PROGRAMME COSTS AS RELATED TO VACCINATIONS, MORBIDITY AND MORTALITY IN THE GAMBIA

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During the attack phase of the programme, in which 315,000 smallpox and 81,000 measles
vaccinations were given in the Gambia, total costs for the campaign were $87,000
(Table 1). For the smallpox programme alone, it was estimated that $39,000 would have
been spent. The calculated cost per smallpox vaccination was $0.124. The calculated
cost per measles vaccination was $0.593.

During 1967, 4,150 cases of measles were reported. Since the conclusion of the attack
phase in April 1968, there have been only 43 cases of measles reported (through 22
March 1969). Thus, a year after the initial programme, reported measles was reduced
by at least 90% and with continued vaccination the incidence of the disease should be
able to be maintained at this new low level. Based on a potential incidence of 14,000
cases of measles a year, we estimate that for $48,000, more than 13,000 cases of measles
were prevented. This is a cost of $3.69 per case prevented. Using a case mortality
rate of 5%, the estimated cost per death prevented is $73.85.

A breakdown of the major components of the overall costs for the programme permits the
identification of particular expenses, which can then become the target of a cost re-
duction campaign. In the Gambia, the two most expensive items were the cost of measles
vaccine and the cost of U.S. technical advice.

There are several ways to reduce the overall expense of the vaccine:

1. More specific definition of target age group. Much vaccine is wasted in the vacci-
   nation of immunes. There will be immunes in every age group, but in progressively
   larger proportions in progressively older groups. We have estimated that in our
   initial programme, in which measles vaccine was given to everyone between 6 months
   and 6 years of age, approximately 60% of all vaccinations were given to persons
   who might be immune. This percentage can be reduced by either reducing the age
   limits of the group, or, preferably, by a process of selecting immunes out of the
   target group for exclusion from vaccination. As the programme undertakes continued
   maintenance vaccinations, additional care will have to be exercized to avoid re-
   vaccinating children who were vaccinated for measles during a previous campaign.

2. Reduction of loss of vaccine. Vaccine loss can be diminished by reducing the num-
   ber of shots fired while testing a Ped-O-Jet by preventing vaccine spoilage through
   better conservation procedures, and by using smaller vaccine vials to avoid dis-
   carding excesses of reconstituted vaccine.

3. Reduction in the dose of vaccine. Obviously, a reduction in the size of the im-
   munizing dose would reduce the cost per child immunized. We are aware of the
   interesting work in this area by our colleagues in Dakar, as well as other research
   workers, and are hopeful that in the not too distant future a reduction in the in-
   dividual dose of measles vaccine will be a possibility.

4. Reduction in the cost of vaccine. We are, indeed, pleased to learn about the recent
   30% decrease in the price of further attenuated measles vaccine being made available
   from the United States. From discussions with some representatives of drug firms
   based in the United Kingdom, I am glad to report that the trend is more general, as
   evidenced by the price of vaccines indicated in their quotations.

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The second largest portion of the total cost of the Gambian attack phase was the amount of money charged to time spent by U.S. technicians. One would expect this to be a continually decreasing cost as the effect of training of our local personnel began to be manifest. Indeed, during the first year of our programme, approximately 130 U.S. advisor days were spent in the Gambia. During the subsequent year, this was reduced to 31 days.

There are additional factors which need to be considered in a cost-conscious approach to the organization of mobile campaigns:

1. A collection point system in which several villages come to a central point versus the village-by-village approach. Relative coverage rates could be compared using the two techniques and a decision on operational strategy made on the basis of savings in terms of time and gasoline and the relative coverage rates observed. So far in the Gambia we have continued to use the village-to-village approach.

2. The use of semi-permanent bases of operation with teams returning to the same base for periods up to one month as opposed to the teams sleeping in the last village vaccinated that day or in the first one to be vaccinated the following day.

   A strategy involving the use of semi-fixed bases of operation is more costly in terms of lost time and gasoline but its use must be evaluated against refrigeration requirements, team morale, superivory control, etc.

3. A final point, obvious as it is, will be made for the sake of emphasis. It concerns not so much a reduction of costs per se as it does the broader uses of the same operation. I am referring to the possibility of increasing the number of antigens offered as a means of taking a greater advantage of the delivery system used. As a natural outgrowth of our first two years experience with measles/smallpox vaccinations, the Gambia strongly endorses the concept of a multiple antigen vaccination programme. We are hopeful that such a programme can become an operational reality in the very near future.

Table 1. Costs of Attack Phase of Smallpox/Measles Programme in the Gambia

Item	Cost of Combined Smallpox/Measles Programme	Percent of Total	Estimated Cost for Smallpox Alone	Percent of Total for Smallpox Alone
Measles Vaccine (85,000 doses)	$37,400.00	43		
Smallpox Vaccine (350,000 doses)	4,550.00	5	4,550	12
Syringes, Iodine, Cotton	800.00	1	400	1
Ped-O-Jets*	4,400.00	5	2,200	6
Ped-O-Jets parts	200.00	1	100	(0.3)
Refrigerators*	700.00	1	350	1
Trucks*	6,000.00	7	6,000	16
Truck Spare Parts	1,150.00	1	1,150	3
Field Equipment*	1,100.00	1	14,880	39
U.S. Aid Technicians**	19,700.00	21	4,000	10
Direct Gambia Costs (Petrol, etc.)	4,000.00	5	4,700	12
Indirect Gambia Costs (personnel, etc.)	7,000.00	8		
TOTAL	$87,000.00	99	38,330	100

* These items were prorated over 2 years. Thus, their cost during the attack phase
  represents one half their total cost. The Ped-O-Jets and vehicles could probably
  be prorated over a 5 year period, thus these data should be considered as maximum
  amounts.

**Computed at $98.29 per adivosr day. 139 days represents ....$ 13,662
  Gasoline per team ....$ 3,686
  Apportioned cost of Atlanta and Lagos administrative support.......$ 2,400

  $ 19,748