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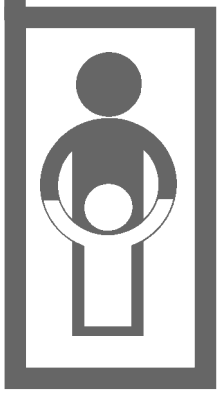
Sustainable outreach services (SOS)

A strategy for reaching the unreached with immunization and other services



DEPARTMENT OF VACCINES AND BIOLOGICALS

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Contents

Glossary

BCG	bacille Calmette-Guérin (vaccine)
CCM	cold chain monitor (cards)
DEC	Di Ethyl Carbamazine
DTP	diphtheria–tetanus–pertussis vaccine
EPI	Expanded Programme on Immunization
IDA	iron deficiency anaemia
IDD	iodine deficiency disorders
IMCI	integrated management of childhood illness
ITN	insecticide-treated mosquito net
MCH	Mother and Child Health
MHDs	monthly health days
MOH	Ministry of Health
NIDs	national immunization days
ORS	oral rehydration salt
ORT	oral rehydration therapy
SNID	subnational immunization day
SOS	sustained outreach services
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VAC	vitamin A capsule
VAD	vitamin A deficiency
VBV	Village Based Volunteers
VVMs	vaccine vial monitors
WPRO	WHO Regional Office for the Western Pacific
YF	yellow fever

1. Foreword

According to the United Nations Development Programme (UNDP) reports of 1998 and 1999, socioeconomic indicators point at an increasing disparity between rich and poor countries as well as between the people within the countries.[1]

Poverty is not merely measured by a decline in income. More importantly, it includes an absolute or relative degradation of the physical and socioeconomic infrastructure, of which the health services, subjected to reforms required by creditors, are part. Not surprisingly, therefore, health indicators report stagnating or deteriorating health conditions for large proportions of the population in many countries.

Increasing disparity between rich and poor, the resulting marginalization and lack of equity threaten to undermine economic, social and political structures on a large scale.

It is generally agreed that this process needs to be stopped and reversed.

Worsening health services affect people in densely populated areas as well as those living in remote areas with already difficult access. The first groups' lack of access is caused by socioeconomic and cultural factors, but remote populations simply lack the possibility to visit health facilities because of distance or other geographic barriers.

Remote populations are not the only ones without access to health services and not all remote populations are poor, but it goes without saying that remote people bear a disproportionate share of the burden.

It is within this context that WHO and the United Nations Children's Programme (UNICEF) have developed a new vaccine-delivery strategy with the aim of reaching remote populations without access to health services.

According to the principle of equity, every child has the right to basic health care, including protection against vaccine-preventable diseases. High-risk groups like remote populations deserve special attention to fulfil this goal.

[1] UNDP, *Rapport sur le dévelopement humain 1998* and *Human development report 1999*. See, in particular, pp. 32–38 and 52–60 in the former and 30, 36, 44, 95, 168 and 211 in the latter.

2. Reaching the "unreached"

2.1 Who are the unreached?

Extraordinary progress has already been achieved in bringing immunization services to African populations in the last twenty four years, since the inception of the Expanded Programme on Immunization (EPI).

Nevertheless, in 12 of the 51 countries of the continent less than half of the children under one year complete their schedule of immunizations and are fully protected against preventable childhood diseases. Large population groups receive no immunizations at all, or receive only the first immunizations of the series and remain partially protected. These populations, "unreached" by immunization services, fall into three distinct groups:

1) Populations living in peri-urban and other areas with usually good physical access to health services who shun contact with government services of all kinds, characteristically fail to register their child births, and make no contact with routine immunization services.

2) Rural populations who are nomadic or seasonally mobile, or simply live so far from the national infrastructure that they make no contact with routine immunization services. In some areas health infrastructure exists, but it is so skeletal, or due to its remoteness functions so poorly, that it is of no value in providing services to the surrounding population.

3) Populations in rural and urban areas with good access to services who succeed in partially immunizing their children but drop out of the series before the schedule is completed. On average, this group would raise immunization coverage by 20% if they completed the schedule correctly.

Although these groups are the main cause of low national levels of routine immunization coverage, they appear to participate well in national immunization days (NIDs) against poliomyelitis. Most countries with low routine immunization coverage have already achieved high levels of coverage with polio vaccine in successive NID rounds (see Table 1).

Where functioning fixed centres and outreach services exist, they should be managerially and materially strengthened. But where they do not exist or are not viable, other strategies should be sought to bring immunization to the people and to stimulate their demand for immunization. After two decades of infrastructure development for routine immunization services, health systems of African countries seem to have reached the limits of coverage possible through static health facilities.

Table 1: Comparison of Polio3 routine coverage and polio NID coverage

Country	1998 coverage with third polio dose in routine services	Highest coverage achieved during polio NIDs	% neonates without a single contact with routine EPI services
Angola	36	90	**32**
Cameroon	48	103	**37**
Chad	24	108	**57**
Congo	21 (1997)	91	**71**
Dem. Rep. of Congo	18	95	**75**
Kenya	64	82	**15**
Mauritania	28 (1997)	95	**31**
Niger	25	103	**58**
Nigeria	45 (1997)	95	**47**
Togo	35	104	**46**

2.2 Strategies for reaching the unreached

Plans to reach the unreached should be comprehensive, addressing all unreached segments of the population. The goal at the outset should be to define these segments according to the best strategies for reaching the whole population equitably.

Where the strategy makes prime use of the existing infrastructure of fixed and outreach services, it will be concerned with immunization within the context of decentralization and integration – the twin pillars of health sector reform. Where the existing infrastructure is non-existent or hopelessly inadequate, the strategy should be concerned with the periodic provision of immunization and a "basket" of the health and other services that the population most wants and needs to be effectively served.

The overall principle of this approach, whether it involves the improvement of the existing infrastructure or it entails new strategies, is that the community is involved in the design as well as the execution of the plan.

3. Sustained outreach services (SOS)

SOS is a strategy for reaching those segments of the unreached population that are too physically remote to be effectively reached by the present infrastructure of immunization services (the second group mentioned in paragraph 2.1). Strategies aimed at improving immunization coverage among the physically accessible but unreached populations (slums, etc.) or decreasing drop-out rates are equally important, but would more rely on managerial improvements than on operational innovations. SOS proposes to serve this unreached population through periodic activities in which vaccines and other medical as well as non-medical services may be delivered. The rationale for this approach is that polio NIDs have demonstrated that campaigns can:

- Reach an important proportion of the population.
- Mobilize resources through partnerships.
- Obtain a high level of political support.
- Succeed in mobilizing the community.
- Provide high visibility to the health sector.

The strategy is innovative in that it represents a radical rethinking of the traditional EPI approach in terms of :

- The interval between immunization contacts.
- Simplification of the usual cold chain strategy.
- Exploitation of new technologies (such as auto-disable syringes, prefilled single dose auto-disable syringes, and vaccine vial monitors).
- The target age groups; and (possibly of greatest importance).
- The choice of interventions delivered in addition to immunization.

SOS is not to be confused with “catch-up” campaigns, which attempt to raise coverage with a one-time intervention. SOS should become a structural component of routine immunization services in those areas for as long as it is needed. Annual campaign “rounds” of short duration can be highly effective in reaching populations at an affordable local cost. Both the frequency of these rounds and the basket of services to be provided remain flexible in the concept of SOS and are chosen locally, according to the local situation.

Most countries with large unreached populations that may wish to implement the SOS strategy will require substantial external assistance at first. However, to ensure the sustainability of SOS, it should be gradually integrated into government's budgets. The terms of the partnership for SOS should therefore be set from the start.

Finally, the impact of SOS should be judged, not solely by immunization coverage and disease reduction, but also by qualitative indicators that reveal the development impact of the strategy and the quality of the services that have been provided. The indicators for monitoring and evaluation should also be set by the partnership during the initial planning for SOS.

