THE ESSENTIAL SCHOOL HEALTH SERVICES PROGRAM DATA REPORT

2006 – 2007 School Year

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Introduction

In recent years, four major changes have dramatically affected school health services: (1) changes in family structure and patterns of parental employment; (2) the impact of diverse cultural and linguistic groups; (3) an increase in the number and severity of illness in students with special health care needs who are enrolled in schools; and (4) a rise in social morbidities such as substance abuse, depression, and violence among children.

These changes have resulted in an increased demand for health services in schools:

- With more working parents, children who are sick with mild or chronic conditions are less likely to be monitored at home on school days and more likely to be sent to the school nurse for assessment and a determination as to whether they need to see a physician (Thurber et al., 1991; Uphold & Graham, 1993; U.S. Census Bureau, 2000; Wold, 2001).

- Some "newcomer" groups rely on the school as a source of information about what services or providers are available in the community. They may not know how to obtain care elsewhere because of language or cultural barriers and, therefore, may look to the school health service for assistance.

- Improved medical technology has enhanced the health of children and adolescents with a variety of conditions and diseases previously associated with short life expectancy, e.g. cystic fibrosis, childhood leukemia, diabetes, juvenile rheumatoid arthritis and kidney disease. In addition, children assisted with medical technology, e.g. catheterizations, tracheostomies, ventilators, etc., are now attending school. Social attitudes that promote inclusion, as well as state and national laws related to disability rights and access to education, have resulted in more children requiring nursing care and other health-related services during the school day (Palfrey et al., 1992; Small et al., 1995).

- Students spend a large part of their day at school; therefore, the school can be an important site where health and education risks, e.g. depression, absenteeism, substance use, may be identified and timely interventions initiated. This can result in increased demands for professional health services in the schools (Thurber et al., 1991).

- The rapid restructuring of the health care delivery system has dramatically impacted school health service programs. With reduced hospitalizations and/or reduced lengths of stay, school nurses are now often responsible for supervising the care of children who have illnesses like acute asthma and diabetes that were formerly managed in a hospital setting (Chabra et al., 2000; Leslie et al., 1998; Schutte et al., 1997).

The Massachusetts Department of Public Health (MDPH) recognizes the need for quality school health services and provides consultation to all of the Commonwealth's school districts. Since 1993, the Department of Public Health has extended to a number of school systems the opportunity to expand on the basic school health services model by establishing the Essential School Health Service Program (ESHS). (The Essential School Health Services Programs were initially entitled the Enhanced School Health Service Programs.)

The goals of the Essential School Health Service model are to:

(1) provide high quality school health services to all children within the community;
(2) support the educational process;
(3) link the school health service programs to all aspects of the health care delivery system that serves children and their families.

In 1993, thirty-six school districts were funded for three and half years to: (a) strengthen the infrastructure of school health services in the area of personnel and policy development, programming, and interdisciplinary collaboration; (b) incorporate health education programs, including tobacco prevention and cessation programs, into the existing school health programs; and (c) develop linkages between school health service programs and community health care providers.

In October 1997, the Department funded 19 school districts under the Essential model (Essential School Health Services, ESHS) and 8 school districts with experience in developing the Essential model to provide consultation to approximately 42 additional school districts ("recipient schools") across the Commonwealth (Essential School Health Services with Consultation, ESHSC). These recipient school districts were interested in developing similar school health service programs.

In November, 1999, the Massachusetts legislature allocated additional funding to the Essential School Health Service Programs (ESHS and ESHSC). School systems for both models were selected for participation through a competitive bid process based on a Request for Response (RFR) developed by MDPH. As a result of the 1999 RFR process, a total of 77 school districts (or affiliated school systems)[1] received awards in 2000: 11 Essential School Health Services with Consultation and 66 basic Essential Programs (see **Appendix A**). An added component of the 1999 RFR was that each applicant public school district was required to provide some elements of basic school health services (vision/hearing screening, immunization review, etc.) to all non-public and charter schools within the community (77 award recipients in 2000 served 253 non-public and charter schools)[2]. An additional 32 school districts received awards in 2001; all of these were basic Essential Programs (Sheetz, 2003).

In February 2003, midyear budget reductions eliminated most funding for the ESHS programs for the remainder of the fiscal year. Because of this, three programs decided to withdraw from the ESHS grant, thus reducing the number to 106 school districts in the spring of 2003. Three more schools withdrew from the grant in 2004, and one additional school withdrew in 2006, leaving 102 districts in the ESHS program. The staff of the School Health Unit, Division of Primary Care and Health Access in the MDPH Bureau of Community Health Access and Promotion administers the programs.

[1] ESHS funding was awarded to local public school systems, regional academic school systems, independent vocational systems, vocational-technical regional systems, and school unions.
[2] 223 non-public (private and parochial) schools, 30 charter schools.

Executive Summary

The information collected by the Essential School Health Services Program provides a valuable snapshot of school nursing practice in a diverse cohort of Massachusetts public schools. The data reveal that school nurses perform a wide array of duties -- direct care, health education, administrative case management, and policy/program development and oversight -- on behalf of students whose health needs range from routine to serious and complex. In addition, some school nurses treat school staff.

Analysis of the ESHS program data for the school year beginning September, 2006 and ending June, 2007 showed the following:

- 102 ESHS school districts reported a total of 5,380,800 student health encounters, and 137,414 staff encounters.
- In a typical district, students visited the school nurse an average of 1.1 times per month.[3] There was substantial variability among school districts, with the encounter rate ranging from 0.5 to 2.5 visits per month.
- After assessment and/or treatment by a school nurse, the majority (91.9%) of the students visiting the nurse's office with an illness or injury complaint were returned to the classroom to continue their studies.
- 11.6% of the more serious injuries to students were classified as intentional. These include injuries resulting from assaults (e.g. physical fighting) and those that were self-inflicted (e.g. intentional drug overdose, suicide attempts).
- School nurses in ESHS districts referred students to emergency health services a total of 9,947 times.
- The majority (89.6%) of the prescriptions managed by the school nurse were for medications dispensed on a PRN, or "as needed" basis.
    - Among students taking PRN medications, asthma medications were the most common (32.2 prescriptions per 1,000 enrolled students).
    - Among students on scheduled prescription medications, psychotropic medications (drugs affecting perception, emotion or behavior) were by far the most common (5.5 per 1,000 enrolled students).
- In the ESHS districts, school nurses administered an average of 130,013 doses of prescription medication to students per month. Sixty percent of the scheduled doses were for psychotropic medication, and 55% of the PRN prescription doses were for asthma medication.
- School nurses in 89 districts conducted Body Mass Index screenings on 93,971 students in grades 1, 4, 7 and 10. In each of the 4 grade levels, at least 30% of the students screened were overweight or obese.
- Blood glucose testing increased from the prior year, and was the most common medical procedure (56.2 procedures per 1,000 students each month, up from 45.5 the prior year).

[3] "Typical" is defined in this report as the median district. It is the district lying in the middle of the group, with half the districts having higher values and half having lower values.

- 20,394 students received an oral health screening from a school nurse, and 26,846 were screened by a dentist or hygienist.
- Tobacco prevention and cessation programs reached substantial numbers of individuals, although activity levels varied widely across districts.
  - 2,533 students participated in individual tobacco cessation counseling, while 646 participated in group cessation counseling.
  - 15,033 students participated in group tobacco prevention activities.
- A total of 114,508 students with special health care needs were reported to school nurses.
  - The most common physical/developmental condition reported to school nurses is asthma (97.7 per 1,000 enrolled students).
  - The most commonly reported behavioral/emotional condition is Attention-Deficit/Hyperactivity Disorder (46.5 per 1,000 enrolled students).
- Parent satisfaction with school health services was measured through a survey of a sample of parents with a child who received nursing services. The response rate was 42% (1,663 questionnaires were returned out of 3,950 distributed). Satisfaction rates on the 6 measured criteria ranged from 90 to 96 percent.

The total number of student encounters is lower than the number reported in FY06 for the following reasons: (a) the voluntary withdrawal of one school district reduced the number of districts reporting encounter data, (b) a revision of the data collection form changed the definition of some reporting categories, (c) in prior years, some encounters involving "as needed" medication administration were double-counted (counted in the "medication administration" category and in another encounter category), overstating the number of encounters, and (d) efforts made through the ESHS Evaluation Committee to reduce inappropriate visits and subsequent loss of class time may have resulted in fewer reported encounters.

Continued refinements in data collection and analysis will more accurately capture school nursing and school health activity, improve our ability to monitor the health needs and status of the school age population, and identify areas for improvements in services and quality of care. Identifying trends in school health encounters and student health indicators may assist school nursing staff in improving the delivery of prevention, education, and intervention services to the school community. Future data collection efforts will seek to increase our knowledge of health needs in the school setting and in the school age population, explore the relationship between student health status and educational outcomes, and investigate ways in which health services and prevention activities in schools can help children live healthier lives.

Findings

School Nurse Staffing

Staffing data was available for all 102 ESHS/ESHSC public school districts whose data contributed to this report. In these districts, the equivalent of 1,287 full-time school nurses were available to 532,476[4] students (the total student population of ESHS districts), thereby averaging 414 students per nurse, during the 2006-2007 school year.[5]

School Health Services Activity

The primary goal of the Essential School Health Services Program is to improve the delivery of health services to students by reinforcing the school health service infrastructure. Toward that end, program participants were required to report throughout the year the type and scope of school nursing activity in their districts. These activities were divided into nine categories of data:

1) **Health encounters**
2) **Injury reports, early dismissals, and referrals for emergency health services**
3) **Medication management**
4) **Screenings**
5) **Medical procedures**
6) **Linkages**
7) **Oral health**
8) **Health education, tobacco prevention, and support groups**
9) **Nursing case management**

1. Health Encounters

Each month, districts reported the total number of student health encounters. An "encounter" was defined as *any contact with a student during which the school nurse provided counseling, treatment, or aid of any kind*. Casual conversations fall outside this definition and were not counted. In addition, mandatory screenings (such as vision, hearing and postural) were not counted as encounters because these are routine population-based activities. Screenings were tracked separately, however.

