

Costs of Immunization of an Adult Refugee Immunization Process:  
Experiences from the University of Louisville Refugee Immunization Program

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INTRODUCTION

- There are approximately 60,000 adult refugees resettled in the United States each year<sup>1</sup>. The adult refugee population must receive certain vaccines for their readjustment of status from refugee toward green card application<sup>2</sup>. Vaccines represent significant costs and active management of those costs is crucial.
- Immunization confers individual and societal benefits and providing immunization to refugees is important to eliminate disparities as well as protect the health of communities in which refugees are resettled. Thus, it is in a society’s best interest to assure that the highest possible proportion of the population is immunized, especially those that resettle from countries where immunization rates are low. Refugees are eligible for vaccination provided by the resettlement program during their first eight months in the US.
- Vaccines need by each refugee vary according age, health condition, pregnancy, and vaccines received prior to resettlement. An individual adult refugee may need up to 8 doses of vaccine: 1-2 Tetanus [Td], 1-Tdap, 2 MMR, 2 Varicella, 1 Influenza, and 1 Pneumococcal. Note: although a complete tetanus series would require two doses of Td, a single dose of Td may be all that can be provided due to the 8 month time constraints of the resettlement program. Age appropriateness is considered for MMR and Pneumococcal vaccines.

OBJECTIVE

The aim of this study was to recognize the costs, both material and human, involved in the refugee immunization process developed and implemented by the Infectious Disease Division of University of Louisville for the Kentucky Office of Refugees and Catholic Charities.

MATERIALS AND METHODS

Program cost were estimated based on resources used in the vaccination process: 1) type of vaccine; 2) number of vaccine doses administered; 3) number of refugees vaccinated ; 4) supplies necessary to perform immunization; and 5) staffing. A process was initiated that sought to enroll the adult refugee as soon as possible after arrival in Louisville, Kentucky. Immunization status was researched in order to establish a vaccine plan of action that followed age-appropriate recommendations and considered the individual refugee’s personal circumstances and documentation. The total cost of vaccines was estimated by multiplying the number of doses of each vaccine by the number of vaccines provided. Staffing cost were determined by the total number of hours that each employee worked on aspects of the vaccination process. Examples of this included time spent on ordering and storing vaccines; provision of immunization; background investigation of immunization records and documentation; logistical on-site immunization clinic support; post-clinic data entry; on-site translation and interpretation services.

RESULTS

**Table 1** shows the vaccines that refugees are required to receive as part of their pathway toward citizenship.

**Table 2** includes all material costs for vaccine administration including vaccine, needle, alcohol swab and bandaid. The median total cost per vaccine dose was \$ 54.79. The average vaccine cost was \$57.33.

**Table 3** outlines the human and material costs other than those used for vaccine administration. These include personnel costs, consumable materials, interpretation, and immunization program staff. The average cost per hour for all staff was \$31.31 and the total salary costs were \$2202.08 per month. The total for the prior 11 months was \$ 24.222.88.

**Figure 1** provides an overview of the doses of each vaccine administered, numbers withheld due to documented immunity or evidence of receipt via overseas medical examination records, ineligibility due to age, and those who missed an appointment and were subsequently unable to receive the vaccine.

**Figure 2** shows the total number of doses expected to be given to each adult refugee (7562) and the total number of doses actually given (4543). Without investigation of status, it is expected that all 7562 doses would have been administered.

**Figure 3** shows the total cost of the doses expected to be given (\$385,019.80) versus the cost of the doses actually given (\$209,713.27).

**Figure 4** summarizes all costs associated with the immunization program, stratified by vaccine. The expected costs assume that all vaccine doses were administered in accordance with the refugee immunization recommendations. The actual costs demonstrate active management of the immunization process using all available information including prior immunization documentation titer results from health screening, and overseas medical examination records. (Expected cost - Actual cost = Savings 385,019.80-209,713.27=175,306.53).

**Table 1: Recommended Vaccines for Adult Refugee Population**

Vaccine	19-49 years	50-64 years	≥ 65 years
Varicella	2 doses	2 doses	2 doses
MMR*	2 doses	2 doses	None
Tetanus^	1 or 2 doses	1 or 2 doses	1 or 2 doses
Influenza	1 dose annually	1 dose annually	1 dose annually
Pneumococcal	None	None	1 dose

\*MMR is not given to those born before 1957.

^Td second dose is provided 6 months after the first dose, if the refugee is still within the 8 month resettlement period.