3.1 Selecting the services

Immunization and vitamin A supplementation comprise the "minimum" package of the SOS. Other services to be included in the SOS are chosen according to the needs expressed by the population and the feasibility of implementation, considering financial and operational constraints. The services may include:[2]

- Micro nutrient supplementation.
- Malaria control.
- Simple curative services.
- Safe delivery kit and traditional birth attendant training.
- Anti-parasitic treatments – Metronidazole.
- Cattle immunization.
- Agricultural counselling.
- Legal counselling.
- Education: family planning, sanitation, etc.
- Vector control.
- Sanitation (well decontamination, latrine construction, etc.).

The criteria for selecting services include:

- Real need and perceived as such by the population.
- Effectiveness.
  - immediate impact;
  - simple one-time intervention;
  - not requiring any follow-up;
  - not demanding high level of specialization.
- Feasibility:
  - financial, human and material resources required;
  - number of staff and weight and volume of materials in relation to accessibility and means of transport.

[2] See the annexes for fact sheets on the different interventions.

3.2 Immunization and vitamin A supplementation

The immunization package need not necessarily be the EPI standard for routine services, but should be based on epidemiological, financial and operational criteria in the areas to be served. Choice of SOS package and delivery strategy is interrelated. The following factors should be considered for the elaboration of a final strategy:

- Which vaccines to include?
- Age-group chosen for the intervention.
- Effectiveness – protection afforded against disease.
- Injection safety.
- Cold chain: required, available, weight, volume, autonomy, etc.
- Accessibility – need for transport and communications.
- Staff training.
- Community participation.
- Cost per round, per immunized child and/or per disease case prevented.

The following paragraphs will deal with the selection of immunization services only. The basket of other interventions will be discussed in chapter 4.

3.2.2 Which vaccines to include?

The following prioritization for inclusion of vaccines to SOS is recommended:

Priority	Vaccine	Rationale
1*	Measles	High disease burden, single-dose impact
1	Yellow fever in risk areas	High disease burden, single-dose impact
1	Oral polio	Polio eradication initiative
1	Vitamin A	Combats vitamin A deficiency
2	Tetanus toxoid	Low single-dose impact
3	DTP	Low single-dose impact
3	Hepatitis B	Relatively high price, low single-dose impact

* Priority 1 is recommended as the "minimum" SOS package for one round per year

BCG should not be used in SOS strategies, because:

- It contributes insignificantly to disease control.
- Its main area of protection is against cerebral TB if given shortly after birth.
- Its intra-dermal administration requires special skills and experience.

Measles is the most complex vaccine to administer in the first priority group of vaccines because it requires reconstitution, it requires ice at the point of administration and it must be used within six hours.

The final decision on which vaccines to include must be made locally.

3.2.2.1 Age group

The target age group for immunization is chosen on the basis of epidemiology and immunization history. Disease incidence in a population with low vaccination coverage is highest among children under five, with peaks between 12 and 36 months (see Tables 3a-c). Therefore the targeted age group should initially be determined by the epidemiology of the disease in that specific region and gradually come down to the under one age group, depending on the success of the strategy.

Table 2. Age specific disease incidence for measles, pertussis and poliomyelitis

a) Median age of measles prior to immunization		b) Median age of whooping cough		c) Poliomyelitis by age					
	Median age in years		Median age in months		Cumulative percentage of cases before the age of:				
					12	24	36	48	60
Urban Africa	1.5 – 2.5	West Africa	24.4	Ghana	22	64	79	91	96
Rural Africa	2.5 – 5	East Africa	35.1	Malawi	15	64	83	90	94
		Congo and South Africa	23.6	India	49	64	74	88	90

Table 3. Suggested age groups for vaccination by population type with SOS

Target population	Nomadic population or any population at high epidemic risk.	Urban and rural populations.	All populations Medium coverage	All populations High coverage
Coverage	<30%	30–50%	50-70%	>70%
Number of rounds feasible per year	1–3	1–3	2	3
Measles / YF	<15	<5	<2	<1
TT	Women 15–45	Women 15–45	Women 15–45	Women 15–45
Polio	<5	<5	<2	<1
DTP	<5	<5	<2	<1
Vitamin A	Children 6–59 months	Children 6–59 months	Children 6–59 months	Children 6–59 months

3.2.2.2 Effectiveness

The impact of immunization on disease is dependent on the timing and number of doses received. The EPI immunization schedule is epidemiologically optimized for developing countries but it cannot be followed under SOS strategies because they provide periodic, rather than continuous, access to services. Protection under SOS is therefore lower than that provided by fixed services but it is still important (see Table 4).

Table 4. Protection of unimmunized children/women after 1, 2 or 3 rounds in one year

Vaccine	1 round	2 rounds	3 rounds	Remarks
Measles protection	>85%	-	-	1 dose gives lifelong
Yellow fever	>90%	-	-	1 dose gives at least 10 years protection
Polio		76–100%	87–100%	Every opportunity should be used for an additional dose for polio eradication
DTP	little	80–100% short term	80–100% long term	
TT/Td	little	3 years	10 years	
Vitamin A		100%		

The minimum interval for all antigens is one months and four months for vitamin A.

3.2.2.3 Injection safety

Injectable vaccines must be administered safely. To ensure safety, the following factors should be considered in designing SOS strategies:

- Qualified staff for injection and vaccine reconstitution;
- Provision and transport of auto-disable syringes and safety boxes;
- Facilities for burning the syringes after use, at the point of use;
- Reconstituted vaccines have to be discarded after 6 hours.

3.2.2.4 Accessibility

Accessibility is better during the dry season, but nomadic populations especially will be moving between water points and are therefore difficult to find. Accessibility as well as mobility decreases during the wet season. These two factors must be weighed against each other.

When choosing the type of transport, the following factors should be considered (see Table 5):

- Who will provide the transport?
- Number of persons to be transported.
- Loading capacity in kg and m^3, with and without passengers.
- Distance (total per day and between fuel supply points).
- Type of services delivered.

Table 5. Example of type of information on different means of transport used in planning SOS strategies

	Toyota Landcruiser HZJ75			**Motor cycle Yamaha AG100**			**Bicycle**		
Range with full tank	**700 km with 1 tank of 90 l**			**400 km**			**Na**		
Loading capacity (give all options: with x persons, you can load y kg and z m^3)	No. of persons 6 3	Weight 500 kg 700 kg	Volume 1.8 m^3 3.2 m^3	No. of persons 1	Weight 20 kg	Volume 0.07 m^3	No. of persons 1	Weight 10 kg	Volume 0.02
Garage	city A			city C			Privately owned		
Maintenance	city B			city C					

3.2.2.5 Cold chain

The "traditional" cold chain for routine immunization consists of a set of rules without differentiation per type of vaccine, except for the recommended storage temperatures. However, in campaign settings a certain flexibility is possible and may make the difference between immunizing or not. The cold chain is maintained for vaccines in SOS for as long as possible.

However oral polio vaccine vials have, for several years, been fitted with vaccine vial monitors (VVMs), which enable them to be used beyond the reach of the cold chain.[3] In this case, polio vaccine is protected from extreme heat by cold boxes or by other local means, such as evaporative cooling (wet cloth or earthenware vessels or gourds, etc.) and by burying or submerging in water. Experience in a number of countries has shown that, with the VVM, polio campaigns can be conducted with a minimum of cold chain requirements, provided the staff is properly trained. Apart from making the campaign cheaper, the active use of VVMs allows teams to travel further – because of less weight – and longer, thereby reaching children that would not have been immunized without this strategy.

Other vaccines, much more heat stable than polio (see Table 6), will have the VVM from 2001. This will allow for a more flexible and effective cold chain, in particular for outreach services. However, freeze-dried vaccines (measles, BCG, yellow fever) will continue to need ice to keep the vaccine cool after reconstitution.

[3] *Making use of Vaccine Vial Monitors. Flexible vaccine management for polio supplementary immunization activities* (WHO/V&B/00.14).

Table 6. Vaccines by heat stability group

Stability group	Vaccine (s)	Days @ +25°C	Days @ +37°C
Least stable	Oral polio	7	2
Moderately stable	Pertussis	30	7
Stable	Yellow fever, BCG, measles	60	14
Highly stable	Toxoids, HB	180	60 (Instantaneous damage @ 45-50°C)

The cold chain monitor (CCM) cards may be used to monitor vaccine status in the SOS if they have been kept with the vaccine throughout the distribution process. CCMs will indicate whether or not to use vaccine after the cold chain has failed, or when it is no longer cool.