[4] In all of Massachusetts, there are 968,661 students in public school districts.
[5] These statistics include data from the ESHSC *lead* districts, but do not include data from the ESHSC *recipient* districts. The count of "School Nurses" includes only Registered Nurses (RNs) and nurse leaders, but excludes other health support staff which may have been funded by the ESHS contract.

During FY2006, the ESHS Evaluation Committee refined the monthly and annual data collection tools. As a result, the FY07 encounter categories are not comparable to those used in previous years. This report is the first to reflect these changes. In addition to changes in encounter categories, districts no longer report secondary reasons for an encounter.[6] The major impact of that decision is that the multifaceted nature of the health encounter, which often includes health education and mental health counseling components, is not fully reflected in these data: The following rules are used to help define encounter categories:

- *Every* encounter includes nursing assessment and health education. An encounter is recorded as an Individual Health Education encounter only when the primary issue is health education and there is no illness or injury involved. Individual Health Education encounters previously made up a large percentage of the reported secondary issues.
- An illness encounter may include illness assessment, acute illness, chronic health condition, etc. It excludes scheduled medication administrations (e.g. daily medication administration for ADHD) and scheduled procedures (ostomy care, scheduled glucose testing).
- Mental/Behavioral Health Support includes any encounter requiring active listening, anticipatory guidance, stress management, altered mental health status or behavior modification/program support. The primary reason for the encounter is related to a mental/behavioral health need.

Between September 1, 2006 and June 30, 2007, 102 school districts reported a combined total of 5,380,800 student health encounters. “Illness assessment,” “Injury/first aid,” and “Scheduled medication administration” were the most common reasons for visits to the school nurse (Table 1). The number of encounters reported per district varied widely, with individual districts averaging between 221.3 and 46,138.1 encounters per month. These differences were largely due to district size. In a typical district, each student visited the school nurse an average of 1.1 times per month, although the encounter rate varied across the 102 districts from 0.5 to 2.5 visits per month. While some students are seen several times each month, many others are never seen. The school nurse workload, measured by the number of encounters a full time nurse logs each month, varied greatly across the districts, with the rate in the typical district being 417.9 encounters per month[7].

Health services were also provided to school staff (i.e., teachers and administrators). School nurses in 102 districts reported a total of 137,414 staff health encounters. Across the 102 districts, monthly averages ranged from 1 to 1,506 staff health encounters per month.

[6] While the goal of recording secondary reasons for an encounter was to capture the mental health services being provided, this goal was not achieved. Nurses frequently categorize the encounter with the presenting symptom, e.g., headache, when, upon further assessment, the underlying cause relates to behavioral health. An exploratory study by the Massachusetts School Nurse Research Network is underway to address this issue.

[7] For these calculations, "school nurses" includes only RNs.

TABLE 1. Number of Student and Staff Health Encounters September 1, 2006 - June 30, 2007				
	Students		**Staff**	
Type of Encounter	**Number**	**Percent**	**Number**	**Percent**
Illness Assessment	2,066,978	38.4	47,315	34.4
Injury/First Aid	1,175,665	21.8	19,975	14.5
Scheduled Medication Administration	736,379	13.7	8,636	6.3
Scheduled Medical Procedures*	567,271	10.5	16,790	12.2
Individual Health Education	258,994	4.8	22,866	16.6
Mental/Behavioral Health Support	111,411	2.1	6,314	4.6
Other	464,102	8.6	15,518	11.3
TOTAL	5,380,800	100.0	137,414	100.0

*"Scheduled Medical Procedures" are those performed for preexisting conditions, which usually require an MD order.
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

2. Injury Reports, Early Dismissals and Referrals for Emergency Health Services

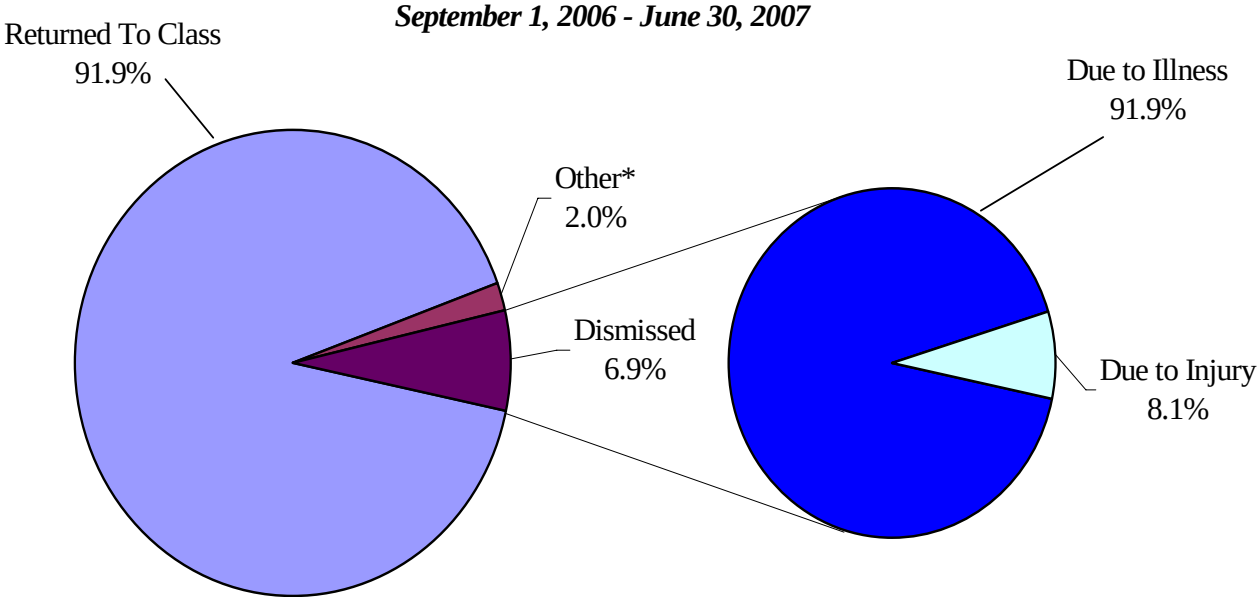
An important function of school nursing practice is to provide on-site health services to students who are sick, injured, or experiencing a serious health emergency. Each month, districts tallied the number of on-campus injury reports, early dismissals due to illness, and referrals for emergency health services. After assessment and/or treatment by a school nurse, the majority (91.1%) of students visiting the nurse's office with an illness or injury complaint were returned to the classroom to continue their studies (Table 2 and Figure 1). These on-site services provide major benefits. Students who are treated on-site can be returned to the classroom with minimal interruption of their educational activities; working parents do not have to take time off from work to provide care; and the high cost of treatment in a doctor's office is avoided.

TABLE 2. Disposition After Illness/Injury Assessment September 1, 2006 - June 30, 2007				
	Students		**Staff**	
Disposition	**Number**	**Percent**	**Number**	**Percent**
Returned to Class	4,299,019	91.1	65,382	82.9
Dismissals	327,813	6.9	11,626	14.7
Other*	94,165	2.0	1,850	2.3
Total	4,720,997		78,858	

* Includes "Stayed in health office" and "Referred to counselor's office".
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

When students had to be dismissed, it was usually the result of illness (92%) rather than injury (8%).

FIGURE 1. Disposition After Nursing Assessment
Student Health Encounters
September 1, 2006 - June 30, 2007



* Includes "Stayed in health office" and "Referred to counselor's office".
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

For injuries of a more serious nature, school nurses filed *injury reports* according to state and local policy. For the 2006-2007 School Year, districts reported a total of 28,590 student injury reports and 2,807 staff injury reports (Table 3):

TABLE 3. Number of Student and Staff Injury Reports
September 1, 2006 - June 30, 2007

Intent	Student		Staff	
	Number	**Percent**	**Number**	**Percent**
Unintentional	20,948	73.3	2,078	74.0
Intentional	3,304	11.6	419	14.9
Unknown intent	4,338	15.2	310	11.0
Total	28,590		2,807	

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Of the student injury reports filed by school nurses, 11.6% involved the intentional infliction of injury (Table 3). These include injuries resulting from assaults (e.g. physical fighting) and those that were self-inflicted (e.g. intentional drug overdose, suicide attempts).

In addition, school nurses in the 102 districts referred students to *emergency health services* a total of 9,947 times.

- In 2,071 (20.8%) of these events, 9-1-1 or ambulance services were called.
- In the remaining 7,876 (79.2%) events, parents or others were called to transport the student to emergency health services.

3. Medication Management

In 1993, the Massachusetts Department of Public Health promulgated regulations governing the administration of medications in public and private schools. The purpose of these regulations (105 CMR 210.000) is to provide minimum safety standards for the administration of prescription medications to students during the school day.

The school nurse's role in managing the medication administration program for the district is broad in scope. In addition to developing district-wide medication policies in collaboration with the school committee, school administration, and school physician, the school nurse:

- administers medications to students (including monitoring students' response to medications);
- delegates the administration of selected medications to appropriately trained school staff (if the district is registered with the MDPH to do so);
- ensures the proper training and supervision of these designated staff; and
- establishes a formal record-keeping system for the district's medication administration program.

Implicit in the description of medication administration is the nurse's responsibility for the following: development of the medication administration plan; assessment of the child prior to administering each medication; and follow-up evaluation of medication efficacy and side effects.

ESHS districts tracked the number of *prescriptions* that had been ordered for their students. Throughout the year, the total number of prescriptions reported to school nurses averaged 61,272.6 per month for the 102 districts (Table 4). Note that because some students had more than one prescription, the number of prescriptions is larger than the number of students with prescriptions. Among prescriptions taken on a scheduled basis, psychotropic medications were the most common, while among prescriptions taken on an "as-needed" (PRN) basis, asthma medications were the most common.

