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GLOBAL HEALTH STRATEGIES VERSUS LOCAL PRIMARY HEALTH CARE PRIORITIES — A CASE STUDY OF NATIONAL IMMUNISATION DAYS IN SOUTHERN AFRICA

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Building on the successful eradication of smallpox, the World Health Organisation, together with other agencies, is now moving quickly to the eradication of poliomyelitis, originally aimed for the year 2000. Plans for the subsequent global eradication of measles are in an advanced stage. Eradication of both polio and measles incorporate as a fundamental strategy high routine coverage, surveillance and special national immunisation days (NIDs), which are supplementary to routine vaccination services.

There has been a lively debate on whether poor countries, with many health problems that could be controlled, should divert their limited resources for a global goal of eradication that may have low priority for their children. From a cost-effectiveness perspective, NIDs are fully justifiable. However, field observations in sub-saharan Africa show that NIDs divert resources and, to a certain extent, attention from the development of comprehensive primary health care (PHC). The routine immunisation coverage rates dropped on average since the introduction of NIDs in 1996, which is contrary to what was observed in the western Pacific and other regions.

The additional investment to be made when moving from disease control to eradication may exceed the financial capacity of an individual country. Since the industrialised countries benefit most from eradication, they should take responsibility for covering the needs of those countries that cannot afford the investment. The WHO's frequent argument that NIDs are promotive to PHC is not confirmed in the southern African region. The authors think that the WHO should, therefore, focus its attention on diminishing the negative side-effects of NIDs and on getting the positive side-effects incorporated in the integrated health services in a sustainable way.

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In disease control one can distinguish between effective control, elimination, global eradication, and extinction. All require deliberate efforts.

Effective control is the reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level, while elimination of disease or infection is the reduction to zero of the incidence in a defined geographical area. Both control and elimination require continued control measures.

Global eradication is the reduction to zero of the worldwide incidence of infection caused by a specific agent; intervention measures are no loner needed. Extinction occurs when the specific agent no longer exists in nature or the laboratory.[1]

From an economic point of view, elimination is generally considered to be less cost-effective than disease control, since the cost per case controlled usually follows the law of diminishing returns. Eradication is especially attractive, since any specific intervention can be stopped after global certification that transmission of infection has ceased.

Building on the successful eradication of smallpox in 1979, the World Health Organisation (WHO), United Nations Children's Fund (UNICEF) and other agencies are now moving quickly towards the eradication of poliomyelitis, which they hope to achieve by the year 2000. Plans for the global eradication of measles are in an advanced stage.

The eradication programmes for polio and measles incorporate the following three fundamental strategies: high routine coverage, supplemental vaccination (national immunisation days (NIDs)) and active surveillance. In particular the NIDs have occasioned lively debate, with proponents and opponents sometimes taking dogmatic positions.

In the southern African sub-region, the strategy for polio is to have 2 annual NIDs 1 month apart in the cold season, continuing for up to 3 years. The target group for vaccination is all children below the age of 5 years, regardless of their vaccination status. With regard to measles, countries have done campaigns among children aged between 9 months and 14 years. Malawi implemented its campaign in September 1998 and Swaziland and South Africa did mathematical modelling to show when the follow-up campaigns must be held.

On the one hand, proponents of NIDs claim that eradication cannot be achieved through routine services alone. They demonstrate the enormous savings that can be achieved after eradication, owing to the highly favourable cost-effectiveness (C/E) ratios.

On the other hand, opponents claim that the almost military vertical approach of NIDs competes with and negatively affects comprehensive primary health care (PHC) development. Some also fear that eradication strategies are becoming the public health strategies for the coming century, diverting funds and attention from the continuous care of vulnerable individuals. In their view strengthening routine immunisation services is more sustainable.

This article attempts to bring both parties together by considering points of mutual agreement. It has been written from personal participation in the first rounds of NIDs as well as participation in the southern African sub-regional planning and evaluation meetings of national Expanded Programme for Immunisation (EPI) managers, organised by the WHO/Africa Regional Office (AFRO). Costs and operational aspects of NIDs in southern Africa are also analysed in this study. Finally, the study includes replies of subscribers to the Afro-Net discussion group on NIDs. Replies were to the following questions: (*i*) What are the direct costs (both human and monetary)? (*ii*) Can an individual country afford not to participate in a global initiative? (*iii*) How does an individual poor country benefit from NIDs? (*iv*) What are the negative effects of NIDs on sustainability of PHC? (*v*) Can these effects be minimised?