3.2.3 Staff training

The success of SOS largely depends on the quality of the application of operational tools in specific situations and therefore on the degree the health worker can identify himself with the strategy. Training should be based on that.

The final strategy should result from the combination of the externally provided operational tools together with the knowledge the trainee already has of the specific situation.

Rather than general rules and global recommendations to be applied everywhere, the trainer should provide tools for problem solving, leading to a tailor-made strategy that reflects minimum standards and equipment specifications as much as local operational constraints.

3.2.4 Focal points

Other programmes (i.e. Guinea worm eradication) have been successful in bringing health services to remote populations with the help of focal points within the community, chosen by them. The role of these focal points would be to:

- Serve as a contact point between the teams and the community to ensure timely and adequate communication and information on visiting schedules.
- Facilitate the arrival of the team.
- Be an intermediate between the teams and the community.
- Express the community's needs.
- Ensure any required follow-up after the team's departure.
- Gradually increase its competence as a result of basic training by the teams, allowing for an extension of the services delivered as well as for building up capacity.

3.2.5 Community involvement

For SOS to be successful, whatever strategy is chosen, community involvement is indispensable:

- To express the specific needs of the region.
- To provide support infrastructure for visiting teams.
- To maintain activities between visits.
- To keep up political pressure for appropriate services.

Initially the services can be proposed and offered to the community, but the services should be of sufficiently high quality to raise demand within the same community as well as in neighbouring areas. This is particularly critical for nomadic populations whose movements and collecting points should determine the SOS strategy for reaching these populations.

For its sustainability it is vital that implementing and maintaining SOS becomes a political issue for community leaders.

3.3 Deciding the strategy

There are three predominant strategies for reaching large, remote populations on a periodic basis:

- The NID strategy: teams are temporarily constituted, supplies are distributed and transport is provided for a single day, or series of days, during which the entire national target population is visited and services are provided.
- The "Grandes Endémies" approach of the 1960s: teams are permanently constituted, provided with transport and make extended "circuits" during which, over a period of 4, 6 or 12 months, the entire national target population is visited and services are provided. If more than one visit is made to the population each year, then the circuits are repeated.
- The recurring subnational immunization day (SNID) strategy: teams are temporarily constituted in a single region or district for a day, or a series of days, during which the entire regional or district target population is visited and services are provided.

These three "variations on the campaign theme" all require micro planning and each has comparative advantages and disadvantages which are shown in Table 7.

Table 7. Comparative advantages and disadvantages of three strategies

"National immunization days"	
Advantages	**Disadvantages**
• Resources mobilized temporarily from other sectors – less costly to MOH • Volunteers available on temporary basis (not for injectable vaccine) • National mobilization, so political visibility and support of leadership	• "Fatigue" after several repeated rounds, particularly multi-rounds per year • Vulnerable to changes in political preferences or personalities • Temporary disruption of **all** health staff • Centralized, national approach usually requires external resources, repeatedly
"Grandes endémies" circuits	
Advantages	**Disadvantages**
• Permanent service infrastructure is integrated within the health system • Extra resources needed to reach remote populations are budgeted and provided centrally – better sustainability • Expertise of teams is assured by their specialization, and experience	• Danger that these services to be seen as "replacing" fixed services in the region. No involvement, or "buy-in" from other health staff in the region • Requires permanent bases, or "launch-points" which are secure and fully equipped with maintenance facilities • Costly – all costs borne by MOH.
Recurring "subnational immunization" days	
Advantages	**Disadvantages**
• Resources mobilized temporarily from other sectors – less costly to MOH • Volunteers available on temporary basis (not for injectable vaccine) • Regional mobilization, so political visibility and support of local leadership • Permits certain staff and supervisors to 'rotate' from one local campaign to another	• "Fatigue" after several repeated rounds, particularly multi-rounds per year • Vulnerable to changes in local political preferences or personalities • Temporary disruption of local health staff

3.3.1 SOS logistic support "hubs"

For the "Grandes Endémies" strategy, logistics support, in terms of transport, equipment and supplies, must be provided to the teams who make the visits, one, two or three times per year to remote populations. The logistics base of these teams, or the "hubs" of SOS, will have to be equipped for transport and equipment maintenance and for supplies storage. SOS Hubs may be established at district or regional health offices or at strategic points, such as rural hospitals where there is electricity for the cold chain, secure storage and transport maintenance facilities, and reliable telecommunications.

Transport is particularly critical for SOS, which seeks to bring services to the most remote populations. The choice of modes of transport, whether four wheel drive, or motorcycle, bicycle or animal will require carefully planned maintenance management to avoid interruptions in availability.

3.3.2 Deciding the number of rounds per year

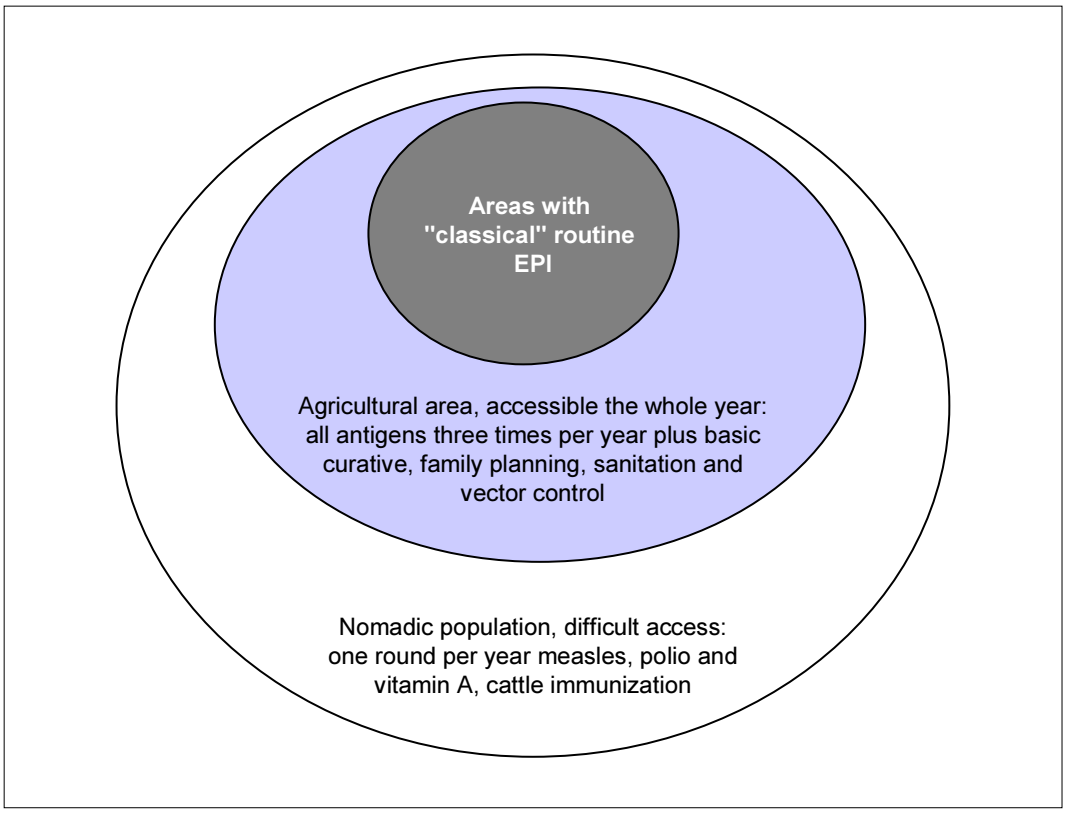
The number of rounds per year can be decided on the basis of the above-mentioned factors and constraints. Strengths and weaknesses of the options are summarized in Table 8.

Table 8. Strengths and weaknesses of different frequencies of SOS

3 Rounds per year	
For:	**Against:**
• Children fully immunized after one year	• Campaign fatigue at all levels, both for planners and implementers
• Lowest costs per fully immunized child	• Highest costs per year
• More opportunities to offer other services	
2 Rounds per year	
For:	**Against:**
• Sufficient protection	• For complete immunization, children under two years must be reached
• Lower total costs per year	• No full protection after one year
• Less risk of campaign fatigue	
1 Round per year	
For:	**Against:**
• Effective in very difficult areas: only measles, YF, polio and vitamin A	• Cohort 0-2 not, or insufficiently protected (DTP and hepatitis B)
• Lowest costs per year and per child for above mentioned antigens	• For complete immunization with all antigens the target group must be under three years old

The final strategy may be flexible in a number of aspects: number of antigens, number of rounds and type of additional services. Different strategies may be combined in a given region (see Figure 1).