TABLE 4. Number of Student Prescriptions Reported to School Nurses (Monthly Average) September 1, 2006 - June 30, 2007			
Medication Class	**Medication Schedule**		
	Scheduled (All Districts)	**PRN (As needed) (All Districts)**	**Total (Daily & PRN) Medications**
Analgesics	32.0	12,376.6	12,408.6
Antibiotics	402.7	392.5	795.2
Anticonvulsants	246.5	437.0	683.5
Antihypertensive	63.7	42.5	106.2
Antihistamines	43.5	3,241.6	3,285.1
Asthma Medications	429.5	17,069.2	17,498.7
Epinephrine	22.4	7,541.1	7,563.5
Insulin	662.4	785.0	1,447.4
Psychotropic	3,472.2	642.8	4,115.0
Other Prescription/OTC Meds	999.9	12,369.5	13,369.4
Total	6,374.8	54,897.8	61,272.6
Row Percent	10.4%	89.6%	100.0%

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Tables 5a and 5b show the *at-school* prescription rates reported by the ESHS districts. The at-school prescription rate reflects the medications that are to be administered at school, during school hours, by the school nurse (or under the supervision of the school nurse). These rates *understate* the actual number of students taking prescription medications, however. There are two reasons for this. First, students who self-administer at school without the knowledge of the nurse are not counted in the nurse's data reports.[8] This type of "counting error" may disproportionately lower reported prescription rates for certain categories of students. Middle and high school students, for example, might be more likely to self-administer than elementary school students, and, therefore, would be less likely to be counted in the numbers reported by the school nurse. Second, medications taken only at home, as some types of *daily* medications are, are unlikely to be reported to school nurses. For example, the decrease in the at-school psychotropic prescription rate over the last few years (from 21.0 per 1,000 students in 2001 to 5.5 per 1,000 students in 2007) may be due to the use of new one-dose slow-release psychostimulant drugs, which are administered at home and are not reported to school nurses. On the other hand, PRN medications (medications prescribed for administration on an 'as needed' basis) such as medications taken to treat asthma attacks or allergic reactions, are more likely to be reported to the school nurse because of the potential need for administration during the school day. As a result, prescription rates for these medications may be better estimates of the true overall prescription rate for the school age population.

[8] Regulations require that students inform nurses about self-administered medications. If students do not comply with regulations, these medications may not come to the attention of school nurses.

Table 5a. Prescription Medication Rate for Scheduled Medication (Prescriptions Per 1,000 Students)						
School Year	**Psychotropic**	**Asthma Medications**	**Antibiotics**	**Insulin**	**Anti-Convulsants**	**Others**
2000-2001	21.0	1.5	1.4	0.2		1.9
2001-2002	13.2	1.0	1.2	0.3		2.0
2002-2003*	7.0	0.5	0.8	0.3	0.2	0.9
2003-2004	7.3	0.9	0.8	0.6	0.5	1.3
2004-2005	5.6	0.4	0.8	0.6	0.3	1.1
2005-2006	5.8	0.3	0.7	0.8	0.3	1.2
2006-2007	5.5	0.6	0.8	1.0	0.3	1.4

While the scheduled medication rate for insulin increased (from 0.2 per 1,000 students in 2001 to 1.0 in 2007), rates for most other classes of scheduled medications decreased, including psychotropic medications, asthma medications, and antibiotics (Table 5a). In contrast, for "as needed" medications, rates for a number of medication classes have increased. For example, the epinephrine prescription rate increased from 7.2 per 1,000 students in 2001 to 15.3 per 1,000 in 2007 (Table 5b). Similarly, "as needed" prescription rates increased for insulin and anti-convulsants.

Table 5b. Prescription Medication Rate for As Needed Medication (Prescriptions Per 1,000 Students)									
School Year	**Asthma Medi-cations**	**Epi-nephrine**	**Anal-gesic**	**Anti-hista-mines**	**Insulin**	**Psycho-tropic**	**Anti-Convul-sants**	**Anti-biotics**	**Others**
2000-2001	25.2	7.2			0.5	0.5		0.1	10.1
2001-2002	26.3	8.3			0.7	0.4		0.1	9.3
2002-2003*	22.7	8.1	4.5		1.0	0.2	0.1	0.1	12.6
2003-2004	30.2	9.8	15.6		1.2	1.4	0.4	0.2	3.7
2004-2005	28.0	12.1	4.2		1.3	1.2	0.3	0.1	3.5
2005-2006	30.9	12.8	4.4		1.4	1.1	0.4	0.1	3.3
2006-2007	32.2	15.3	5.7	4.8	1.5	0.8	0.7	0.0	6.4

* The 2002-2003 school year data only included only 4 out of 10 months of data. The 2000-2001 school year had 74 districts reporting as compared to 103 districts in 2003-2004.
Rates shown are those reported by the typical (median) district in the ESHS program.
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program

School nurses in the 102 ESHS districts administered an average of 130,013 doses of medication to students per month. Psychotropic medication was the most commonly administered type of scheduled prescription medication, and asthma medication was the most commonly administered type of PRN prescription medication. Among medications administered per school protocol, analgesic medication was the most common. (Table 6).

School also administered an average of 4,485 doses of medication to school staff per month, including 4,012 monthly doses of OTC/PRN medications, 14 monthly doses of epinephrine medications, and 458.6 monthly doses of other prescription medications.

TABLE 6. Average Number of Medication Doses by Type Administered to Students by School Nurses* Per Month September 1, 2006 - June 30, 2007

Medication Class	Medication Schedule					
	Scheduled Doses		PRN Doses per Prescription		PRN Doses per Protocol	
	N	%	N	%	N	%
Analgesic	232.2	0.3	2,514.0	12.7	19,719.0	58.8
Antibiotic	1,698.9	2.2	84.8	0.4	421.9	1.3
Anticonvulsant	3,365.1	4.4	32.6	0.2	2.4	0.0
Antihypertensive	847.5	1.1	12.8	0.1	2.4	0.0
Antihistamine	218.9	0.3	283.4	1.4	398.9	1.2
Asthma	2,604.6	3.4	10,929.9	55.3	550.4	1.6
Epinephrine	48.3	0.1	66.0	0.3	7.1	0.0
Insulin	9,687.5	12.6	2,608.1	13.2	125.0	0.4
Psychotropic	46,581.2	60.7	447.7	2.3	92.6	0.3
Other	11,397.2	14.9	2,797.3	14.1	12,235.9	36.5
TOTAL	76,681.4	100.0	19,776.6	100.0	33,555.6	100.0

* Includes supervised self-administration
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

4. Health Screenings

Public schools in Massachusetts are required by law to conduct postural, hearing, and vision screening on all students.[9] Some school systems have also opted to conduct voluntary health screenings based on the particular health needs of their students. School nurses are responsible for ensuring that these screenings are completed and for referring students for follow-up care when needed. During the school year, school nurses at 102 districts conducted the following number of required and voluntary student health screenings (Table 7). These numbers represent *initial* screenings, and do not include *re-screenings*:

[9] The law permits waivers of certain grades under certain circumstances. Postural screenings of students in grades 5 through 9 may not be waived, however.

TABLE 7. Yearly Student Health Screenings School Years 2005-2006, 2006-2007				
	Screenings All Districts		% of Students Screened Median District*	
Type of Screening	**2005-2006**	**2006-2007**	**2005-2006**	**2006-2007**
Hearing	346,083	296,717	63.9	59.8
Height/Weight	296,794	309,687	60.8	70.5
Postural	152,009	154,643	32.6	35.4
Vision	332,709	327,825	65.1	63.6

* Medians exclude districts that did not track that type of screening.
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Body Mass Index (BMI) Screenings

The Centers for Disease Control and Prevention recommends the use of Body Mass Index (BMI) measurements to screen for obesity in children. BMI is a number calculated from height and weight, and is a reliable indicator of body fat in most people. For children and teens, BMI is age and sex specific, and is plotted on BMI growth charts to reveal the child's percentile ranking, which indicates the relative position of the child's BMI among children of the same age and sex. The BMI percentile can then be used as a screen for overweight. BMI percentiles derived from direct measurements done by school nurses should be more accurate than those derived from self-reported heights and weights obtained from student surveys. Although it was not an ESHS program requirement, school nurses were asked to perform BMI screenings in grades 1, 4, 7 and 10 whenever possible to permit us to aggregate data by grade level. In addition, nurses were asked to report screening results when they had completed BMI screenings on at least 70% of the student enrollment at a given grade level, in order to ensure the results were representative of the students at those grade levels in their district. School nurses in 89 districts met the screening criteria (70% of enrollment) for 1 or more of the designated grade levels, with a total of 93,971 students screened (see Table 8). Nurses in 50 (49%) of the districts met the screening criteria for all 4 of the designated grade levels.

TABLE 8: Number of ESHS Districts Providing Universal BMI Screening and Number of Students Screened September 1, 2006 - June 30, 2007 (n = 102 districts)			
Grade	**Districts**		**Students Screened**
	n	**%**	**n**
1	75	73.5	23,092
4	85	83.3	30,266
7	76	74.5	24,404
10	59	57.8	16,209
All reported grades	89	87.4	93,971

Notes: 10 districts did not submit screening data meeting the reporting criteria (that 70% of students in a grade level should be screened). Data from 3 districts were excluded due to data quality problems.

Although these results are not necessarily representative of the entire state, these results do provide information about a large number of students in ESHS districts. In each of the 4 grade levels, at least 30% of the students screened were overweight or obese, with males in all 4 grades more likely to be overweight or obese than females (Table 9). School nurses may send BMI screening results back to a student's physician or parents, depending on district policy.