THE DILEMMAS OF ERADICATION

In their article entitled 'Ethical dilemmas in current planning for polio eradication', Taylor *et al.*[2] looked at the dilemmas of polio eradication at global level. The authors expressed their concern at the intensification of worldwide eradication efforts, in particular the organisation of NIDs. The authors also raised questions regarding the balance between global goals and local priorities and the resulting ethical implications.

Probably the most important question raised by the authors is whether poor countries, with many controllable health problems, should divert their limited resources towards a global goal that has low priority for their children. Unfortunately the authors do not provide a clear-cut answer to this question. This article attempts to provide such an answer for southern Africa.

What are the costs of NIDs?

A cost study of NIDs in the southern African WHO sub-region[3] showed that the average direct cost per vaccinated child of two rounds of polio vaccine was around US$0.92. This included the cost of vaccines, training, logistics, and social mobilisation. Vaccines, at 48% of the total, constituted the major cost. The cost of a single measles vaccination during a campaign, given with a disposable syringe that is properly destroyed, is also close to US$1. Some savings can be made by giving measles and polio vaccines at the same time, but the different operational strategies for polio and measles eradication may not always allow for this.

The total costs of NIDs in the sub-region have been calculated. For polio we assumed the maximum scenario of three annual campaigns of two rounds for all children aged under 5 years. For measles we assumed three campaigns: an initial campaign for all children aged between 9 months and 14

years and two campaigns (for children in the same age group) at 4-year intervals thereafter. A 5% additional cost for intensifying epidemiological surveillance is included in the calculations. Table I shows that the total cost is around US$ 114 million.

In both 1996 and 1997 expenditure on NIDs in the region was mostly provided by external funds. The exception was South Africa, which paid the full amount with internal funds.

Social costs paid by the community to participate in NIDs are not included in the above calculations. A costing study in Malawi[4] calculated that a mother spends 3 hours and 20 minutes to bring her child to one round of NIDs. Taking a rural salary as US$0.5 per day, the mother's time for two rounds of polio adds approximately $0.4 to the direct costs. The hidden cost of salaries and operational costs of health care facilities, always covered by internal funds, were also excluded from our calculations.

Can countries afford to pay for NIDs?

Society has to balance expenditure on NIDs with expenditure on other pressing needs. In South Africa, NIDs annually consume less than 1/1 000 of the total recurrent budget for health. In contrast, a poor country such as Mozambique with an internal health budget of roughly US$30 million per annum (US$1.7 per capita), would have to spend US$3 million (or 10%) of its annual health budget on one national polio campaign. With all the goodwill in the world, there is probably no country that can suddenly increase its health budget by 10%. External financial support in the form of loan, credit, or grant is therefore indispensable. In practice, such support has been forthcoming.

Affordability of human resources is a potentially more serious issue. Vaccination teams usually consist of two to four people, at least one of them a professional. In practice, health workers are withdrawn from their normal duties for between 2 days and 2 weeks. As no country has found it difficult to recruit basic health workers from the pool of available staff or trainees, NIDs have not substantially affected the normal daily execution of other PHC services. The time spent by district, provincial, and central staff is, however, much more substantial. District staff are diverted for 1 - 2 months to plan, mobilise, support, train, organise logistics, and evaluate a campaign. At provincial level this time may easily double, and at central level it may require up to half of the total available time of the national EPI manager and his/her staff. Consequently, central and provincial staff can pay much less attention to routine services.

What are the side-effects of NIDs?

Eradiction strategies cannot be seen in isolation — both positive and negative side-effects have been extensively documented. The proponents of eradication frequently claim that experience in the Americas has shown that vaccination campaigns can have a positive impact on the development of PHC and that social mobilisation reduced distrust between health services staff and communities and fostered a new awareness of health and prevention.[5]

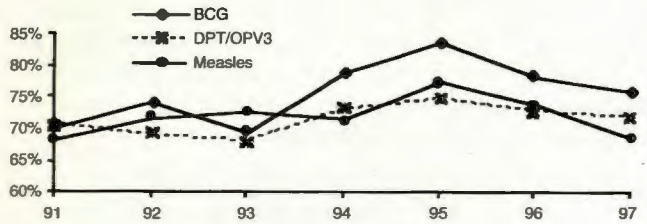
The polio eradication initiative has had a positive impact on the quality of epidemiological surveillance systems in most countries in the southern African sub-region. By improving surveillance of suspected polio (acute flaccid paralysis (AFP)), attention was focused on the importance of disease surveillance systems, which were strengthened accordingly. It is not clear whether this improvement will be sustainable once the extra resources put in for polio surveillance are withdrawn. Not only did the sensitivity of the reporting of cases of suspected polio (AFP) increase, but it also contributed to the quality of the information system and called attention to the importance of epidemiological surveillance as such. While it is not yet clear, it is hoped that the impact of NIDs will go further than that of the polio initiative alone, and that improvements to surveillance will be made in sustainable ways.

