

**Evaluation of the Kansas City  
Metropolitan, School-based, Hepatitis  
B Immunization Program**

**THE GET HEPB PROGRAM**

**1996 - 2000**

**A Program Sponsored by the  
Mid America Immunization Coalition**

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## **Introduction**

The Mid America Immunization Coalition (MAIC), a metropolitan-wide, multi-agency coalition, was established in 1991. The purpose of the MAIC has been to improve immunization rates among infants, children and youth and increase the level of knowledge about immunizations among the lay public and professionals. The success of the organization has been most clearly seen in the broad base of organizational involvement and the increased immunization rates of children under the age of two from 56% in 1994 to 84% in 1997.

In 1996, Merck and Company Vaccine Division joined with the MAIC to increase public awareness of hepatitis B and the vaccine to prevent it and investigate various methods of delivering hepatitis B vaccine to infants, children and adolescents. An advisory board requested and accepted proposals from numerous agencies in the Kansas City metropolitan area describing diverse methods to educate people about hepatitis B and improve immunization rates. Many different approaches and methods were approved, funded and implemented in the "Model Cities Program." Analysis of the project revealed that interventions fell into one of three categories: a) staff education only, b) parental education only, c) staff/parent/child education with school-based vaccinations. Results of the evaluation concluded that the most effective and efficient method for reaching large numbers of adolescents was the school-based model combined with education.

The school-based program, named Get HepB, expanded in 1997-98 to include a number of Kansas and Missouri school districts in the metropolitan

area. A similar program, with even more schools, was conducted in 1998-99. Funding for vaccine and the program became an issue in 1999-00 leading to a Missouri only program. An evaluation was conducted each year and results have been published in professional journals. Key evaluation findings are presented later in this publication.

This first section of this report presents a compilation of findings from the four years of the school-based, hepatitis B program. The second section of the report focuses on the specific evaluation findings from the 1999-2000 school year.

The **MOST IMPORTANT** finding from the entire program is that it can be done. Thousands of hours of work and dedication have gone into making the GET HEP<sub>B</sub> program a success. It would take pages and pages to thank everyone who participated in this program. The program has become so successful that in the current year, 2000 - 2001, the MAIC was not able to provide a coordinator, but health departments and schools have continued their relationships and the school-based hepatitis B immunization program.

## 1996- 2000 GET HEP<sub>B</sub> OVERVIEW

- A total of 46,749 students have been offered the opportunity to receive the hepatitis B vaccine in a school-based program.
- 37,052 (79.26%) of these students and their parents returned consent forms
- Of those returning consent forms, approximately 23.7% chose not to participate
  - ◆ 80% of these indicated they were already immunized
  - ◆ 15% wanted to use their own provider
  - ◆ 5% felt it wasn't necessary to be vaccinated or gave other reasons
- Of those returning consent forms and wishing to participate (approx. 27,939)
  - ◆ **26,464** (94.7%) received at least one dose of vaccine
  - ◆ 22,598 (80.9%) of those participating in the program, completed the vaccine series
- Total number of students completely immunized either at school or in other locations - 29,827 (64% of the total student population). At least another 2,000 are partially immunized and in the process of completing the series.
- Program expenses since 1997 have totaled \$308,852. This figure represents \$11.78/student participant in the program. The average administration cost-per-dose was \$4.03.
- Due to this program a total of \$53.6 million in future health care costs have been avoided.

In the following pages yearly comparative information is provided in either table or narrative format. It is hoped that the reader can gain a sense of the tremendous impact that this program has had and will have on the Kansas City metropolitan area.