TABLE 9: Percentage of Under- and Overweight Students in Grades 1, 4, 7, and 10 in ESHS Districts as Reported by School Nurses Conducting Universal BMI Screenings (89 Massachusetts Public School Districts, 2006-2007 School Year)

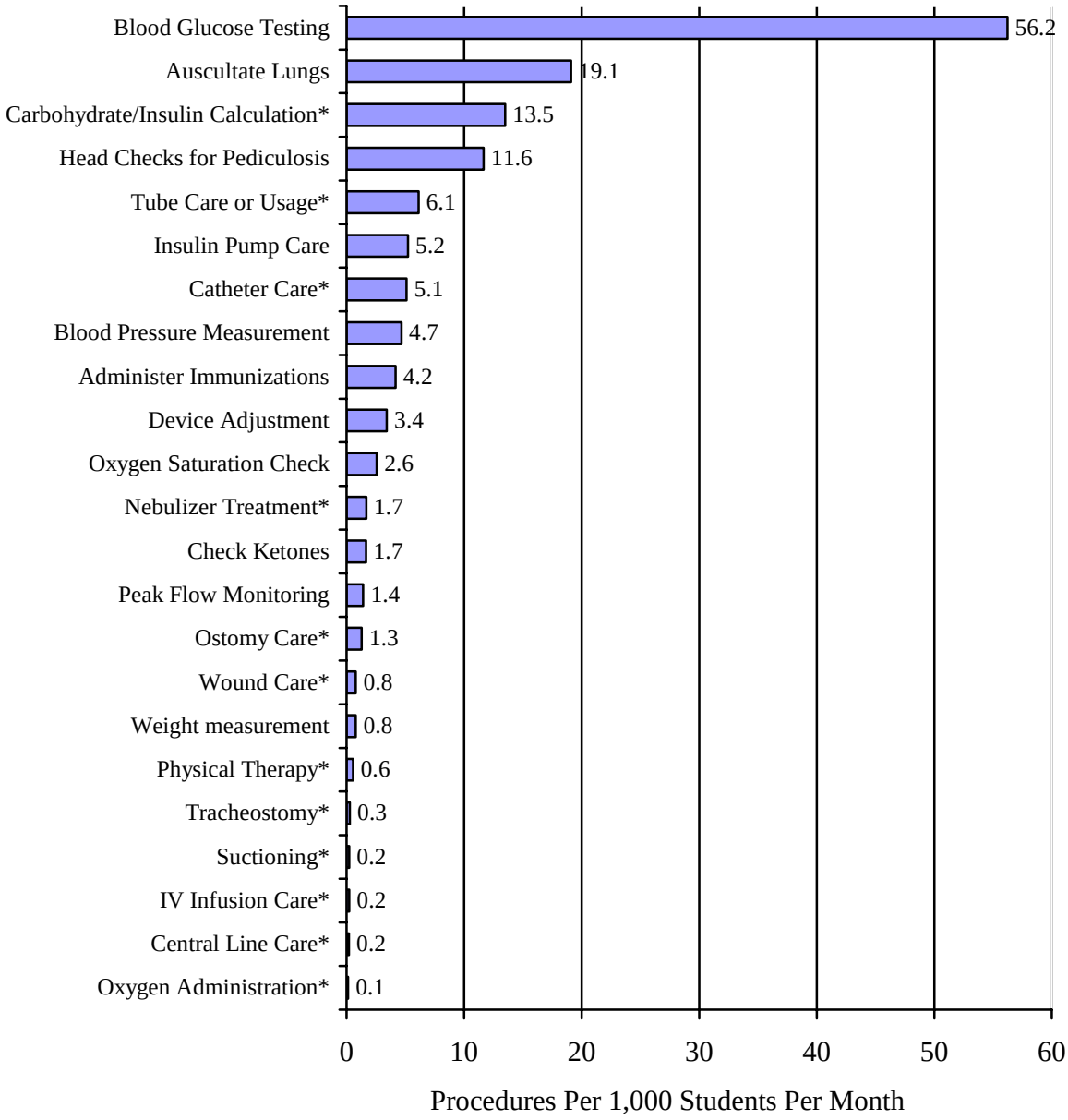
		Grade 1		Grade 4		Grade 7		Grade 10	
		Male	Female	Male	Female	Male	Female	Male	Female
	Total students screened:	11,946	11,146	15,410	14,856	12,768	11,636	8,280	7,929
Weight category*	**BMI Percentile Range**	%	%	%	%	%	%	%	%
Underweight	Less than the 5th percentile	1.9	2.3	2.7	3.2	2.6	2.9	2.4	2.3
Healthy Weight	5th percentile to less than the 85th	64.8	67.2	59.7	62.7	59.4	63.9	60.1	65.3
Overweight	85th to less than the 95th percentile	16.4	15.6	17.3	17.1	18.3	17.1	18.3	17.5
Obese	Equal to or greater than the 95th	17.0	14.8	20.3	16.9	19.7	16.0	19.3	14.9
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Subtotal: Overweight or Obese		33.4	30.4	37.6	34.0	38.0	33.2	37.6	32.4

* For children and adolescents, the CDC uses the term "overweight" instead of "obese" and the term "at risk of overweight" instead of "overweight." We have chosen to use the same labels that are used with adults to avoid confusion over the terminology in line with recommendations recently released by a committee of experts representing 15 medical and health organizations (Expert Committee, 2007).

5. Medical Procedures

Enrollment of children assisted by medical technology in the public school system has increased in recent years. This phenomenon presents multiple challenges for school administrators, parents and guardians, school health services personnel, teachers, and students. ESHS school districts collected information on the number and type of procedures that involved medical technology, as well as other medical procedures performed by school nurses. Consistent trends in the school health data may be associated with emergent public health issues. For example, the increase in Blood Glucose Testing and Insulin Pump Care over the past 5 years may be a consequence of the current obesity/diabetes epidemic. Monthly medical procedure rates per 1,000 enrolled students are shown in Figures 2 and 3.

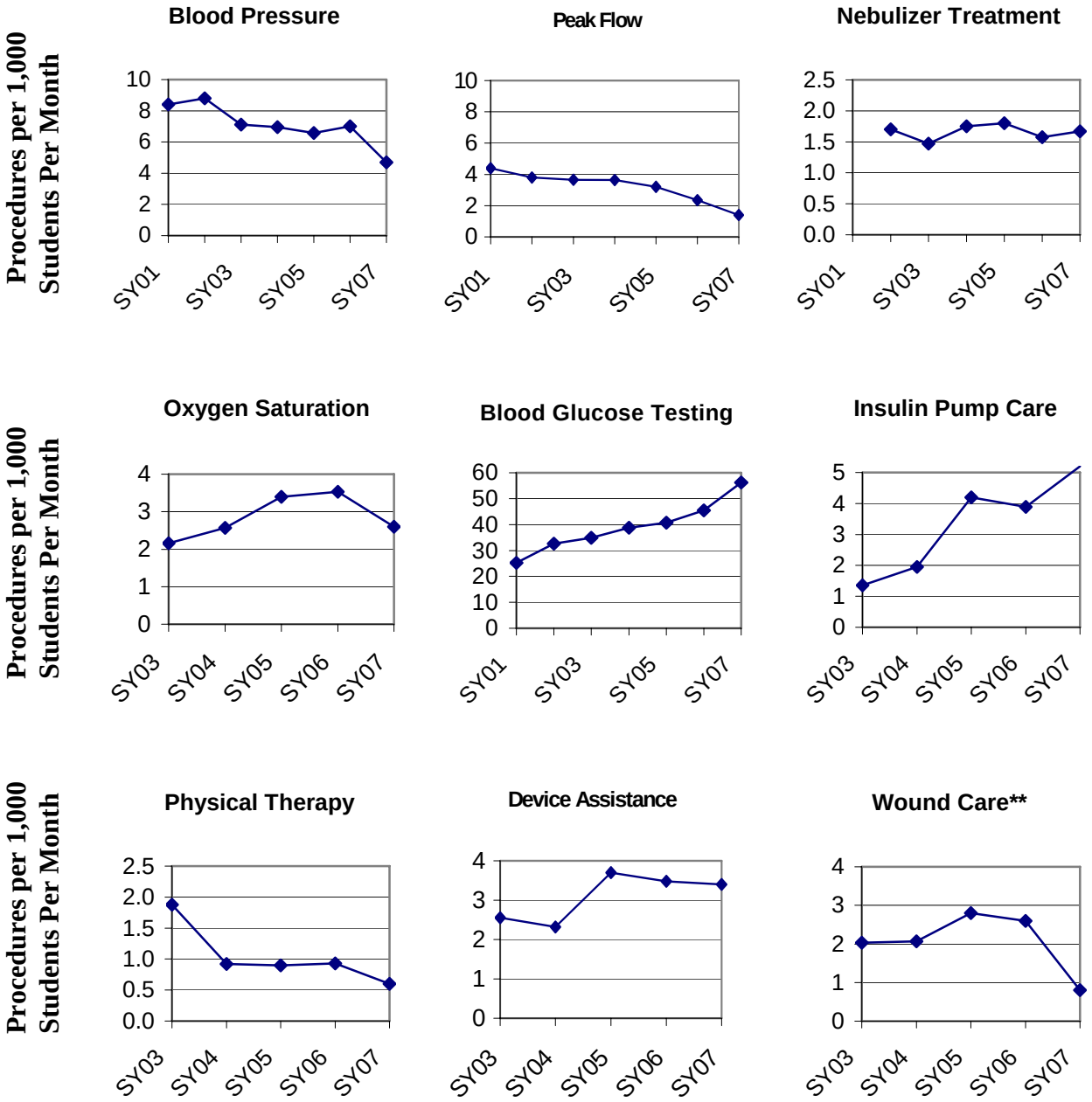
FIGURE 2. Medical Procedure Rates (Students)
Sepember 1, 2006 - June 30, 2007



Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.
Note: Rates were calculated from those districts performing the procedure at least once.

