parents raising concerns about their children participating in gym activities because of asthma? What do they say?
10	How do you feel about students with asthma and sports participation?
11	How do teachers feel about managing asthma attack in a classroom?
12	How about you? How do you feel about managing acute asthma?
13	What happens if you are (RN) out (sick)? What is the procedure for dealing with asthma attacks in this case?
Now I am going to ask you about how asthma is handled at your school.	
14	Please describe how students with asthma are identified at your school.
15	How do teachers know if a student in their class has asthma?
16	How do you find out if a student has asthma? What is the most common way you find out that a student has asthma?
17	If a student has asthma attack and needs medications what should happen? Is there a procedure in place? What actually happens?
18	Is there a procedure in place, how acute asthma episodes should be handled at the school? How acute asthma episodes are actually handled at the school?
19	Please describe what services, if any, are provided for students with asthma at the school. (open airways)
20	Please describe the DOE-/DOH-recommended asthma management initiative (MAS). Is this initiative followed at the school? IF AWARE, have you received initial training, from whom and when? Do you know where to get materials about MAS? Do you receive in-service on MAS every year?
21	How does your school handle physical activity and gym classes for students with asthma?
22	How does your school handle recess and students with asthma?
23	Is there instruction for teachers on what it means to have a child with asthma in their classroom? If yes, who provides this instruction? Have you received this instruction? Any other instruction? From what sources?
24	Please describe what is the NYC physical education requirement for elementary school students.
25	The goal of this study is to develop an intervention to improve physical activity levels in students with asthma. We may introduce exercise in curriculum, how do you suggest we do it? What modifications would you suggest to have for students with asthma?
Principal interview guide	
1	What has your experience been with asthma in students at your school?
2	Have you encountered a student at your school who had an acute asthma attack in the classroom? If yes, please describe what happened. How was it handled? How often does this happen?

Nurse interview guide

- 3** If no, what would happen if a student developed an acute asthma attack in a classroom? Please describe what a teacher would do.
 - 4** Have you had a student at the school who had an asthma attack during/after gym? If yes, what happened and how it was handled? If no, please describe what would happen if a student had an acute asthma attack during gym.
 - 5** How do teachers feel about managing asthma attack in a classroom/gym?
 - 6** Do all classes participate in gym? If yes, how often?
 - 7** Have you encountered parents raising concerns about their children's asthma? About their children participating in gym activities because of asthma? What do they say?
 - 8** How do you feel about students with asthma and sports participation?
 - 9** What if the RN is out sick? What is the procedure for managing acute asthma attacks in this case?
-

Now I am going to ask you about how asthma is handled at your school.

- 10** Please describe how students with asthma are identified at your school.
 - 11** How do teachers know if a student in their class has asthma? How do gym teachers know which students have asthma?
 - 12** If staff has concerns about health of students with asthma, who do they talk to about it? Is there a procedure in place for staff to get help with a student's asthma? How often is this procedure actually followed?
 - 13** How are asthma medications handled at the school? If a student has asthma attack and needs medications what should happen? What actually happens?
 - 14** Is there a procedure in place, how acute asthma episodes should be handled at the school? How acute asthma episodes are actually handled at the school?
 - 15** How does your school handle physical activity and gym classes for students with asthma?
 - 16** Do students with asthma participate in gym or are they excused?
-

If they participate, do they reduce the amount of physical activity because of asthma? Who makes this determination to modify or reduce the amount of physical activity for students with asthma? Gym teacher, nurse, student's doctor? What are some examples of activity modification?

- 17** How does your school handle recess and students with asthma?
 - 18** Please describe what services, if any, are provided for students with asthma at the school.
 - 19** Please describe the DOE-/DOH-recommended asthma management initiative (MAS) on managing asthma during the school day. Is this initiative followed at the school?
 - 20** Is there instruction for teachers/staff on what it means to have a child with asthma in their classroom? If yes, who provides this instruction? Have you received this instruction? Any other instruction? From what sources?
 - 21** The goal of this project is to develop an intervention targeting children with asthma to improve their physical activity levels. This intervention may include components of asthma education for students and staff and physical activity component (classroom-based). Do you have any suggestions on how would this intervention maybe be received by the school/teachers/children?
-

Note. RN = registered nurse; DOE/DOH = Department of Education/Department of Health; MAS = Managing Asthma in Schools; NYC = New York City.

Table 2

Verbal Counting Survey for the Principal ($N = 13$) and Nurse ($N = 9$) Populations.