**Table 1. GET HEP<sub>B</sub> student, consent, participation, and completion data**

	<b>1999 - 2000</b>	<b>1998 - 1999</b>	<b>1997 - 1998</b>	<b>1996 - 1997</b>
Total number of students	12,549	18,764	14,865	571
Number returning consent/refusal form	9,417	15,762	11,446	431
% of total students	.75	.84	.77	.75
Number choosing to not participate	2,377	3,953	2,352	unknown
% of those returning consent forms	.25	.25	.21	unknown
Number choosing to participate and receiving at least one dose	6,910	10,627	8,925	235
% of those returning consent forms	.73	.67	.78	unknown
Number completing the hepatitis B vaccine series	6,149	7,970	8,479*	189

\*Number extrapolated from suburban data only, it is an overestimate

**Table 2. GET HEP<sub>B</sub> financial information**

	1999 - 2000	1998 - 1999	1997 - 1998	1996 - 1997
Total number of students	12,549	18,764	14,865	571
Total receiving at least one dose	6,910	10,627	8,925	235
Total doses administered.	19,116	31,807	26,143	Unknown
Total volunteer hours	1,914	2,459	2,315	Unknown
Total school staff hours	2,262	3,230	1,582	Unknown
Total school cost @ \$12.66/hr*	\$28,637	\$40,892	\$20,028	Unknown
Total health department staff hours	2,150	3,565	2,269	Unknown
Total health department cost @ \$16.50/hr*	\$35,475	\$58,823	\$37,438	\$5,103
Total cost (staff + supplies + administration)	\$82,972	\$131,792	\$94,090	Unknown
Administration cost-per-dose	\$4.34	\$4.14	\$3.60	Unknown

\*salary/hour in this report was averaged across the four years to provide a more accurate side-be-side comparison.

The following two tables represent a simplistic analysis of the impact of the GET HEP<sub>B</sub> program on future health care costs. A complete cost-effective analysis was not possible due to the lack of certain data.

**Table 3. Future healthcare costs without the GET HEP<sub>B</sub> Program\***

	1999 - 2000	1998 - 1999	1997 - 1998	1996 - 1997
Total number of students	12,549	18,764	14,865	571
Number already immunized**	2,510 (20%)	3,378 (18%)	2,223 (15%)	46 (8%)
Number immune if vaccine 90% effective	2,259	3,040	2,001	41
Total non-immune youth	10,290	15,724	12,864	530
Number who will get hepB (4.15%)	427	653	534	22
Cost of care (\$210 each)	\$89,670	\$137,130	\$112,140	\$4,620
Number progressing to chronic (40%)	171	261	241	9
Cost of care (\$87,000)	\$14.9 mil	\$22.7 mil	\$21.0 mil	\$0.78 mil
Number progressing to cancer (25%)	107	163	133	6
Cost of care (\$96,500)	\$10.3 mil	\$15.7 mil	\$12.8 mil	\$0.58 mil
Total cost of care	\$25.5 mil	\$38.4 mil	\$33.8 mil	\$1.36 mil

\*These figures are not the same as those in previous reports. More information has become available and the calculations are more accurate.

\*\*Over the years the percentage of adolescents already immunized has increased. These numbers represent the best estimate based on the data available.

**Table 4. Future healthcare costs with the GET HEP<sub>B</sub> Program\***

	1999 - 2000	1998 - 1999	1997 - 1998	1996 - 1997
Total number of students	12,549	18,764	14,865	571
Number already immunized	2,510 (20%)	3,378 (18%)	2,223 (15%)	46 (8%)
Number completely vaccinated in the program	6,149	7,970	8,479	189
Total vaccinated youth	8,659	11,348	10,702	235
Number immune if vaccine 90% effective	7,793	10,213	9,632	212
Total non-immune youth	4,756	8,551	5,233	359
Number who will get hep B (4.15%)	197	355	217	15
Cost of care (\$210 each)	\$41,370	\$74,550	\$45,570	\$3,150
Number progressing to chronic (40%)	79	142	87	6
Cost of care (\$87,000)	\$6.9 mil	\$12.4 mil	\$7.6 mil	\$0.52 mil
Number progressing to cancer (25%)	49	89	54	4
Cost of care (\$96,500)	\$4.7 mil	\$8.6 mil	\$5.2 mil	\$0.39 mil
Total cost of care	\$11.6 mil	\$21.0 mil	\$12.8 mil	\$0.91

When the Total cost of care from Table 3 is compared to the same data in Table 4 there is a difference of \$53.6 million dollars! **With the GET HEP<sub>B</sub> program potential health care costs of over \$53 million dollars have been avoided.**

Key points from the yearly evaluations are provided below.