The procedures listed in Figure 2 required differing amounts of nursing time. Those procedures identified with an asterisk (*) require significant amounts of professional nursing care. Many of these procedures were formerly performed in a hospital setting.

FIGURE 3. Procedure Rates per 1,000 Students per Month*
School Years 2000-2001 through 2006-2007



*Among those districts performing the procedure at least once.
** The definition of Wound Care was changed in 2007, so that dressing changes are no longer counted.
Note that in 2002-2003, data was available for only 4 out of 10 months. If there are no data points then data was not available for that year. Rates shown are those reported by the typical (median) district in the ESHS program.
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program

While some procedure rates have declined (blood pressure monitoring, wound care), procedures related to diabetes management (blood glucose monitoring and insulin pump are) have increased.

Monthly medical procedure totals are summarized in Table 10:

TABLE 10. Medical Procedure Types and Totals
September 1, 2006- June 30, 2007

Type of Procedure	Number of Procedures Per Month	
	Students	**Staff**
Administer Immunizations	5,586	411
Auscultate Lungs	14,048	381
Blood Glucose Testing	27,027	133
Blood Pressure Monitoring	3,488	2,756
Carbohydrate/Insulin Calculation	7,356	40
Catheter Care	2,246	22
Central Line Care (a)	80	8
Check Ketones	1,248	2
Device Adjustment	2,974	27
Head Checks for Pediculosis	9,752	463
Insulin Pump Care	3,901	33
IV Infusion Care	86	28
Nebulizer Treatment	1,073	13
Ostomy Care (c)	396	6
Oxygen Administration	214	4
Oxygen Saturation Check	3,162	73
Peak Flow Monitoring	2,858	11
Physical Therapy	1,483	7
Suctioning	144	1
Tracheostomy Care	112	1
Tube Care or Usage (b)	4,047	20
Weight measurement (d)	704	240
Wound Care	1,775	124

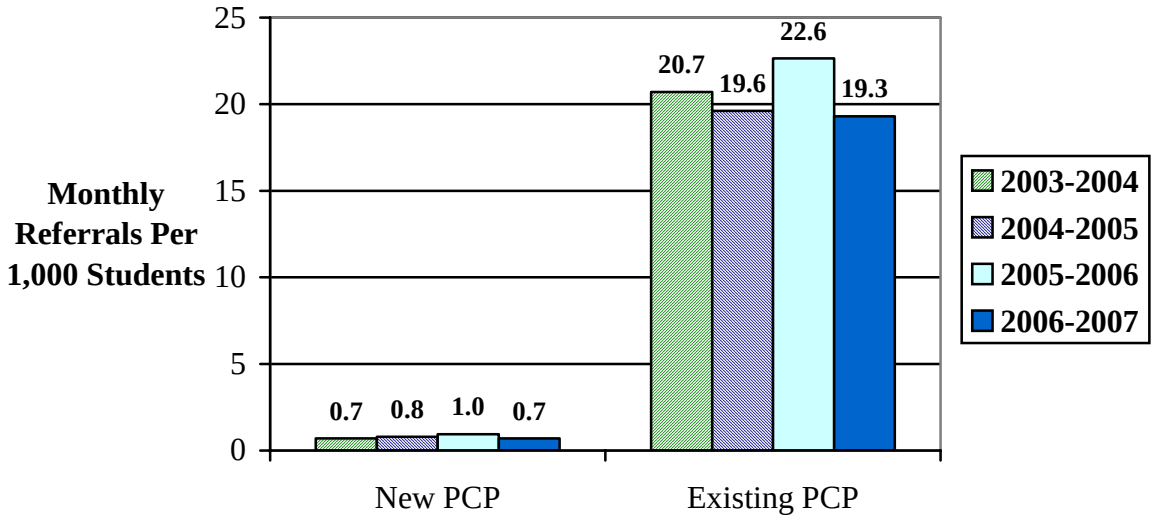
a) Central Line Care: Monitor infusion or administration, Pump monitoring, IV Bag Change, dressing change.
b) Naso-Gastric, Gastronomy or Other Feeding Tube Care or Usage
c) Ostomy Care- Colostomy/Ileostomy/Urostomy
d) Weight management for medical conditions not related to screening
Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

6. Linkages

ESHS school systems identified students without primary care and, in consultation with their families, referred them to appropriate health care services. A referral is reported whenever an actual appointment has been set up with a provider or agency.[10] School systems also referred many students to their existing primary care providers. During the 2006-2007 school year, participating districts reported the following:

- A total of 142,738 students requiring primary care services were identified and referred to primary care providers. Those students without primary care providers were referred to new providers. Referrals included:
  - 8,213 referrals to new primary care providers (5.8% of total primary care referrals). In a typical district, monthly referrals to new primary care providers averaged 2.0 students, a rate of 0.7 referrals per 1,000 enrolled students per month.
  - 134,525 referrals to existing primary care providers (94.2% of total primary care referrals). In a typical district, monthly referrals to existing primary care providers averaged 63.6 students, a rate of 19.3 referrals per 1,000 enrolled students per month.

FIGURE 4. Primary Care Provider Referrals
Median Monthly Rate Per 1,000 Students
School Years 2003-2004, 2004-2005, 2005-2006, 2006-2007



Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

[10] Prior to 2006-2007, a referral was counted whenever the student was advised to follow-up with a provider.

In addition, districts in the ESHS program provided the following referrals for students during 2006-2007:

- 7,949 referrals to insurance providers.
- 14,007 referrals for mental/behavioral health services.

Each month, school nurses receive Massachusetts Asthma Action Plans (MAAPs) from health care providers.[11] These written plans provide individualized instructions for managing asthma episodes and administering asthma medications. During the school year, 102 districts reported receiving from providers MAAPs for 456.8 students monthly. Individual districts received between 0.0 and 67.2 action plans per month.

[11] This section refers only to Standard Triplicate Form Massachusetts Asthma Action Plans.

7. Oral Health

School nurses are increasingly performing oral health related activities. Table 9 summarizes these activities for the 2006-2007 school year.

The typical district participating in oral health screening activities screened students at an annual rate of 22.4 per 1,000 students.[12] There was considerable variability across districts, with the range being 0 to 703 screenings per 1,000 students. Over one-half of oral health screenings (57%) were performed by school nurses (Table 11).

TABLE 11. Number of Students Receiving Oral Health Services September 1, 2006 - June 30, 2007

Type of Oral Health Activity	% of Districts Performing Activity	Number of Students (All Districts)
Oral health screenings by a school nurse	38.2%	20,394
Oral health screenings by a dentist or hygienist	60.8%	26,846
Referrals to a dental provider	55.9%	11,433
Referrals completed	33.3%	2,957
Screenings of third grade students	53.9%	7,017
Dental sealants applied in school	30.4%	5,969
Flouride rinse treatments applied in school	57.8%	27,827

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

8. Health Education, Tobacco Prevention, and Support Groups

School nurses are often called upon to provide health education and deliver presentations. In this teaching role they provide information to students, staff, and community members on topics such as nutrition education, life threatening allergies, and human growth and development. Throughout the 2006-2007 school year, school nurses in the 102 districts reported making 17,979 classroom presentations. In a typical district, each full-time school nurse delivered 1.1 presentation every month (range: 0 to 20.6 presentations per nurse per month). The types of presentations given most frequently were fitness/nutrition/wellness, life threatening allergies, and oral health/hygiene (Table 12).

[12] Rate is based on those districts that performed one or more oral health screening activities.

TABLE 12: Number of Wellness/Safety Presentations and Number of Participants, by Topic Area September 1, 2006 - June 30, 2007				
Topic Area	**Number of Presentations Per Month**	**Number of Participants Per Month**		
		Students	**Staff**	**Community**
Blood Borne Pathogens	200.8	746.1	2,128.9	3.3
CPR/AED Programs	65.6	680.8	505.1	75.9
Crisis Team	43.3	666.5	746.7	75.4
Environmental Health	39.8	1,053.1	331.5	78.9
Fitness/Nutrition/Wellness	298.7	6,784.0	930.5	263.7
Growth/Development	173.5	2,617.0	134.0	52.9
Life Threatening Allergies	276.8	2,251.1	2,677.9	112.7
Mental Health/Wellness	100.3	1,814.4	267.2	29.6
Oral Health/Hygiene	262.8	6,328.1	406.3	42.0
Other	336.3	9,413.9	1,721.0	517.1

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Health education was also promoted through the preparation of flyers and mailings. During the school year, school nurses were involved in the creation of a total of 19,105 health promotion / education flyers or mailings. In the typical district, each nurse was involved in the creation of 1 flyer or mailing per year.

During the school year, school nurses in ESHS districts provided the following tobacco prevention/cessation and substance abuse services:

- 87 districts reported a total of 2,393 assessments of students for suspected substance abuse.
- A total of 2,408 tobacco group prevention meetings were held in 29 districts, in which attendance summed to 13,560 students and 401 adults.
- A total of 235 tobacco group cessation meetings were held in 20 districts, in which attendance summed to 646 students and 31 adults.
- A total of 3,756 individual tobacco cessation counseling sessions were delivered to 2,533 students and 281 adults in 71 districts.[13]
- In 38 of the districts, students were referred to other tobacco prevention/cessation services 371 times, and adults were referred to outside sources 90 times.

[13] This number is expected to rise when the training on School Nurse Individual Interventions to Assist Students to Stop Smoking is resumed. (See discussion on the UMASS program)

During the 2002-2003 school year, the MDPH School Health Unit collaborated with the University of Massachusetts, Department of Preventive and Behavioral Medicine, in conducting a randomized controlled trial (RCT) to determine if school-nurse interventions could help individual students stop using tobacco. The study was implemented in 71 Massachusetts schools. The results demonstrated the feasibility and potential efficacy of this intervention in increasing self-reported short term (6 week and 3 month) quit rates among adolescent smokers who wished to quit.