Figure 1: Example of SOS in a region



3.4 SOS-like experiences

A number of countries have already implemented programmes with characteristics similar to SOS. In all of them the programmes were born from a concern on how to reach populations deprived of basic health care.

Multiple service delivery in Cambodia

In Cambodia, 95% of the population is living in central urban and rural areas, mainly on rice agriculture. Rice fields cover roughly 40% of Cambodia's landmass. Only 5% of the population live spread out over the remaining 60% of the surface area, covered with forests and/or hills.

Schematically, Cambodia can thus be divided into two strata: a) a non-malaria transmission area with a population density of 132/km^2 (9.5 million on 72 000 km^2); and b) a malaria transmission area with an average population density of five inhabitants/km^2 (0.5 million on 108 000 km^2).

Over 2/3 of the scarce forest population are subdivided into a dozen different ethnic minority language groups, while the remainder of the total population is ethnic Khmer. The ethnic minority groups are culturally isolated, semi-nomadic, living on subsistence agriculture, hunting and gathering forest products. In money terms, they are the poorest section of Cambodian society.

During Cambodia's rich economic development period of 1955–1970, the public health system thrived within the high population density areas and eventually reached higher standards than that of neighbouring Thailand.

Almost 30 years of war and civil war followed. Notably, after the genocide aiming at "intellectuals" such as medical personnel, there is the urgent necessity to rebuild the curative health services all over the country. In this context, the establishment of health posts in remote forest areas has become secondary. It is especially difficult now that very low Government salaries require health staff to unofficially charge patients for treatment, which is not realistic in minority areas due to barter economy.

Still, attempts are being made – by nongovernmental organizations (NGOs) – to set up and maintain health posts using minority staff, despite all odds. The process is lengthy and costly (very labour intensive). Since 1996, the National Malaria Programme has carried out systematic distribution of mosquito nets to forest villages. After four years of expansion, the programme now reaches about 80% of the target population in over 1000 remote villages within 12 forested provinces. The success of this large-scale outreach activity was made possible through the establishment of a network of 15 NGOs that provide the logistic support to the provincial health services that are executing the activities.

As outreach is the common problem for all disease control programmes, spontaneous combinations of activities during the mosquito net distribution occurred, almost instantaneously ("Can you give me a ride?"). At the moment, the combined outreach activities centred around bed nets include: a) the malaria treatment of fever cases (with Mefloquine); occasionally b) differential diagnosis of all fevers and treatment; c) distributions of Mebendazol 500 mg de-worming tablets (lowering infestation with hookworm and Ascaris under clinically relevant levels); d) vitamin A distributions; e) screening for leprosy; and f) routine EPI. During four years of implementation, the programme could demonstrate a good impact on health and on the quality of life among the villagers.

The mosquito bed nets have thus become, due to their popularity with the target group, a platform for many health messages and services. It is important to realize that the Cambodian outreach phenomenon was initially not intended as a revival of the mobile teams, but unintentionally, due to the necessities and opportunities of the field, began to very much resemble what had been developed decades earlier in French-speaking West Africa, from the nucleus of mobile sleeping sickness control campaigns. The basic principle, which is still valid, can be summarized as "where there is not fixed health system, it has to be mobile".

Multiple service delivery in Cambodia (continued)

The Cambodian Ministry of Health and WPRO officially endorsed this approach and it is seen as a substantial strengthening of the health system. The outreach activities are to be progressively taken over by the health centres of new Operational Districts and integrated into the "Minimum Package of Activities" as part of the ongoing health system reform.

It is equally important to strengthen the fixed base, curative public health system wherever possible. As such, RBM Cambodia is raising funds to establish new health posts in forested areas. Consequently, the combined outreach activities are only one of the answers to one very specific problem setting, which has to be complemented with a set of specific other solutions for other specific risk groups. There is no single recipe, except using opportunistically (and unashamedly) every method that works, no matter how trendy or outdated. Combined outreach activities or SOS are right for areas of low population density within poor countries.

Outreach services – Mozambique 1999–2001

Since the peace accord in 1992, the Health Sector in Mozambique has demonstrated steady improvements in the delivery of health services. There has been increased expenditure on health and a high percentage of aid provided for health services. However, improvements in the delivery of health services have not made a significant impact on child health.

In Mozambique, children still face major problems of access to quality health care. The infant mortality rate remains 146/1000 live births, with one out of two children being immunized and communities remaining inactive in the development.

Data from the 1997 national census showed that 71% of the population lives in rural areas, that the average distance of the population from a primary health centre is 20km and that just over 50% of the health facility network is equipped to provide vaccination services routinely.

The Ministry of Health (MOH) initiated the National Integrated Plan for Maternal and Child Health. The EPI five-year plan was developed with the aim of extending fixed posts to provide outreach services through "satellite posts" involving a package of services and initiating community participation through monthly health days (MHDs). Monthly health days provided the bridge between outreach services and facilitation of the community's use of health services. Common activities implemented during monthly health days include assessing community health problems, deciding on a preventive action for health (EPI, family planning, antenatal care, vitamin A), sanitation and water activities, education (integrated management of childhood illness – IMCI), treatment and evaluation actions for health.

Some of the obstacles to the programme were lack of human resources for facilitation and implementation, transport, difficulties in achieving the necessary scale and community demands often out of the health area. Mozambique requires UNICEF support in the development and implementation of district plans for outreach activities, community capacity development, extension of vaccination services through fixed posts, implementation of MHDs and decentralized and focused campaigns.

In conclusion, the MOH has defined clear objectives for the extension of MCH services through outreach activities and MHDs. The integration of health programmes and decentralization of services is a challenge for a more coordinated support.

Reaching the unreached – experience of Chad

Chad is a landlocked country with a population of approximately 7.5 million people, 80% of whom live in rural areas.

In early 1990, Chad started a democratic process and tried to build a health system based on a health policy that focused on primary health care, district and community participation and cost recovery. Despite the efforts made by the present government, the situation of women and children remains poor. Chad owes its high infant and maternal mortality rate of 194/1000 and 827/100 000 live births respectively to increased poverty and illiteracy rates but mainly due to a lack of basic health services with low accessibility to health facilities.

The Government launched a revitalization programme/Bamako Initiative that operated in 10 of the 55 districts. The project is mainly supported by UNICEF and the World Bank. Its objective is to reduce mortality rates for infants and children. Despite the efforts by the health team and the availability of funds, the indicators improve, but remain low. For instance between 1995 and 1997, EPI coverage had smoothly increased from 8% to 30%. Similar results were found with other child health indicators including ORT use and antenatal care.

An in-depth analysis was conducted and showed that the results were due to poor contact between the community and the health centre, poor accessibility and lack of human resources at the health facility and community level. In this context, it was decided to review the strategy used and to add a mobile strategy. This strategy based on provision of a basic health package including EPI services, vitamin A, ORS, malaria, TB, growth monitoring, well treatment and health education was designed to reach all communities located more than 20 km from a health centre and to complement the fixed strategy. The mobile team was based at the district level and allowed to reach villages once a month during the dry season.

The contribution of these different strategies resulted in an increase in the indicators. For instance, DTP had increased from 30% in 1997 to more than 50% in 1999. Diseases associated with EPI also decreased as well as the severe cases of measles and diarrhoeal disease.

The cost of these strategies, (fixed, outreach and mobile) is less than $0.50 per year per inhabitant. According to achievements of the project in the intervention zone, the government and other parties decided to establish the mobile strategy as a component of the revitalization process, to use the lessons learned on how to reach the unreached and to reorient the current projects that show poor achievement.

Chad planned and concluded a national child health week in May 1999. This process acquired a national mass campaign in order to strengthen some of the child health indicators including vitamin A use, ORS use, use of impregnated bed nets and exclusive breast feeding. The mass campaign was conducted during the African day for children, which represented the high risk period for malaria and diarrhoeal diseases. During this campaign a second annual dose of vitamin A was provided to 55% of the target population.