**Table 2: The types of vaccine, vaccine cost, vaccine administration cost and cost-per-dose of vaccines provided to refugee at the Refugee Clinic**

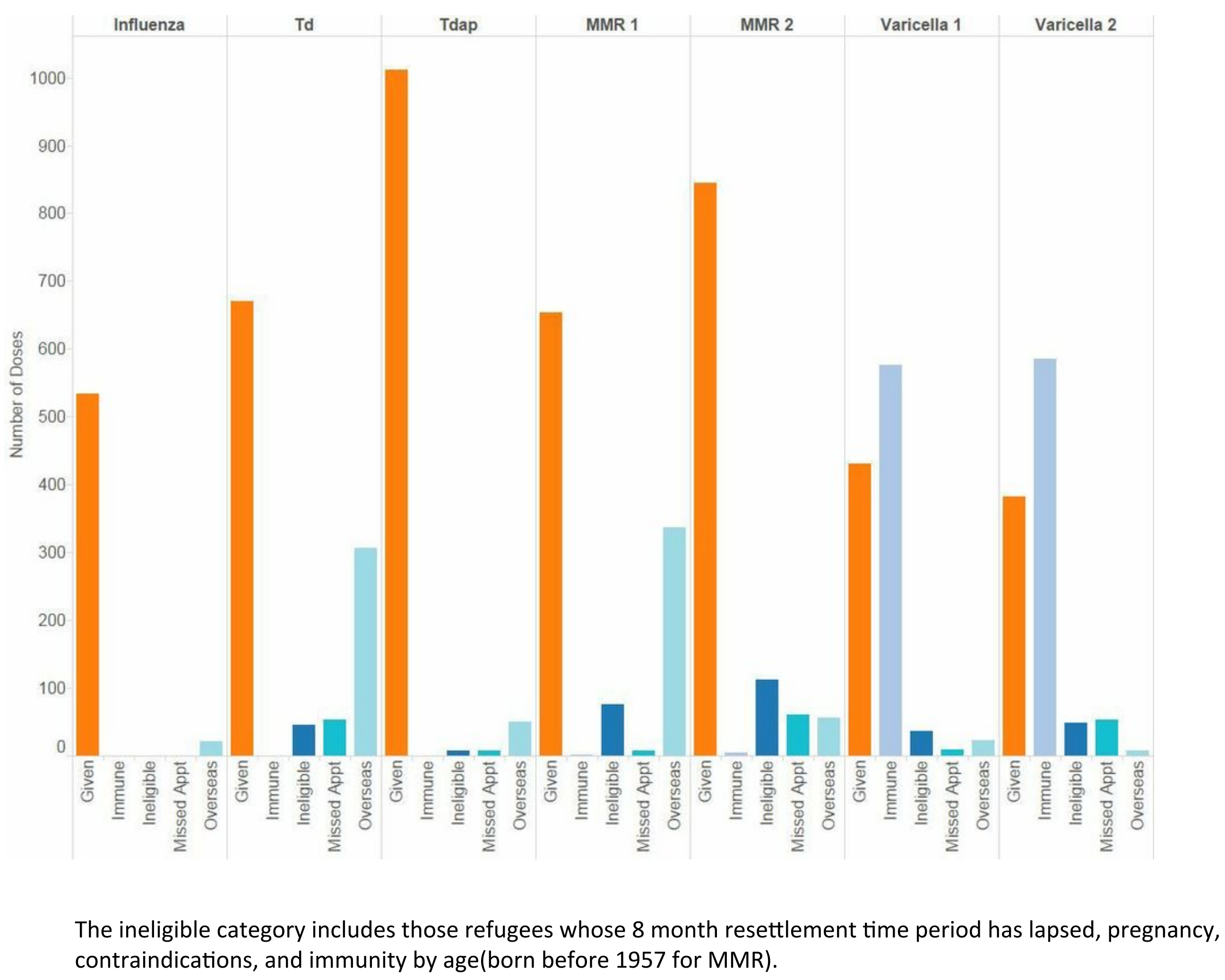
Type of vaccine	Vaccine administration cost	Vaccine cost	Vaccine cost per dose
Influenza	\$0.78	\$10.51	\$11.29
Td	\$0.78	\$16.80	\$17.58
Tdap	\$0.78	\$32.19	\$32.97
MMR	\$0.78	\$54.01	\$54.79
Varicella	\$0.78	\$90.46	\$91.24
Pneumococcal	\$0.78	\$140.00	\$140.78