Based on these outcomes, the National Institutes of Health (NIH) has awarded the University of Massachusetts Medical School (UMMS) a four-year grant to test this intervention in a randomized controlled trial, designed to be delivered by the school nurse in the course of her/his routine clinical duties through four individual 15 to 20 minute sessions with individual teens. As a result of the partnership with the UMMS Department of Preventive and Behavioral Medicine and the MDPH School Health Unit, thirty-six public high schools with an enrollment of at least 350 students are currently participating in this NIH grant study.[14] Prior to the NIH study, the School Health Institute had been offering trainings to school nurses based on the results of the 2002-2003 study. These trainings have been temporarily discontinued so as not to affect the NIH study results.

[14] It is anticipated that approximately 1,000 teens will be recruited during the course of two years with baseline assessments including salivary cotinine (metabolic of nicotine) and follow-up assessments 3 and 12 months following baseline. Cotinine validation and 12 month follow-up assessment is considered the gold standard of tobacco research.

Support Groups

Table 13 summarizes participation in student support group activities led or assisted by school nurses for the 2006-2007 school year. It does not include tobacco-related support groups which were discussed previously.

TABLE 13. Participation in Support Group Activities, by Topic Area
September 1, 2006 - June 30, 2007 (n=102 districts)

Topic Area	% of ESHS Districts Offering Group	Monthly Group Meetings	Monthly Participants		
			Students	Staff	Parent/ Community
Alcohol or Substance Abuse	31.4	23.3	321.4	17.4	15.8
Anger/Conflict/Violence Management	23.5	34.7	162.1	22.5	7.2
Asthma	22.5	27.3	105.1	22.0	16.4
Diabetes	37.3	22.0	47.9	24.4	6.9
Emotional / Psychosocial Support	41.2	98.0	173.3	102.2	10.4
Food Allergy	39.2	19.9	112.4	91.7	30.2
Gay/Bisexual/Lesbian/ Transgender	15.7	15.9	288.2	24.5	1.4
Health Careers	18.6	24.3	253.6	18.2	6.6
Nutrition/Physical Activity	43.1	91.7	556.3	131.9	19.9
Peer Leadership	27.5	19.0	140.8	27.4	6.5
Other	60.8	105.7	462.1	192.3	51.5

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

The type of support group most likely to be offered was "Nutrition/Physical Activity." This type of group was offered by 43.1% of districts and attracted the highest number of participants, among both students and staff. The second most common type of support group was "Emotional/psychosocial," offered by 41.2% of districts. Support groups in the "Emotional/psychosocial" area met more frequently than the other types of support groups.

In the nutrition area, school nurse support can extend beyond making support groups available. Some students come to school without adequate breakfasts or lunches, and school nurses provide

food and/or snacks. During the school year, school nurses reported they provided snacks a total of 127,714 times.

9. Nursing Case Management

Data from the monthly activities report revealed that, beyond providing direct care to students, school nurses spent a significant portion of their day performing case management duties that included communication with families, other school staff, and community health care providers about student health concerns. During the school year, school nurses from 102 districts conducted:

- a total of 894,218 health counseling and education communications with parents (including phone calls and letters, but excluding meetings and home visits), with the typical district reporting 621.1 communications per month (range: 1.9 to 5,983.9 communications per month);

- a total of 2,165 home visits, with the typical district reporting 0.3 home visits per month (range: 0.0 to 52.6 home visits per month);

- a total of 370,666 communications with other school staff about student health issues, with the typical district reporting 231.8 communications per month (range: 1.8 to 3,733.6 meetings per month);

- a total of 84,633 communications with other agencies and health providers about student health issues, with the typical district reporting 28.7 communications per month (range: 0.4 to 1259.2 phone calls per month).

- a total of 28,074 case management meetings, with the typical district reporting 13.7 meetings per month (range: 0 to 485.5 meetings per month).

The following chart shows median case-management activity levels per school nurse FTE per month across the 102 participating districts:

TABLE 14. Nursing Case Management Activities:
Student-Health Related Activities Per Month Per Nurse FTE
September 1, 2006 - June 30, 2007

Type of Activity	Activities Per Month Per FTE
Communications with parents	63.6
Communications with staff	22.6
Communications with community agencies/providers	4.5
Case management meetings	1.6

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

For children with special health care needs, nursing case management involves the development of Individual Health Care Plans (IHCPs) designed to maximize their potential for learning. An IHCP, usually developed by the school nurse in conjunction with the student's family, the school physician, other school staff, and relevant community health care providers, is an individualized care plan that stipulates a student's specific medical, nursing, emergency care, and educational needs while in school during the school day. IHCPs are reviewed on a regular basis to ensure that students receive the appropriate health care they need during the school day.

During the 2006-2007 school year, 102 ESHS sites reported:

- a total of 33,753 IHCPs for the year, with the median district reporting 89 IHCPs (range: 0 to 5,215 IHCPs);

- a median rate of 18.2 IHCPs per full-time school nurse (range: 0 to 129.7 IHCPs per full-time school nurse).

Program Development

School nurses perform program planning and development activities in coordination with other school district professionals, in areas such as environmental health, policy development, crisis management, and emergency preparedness. In addition, nurses attend meetings that contribute to their professional development. Meetings may be held at a specific school building or at the school district level. During the 2006-2007 school year, school nurses attended 1,393.8 program and professional development meetings per month (Table 15).

TABLE 15. Number of Program Development Meetings Attended by School Nurses, by Topic Area

September 1, 2006 - June 30, 2007

Topic Area	Number of Meetings Per Month (All Districts)
Crisis Management	197.2
Emergency Preparedness	173.0
Environmental	23.8
Mental Health	115.2
Policy Development	139.1
Professional Development	386.0
Other	359.5
Total	1,393.8

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Students With Special Health Care Needs

1. Types of Special Health Care Needs

School nurses provide care for students with a wide variety of special health care needs. Table 30 shows the rates by type of condition. These rates are based on information provided to the school nurse by the student's primary care provider, who conducts a physical examination and submits a School Health Record once every 3 to 4 years. This information is supplemented by parent reports (on emergency cards and health information forms) submitted annually. Conditions not requiring special nursing care in school may be less likely to be reported to school nurses. For those conditions, these data may under-count the true rate in the student population. In the ESHS districts, a total of 114,508 students with special health care needs were reported to school nurses. The most commonly reported physical/developmental condition is asthma (Table 16). Other common conditions include allergies, migraine headaches, seizure disorder, and cardiac conditions. The most commonly reported behavioral/emotional condition is Attention-Deficit/Hyperactivity Disorder (ADHD).

TABLE 16: Number of Students With Special Health Care Needs Reported to School Nurses in ESHS Districts (Number and Rate Per 1,000 Enrolled Students) September 1, 2006 - June 30, 2007

	Number (All Districts)	Rate Per 1,000 Students (All Districts)
Physical/Developmental Conditions		
Allergies:		
Bee Sting Allergies	2,828	5.3
Food Allergies	14,932	28.0
Latex Allergies	813	1.5
Asthma	52,049	97.7
Autoimmune Disorders (Arthritis, Lupus, etc.)	1,025	1.9
Blood Dyscrasias:		
Hemophilia	131	0.2
Sickle Cell Trait	502	0.9
Other Blood Dyscrasias	1,001	1.9
Cancer	430	0.8
Cardiac Conditions	3,537	6.6
Celiac Disease	331	0.6
Cystic Fibrosis	193	0.4
Diabetes Type I	1,338	2.5
Diabetes Type II	311	0.6
Inflammatory Bowel Disease (IBS, Crohn's, etc)	1,201	2.3
Migraine Headaches	5,348	10.0
Neurologic Conditions:		
Cerebral Palsy	937	1.8
Spina Bifida	191	0.4
Seizure Disorder	3,997	7.5
Neuromuscular Degenerative Disorder	541	1.0
Other Physical/ Developmental conditions	15,734	29.5
Behavioral/Emotional Conditions		
ADHD/ADD	24,754	46.5
Autism	3,218	6.0
Depression	4,997	9.4
Eating Disorders	1,196	2.2
Other Behavioral/Emotional conditions	9,381	17.6
Total Students With Special Health Care Needs	114,508	215.0

Source: *Status Reports* submitted by districts in the Essential School Health Services program.

2. Students With Do Not Resuscitate (DNR) Orders

For some students who are terminally ill, parents and medical providers may determine that cardio pulmonary resuscitation should not be performed, and a Comfort Care/Do Not Resuscitate order will be prepared. During the school year, 5 students with DNR orders were reported to school nurses.

3. Cardiovascular Health and Automated Electronic Defrillators (AEDs)

An automated external defibrillator (AED) is a portable device used to restore normal heart rhythm to patients in cardiac arrest. If cardiac arrest is not treated within a few minutes, the condition is fatal. Over one-half (55.1 %) of ESHS school districts have at least one AED in all of their school buildings, up from 29.7 percent in 2003-2004 (Table 17). Still, 9.2% of ESHS districts have not deployed AEDs in any of their school buildings, and 42.5% of school buildings in ESHS districts do not have an AED.