3.5 Evaluating SOS

The whole purpose of SOS is to apply lessons learned from polio eradication and other initiatives to increase access to children currently physically beyond the reach of the routine programme. Thus the priority in evaluating SOS will initially be through the use of process indicators, with a particular emphasis on the proportion of unreached that have been made accessible, the number of interventions, costs, partnerships, community participation, etc.

Evaluation must necessarily be simple in the case of difficult-to-access populations and should require relatively low-level skills of health staff. Evaluation standards can evolve with the increase of accessibility and of the available skills.

For each intervention, a gliding scale should be defined from the minimum to the maximum information required for its evaluation (see the fact sheets in the annex). A minimum evaluation could be the number of interventions given out (bed nets, doses, etc.) whereas the maximum evaluation would measure the impact on specific and overall mortality. The latter presupposes the existence of reliable baseline data on the basis of which the impact can be measured.

3.6 Financing and implementing SOS

Reaching physically remote populations is very costly. Some cost studies have shown a factor of five between the cost per fully immunized child in high density, urban populations and remote, low-density populations. In difficult topography, where there are no roads and no telephones the cost is highest. Yet, the largest unreached populations requiring a SOS strategy are in the poorest countries.

It is clear, therefore, that governments will require considerable additional resources to launch and to sustain SOS in the long term. The following principles are prerequisites for starting SOS in a country: partnership, moving towards self-sufficiency and cost-effectiveness.

3.6.1 Partnership

Additional resources, human or financial, imply that a government planning SOS will need to enter into a partnership with external agencies and the internal private sector, NGOs and other governmental departments. Involvement of other ministries is therefore crucial from the start of the project.

This partnership should use the existing mechanism of the Interagency Coordinating Committee.

Partnership should be:

- Contractual: the contributions of the partners and their respective roles should be clearly defined from the outset. The "contractual" role of the government should not only include their support to the SOS strategy but also require additional efforts to reach the unreached in other segments of the unreached population, which may not require this level of external support.
- Long term: partners should be willing to commit themselves in the long term, rather than merely in the short term. SOS is not a project but an indefinite strategy for achieving health and a better quality of life for remote populations.

3.6.2 Moving towards self sufficiency

Over the medium to long term, governments should expect to progressively take over a greater and greater share of the cost of SOS, starting at the outset with at least a small percentage. The target for this share of the total cost might be adopted from the Vaccine Independence Initiative.

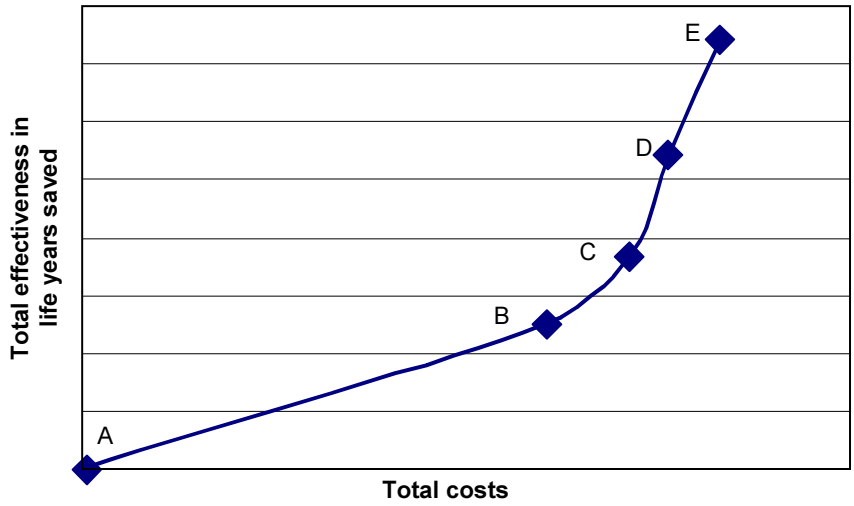
Not only the government, but also the community should 'buy in' to SOS by providing local revenue to offset certain elements of the cost of SOS. Opportunities for cost recovery will vary widely from country to country and may not exist at all in some countries. But it is a principle of the concept of SOS that sustainability depends on the motivation of the population to give, as well as to receive.

3.6.3 Cost-effectiveness of SOS

The cost-effectiveness of SOS can be assessed in two ways. First, the overall cost-effectiveness of the services in comparison to other health interventions is an important tool for supporting financial sustainability and is essential when determining the priority of SOS compared to other health interventions. Overall cost-effectiveness will vary from setting to setting and is determined by the costs of delivering the services, on the one hand, and on how much disease burden is reduced, on the other hand. Costs as well as effects in terms of reduction in disease incidence must thus be closely monitored to determine the cost-effectiveness. However, as reliable epidemiological surveillance systems are difficult to establish in the areas in question, it is likely to be difficult to monitor the impact on the health of the target population. As mentioned above, this evaluation system will be established gradually. The costs of SOS can be more easily examined. Annex 2 outlines a standard framework for monitoring annual costs of SOS.

The second approach to cost-effectiveness is related to the change in cost-effectiveness from introducing additional interventions to SOS. By treating immunization services as the "basis" of SOS, the incremental costs of additional interventions are likely to be relatively low. Immunization services demand a relatively high initial capital investment in terms of transport and cold chain equipment, but when this is established, it will be relatively cheap to add additional interventions, such as vitamin A supplementation and malaria treatment. This principle is illustrated in Figure 2 below.

Figure 2. SOS cost-effectiveness



Option A: Do nothing

Option B: Immunization services

Option C: Immunization services plus vitamin A supplementation

Option D: Immunization services plus vitamin A supplementation and malaria bednets

Option E: Immunization services plus vitamin A supplementation, malaria bednets and malaria treatment

The figure illustrates total costs and effects (in terms of life years saved) for four different SOS strategies as well as the "do nothing" option, which does not cost anything, but does not save any lives either. Costs as well as effects increase when an additional intervention is included. However, it is seen that the relative increase in costs compared to the outcome is less for option C, D and E compared to option A. The decrease in the slope of the graph illustrates that the incremental cost-effectiveness ratio improves with additional interventions, indicating that relatively more extra outcome is gained from the same additional costs. Clearly, if a decision is taken to provide unreached populations with health services, a combination of interventions is more cost-effective than the provision of separate services.

3.7 Target countries for SOS

Because the content and strategy of SOS will vary widely from country to country, it is evident that no one-model or one-country trial will suffice in convincing other countries to launch SOS themselves.

Criteria for targeting initial countries for SOS should include:

- Large, remote populations unreached by immunization services as expressed by low DTP1 coverage (<50%).
- National coverage of polio3 under 50%.
- High national dropout rates from DTP1 to measles.
- Countries of unrest or war.

4. Criteria for choosing and combining SOS services

The practical possibility of combining interventions during a single visit will largely depend on a number of factors:

- Operational constraints to delivering the intervention: weight and volume of the required means in relation to the transport capacity.
- The number of doses/treatments per intervention required to be effective compared with the frequency of the visits.
- The required training level of health staff.
- Necessity for and requirements of follow up.
- Complexity of administration.
- Risk in case of non-compliance, etc.

To know if interventions should be combined, three issues need to be clarified:

1) Should the intervention take place?
2) What is the effectiveness of the intervention in a setting of periodic contacts?
3) How do the operational constraints of each intervention affect specific objectives (eradication) in case of combination?

The interventions need prioritization, assessment of effectiveness in relation to a particular delivery strategy and assessment of elements relative to their combination.

The questions asked in Table 9 below go into depth with details of an operational nature. The success of the combination of interventions depends to a large extent on the very practical details of their implementation. If these details are ignored, the risk is that what seemed to be a great idea, may finally be harmful to all interventions involved.

How to use the form

The form consists of three blocs:

- The first bloc allows prioritizing the intervention.
- The second bloc provides elements for the determination of the effectiveness of the intervention in a campaign setting.
- In the third bloc the feasibility of combining interventions is analysed.

The questions in the blocs should be answered by encircling the correct answer in the cells behind it.