Descriptive phrasing	No. of principals	No. of nurses
Most	8	6
Majority	7	5
Many	5–13	4–9
Some	2–7	2–6
Few	2–6	2–5

Table 3

Sociodemographic Characteristics of the School Principals and Assistant Principals ($N = 13$) and Nurses ($N = 9$) in Elementary Schools in the Bronx, New York.

Characteristic	Nurses		Principals	
	<i>N</i>	% ^a	<i>N</i>	% ^a
Mean age, years (<i>SD</i>)	52	9	47	7
Female gender	9	100	10	77
Ethnicity				
Hispanic/Latino	2	22	2	15
Not Hispanic/Latino	7	78	11	85
Race				
African American	6	67	4	31
Caucasian	1	11	7	54
Other	1	11	0	0
Not specified	1	11	2	15
Work experience				
Mean years worked in New York City School (<i>SD</i>)	5	3	21	8
Mean years worked in the School (<i>SD</i>)	4	2	9	5
Exposure to asthma				
Self	2	22	2	15
Family member	8	89	9	69
Student	9	100	13	100
Exercise habits				
Exercises regularly	6	67	11	85

^a Rounded to nearest whole number.

Table 4

Category 1: “There Is No Real Procedure”: Procedures and Policies Around Asthma Management in School.

Major themes	Relevant quotes
1. Identification of students with asthma	<p><i>Principal 1:</i> The parents let us know if they [the children] have asthma and then we just see if there's medication that they need to take [...] the parents come in and tell us.</p> <p><i>Principal 8:</i> Generally, you know, if it's an emergency, the blue card is pulled out and then you look for allergies and all those other things, but we don't normally have to. But that's where all that information is kept—on the blue card.</p> <p><i>Nurse 1:</i> There was one child that I think she's new this year that came in and stated that she had shortness of breath and that's how I discovered that she was an asthmatic. And her mother gave, I gave her the form, her mother brought in the form, she had just that one incident where she had shortness of breath so I discovered that.</p> <p><i>Nurse 9:</i> And usually on the physical that's how usually I find most of my asthma cases, is when they come back with their physicals and the doctor fills out.</p>
2. Asthma medication administration	<p><i>Principal 4:</i> As long as they have the form [MAF], correct. They must have the form. And if the pump is noticed without the form, then the parents are called immediately. And teachers are aware of who should be carrying the pump and who should not be.</p> <p><i>Principal 5:</i> So if a child has an inhaler on him or her, and wants to use it, they'll call the nurse or they'll call me and you know, they'll either come down here—if we have the 504^a, then the nurse can do it. [...] If we find that a child has a pump and we don't know about it, we call home always, but I can't ... I ... if I have a child in distress, I'm not going to tell them not to use the pump if they have it. [...] If I see the child's in distress and they don't have a 504 I let them use it here and then I'll call the parent and tell them I need a form.</p> <p><i>Nurse 2:</i> The doctor says that they're allowed to, to carry their own pumps, but I also assess them to make sure that they really are allowed. I sit them down and I ask them various questions to see if they know their medication, when to use it, when not to use it, how to use it, and if they answer those questions correctly and I deem them able to carry then they can carry their own asthma meds.</p> <p><i>Nurse 8:</i> So usually if the kid brings a pump to school and we don't have a 504 for them on hand, the teacher would confiscate it. It would be brought down to me and I'd call the parent and tell the parent, you know, “He's supposed to have this form,” you know, the 504 [...] And on the 504 form, there's a box that's checked off that your child can carry it independently or if it needs to stay in the nurse's office.</p>
3. Lack of formal school policies relating to acute asthma episode management	<p><i>Principal 2:</i> We would get the child to the nurse ASAP, who would make a determination as to whether it could be handled here, so to speak, if the child had medication here to be administered to him or whether EMS needed to be contacted for transport to a hospital. And, of course, a parent would be called as well.</p> <p><i>Principal 3:</i> I have seen some very severe cases in which I've had to be called to the nurse's office and the emergency, 911 had to be contacted and students have had to be taken to the hospital. I've seen some milder cases who were still brought to the nurse's room and upon the nurse's evaluation, they decided to contact the parent, for various reasons, of course to let the parent know what was going on</p> <p><i>Nurse 1:</i> There's no real procedure, usually when anything happens, they would call me and I would get a call to go to the particular area.</p> <p><i>Nurse 4:</i> I haven't had any real incidents where I've had students that I'm able to treat that I've had to call 911 for. Generally, I have to call EMS for students who don't have paperwork on file and I'm not allowed to administer any type of medication to them and I can only use other type of modalities such as putting them by an open window, giving them some water, instructing them to try to relax and breathe, loosen their clothing and things of that nature.</p>

Note. MAF = Medication Administration Form; EMS = emergency medical services.