Table I. Estimates of total direct costs (in million US$) of NIDs in the South African sub-region

Country	Population* (million)	% 0 - 4 years†	Polio	% 0 - 15 years†	Measles	Total
Angola	11.5	18.7	6.23	44.7	8.97	15.20
Botswana	1.5	14.5	0.63	45.7	1.07	1.70
Lesotho	2.1	17.9	1.09	41.9	1.55	2.64
Malawi	11.4	19.1	6.31	46.9	9.22	15.53
Mozambique	15.8	18.5	8.47	44.5	12.23	20.70
Namibia	1.6	18.6	0.86	44.8	1.25	2.11
South Africa	37.8	14.5	15.88	38.6	24.34	40.22
Swaziland	0.9	18.8	0.49	41.9	0.68	1.17
Zimbabwe	11.5	19.2	6.40	44.5	9.05	15.44
Total	94.1	17.7	46.37	43.6	68.35	114.71

*Source: WHO/EPI Info system, 1996.
†Source: Projections from the World Development Report, 1993.

The NIDs for measles have drawn attention to the need to improve injection safety. Many countries have introduced auto-destruct syringes and needles during campaigns. Countries also had to recognise the need to set up a waste disposal system, including collection in boxes and proper incineration. To date, auto-destruct syringes and needles have mostly been used only during the NIDs, and not for routine vaccinations or curative services. Also, it is still not clear if the impact of NIDs on injection safety will be sustainable. On the negative side, the positive impact of campaigns on the coverage rates of routine immunisations in the western Pacific, as described by Aylward *et al.*,[6] could not be confirmed in the southern African region. On the contrary, the coverage rates of the most important antigens have, on average, declined since the introduction of the NIDs in 1996 (Fig. 1).



Source: WHO/AFRO, June 1998

Fig. 1. Average coverage rates of three antigens in 9 countries of the southern African block routine immunisation programmes (1991 - 1997).

Many countries in sub-Saharan Africa claim that campaigns are temporarily disruptive. A South African study[7] claimed that campaigns divert attention from the development of routine services. Barron[8] suggested that mass campaigns are only acceptable as a catalyst to build PHC services and mobilise community awareness of health issues. He concludes that since this usually does not happen, campaigns have a negative impact on routine services.

Personal observations in the field and reactions sent by e-mail confirm the competitive and disruptive effect of NIDS on building sustainable PHC services. So far nobody in southern Africa has argued that NIDs support PHC. Contrary to claims in other parts of the world, NIDs have to some extent disrupted the development of integrated PHC structure in the southern African region. This is mainly at management level, where time spent organising NIDs competes with time spent on routine tasks. Participation in NIDs is also usually paid for and this may create envy in those who are excluded, causing tensions among the staff. NIDs may also undermine confidence in primary level care. As we heard one mother say: 'If we come to the facility because we are following the Road-to-Health chart, why do we suddenly need extra vaccinations? Something must be wrong with the maternal and child health services in the health centre.'

Opponents of NIDs do not always make the necessary distinction between the global goal of eradication and the goal of providing daily care to the individual through PHC. Opponents frequently misconceive NIDs as being an alternative way to improve routine coverage figures, and then reject NIDs on grounds of inefficiency.

National perspective versus global responsibilities

Eradication of a disease is the ultimate goal in terms of sustainable impact on that disease. There is no doubt that the current global strategies for the eradication of both polio and measles can pass the cost-effectiveness (C/E) test with honour (see Fig. 2). If the world does not embark on eradication of polio and measles, it will face a gradually increasing level of costs per disability-adjusted life-year (DALY) gained. The C/E ratios for control will, in the final phase, reach unacceptably high levels. Against this, C/E ratios for eradication strategies become, within the rather short time of less than 10 years of concluding the investment, more favourable than those for control alone.[9]

Fig. 2 depicts the cost-effectiveness ratios of control and eradication strategies for both polio and measles.