### **1997-98 Evaluation**

- A program director was hired and did an excellent job.
- Over \$27 million in lifetime medical expenses were saved through the program.
- With a very short time for implementation, the program was well organized.
- Consent forms were problematic
  - absolute deadlines for returning the forms are needed
  - The size may be intimidating to some
  - The educational material with the forms was very helpful
- School education programs were very beneficial
- School support from the Principal and/or school nurse was critical to success
- Student transfers created a challenge for tracking program participants.

### **1998-99 Evaluation**

- Getting accurate and complete data is a challenge.
- Almost \$25 million in health care expenditures were saved due to the program.
- Schools with large number of students and/or a high number of students on free/reduced price lunches had lower participation rates.
- Schools with a large number of Medicaid or uninsured students had lower completion rates.
- Private and small schools do best in all categories.

## **1999-00 Evaluation**

- Data from 9,417 consent/refusal forms were entered into a database.
- Almost \$14 million in lifetime medical expenses were saved through the program. This is less than previous years because more adolescents are becoming immunized thereby decreasing potential costs for those not in the program.
- Most indicating that they were already immunized and did not want to participate in the program provided evidence of past immunization dates.
- Eighty-nine percent of the participants in the program received a third dose.
- Income level does not appear to significantly influence consent, participation, or completion rates.
- African American and American Indian populations had lower participation and completion rates than other ethnic groups.
- The population returning consent forms with multiple blank fields had the highest percent of already immunized, non-participants when compared with all other groups.
- Private and/or smaller schools outperformed their larger counterparts again this year.
- Urban schools, regardless of size, were lower in every category than suburban schools.

## **1999-00 GET HEP<sub>B</sub> OVERVIEW**

- A total of 18 school districts participated, all in Missouri
- Twenty-nine Catholic and private schools joined in, with 951 students
- Vaccines were given to students at 106 different school buildings
- Four health departments combined with volunteers to administer the vaccines
- Total students enrolled at participating schools - 12,549
- Of these students, 9,413 (75%) returned consent forms
- Of those returning consent forms:
  - 2,377 (25%) chose not to participate because -
    - 1,873 (20%) were already immunized with all but 334 giving past dates
    - 336 (4%) wanted to use his/her own provider
    - 168 (2%) felt it was unnecessary or gave other reasons not to participate
  - 6,910 (73%) received vaccines during the program with 6,149 receiving a third dose in the program
  - 2% were not immunized due to absences and other reasons
- Approximately \$19,000 in direct contributions were received
- Total program costs were \$81,972.
- Seven hospital and health care agencies donated supplies and personnel
- Six organizations provided volunteers
- Almost \$13.9 million in future health care costs were prevented through the GET HEP<sub>B</sub> program this year.

### **Data Issues (Still)**

Data from 9,417 consent forms were entered directly into a database providing the most comprehensive evaluation of student data thus far. However, data from schools and health departments were still needed to determine hours of work and actual size of student body. Unfortunately, school data was received from only 34 of the 106 schools and data from health departments was available for only 65 schools. This lack of data limits some of the findings in this year's evaluation. One particular challenge was determining cost of the program. The number and cost of both school and health department staff hours were extrapolated and may not be accurate.

### **Past Immunization Status**

With the data from the consent forms information about past hepatitis B immunizations could be derived. A total of 1,873 parents indicated that they didn't want their child to participate in the school-based program because their child was already immunized. This represents 20% of the total consent/refusal forms returned and 79% of all of those not wanting to participate. Of those indicating prior immunizations, 1,573 (84%) provided past dates verifying immunization status. However, only 1,191 gave a date for the third immunization. It was assumed that the remainder wanted to complete the immunization series with their own provider.

A total of 366 indicated that they did not want their child to participate in the school-based program, but preferred to use their own provider. Of these,

only 23 provided past dates for verification of starting the series. Only 69 out of 9,417 returned consent/refusal forms indicated that the hepatitis B vaccine was not necessary.