The cells are in columns with headings that can be ignored at this stage: they are meant for the interpretation of the bloc as a whole and not for each single question. The interpretation is given below the table.

4.1 Questions

See Table 9 below.

Bloc I Criteria for decision-making related to prioritization

- The intervention should take place if:
  - questions 1 or 2 are answered in the 'Yes' column (a positive answer to either of these questions overrules all other considerations regarding whether or not the intervention should take place) or
  - questions 3 or 4 are answered in the 'Yes' column.
- The intervention should be considered if any of the answers of questions 3 to 5 are in the 'To be considered' column.

Bloc II Criteria for decision-making on effectiveness in a setting of periodic contacts.

- The intervention can take place in a setting of periodic contacts if all answers to the questions in this bloc are encircled in the 'Yes' column.
- Using a setting of periodic contacts should be considered carefully if any of the answers to the questions is encircled in the 'Reconsider' column.
- The intervention should not be administered in a setting of periodic contacts if any of the answers in the 'No' column is encircled.

Bloc III Criteria for decision-making on combining different interventions.

- Interventions can be combined if all answers to the questions in this bloc are encircled in the 'Yes' column.
- Combination should be carefully reconsidered if any of the answers to the questions is encircled in the 'Reconsider' column.
- Combination should not take place if any of the answers in the 'No' column is encircled.

Table 9: Questionnaire for assisting decision-making on interventions

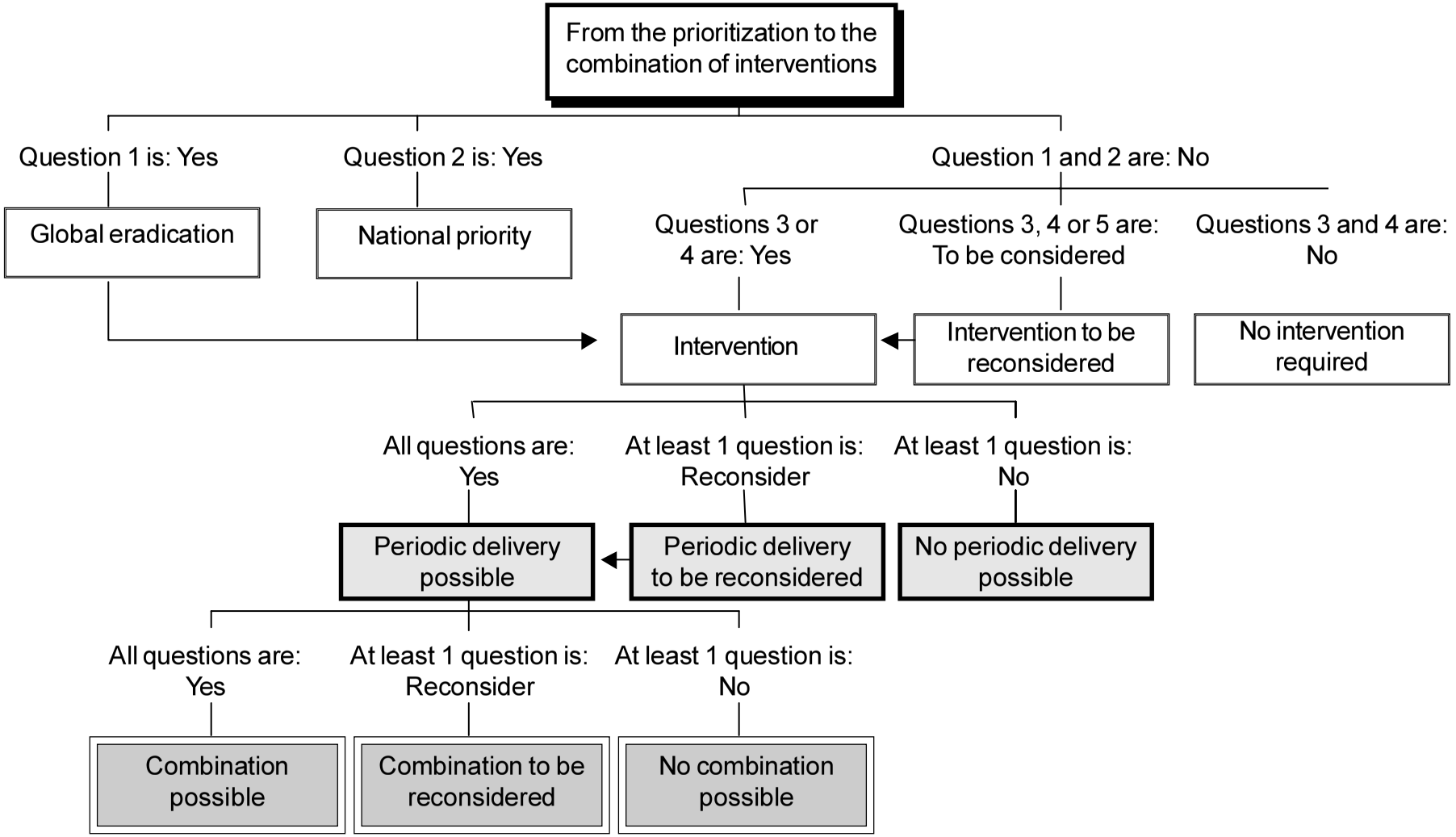
Bloc I		***What is the priority of the intervention?***		
		Yes	**To be considered**	**No**
Prioritization: should the intervention take place?	1. Is there a global eradication/elimination initiative?	**Yes (go to 6)**		**No**
	2. Is there a national eradication/elimination initiative?	**Yes (go to 6)**		**No**
	3. What is the magnitude of the problem for which intervention is considered (incidence)?	**High incidence**	**Medium incidence**	**Low incidenc**
	4. How serious is the disease in terms of mortality, permanent handicap, social disruption, or other criteria (absolute and compared to global/regional levels)?	**Very serious**	**Serious**	**Not serious**
	5. How serious is the disease perceived by the community?		**Serious**	**Not serious**
Bloc II		***Can the intervention take place in a setting of periodic contacts?***		
		Yes	**Reconsidered**	**No**
Effectiveness of the intervention: should the intervention take place in a setting of periodic contacts?	6. What is the minimum number of interventions per year required to achieve the objectives?	**1-3**	**4-6**	**> 6**
	7. Is there an epidemiological or practical reason to choose a setting of periodic contacts?	**Yes**	**No**	
	8. Does the intervention have an immediate, measurable and visible impact after each visit?	**Yes**	**No**	
	9. Does the intervention have an unacceptable negative impact in case of interruption	**No**		**Yes**
	10. Does the intervention imply referral to other health structures?	**No**	**yes**	
	11. If required, are other health structures for referral available?		**yes**	**No**
	12. Does the intervention require follow-up with a level of competence exceeding the available skills?	**No**	**yes**	
	13. Can the beneficiary or community easily be trained in that follow-up, or is assistance from the outside necessary.	**Beneficiary or community**	**outside**	

Table 9: *(continued)*

Bloc III		***Can interventions be combined?***		
		Yes	**Reconsidered**	**No**
Effectiveness of combined interventions	14. Should the intervention take place in a setting of periodic contacts: Yes if all answers in the 'Yes' column in the previous bloc were circled; Reconsider if any of the answers in the 'Reconsider' column was encircled; No if any of the answers in the 'No' column was circled.	**x**	**x**	**x**
	15. Do all interventions have to respect the same time constraint to be carried out (e.g. immunization for epidemic control versus routine)?	**Yes**	**No**	
	16. Can the intervention correctly and safely be carried out within the limits of the time constraint of the fastest one?	**Yes**	**No**	
	17. Do the compared interventions have the same target age group?	**Yes**	**No**	
	18. Do all interventions require the same minimum level of training? (no medical training, auxiliary, nurse, medical doctor, medical specialist, non-medical specialist)*	**Same level of training or training for eradication is the highest**	**Different level of training or training for intervention is not the highest**	
	19. Can one person be trained to carry out all interventions?	**Yes**	**No**	
	20. Is the equipment required for transport/storage of the same complexity? (none, simple cold chain, complete cold chain, other)	**Same type or equipment for eradication is the most complex**	**Different type**	**Equipment for eradication is not the most complex**
	21. Does the transport of the combined materials (weight/volume) require a different type of transport than for the materials of each intervention done separately? (foot, bicycle, motorcycle, car)	**No**	**Yes**	
	22. Does the type of transport required for combined interventions reduce the areas that need to be accessed for eradication activities?	**No**		**Yes**
	23. Do the interventions overlap geographically?	**Yes**		**No**

* For example, measles requires more skills than polio immunization. To add measles to polio should therefore be reconsidered.

