Appendix 4.5
PRICES OF VACCINES FOR PUBLIC PROGRAMS AND PRIVATE PHYSICIANS

The Center for Disease Control (CDC) estimated that it was able to buy vaccines from manufacturers for about half the price paid by private physicians (Hinman, 1978). Prices paid by CDC between October 1977 and September 1978 and prices paid in 1978 by private sector purchases are shown in table 4.5A.

Merck Sharp and Dohme reported that some of their recent contracts to CDC have included a surcharge for liability. For example, rubella vaccine cost CDC **$0.60** in the contract year from October 1976 to September 1977; the same vaccine cost CDC $0.71 in the fiscal year's contract running from October 1977 to September **1978. In a recent contract,** the price for measles, mumps, and rubella vaccine to CDC was $2.35 per single dose. The price would have been even less, but for the surcharge imposed by Merck.

In 1977, the State of California paid $6.45 for a 10-dose vial of influenza vaccine (Grant, 1978). In 1977, Wyeth was supplying lo-dose vials to private physicians for $9.50 each. Wyeth representatives listed the following as reasons why the price was lower to the State of California: 1) the policy forbidding returns of vaccines purchased by public programs, 2) the ability of the manufacturer to time production and sales under public programs, and 3) the lower shipping weight that results from reduced bulk in packaging (Cahill, 1978).

James Chin, State epidemiologist, California State Department of Health, Berkeley, estimated that the military pay about one-half of the price paid by the private sector for vaccines (Chin, 1978). Private physicians buy small amounts and pay various types of middlemen; furthermore, many hospitals buy vaccines on a returnable basis. Public purchasers, however, buy directly from the manufacturer on a nonreturnable basis. They also receive a discount for the large amount of their purchase. As a result, public purchasers benefit from lower prices.

Table 4.5A.—Public and Private Prices Paid for Vaccines

	CDC	Private sector[a]	
Type of vaccine	Oct. 1977-Sept. 1978	Before June 1, 1978	After June 1, 1978
Measles, mumps, rubella	$2.35/single dose vial[b] $1.88/ten-dose vial	$5.91/ten single dose vials	$6.16/ten single dose vials
Measles, rubella	$1.20/single dose vial[a] $0.95/ten-dose vial[a] $0.56/fifty-dose vial[a]	$3.56/ten single dose vials	$3.81/ten single dose vials
Measles	$0.87/single dose vial $0.68/ten-dose vial $0.39/fifty-dose vial	$2.02/ten single dose vials	$2.27/ten single dose vials
Rubella	$0.71/single dose vial[b] $0.46/ten-dose vial[b] $0.42/fifty-dose vial[b]	$2.22/ten single dose vials	$2.47/ten single dose vials
Mumps	$1.40/single dose vial[b] $1.11/ten-dose vial[b]	$2.81/ten single dose vials	$3.06/ten single dose vials

[a]No liability surcharge.
[b]Liability surcharge included.

SOURCE: Beck, Merck Sharpe and Dohme, 1978 (Beck, 1978.)

Appendix 4.6
A METHOD OF CALCULATING ATTRIBUTABLE RISK FOR PNEUMOCOCCAL PNEUMONIA[1]

Attributable risk from the Foy and Fekety studies can be calculated using the procedure described below (Fey, 1975, Fekety, 1971). In the Foy study, it was reported that pneumococcal isolates were present in 24 percent of the pneumonia cases and in 12.2 percent of the non-pneumonia control cases. From this information, the table below can be constructed:

[1]This explanation of this method of calculating attributable risk was provided by Donald Shepard, Ph. D., Harvard University (Shepard, 1979).

Pneumonia Cases: Pneumococcal Isolates and Types of Pneumonia

	Pneumococcal isolate(s)		
	yes	no	Totals
Pneumococcal pneumonia	a		x
Other pneumonia	b		y
All pneumonia	24%		100

a = the percent of pneumococcal pneumonia cases which have pneumococcal isolates
b = the percent of other pneumonia cases which have pneumococcal isolates
x = the percent of pneumonia cases which are pneumococcal
y = the percent of pneumonia cases which are not pneumococcal

We are interested in the variable x, the percent of pneumonia cases which are pneumococcal. In order to solve for the variable x, we need to postulate a number of relationships. First, we can assume that a = x, or that pneumococcal isolate is present in all cases of pneumococcal pneumonia. Second, from the Foy study we know that pneumococcal isolates were present in 12.2 percent of the control cases, and we assume they are present in 12.2 percent of the non-pneumococcal pneumonia cases. Therefore, b = .122y. Third, from the Foy study we know that a + b = .24, or that pneumococcal isolates are present in 24 percent of all pneumonia cases. Fourth, it is obvious that x + y = 1.00, or the percent of pneumonia cases which are pneumococcal plus the percent which are not pneumococcal must sum to 100 percent. From these relationships we can solve for x.

(1) $b = .122y$, so $y = b/.122$

(2) $x + y = 1.00$, so $x + b/.122 = 1.00$
so $b = .122(1.00-x)$

(3) $a + b = .24$, so $a + .122(1.00-x) = .24$

Since a = x, then

(4) $X + .122\ (1.00-x) = .24$

then solving for x,

(5) $x = \frac{(1-.122)}{.878} = .134 = 13.4\%$

In a similar manner, using the data from the Fekety study we can calculate that the attributable risk in this study is 62 percent.