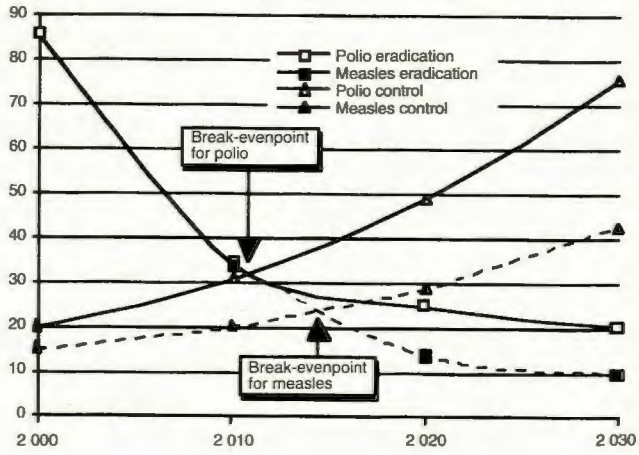


Fig. 2. Cost-effectiveness ratios for global polio and measles eradication and control in a time perspective.

The average annual costs per DALY gained by control strategies will gradually rise as a result of the increasing number of children to be vaccinated and the declining number of DALYs gained because of the ever-lower transmission rate of the disease. The costs per vaccinated child in the control strategy will vary greatly by continent, but for reasons of simplicity we applied an amount of US$1 as the average cost per vaccinated child in the control scenario for both diseases. Costs assume 100% vaccination coverage.

The average annual costs per DALY gained in an eradication strategy are based on the total costs of the eradication strategy divided by the number of DALYs gained since the start of the eradication. Total costs of polio eradication are estimated at

US$1 billion, and that for measles at US$3.7 billion (UNICEF, 1997). The average annual costs are the result of the division of the total costs by the number of years since the start of eradication. A 3% annual discounting has been applied to correct for utility in the future.

It is assumed that for both polio and measles all routine vaccinations will be suspended 3 years after global certification of a world free of polio or measles. Population projections and expected numbers of DALYs gained are projections of the trends presented in the Global Burden of Diseases series.[10]

Bart *et al.*[11] demonstrated that enormous savings, particularly in the industrialised world, would be made after the global certification of a world free of polio. The future savings made by investing now in eradication efforts are substantial. These savings should be used to support the further development of integrated PHC, and to compensate for the disruption to these services that NIDs are currently provoking.

Initiatives for global eradication of disease are comparable to other global agreements between countries on issues such as human rights and the banning of land mines and nuclear weapons. Given its great impact, such an agreement should be prepared with the greatest possible care and only endorsed if the expected contribution of each individual country is defined in detail.

The eradication of polio was endorsed by a 1988 global resolution of all member states of the WHO, and was confirmed at the World Summit for Children in 1990. On both occasions the endorsement of polio eradication was based solely on technical feasibility and expected future benefits. Implications of NIDs on health systems and PHC were not considered.

Since eradication is a global initiative, commitments should be shared according to capacity between the 'haves' and 'have-nots'. As long as there is no consensus regarding their importance, eradication initiatives may not receive the necessary broad support and funding. If the initiative is not prioritised by donors it becomes an empty statement, and the 'have-nots' can only adopt a posture of passive resistance.

From a monetary point of view the industrialised world benefits most from rapid eradication. However the benefits in disease reduction are greater in developing countries where the incidence of new cases of both polio and measles is higher.

Taylor *et al.*[2] raise the question of whether poor countries with many health problems should divert their limited resources towards a global goal that has low priority for their own children. By definition, global eradication initiatives need the support of all countries of the world; non-participation of a single country could jeopardise the entire exercise.

If an individual country refuses to implement eradication interventions it would not be unethical to exercise some pressure on that country. If that country, however, suffers from constraints in implementation, then committed countries with greater resources should be prepared to assist, for example by providing vaccines or covering recurrent costs.

One can question whether NIDs are an absolute requirement for eradicating polio. In fact, NIDs have never been undertaken in the USA and Canada. Other countries with high routine coverage rates and a reliable surveillance system in place (including South Africa) decided not to complete the full set of 4 years of two rounds of NIDs, relying rather on their surveillance system as a prerequisite for the 'Free of polio' certification.