TABLE 17. Deployment of Automated External Defibrillators (AEDs) in ESHS School Buildings and Districts

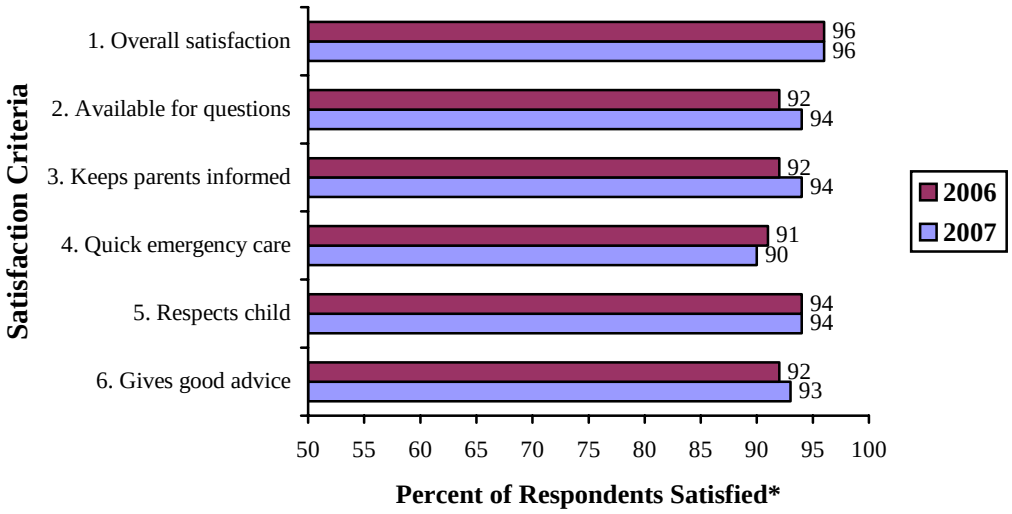
	2003-2004		2006-2007	
	n	%	n	%
Total buildings	870		1309	
AED Status of Building				
No AEDs	596	68.5	457	42.5
One AED	218	25.1	494	46.0
More than One AED	56	6.4	124	11.5
Total districts	91		98	
AED Status of District				
No AEDs in any building	30	33.0	9	9.2
At least one AED in all buildings	27	29.7	54	55.1
At least one building with more than one AED	36	39.5	73	74.5

Source: *Monthly Activities Reports* submitted by districts in the Essential School Health Services program.

Client Satisfaction

In order to assess parents' perceptions of the quality of care that their students receive at school, a client satisfaction survey was conducted. Parents of students who received school health services were asked to complete a brief questionnaire. Each district is surveyed once every three years. In these districts, parents of approximately 100 students receiving health services are mailed a questionnaire and then requested to complete the questionnaire and return it to DPH. Parents of students at all grade levels are included in the sample. In the 2006-2007 school year, 1,663 parents returned completed questionnaires (42% of the 3,950 parents who were mailed questionnaires). Parental satisfaction rates on the measured criteria ranged from 90 to 96 percent (Figure 5).

FIGURE 5. Percentage of Parents Satisfied with School Nursing Services in ESHS Districts 2005-06 (n = 1,323 parents in 29 districts) and 2006-07 (n = 1,663 parents in 35 districts)



* Parents were deemed "Satisfied" if they "Agreed" or "Strongly Agreed" with the statement.

Detailed description of the Satisfaction Criteria:
1. I am very satisfied with the care my child receives from the school nurse.
2. If I have a question or concern, I can reach the school nurse for help without any problem.
3. The school nurse does his or her best to keep me informed about my child.
4. In an emergency at school, my child can get nursing care quickly.
5. The school nurse treats my child with respect.
6. I value the advice given by the school nurse

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APPENDIX A

School Districts and Student Enrollment
Essential School Health Services Program: 2006-2007

DISTRICT NAME	ADMINISTRATION	REGION	TYPE	STUDENTS
Amesbury	Town	NE	R	2,433
Amherst-Pelham	Regional Academic	W	R	3,756
Ashburnham-Westminster	Regional Academic	C	R	2,472
Ashland	Town	Metro West	R	2,653
Avon	Town	SE	R	761
Barnstable	Town	SE	R	4,543
Belchertown	Town	W	R	2,684
Berkshire Hills	Regional Academic	W	R	1,469
Boston	City	Boston	C	56,388
Bourne	Town	SE	R	2,542
Braintree	Town	Metro West	R	5,165
Bridgewater-Raynham	Regional Academic	SE	R	5,881
Brockton	City	SE	C	15,612
Brookline	Town	Boston	R	6,142
Cambridge	City	Metro West	R	5,599
Canton	Town	Metro West	R	3,093
Central Berkshire Regional (Dalton)	Regional Academic	W	C	2,144
Chelsea	City	Boston	C	5,566
Chicopee	City	W	R	7,691
Clinton	Town	C	R	2,042
Dedham	Town	Metro West	R	2,871
Douglas	Town	C	R	1,775
East Longmeadow	Town	W	C	2,859
Fairhaven	Town	SE	R	2,141
Fall River	City	SE	R	10,459
Foxborough	Town	Metro West	R	2,924
Framingham	Town	Metro West	C	8,085
Frontier	Regional Academic	W	R	1,686
Gardner	City	C	R	2,981
Gateway	Regional Academic	W	R	1,337
Georgetown	Town	NE	R	1,738
Gloucester	City	NE	R	3,763
Granby	Town	W	R	1,145
Hadley	Town	W	R	652

Appendix A continued

DISTRICT NAME	ADMINISTRATION	REGION	TYPE	STUDENTS
Hampden-Wilbraham	Regional Academic	W	R	3,766
Hanover	Town	SE	R	2,793
Harwich	Town	SE	R	1,399
Haverhill	City	NE	R	7,597
Holliston	Town	Metro West	R	2,939
Holyoke	City	W	R	6,256
Hudson	Town	Metro West	C	2,882
Lawrence	City	NE	C	12,204
Leominster	City	C	R	6,123
Lexington	Town	Metro West	R	6,226
Lowell	City	NE	R	13,902
Ludlow	Town	W	R	3,081
Lynn	City	NE	R	13,619
Malden	City	NE	R	6,320
Mansfield	Town	SE	R	4,893
Marblehead	Town	NE	R	3,128
Medford	City	NE	R	4,861
Melrose	City	NE	R	3,527
Milford	Town	C	R	4,201
Milton	Town	Metro West	R	3,724
MohawkTrail Regional (Buckland)*	Regional Academic	C	R	1,451
Mount Greylock School Union (Lanesborough)	Town	W	R	521
Nashoba	Regional Academic	C	R	3,295
Natick	Town	Metro West	R	4,567
Needham	Town	Metro West	R	4,995
New Bedford	City	SE	R	13,106
Newburyport	City	NE	R	2,382
Newton	City	Metro West	R	11,631
North Andover	Town	NE	R	4,624
North Attleborough	Town	SE	R	4,782
North Berkshire Union (Clarksburg)	City	W	R	367
Northampton&SmithVoc.&agr.	Town	W	R	3,333
Northboro-Southboro	Regional Academic	Metro West	R	4,879
Northbridge	Regional Academic	Metro West	R	2,660
Norwood	Town	Metro West	R	3,490
Palmer	Town	W	R	1,933

Appendix A continued

DISTRICT NAME	ADMINISTRATION	REGION	TYPE	STUDENTS
Pioneer Valley Regional (Northfield)	Regional Academic	W	R	1,112
Pittsfield	City	W	R	6,352
Plymouth	Town	SE	R	8,325
Provincetown	Town	SE	R	212
Quincy	City	Metro West	R	8,785
Randolph	Town	Metro West	R	3,450
Rockland	Town	SE	R	2,524
Rockport	Town	NE	R	1,038
Salem	City	NE	C	4,433
Sandwich	Town	SE	R	3,819
Shirley	Town	C	R	655
Somerville	City	Metro West	R	4,984
Southwick Tolland	Regional Academic	W	R	1,904
Springfield	City	W	C	25,791
Stoughton	Town	SE	R	3,970
Taunton	City	SE	R	8,155
Triton (Byfield)	Regional Academic	NE	R	3,277
Wachusett	Regional Academic	C	R	7,208
Walpole	Town	Metro West	R	3,915
Waltham	City	Metro West	R	4,836
Ware	Town	W	R	1,248
Watertown	Town	Metro West	R	2,491
West Bridgewater	Town	SE	R	1,220
Westborough	Town	Metro West	R	3,483
Westfield	City	W	R	6,377
Westford	Town	NE	R	5,234
Weston	Town	Metro West	R	2,395
Weymouth	Town	Metro West	R	6,938
Whitman-Hanson	Regional Academic	SE	R	4,372
Wilmington	Town	Metro West	R	3,844
Winthrop	Town	Boston	R	2,017
Worcester	City	C	R	23,603
TOTAL				532,476

Notes:
"Type" refers to type of ESHS award: "R" means that the district is a part of the basic or regular ESHS program; "C" means that the district is a part of the ESHS with Consultation program.
"Region" refers to the six standard geographic regions defined by the Executive Office of Health and Human Services (EOHHS): "W" =Western, "C" = Central, "NE" = Northeastern, and "SE" = Southeastern. "Metro West" and "Boston" are self-explanatory.

APPENDIX B

Student Demographics

TABLE B1. Race/Ethnicity of Students in ESHS Districts and Massachusetts Public Schools (2006-2007)				
	ESHS Schools		**State Public Schools**	
Race/Ethnicity	**Number**	**Percent**	**Number**	**Percent**
African American	63,866	12.0	79,365	8.2
Asian	32,032	6.0	46,147	4.8
Hispanic	100,929	19.0	128,993	13.3
Native American	1,514	0.3	2,736	0.3
White	324,035	60.9	692,955	71.5
Native Hawaiian, Pacific Islander	703	0.1	2,130	0.2
Multi-Race, Non Hispanic	9,397	1.8	16,335	1.7
Total Population	532,476	100.0	968,661	100.0

TABLE B2. Selected Characteristics of Students in ESHS Districts and Massachusetts Public Schools (2006-2007)				
	ESHS Schools		**State Public Schools**	
Characteristic	**Number**	**Percent**	**Number**	**Percent**
First Language Not English	114,008	21.4	143,952	14.9
Limited English Proficient	45,890	8.6	54,071	5.6
Low Income	207,688	39.0	280,238	28.9
Total Population	532,476		968,661	

APPENDIX C

Essential School Health Services Program

Minimum Deliverables

Infrastructure for the comprehensive School Health Program strengthened.