^a504 is another name for the MAF.

Table 5

Category 2: “The Nurse Can’t Just Give the Medicine”: Barriers to Effective Medication Administration in School.

Major themes	Relevant quotes
1. Difficulties associated with MAF collection	<p><i>Principal 1:</i> 504 is an authorization for us to administer medication. We can’t administer medication without the parent consent and doctor consent. So even if it’s a pump, anything—you have to have a 504 for us to do any type of intervention with the child.</p> <p><i>Principal 3:</i> In many instances—in some instances, I shouldn’t say many, the child had a pump, but we did not have the necessary 504^a form.</p> <p><i>Nurse 3:</i> The noncompliance basically is with the parents not bringing the 504 forms back or the medications for administration for the medication here at school.</p> <p><i>Nurse 4:</i> [On managing an acute asthma attack] I don’t think any one feels comfortable. [...] I have had on numerous occasions had to call 911 because I didn’t have the paperwork [...] When I first started of course, that was one of the scariest things I’ve ever encountered is sitting and watching a child wheeze and not being able to intervene and having medicine at my disposal but not.... And the EMS comes and they look at you sometimes like you have 10 heads but there’s protocol and procedure and I can’t treat.</p> <p><i>Nurse 6:</i> I feel helpless because you in a job that you supposed to be helping people [...] especially little children. You supposed to be helping them where they can survive and if you can’t give them the medicine because the state said this is to protect you and it’s a protection but you don’t have it, you feel helpless.</p>
2. Difficulty of communicating with the parents	<p><i>Assistant Principal 2:</i> Although we have given parents, forms to either bring their pumps to school and signing over a release to us, so the doctor gives a second pump here. That’s not being followed through.</p> <p><i>Principal 10:</i> Having phone contact with parents is a challenge, having working numbers is a challenge, parents having a working phone is a challenge, parents being able to answer the phone when they’re at work—99% of our parents are working parents and they work, you know, all hours of the day and night and it can be a challenge so that sometimes often puts us in a place of having to call ... you know, we’ll call an aunt or a neighbor or someone who we know that they know again, since most of our students have been here for a long time—we have other numbers to call. We usually get someone from the family or the extended family to respond. But a lot of 911 calls go out because we don’t have any way of reaching the family.</p> <p><i>Nurse 2:</i> And I do try to speak to parents, but sometimes parents are very hard-headed and, you know, sometimes we just have to comply with the parents, but I keep educating and hoping that, you know, sometimes if they hear it 100 times, maybe they’ll listen. (Laughs)</p> <p><i>Nurse 8:</i> You give out a 504 form to the [...] child for the parents and usually I try to follow up maybe like a month or two. I call the mom, “You need another form? You’ve got to bring it back,” and then, you know, they’ll be like, “Oh, well, it’s mild. He doesn’t really have asthma,” you know, so.... And, you know, you can’t force them to bring back the form.</p> <p><i>Nurse 9:</i> I’ll say, “Mom, please, you know I need the back of this signed.” Sometimes I’ll go and wait for them after school in the courtyard. I, I have done so many things just to get these 504s, because I know how important, you know giving asthma pump to these children are.</p>
3. A complete reliance on the nurse in case of an emergency	<p><i>Principal 2:</i> Getting to the nurse, the nurse makes a determination as to how to proceed, whether to transport the child to the doctor or have the child rest in the nurse’s office until he or she has calmed and could return to his regular activity.</p> <p><i>Principal 10:</i> I mean, you should go and sit in the nursing suite for an hour—unbelievable. It’s busier than any emergency room. We just don’t have all the traumas, but it’s extremely busy.</p> <p><i>Nurse 3:</i> They said to not administer medications but you know what though? I have a license on the line and if I know that this child has asthma, I’m not gonna let them just sit there because um, that child’s life is in my hands at that moment, especially if they’re you know, really bad. [...] Cause there was, you know, there was an episode that happened before and the nurse lost her license. I think it was a child a year or two ago—the nurse knew that she had asthma but she wouldn’t administer the medication because the child didn’t have a 504. [...] So the nurse was like, “I’m not gonna give the medicine,” and the child I mean, died.</p> <p><i>Nurse 3:</i> It makes you feel helpless cause then you’re not able to, you know, to take care of this child properly. And it makes you feel frustrated because the parents are not helping.</p>
4. Lack of staff training on asthma	<p><i>Assistant Principal 2:</i> I’m going to be frank with you, I’m not too sure how they [the teachers] feel about it. I, as a classroom teacher that had been trained, I just handled it. And I guess we all assume well, we would handle it. If it happens, you know we call the nurse. And the anxiety around having a pedagogue feel that their, um, not equipped to handle that has never entered into my mind. I always hoped they’d go into a mode of action.</p> <p><i>Principal 7:</i> I don’t think any one feels comfortable. I don’t think any one feels comfortable because you know we’re not trained in dealing with some of those issues. So I don’t think anyone feels comfortable.</p>