### **Health Problems**

Only 13 parents indicated that their child had a yeast allergy, a possible contraindication to some vaccines. Another 471 noted that their child had a heart or lung problem, mostly asthma. Interestingly, all of these students received immunizations at school. This may represent an awareness to health issues, including vaccinations, by these parents.

### **Program Outcomes**

In the analysis phase of this evaluation references are made to program outcomes. The three outcomes are listed and defined below.

**Consent rate** - the percentage of students returning a consent form, even if they didn't want to participate.

**Participation rate** - percentage of students giving consent and receiving at least one dose of vaccine.

**Completion rate** - percentage of students that completed all three doses in the school-based program.

## **Completion Rate**

With the data available this year a true completion rate could be determined. Table 5 shows the immunization status provided by parents on the consent/refusal form and the immunization status of students participating in the program.

A total of 81% of the students participating in the program received all three doses at school. Adding the number of students who received a third dose at school, a total of 6,149 students (89% of participants) completed their vaccine series at school. When all students who had received a third dose prior to the program or at school are summed, a total of 7,405 completely vaccinated students are found. This represents 59% of the total student population or 79% of those returning consent forms.

**Table 5. Hepatitis B vaccine doses received prior to and during the program.**

	Prior	In Program
Received first dose only	553	168
Received second dose only	23	37
Received third dose only	13	168
Received first and second dose only	446	556
Received second and third dose only	6	343
Received first and third dose only	1	77
Received all three doses	1,200	5,597

## **Income**

Student zip codes were entered into the database and zip codes were matched with mean income/zip code. This does not give an accurate family income per student participant, but does provide some measure of socioeconomic status of students. Fifty-eight zip codes with >20 students/zip code were used in the analyses. A total of 8,825 students were included in these zip codes.

There were no significant correlations between income and any of the program outcomes. When the zip code incomes were divided into high (>\$50,00, n=8), medium (\$30,000 - \$50,000, n=37) and low (<\$30,000, n=13) there was a significant difference between the percentage of students choosing to participate in the program ( $F=3.63$ ,  $p=.03$ ). The percentage in the medium income group (.77) was higher than the other two groups (both .70).

## **Race/Ethnicity**

One of the fields on the consent/refusal form asked for the student's race or ethnicity. Descriptive information related to race/ethnicity can be found in the table below. Those indicating Caucasian race comprised the majority (71%) of those returning consent forms. In the third largest group, those not answering the question, 54% choose not to participate because they were already immunized or choosing to use another provider, 3% didn't participate for other reasons, and only 43% actually participated. It has been speculated that those

already "taking care of the hepatitis immunization" chose not to share other information, such as race, with the program sponsors.

**Table 6. Descriptive data according to race/ethnicity.**

	Caucasian	African American	Hispanic	Asian	American Indian	Other	Not Answered
Total number	6,703	1,486	311	101	39	69	700
Percent of total number	.71	.16	.03	.01	.00	.01	.07
Percent already immunized	.18	.18	.17	.21	.23	.26	.40
Percent choosing to use own provider	.03	.05	.03	.04	.05	.06	.14
Participation rate	.78	.75	.78	.71	.72	.68	.43
Completion rate	.91	.80	.83	.90	.82	.94	.83

Without including the "No Answer" group, there was still a significant difference in participation rate between the groups ( $t=16.84$ ,  $p<.001$ ). The participation rate of Caucasians and Hispanics was higher than the other groups. Completion rates were also significantly different ( $t=43.64$ ,  $p<.001$ ). Caucasian, Asian, and the "Other" group had higher completion rates.

### **Insurance Status**

Last year, data was available only to identify students with Medicaid or no insurance, and students from Johnson County. This data provided some insight,

but, this year insurance data from all students were available and analyzed.

Descriptive information is provided in the table below.

**Table 7. Descriptive data by insurance status.**

	Commercial Insurance	Medicaid	No insurance or no information
Total number (% of population)	4,066 (.43)	1,463 (.20)	3,888 (.37)
Percent already immunized	.14	.08	.33
Percent choosing to use own provider	.02	.01	.07
Participation rate	.82	.88	.59
Completion rate of participants	.92	.86	.87

There were statistically significant differences between the three groups in most analyses. The large group indicating no insurance or not answering the question had a significantly larger percentage of students already immunized ( $t=47.6$ ,  $p<.000$ ) and therefore, a significantly lower participation rate ( $t=8.63$ ,  $p=.013$ ). Those with commercial insurance had a higher completion rate, though not statistically significant ( $t=2.43$ ,  $p=.135$ ).