1. Quarterly meetings of School Health Advisory committee.
2. Implementation of school district and building emergency plan by Year 1.
3. 100% students requiring prescription medications during the day have medication administration plan by Year I.
4. Role of school health services in student support/intervention program established.
5. Minimum of 1 support group operational in addition to Tobacco by Year II.
6. Annual student health needs assessment conducted and analyzed.
7. A selected number of policies reviewed, revised and approved annually.
8. Position descriptions for school health personnel developed during Year I.
9. 100% of students with special health care needs have individualized health care plans by end of Year I.
10. Marketing brochure completed during Year II.

Comprehensive health education program, including tobacco prevention and cessation, strengthened.

1. Documentation of enforcement activities related to violation of the tobacco-free school policy yearly or enforcement plan for tobacco-free school policy implemented in Year I.
2. Completion of annual tobacco use assessment.
3. Establishment of target goal for reduction in tobacco use, Year II.
4. Documentation of coordinated planning with health education coordinator.
5. Participation in a local community-based coalition addressing child and adolescent health.

Students linked to primary care providers, other community health providers and community prevention programs, and referred to insurance plans if uninsured.

1. Design and implementation of on-going process for identifying primary care providers and health insurers (including HMOs) serving the current student population and referral mechanisms for children/families, Year I.
2. 90% of all students will have their primary care provider and insurance carrier identified by end of Year II.
3. 75% of all students identified as lacking a primary care provider will be referred to a provider within the first year, with incremental increases annually.
4. 100% of uninsured eligible children and adolescents referred to Children's Medical Security Plan (CMSP) or MassHealth for enrollment by end of Year I.

Management information system implemented.

1. 100% of the students' health records will be computerized by Year II.
2. Completed annual report on data specific to the program.

Development of quality improvement process with identification of projects to document the effectiveness and efficiency of the school health service program.

1. In relation to efficiency, work with BFCH to determine formula to calculate cost per encounter.
2. Identification of types of student encounters (health assessment, nursing care, nursing treatment, first aid, etc.) by end of Year I.
3. Develop one health status improvement measure such as % of six graders appropriately immunized, or decrease to less than 10% number of students who use tobacco, etc.

APPENDIX D

Data Collection Methods

Contractual obligations require districts in the ESHS and ESHSC programs to submit a monthly report to MDPH. This report, the ESHS **Monthly Activities Report**, provides a detailed, standardized summary of the health services activities that took place in the district during the prior month. It includes a count of the number of encounters, medications administered, medical procedures, and other types of services provided.

Information for these reports is gathered from each school nurse. In most districts, school nurses enter health encounter data into a computer database loaded on a computer located in the school health office. The database facilitates data reporting as well as helps the nurse maintain systematic records and schedule follow-ups.[15] Nurses are encouraged to enter information during or directly after a health encounter. Each district in the ESHS program selects its own database software. Across the program, ten or more different software products are used, although the majority of districts use one of two popular applications. Within a district, all school nurses usually use the same software product. The software products operate differently. Many districts use a networked database that links all schools to the same database and permits the data coordinator to run district-wide data reports, while other districts use stand-alone databases in which data reports must be run separately at each school before being compiled at the district level. Due to resource constraints, nurses in a few school districts maintain paper logs and manually tabulate the data. Although districts use different software applications and some districts tabulate data manually, all districts are required to tabulate their data the same way and to submit a standard data report to MDPH. In any event, information is gathered from each school nurse in the district, tabulated, and entered into the Monthly Activities Report form in summary (or aggregate) form.

In addition, districts in the ESHS and ESHSC programs submit **status reports** once a year. This report measures progress in meeting program objectives, and includes performance measures relating to health services infrastructure, MIS development, linkages to all aspects of the health delivery system, and quality evaluation. It also summarizes the number of health screenings performed and health surveys administered during the school year. The recipient school districts in the ESHSC program submit this report once a year.

Data from the monthly activities reports submitted by ESHS/ESHSC program districts during the 2006-2007 school year is the primary source of information for the statistics presented. Over the course of the 2006-2007 school year, monthly encounter data were collected successfully from 102 of the 102 ESHS award recipients that were required to submit data (100% of program total), serving a total of 532,476 students (55% of the state public school enrollment total). For the 102 school systems that submitted data during the 2006-2007 school year, MDPH received 976 (96%) of the 1020 expected monthly reports.

[15] Paper logs are still used to record data elements that are not typically included in most school health software programs. For example, one item that is usually logged by hand is "Number of support group meetings."

For the 102 districts that form the basis of this report, the median student enrollment was 3,626, with a range of 212 to 56,388 students. This sample includes school districts from many areas of the state. It includes urban, suburban, and rural districts; city, town, regional, and vocational school systems; and large, medium, and small districts.

Data Analysis Methods

In order to reduce the potential for confusion, the statistical concepts and terms used in this report are described below.

For each measurement or "indicator," a ***district-level statistic*** is determined in each district by calculating a monthly average for the 10-month evaluation period. The **monthly average** for a particular district is calculated by adding the total number of events or encounters that occurred in a particular district during the evaluation period and dividing that total by the number of months included in that evaluation period. Because it is awkward to refer constantly to the "monthly average for the district" or the "district-based monthly average," these data are referred to as the **district average**. These two terms--the monthly average and district average--are used interchangeably in this report. All monthly averages in this report were calculated over the same ten-month period (September through June).

Wherever possible, standard units of analyses (*rates*) are used, as they facilitate both cross-district and historical comparisons, which can provide context and meaning to the statistics. The standard units of analysis that were used most frequently in this report are the monthly rate per 1,000 student health encounters, the monthly rate per 1,000 enrolled students, and the monthly rate per full-time equivalent (FTE) nurse. The **monthly rate per 1,000 student health encounters** is calculated by dividing the monthly average for that indicator by the total number of student health encounters in that district and multiplying the result by 1,000. Similarly, the **monthly rate per 1,000 enrolled students** is calculated by dividing the monthly average by the total number of enrolled students in that district and multiplying the result by 1,000. Rates per thousand enrolled students were calculated utilizing October student enrollment figures provided by the Massachusetts Department of Education (see Appendix A). Finally, the **monthly rate per full-time equivalent (FTE) nurse** is calculated by dividing the monthly average by the total number of Registered Nurse FTEs in that district. Sometimes the rate is not based on an average of *monthly* data but on aggregate data for the full year. For example, **the rate of health screenings per 1,000 students** is determined by dividing the total number of screenings *for the whole year* by the number of students enrolled and multiplying the result by 1,000.

Program-wide statistics describe not individual districts, but the ESHS/ESHSC program as a whole. In these calculations, each district represents a data point that is used in calculating summary statistics. For example, if averages are calculated for 100 districts, the result is a collection of 100 district averages that can be arrayed from lowest to highest along a frequency distribution. When frequency distributions are *skewed* (that is, the values tend to clump around either the lowest or highest value, rather than around the middle), the *median,* rather than the *average,* is used to measure central tendency. *Because most of the ESHS/ESHSC frequency distributions were skewed, the median is used throughout this report.* The **median** represents the number above and below which exactly 50% of the districts fall. It is a better measure of central

tendency than the *average* for skewed data, because the average tends to be more affected by extreme values. The most common use of median in this report is with district-based monthly averages; for a particular indicator, the median for the group of ESHS/ESHSC districts (a *program-level* statistic) is the district average (or monthly average) above and below which exactly 50% of the individual district averages fell. The **range** of a set of district averages refers to the lowest and highest values across the entire group of ESHS/ESHSC districts. The district with the median value for an indicator is sometimes referred to as the **median district** or the **typical district**. The median value across all the monthly district averages is also referred to as the **median district average**.

Medians can also be calculated for rates. For example, the **median Emergency Referral rate** (i.e., Emergency Referrals per 1,000 health encounters) is calculated by first putting the total number of Emergency Referrals in the form of a rate (for each district, dividing the total number of Emergency Referrals by the number of student health encounters and multiplying by 1,000), and then finding the median of these rates.

Data Limitations

This report focuses exclusively on the delivery of school health services by nursing staff. In addition, because project sites were not selected to serve as a representative sample of the Commonwealth, this summary is descriptive in nature and is not intended to be used to make generalized statements about health services in all Massachusetts public schools. Furthermore, caution should be exercised when comparing ESHS statistics across years. Each year the set of districts that report data changes to some degree, which creates somewhat different sample sets. For example, in the 2000-2001 school year, 74 districts reported data, whereas in the school year 2003-2004, 103 districts reported data. In addition, in years prior to 2001, the number of districts that reported data (approximately 25) was drastically lower than in more recent years (approximately 100). Due to this difference in data sets, comparisons to data from years prior to 2001 would be considerably less valid. Also, data has not always been available for all months of the school year. Most notably, in the 2002-2003 school year, only the months September through December were reported. This noted, after 2001 the core group of districts has been relatively stable, and the sample size is large enough such that comparisons are not without merit. Where statistical differences are large, and trends continue for several years, comparisons are more likely to be meaningful.

The descriptive data presented here also do not capture the dynamic and multi-faceted nature of health services delivery in a school system, which would require in-depth qualitative analysis of the program participants. Differences in data collection and data tabulation procedures may account for some of the variability observed across districts. Furthermore, a small percentage of the school districts in the program did not have computerized records of office visits and relied on paper logs and hand tallying of data by individual nurses. In these cases, it is impossible to control for factors such as data-entry errors at the district level, consistent misinterpretation of data elements, and numerical “guesstimates” provided by participants. Some of these data quality problems can lead to significant under- or over-counting. Finally, interpretation of the data is limited because we have not attempted to analyze the influence of school district demographics or other participant differences.

Participating districts were required to implement, in a short period of time, both program innovations that entailed major organizational change and, in most cases, the development of an internal data collection system (see Appendix B). Therefore, this report represents a preliminary attempt to measure the health services activity in participating school systems. Improvements in data collection procedures, data collection tools, and data collection instructions and training occur on a continuing basis, leading to corresponding improvements in data validity and reliability.