Major themes	Relevant quotes
	<i>Nurse 1:</i> No, we don't really have education. It's basically a lot of times, I just like if the teachers who question it, well, you know, what do I do and then we just sit and discuss the fact that the child may be short of, have shortness of breath.
	<i>Nurse 3:</i> [the teachers] They don't feel comfortable I don't believe, no. And it's not their job to feel comfortable; they're there to teach so they have enough going on in the class.

Note. EMS = emergency medical services.

^a504 is another name for the Medication Administration Form (MAF).

Table 6

Category 3: “They Don’t Want Their Kids in Gym”: Barriers to PA in Children With Asthma.

Major themes	Relevant quotes
1. Activity level modification for children with asthma	<p><i>Assistant Principal 3:</i> You know, for the most part I think parents are pretty straightforward in what their kids can and can’t handle if they are asthmatic. And so they’ll let the teachers know.</p> <p><i>Principal 6:</i> [Gym teachers are] I think a little bit overconscientious of students with asthma so you know they give them like the time to sit and you know relax for a little bit and then get back you know on task or join the activities but their [they’re] very cognizant of that, they have a system in place where they you know stop, relax, go drink water you know and not push the children to the limit.</p> <p><i>Nurse 1:</i> What I would do is I would tell the teacher they are not to participate in gym. They can go to gym with the rest of the class, but they’re not to participate and to let also the aids know because they go to, they play outside when the outside is available. They play outside during lunch periods. So, we want to make sure that they’re ok physically before they start doing these activities again.</p> <p><i>Nurse 3:</i> I’ve have ... yeah, I’ve had a lot of parents come to me and tell me that they don’t want their child outside. [...] when it’s cold or like when the allergy season is high, the pollen count, the parents doesn’t want them to go outside.</p> <p><i>Nurse 4:</i> [about the gym teacher] She’ll call me up and she’ll say, “This student has asthma. I’m going to do something strenuous. Do you have paperwork to treat them?” And if I say no, she says, “I’m gonna ... alright, sit them out. Can you please send another form home for the parent?”</p>
2. Asthma attacks during gym or recess	<p><i>Assistant Principal 1:</i> We have had kids that have had during lunch, during recess and during gym, yeah, they’ve had an acute asthma.</p> <p><i>Principal 9:</i> I think it was outdoor recess and it was when the weather got warm and he had an attack and they brought him into the lobby; nurse came down, you know, they did the cold towel things; EMS was called.</p> <p><i>Nurse 5:</i> Last year I think I may have had one episode and that’s because the student failed to come get the medication prior to going into gym.</p> <p><i>Nurse 8:</i> I had a student came to me after playing gym complaining his chest was tight. I listened, assessed his chest, did a pulse ox. Um, he used his pump. He sat, drank some water, relaxed and he was fine. He went back to class. I called mom, let mom know what had happened, told her he used his pump, what time he used his pump and went back to class. That’s what I usually do.</p>
3. The schools are not meeting the State minimum physical education requirement	<p><i>Principal 4:</i> Every single class has gym [once a week]. It’s mandated as part of the curriculum. We are lucky to have a gym, I also we have two gym teachers and gym instruction is very differentiated in the gym.</p> <p><i>Principal 8:</i> We have one gym teacher; we try to give everybody gym as much as we can, but there’s not enough, you know, enough day time in the schedule. So for me it’s like, if you don’t have gym, then you absolutely have like technology and art.</p> <p><i>Principal 9:</i> Not all [classes participate in physical education]. There are too many classes to all be ... and I only have one gym teacher.</p> <p><i>Nurse 1:</i> Sometimes some kids will go [to gym] twice a week and then some of them will only go once a week.</p> <p><i>Nurse 3:</i> [on NYS physical education requirement]: Isn’t it 30 minutes a week or it’s 60? I’m not sure. I know they have one gym class per week.</p>

Note. PA = physical activity; NYS = New York State.