RESULTS, CONTINUED

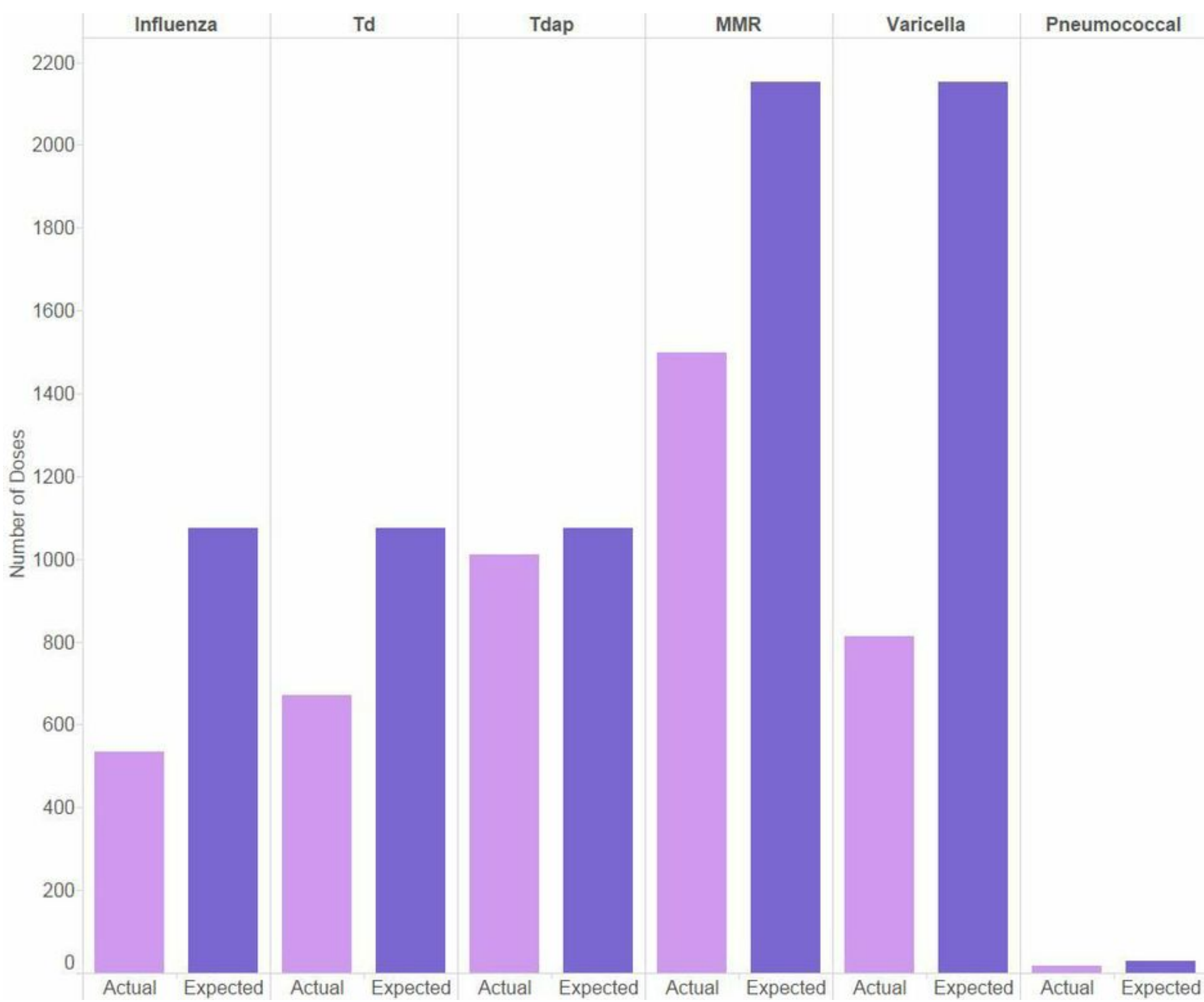
**Table 3: Human and Material Costs Other than Vaccines, per Month**

ACTIVITY	Cost Per Hour	Number of Hours	Total Cost
Vaccine Management and Administration work	\$50.78	5	\$253.90
Paperwork Pre and Post Clinic Day	\$26.92	20	\$538.40
Administration	\$16.23	32	\$519.36
Language Interpretation			\$450.00
Subtotal		57	\$1,761.66
Fringe Benefits (25% of total salaries)			\$440.42
Total Cost Per Month			\$2,202.08