Figure 3: Flow chart – prioritizing and combining interventions



Annex 1: Fact sheets for additional interventions

These sheets are part of the SOS guideline and give the basic characteristics of potential additional interventions. It is assumed that the decision has been taken that the intervention is suitable for SOS. A tool to help make that decision is the flow chart: “Criteria for inclusion”.

Contents

Annex 1.A: Malaria prevention through distribution of mosquito nets

Questions that are not appropriate for a specific intervention can be left open.

Type of intervention: malaria prevention through distribution and proper use of insecticide treated mosquito nets (ITNs), treatment and re-treatment of nets with pyrethroid insecticides.

Morbidity in absence of intervention: one malaria attack per year per child (0–4years) in areas of stable transmission.

Mortality in absence of intervention: About one death per year for 100 children (0–4 years) in areas of stable transmission.

Intervention's impact on morbidity: reduction of 50 to 60% of malaria morbidity.

Intervention's impact on mortality: reduction of 15 to 25% of overall mortality.

Type of products: 1) Nets: either locally available or imported (bednets, hammocks, curtains…) made preferably of polyester multi-filament, 80 to 100 deniers, 156 mesh. Other locally available netting materials such as cotton or nylon may also be suitable.

2) Insecticide for net treatment/re-treatment according to WHO specifications for active ingredients and formulations and packaged preferentially under individual doses. Currently, stable pyrethroids in water-based liquid formulations or tablets are recommended. Nets should preferably be treated on the spot but may also be purchased already treated.

Mode of administration/implementation: Nets have to be distributed to the community (several possible options, from free or partly subsidized to full profit basis), ensuring:

i) proper, consistent and sustainable use by individuals, especially by the risk group (children under five and pregnant women) and ii) regular re-treatment with pyrethroid insecticides (every six months to one year according to malaria seasonality, length of transmission season and insecticide used for treatment). In case of frequent washings (one per month and over), nets will have to be re-treated after three to four months.

Treatment of nets, made either by community or individual dipping, has to be first demonstrated to users by village health workers or SOS staff and supported by appropriate educational materials, including one very simple and illustrative sheet

specifically designed for users (instructions for use). Several options available for re-treatment, from a "Treatment Day" for the whole community to a personal method of treatment using single doses (sachets, tablets) which should be made locally available throughout the year.

Target population age group: Children under five and pregnant women. Usually, the whole family has to be covered in order to have the target group protected. ITNs are effective in areas with high as well as low malaria endemicity levels.

Criteria for inclusion of individuals: No criteria for inclusion/exclusion except that priority should be given to the target group.

Criteria for exclusion of individuals: No criteria for exclusion.

Adverse events: Possibility of misuse of insecticide during or after treatment and re-treatment. However: no significant risk for human health according to safety profiles of insecticide products used for net treatment. Possible transient non-dangerous irritation of skin, eyes or sinus with some pyrethroids immediately after net treatment. Some risk of environmental impact, although very limited, if insecticide solutions are poured in large amounts into small rivers or water ponds colonized by fishes and beneficial non-target organisms.

Number of times per year the intervention must taker place to be effective: no more than once to twice a year according to malaria seasonality, length of transmission season and insecticide used. Intervention (net distribution, treatment/re-treatment) will be more effective if made just before the beginning of the transmission season (usually, the rainy season).

Required qualifications for the administration/implementation: Basic level of village health worker if adapted pamphlet/posters with simple and readily understandable instructions for use are provided to users together with nets and insecticide. Personnel of SOS teams should be able to talk about the usefulness of ITNs in preventing mosquito trouble and malaria transmission, while encouraging people within target communities to organize themselves for payment (resource mobilization, credit) and guide them on proper and sustainable use of ITNs, including need for re-treatment.

Required follow-up of treatment: providing insecticide once or twice a year for re-treatment and nets once a year for renewing damaged ones and protecting new members within the target communities. Encourage proper, consistent and sustainable use of ITNs.

Qualifications required for follow-up: Village health worker level.

Consequence of non-compliance of follow-up: Bad or incomplete malaria prevention. When creating demand for ITNs, one should ensure that further demands will be satisfied, thus nets and insecticide must be made available during subsequent SOS missions.

Does the intervention require health education: Yes, especially for the first rounds and to re-enforce the need for appropriate use and re-treatment.

Duration of protection of one intervention: six months to one year (see above).

Specific transport and storage conditions: None for transport of nets or insecticides.

Weight/volume of drugs/equipment per unit or smallest packaging: one polyester net packed in individual plastic bag weighs about 400 to 450 g and is relatively voluminous. There is, for the first distribution round at village level, an important bulk to deliver, which may require the use of a car or a small truck depending on the target population size. One net is expected to last for three to four years on average. In general, it is estimated that communities need one net for 1.8 individuals.

Insecticide may be packed either in individual doses (sachets or tablets), one litre bottles or drums (10 to 50 litres). Most commonly, one litre bottles or individual doses. One litre of formulated insecticide is enough to treat 50 to 150 nets depending on net size and requested dosage which differs from one insecticide to the other.

Sachets (6 ml insecticide formulation) or individual tablets to treat one net are very light and can easily be stored/transported. Insecticide in bulk (drums) although cheaper, should be avoided in this context because of possible misuse and losses.

Comments: Implementation of ITNs is an efficient intervention in malaria prevention, especially in areas with low transmission (Sahelian countries in Africa, highlands of Eastern/Southern Africa and Madagascar, most of Asiatic and South American countries). It has also been successfully used to prevent transmission of leishmanisasis and filariasis.

Nets are relatively voluminous to transport. On the contrary, insecticides usually act at very low doses and do not require transportation of huge bulk.

ITNs may be well suited to the SOS concept in many areas if the problem of net transportation is solved as well as financial aspects (who pays how much to whom?).

For routine evaluation:

1) What is the size of the SOS-targeted population and, possibly, the population targeted for malaria prevention (children under five, pregnant women)?
2) How many nets does the population use prior to SOS intervention?
3) How many nets have been delivered through SOS and when?
4) How much insecticide or how many individual doses have been delivered and when?

These four questions may give a reasonable idea on coverage rate and proportion of nets that have been treated/re-treated.

For more sophisticated investigations

1) How many sleeping units are fitted with a net and how many nets have been properly installed? (Survey in a representative sample of houses/human dwellings, counting separately SOS nets and “traditional” nets.)

2) What proportion of the target population is protected (pregnant women plus children under five)? (Questions addressed to a representative sample of the population.)

3) How many nets have been treated/re-treated with insecticide? (Questions addressed to a representative sample of the population.)

4) How many people were informed about the availability of nets and insecticide? How many understood the necessity to treat their net(s) with insecticide? How many have treated/re-treated their net(s)? (Information collected through simple KAP surveys.)

Annex 1.B: Scabies

Type of intervention:	Targeted treatment of individuals with symptoms and their household members
Morbidity in absence of intervention:	Considerable, and long standing as a nuisance, leading to complications such as nephritis, skin infection, deeper tissue infection and possibly rheumatic fever
Mortality in absence of intervention:	Unclear, but probably low
Intervention's impact on morbidity:	High
Intervention's impact on mortality:	Low
Type of drugs:	Topic treatment with benzyl benzoate (twice)
	Or systemic with ivermectin (once)
Mode of administration/ implementation:	topic or systemic
Target population age group:	mainly children as index cases, and family members
Criteria for inclusion of individuals:	symptoms (itchy skin rash)
	Criteria for exclusion of individuals:
Adverse events:	irritation for topical application
	ivermectin no major side effects
Number of times per year the intervention must taker place to be effective:	1–2/year
Required qualifications for the administration/implementation:	none
Required follow-up of treatment:	none
Qualifications required for follow-up:	none
Consequence of non-compliance of follow-up:	none
Does the intervention require health education:	yes, if spread occurs by contact

Specific transport and storage conditions:	benzyl benzoate liquid in containers
Weight/volume of drugs/equipment per unit or smallest packaging:	no answer
Comments:	ivermectin might be used to treat helminthic infections as well, such as onchocerciasis.