As with the race/ethnicity section above, it is possible that parents/guardians that had already immunized their children didn't feel the need to complete the demographic section of the consent form. This may account for the high number of students already immunized or choosing to use their own provider not supplying data in this field.

When the insurance status was applied to the school of attendance, results similar to last year were obtained. As the percentage of students on Medicaid increased in a school the consent rate decreased ( $r=-.24$ ,  $p=.016$ ), the

participation rate decreased ( $r=-.28$ ,  $p=.004$ ), and the completion rate decreased ( $r=-.22$ ,  $p=.02$ ). Conversely, as the percentage of students with commercial insurance increased the consent rate increased ( $r=.27$ ,  $p=.006$ ) and the completion rate increased ( $r=.31$ ,  $p=.001$ ), but the participation rate did NOT increase significantly.

### **Public/Private Schools**

Students from 29 private and 77 public schools were eligible to participate in the program. The mean number of students per school was much lower in private schools (32.8) than public schools (150.6). It is possible that any differences between public and private schools may have more to do with size, than anything else. However, it should also be noted that significantly more students in private schools had commercial insurance ( $t=2.47$ ,  $p=.015$ ).

Similar to findings from last year, the consent rate was significantly higher ( $p=.037$ ) in private schools (.95) than in public schools (.78). The participation rate was higher ( $t=2.49$ ,  $p=.014$ ) in public schools (.91) than private schools (.72), mostly due to prior immunizations by those in private schools. The completion rate in private schools was higher (.93) than public schools (.88), though not at a statistically significant level ( $p=.51$ ).

An interesting finding this year was encountered when a "percentage of all students fully immunized" was determined. To arrive at this figure the total number of students indicating they were already immunized was added to the students completing vaccinations at school and this sum was divided by the total

number of consent forms returned. When the private and public schools were compared there was no significant difference (private=.79, public=.77).

### **Size of School**

Once again, the size of the school makes a difference. As school size increases, the consent rate decreases significantly ( $r=-.26$ ,  $p=.007$ ). However, the participation ( $r=.14$ ,  $p=.15$ ) and completion ( $r=-.12$ ,  $p=.23$ ) rates were not significantly effected by school size. It was hypothesized that the parents/guardians in smaller schools have closer relationships with the school program coordinator and follow-up of consent form returns was easier.

### **Suburban/Urban Schools**

In all outcomes suburban schools were significantly different than urban schools. This probably represents a combination of size, insurance coverage, and socioeconomic status. School support by principals and school staff was not a factor because such support was as varied in suburban schools as urban schools.

**Table 8. Comparison of outcome measures between suburban and urban schools**

	Suburban	Urban	<i>t</i> value	p value
Consent rate	.90	.56	4.05	.000
Participation rate	.77	.83	2.18	.032
Completion rate	.92	.77	2.54	.012

## **Summary**

The 1999-2000 GET HEPB program was another success. The benefits gained for the expenditure were again great and are the best in the country. You have conducted a very efficient program. Each year we learn more about how to make the program even better. However, we continue to have "pockets" of youth that need our help. Large schools in the urban core continue to have lower rates of participation than their suburban counterparts. Specific efforts to change this trend are needed.

It can be seen that the four-year, Kansas City metropolitan, school-based, hepatitis B immunization program has been a great success. In two more years those immunized against this disease at birth will be in the sixth grade and the need for a school-based program may no longer be needed. However, our work is not done. Each year of the program there has been 25% of the student not return consent forms and we need to be more vigilant at tracking adolescent immunization rates for Td, MMR, and even varicella. Adolescents present unique health care problems and are difficult to access due to limited exposure to the health care system. We must be vigilant in our efforts to help them stay healthy. Congratulations on the work completed thus far and continue to work at improving the health of Kansas City metropolitan residents.