However, the current coverage rates of the routine EPI services in some countries in the southern African sub-region (Table II) do not provide a solid basis for achieving the target for global eradication of polio in a reasonable time period. Considering that upgrading the routine EPI services implies a major effort, in the short term it is much more cost-effective to organise NIDs. The impact of NIDs on disease transmission is probably greatest in those countries where routine coverage is lowest. As a result of their weak infrastructure, these are probably the very countries that will experience most disruption from NIDs. To minimise the negative side-effects in these countries, NIDs must be planned very carefully and well in advance. Instead of persisting in pointing out the positive impact NIDs have on PHC, the WHO would do better to pay more attention to the negative side-effects of NIDs. If PHC has to be strengthened, there are more appropriate ways of doing so.

Table II. Coverage rates (%) of routine vaccination services for polio (3rd dose) and measles vaccination (1997)

	Polio	Measles
Angola	36	74
Botswana	80	79
Lesotho	57	53
Malawi	73	87
Mozambique	61	70
Namibia	65	58
South Africa	73	76
Swaziland	73	57
Zimbabwe	79	73
African region	57	61

*Source: EPI-Information System — Immunisation Coverage on Four Antigens, WHO, 1998.

The creation of vertical NIDs structure should not be bluntly rejected. It serves a completely different objective to that of individual care provided by the integrated routine services. Periodic campaigns can never replace the continuous care of PHC.

The discussion should, therefore, not be about whether vaccinations should be administered through routine services or through NIDs. Society needs integrated PHC, and it needs NIDs on a temporary basis to eradicate disease efficiently.

Eradication initiatives could contribute to sustainable development of the health infrastructure by improving epidemiological surveillance systems. This will not only be beneficial to the health infrastructure as a whole, but will also prevent too many vaccinations being administered, a possibility in unreliable surveillance systems. Investing in surveillance will quickly pay off.

Since the Alma Ata conference in 1979, discussions on the extent to which target-driven programmes affect sustainable PHC have been polarised. The limited health budget has to be divided between both eradication programmes and PHC, and in that respect they are competitive. During the past 20 years target-driven vertical programmes have been separate from and have competed with integrated PHC. Each system contributes in its own way towards improving health. Both systems have a vertical target dimension and a horizontal individual care dimension. The vertical dimension is stronger in target-driven programmes, the horizontal is stronger in PHC. Vertical programmes may have a special place in certain phases of the fight against diseases, namely in the beginning to start up a programme and at the end to finish the job. To date, the world is still divided into horizontalists and verticalists. Both groups would do better to sit down together and weave the horizontal and vertical fibres into a sustainable web.

The views expressed in this article are those of the authors and should not be attributed to their respective organisations.

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CONTRIBUTION OF GROWTH HORMONE-RELEASING HORMONE AND SOMATOSTATIN TO DECREASED GROWTH HORMONE SECRETION IN ELDERLY MEN

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Objective. The pathophysiology of the decline in circulating growth hormone (GH) concentrations that may occur with ageing remains elusive. We have investigated the potential contributions of decreased endogenous GH-releasing hormone (GHRH) and increased somatostatin secretion to this phenomenon.

Design and methods. The strategy used was to stimulate GH secretion in 8 young (20 - 24 years old, body mass index (BMI) 22.8 ± 2.8 kg/m^2) and 8 elderly (68 - 82 years old, BMI 23.4 ± 1.6 kg/m^2) male subjects on separate occasions by means of: (*i*) intravenous bolus 0.5 µg/kg D-Ala^2 GHRH(1-29)-NH$_2$ alone; (*ii*) 0.5 µg/kg GHRH after pre-treatment with two oral doses of 50 mg atenolol (to inhibit somatostatin secretion); (*iii*) 1.25 mg oral bromocriptine alone (to increase endogenous GHRH and/or inhibit somatostatin); (*iv*) 50 mg oral atenolol plus 1.25 mg oral bromocriptine; and (*v*) 0.5 µg/kg GHRH after pre-treatment with 1.25 mg oral bromocriptine.

Results. The elderly men had a significantly lower peak and area under curve (AUC) GH response to intravenous GHRH when compared with 8 young men (peak 3.1 ± 1.0 ng/ml v. 21.6 ± 5.0 ng/ml, AUC 205 ± 56 ng/ml/min v. 1 315 ± 295 ng/ml/min, $P < 0.05$). Pre-treatment with atenolol before GHRH administration produced no significant increase in peak and AUC GH response in both groups, which remained lower in the elderly men than in their young counterparts (peak 5.5 ± 1.8 ng/ml v. 29.3 ± 7.0 ng/ml, AUC 327 ± 90 ng/ml/min v. 2 017 ± 590 ng/ml/min, $P < 0.05$). Bromocriptine alone did not cause a

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