**Figure 1. Overview of Vaccine Assessment and Administration**

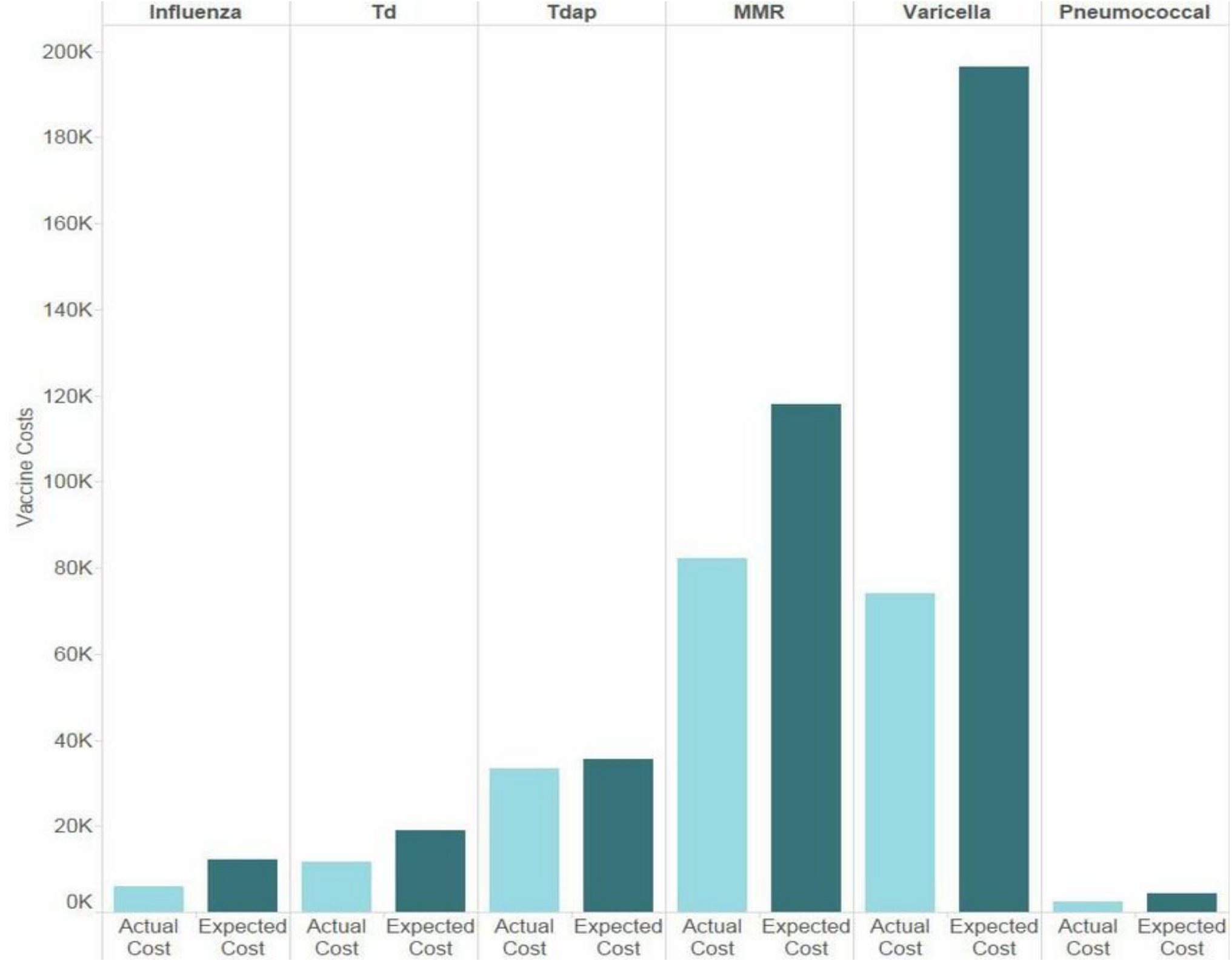


**Figure 2: Comparison Between the Number of Expected versus Actual Doses Administered.**

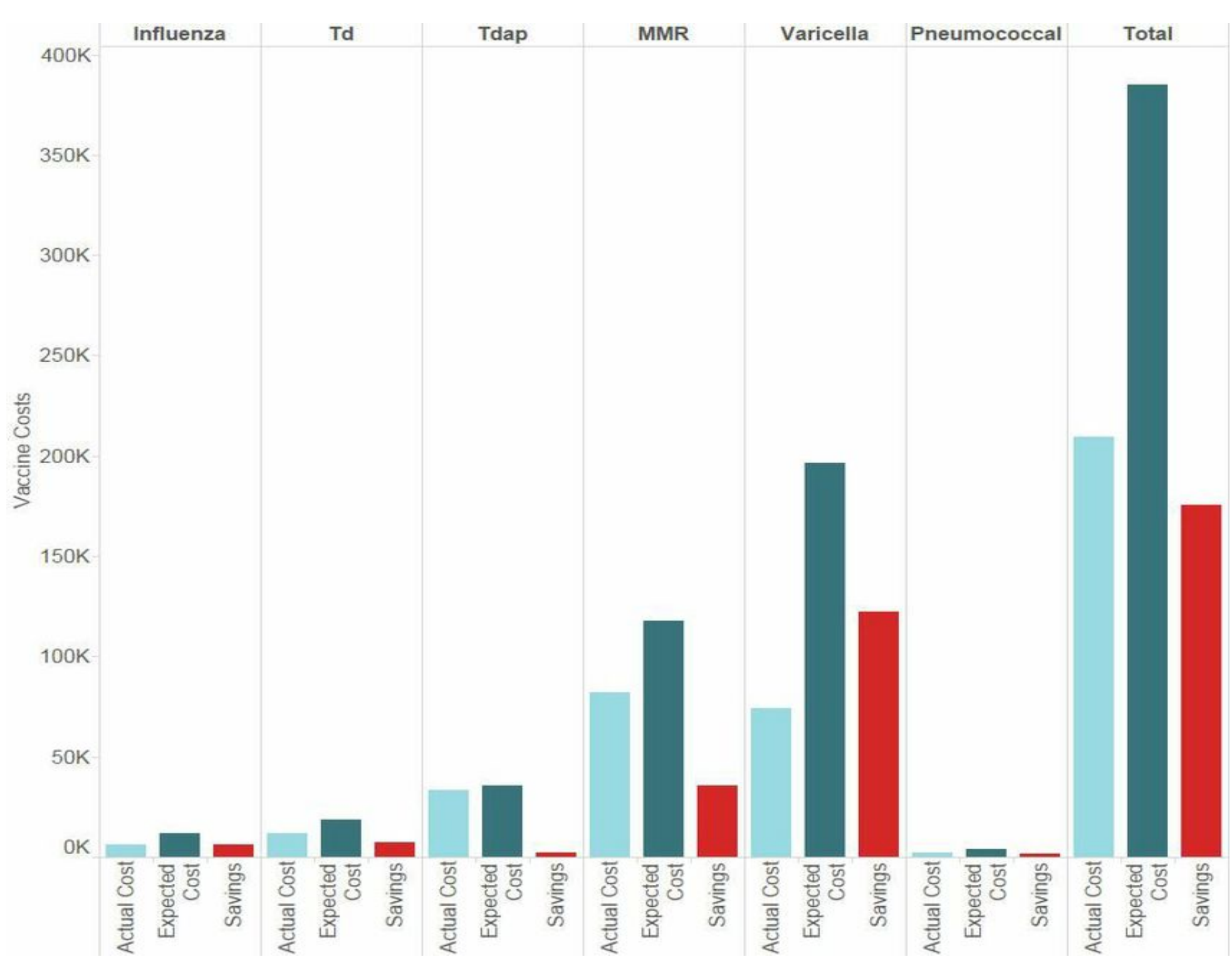


RESULTS, CONTINUED

**Figure 3: Comparison Between Expected and Actual Costs by Types of Vaccine.**



**Figure 4. Summary of All Costs for the Adult Refugee Immunization Program**



CONCLUSIONS

- There are significant opportunities to control cost with a managed program. This program shows a variety of approaches that can reduce the high costs of the immunization process. Some additional costs are important but were not investigated including transportation of staff. An additional cost saving that was not evaluated include the benefits of group interpretation v. individual interpretation.
- This study has some limitations. Some vaccines were not given based upon existing immunization documentation. Reliability of the documents/records are unknown.
- Continued emphasis on efficiencies including streamlining of the process, lower vaccine costs, and identification of volunteer workforces may provide new training opportunities as well as cost savings for the Kentucky Office of Refugees and Catholic Charities.
- Implementation of an efficient process works to ensure a well immunized refugee population which translates to community safety and impacts subsequent healthcare costs..
- This program may be used as a model for other such programs. Future studies that examine costs for Refugee immunization program are needed for comparison purposes to better understand the real benefits.

REFERENCES

1.Department of State, Bureau of Population, Refugees, and Migration, Refugee Processing Center  
2. Centers for Disease Control and Prevention, Division of Global Migration and Quarantine, MS E-03 1600 Clifton Road, Atlanta, GA 30333, United States