Annex 1.C: Vitamin A

Type of intervention: In communities when vitamin A deficiency is a public health problem, high-dose vitamin A supplementation of children under 6 months and post-partum women within 6–8 weeks of delivery.

Morbidity in absence of intervention: Vitamin A deficiency is the leading cause of preventable blindness in children. Measles and diarrhoea are more severe in children who are vitamin A deficient.

Mortality in absence of intervention: no answer

Intervention's impact on morbidity: In addition to reducing the severity of measles and diarrhoea, a recent study in Papua New Guinea found that vitamin A supplementation may be an effective low-cost strategy to lower morbidity due to *P. falciparum* malaria in young children (30% fewer malaria attacks and 36% reduction in the number of parasites in their blood).

Intervention's impact on mortality:

In children 6–59 months:

- 23% reduction risk of all-cause child mortality
- 50% reduction in risk of measles mortality
- 33% reduction in risk of diarrhoeal disease mortality

Type of drugs: Vitamin A capsules 100 000 IU and/or 200 000 IU dosage.

Mode of administration/implementation: oral; cut open capsule and squeeze liquid into mouth. Age-specific dosage for prevention: 100 000 IU for children 6–11 months; 200 00 IU for children 12–59 months and postpartum women.

Equipment needed for the administration/implementation: scissors and a plastic disposal bag or container.

Required means of disposal for this equipment:

Target population age group:

- children 6–59 months
- postpartum women within 6–8 weeks of delivery.

Criteria for inclusion of individuals: Children/postpartum women living in areas with a known or suspected vitamin A deficiency public health problem (as defined by the prevalence levels of selected biological indicators of VAD). Demographic and ecological risk factors for VAD include:

- IMR > 75/1000 live births.
- U5MR > 100/1000 live births.
- Full immunization coverage or, particularly measles immunization coverage, in < 50% of children 12–23 months of age.
- Median dietary intake < 50% of recommended safe level of intake among 75% of children 1–6 year of age.
- Measles CFR $\geq$ 1%.
- No formal schooling for $\geq$ of women 15-44 years of age.
- < 50% of households with a safe water source.

Criteria for exclusion of individuals: Do NOT give high-dose vitamin A capsules to pregnant women, or women of reproductive-age who may be pregnant, because of the potential harmful effects to the fetus (birth defects).

Adverse events: Side-effects are rare when the correct age-specific dose of vitamin A is given. Occasionally, some children (depending on age between 1.5–7% of children) experience loose stools, headache, irritability, fever, nausea and vomiting. These transient side-effects disappear without treatment within 1–2 days.

Number of times per year the intervention must taker place to be effective: In child populations at risk, every 4–6 months (approx. twice per year). Postpartum women only once during the safe infertile period (6–8 weeks after delivery).

Required qualifications for the administration/implementation: basic training: (i) to screen for correct age-specific dosage; (ii) opening, administering and discarding of capsule; (iii) recording vitamin A given on immunization card.

Required follow up of treatment: every 4–6 months.

Qualifications required for follow up: Same as basic training indicated above.

Consequence of non-compliance of follow up: Assuming that nutritional diet and intake has remained the same, liver stores of vitamin A will return to their depleted state within 4–6 months.

Does the intervention require health education: Mothers/caregivers should be told that vitamin A capsules will help protect the eyesight and health of their children. They should also be encouraged to feed their children foods rich in vitamin A (green leafy vegetables, orange fruits, eggs, livers).

Duration of protection of one intervention: Following high-dose vitamin A supplementation, liver stores of children will be fully replete for a period of 4–6 months.

Specific transport and storage conditions: Vitamin A capsules do not require refrigeration or cold chain, but should be kept dry and out of direct sunlight. They should NOT be frozen. A bottle of vitamin A capsules, if unopened, will keep its potency under good storage conditions for at least two years. However, once a bottle is opened, the capsules should be used within one year. Storage of the 100 000 IU and 200 000 IU capsules (generally different colours) should be separate and clearly identified, so not to mix up the two doses.

Weight/volume of drugs/equipment per unit or smallest packaging: Both the 100 000 IU and 200 000 IU capsules come in containers of 500 capsules which weigh 222 grams per pack.

Comments: Vitamin A capsules are also used to treat measles and clinical vitamin A deficiency (i.e. xerophthalmia). It should be noted that the dosage schedule is different when using vitamin A for treatment and includes infants under six months of age.

Minimum evaluation: coverage of vitamin A capsule (VAC) distribution before and after intervention.

Maximum evaluation: baseline serum retinal survey (to assess vitamin A status of population) and then ex-post follow-up survey after several rounds of the intervention.

Annex 1.D: Soil-transmitted helminth infections

Type of intervention: control of morbidity due to soil-transmitted helminth infections.

Morbidity in absence of intervention: important, related to endemic level.

Mortality in absence of intervention: some direct mortality in children under five, otherwise indirect mortality.

Intervention's impact on morbidity: excellent.

Intervention's impact on mortality: good.

Type of drugs: any of the four following drugs: albendazole, medendazole, levamisole or pyrantel.

Mode of administration/implementation:

albendazole: single oral dose of 400 mg

medendazole: single oral dose of 500 mg

levamisole: single oral dose of 2.5 mg/kg

pyrantel: single oral dose of 10 mg/kg

Equipment needed for the administration/implementation: weight scale in case levamisole or pyrantel is used.

Required means of disposal for this equipment: none.

Target population age group: pre-school children, school age children (5–19); girls and women of childbearing age.

Criteria for inclusion of individuals: highly infected or living in a highly infected area (see WHO guidelines for treatment strategies).

Criteria for exclusion of individuals: none.

Adverse events: none.

Number of times per year the intervention must taker place to be effective: 1–3 (depending on epidemiological situation).

Required qualifications for the administration/implementation: nurse, nurse aid or teacher.

Required follow up of treatment: none.

Qualifications required for follow-up: N/A.

Consequence of non-compliance of follow-up: none.

Does the intervention require health education: yes, as a complement.

Duration of protection of one intervention: depending on the endemic level, four months to one year.

Specific transport and storage conditions: none.

Weight/volume of drugs/equipment per unit or smallest packaging: tins 1000 tablets.

Comments: further details on treatment strategies are contained in the WHO guidelines for the evaluation of soil-transmitted helminthiasis and schistosomiasis at community level – WHO/CTD/SIP/98.1.

Annex 1.E: Schistosomiasis

Type of intervention: control of morbidity due to schistosomiasis.

Morbidity in absence of intervention: important, related to endemic level.

Mortality in absence of intervention: mainly late, indirect mortality.

Intervention's impact on morbidity: excellent.

Intervention's impact on mortality: good, long-term.

Type of drugs: praziquantel .

Mode of administration/implementation: single oral dose, 40 mg/kg.

Equipment needed for the administration/implementation: weight scale.

Required means of disposal for this equipment: none.

Target population age group: school age children (5–19); adults in special occupation groups (irrigation workers, fishermen).

Criteria for inclusion of individuals: infected or living in a highly infected area (see WHO guidelines for treatment strategies according to the epidemiological situation).

Criteria for exclusion of individuals: pregnancy (as a general rule).

Adverse events: generally mild side-effects (abdominal pain, transient diarrhoea, nausea, dizziness), occasionally benign allergic reactions if patient is heavily infected.

Number of times per year the intervention must take place to be effective: one

Required qualifications for the administration/implementation: nurse, nurse aid or teacher.

Required follow-up of treatment: check for vomiting and allergic reactions during hours following treatment.

Qualifications required for follow-up: nurse or nurse aid.

Consequence of non-compliance of follow-up: no severe consequences.

Does the intervention require health education: yes, as a complement.

Duration of protection of one intervention: depending on the endemic level, but at least one year.

Specific transport and storage conditions: none.

Weight/volume of drugs/equipment per unit or smallest packaging: tins of 500 or 1000 tablets.

Comments: the decision to indiscriminately treat all individuals in a population or in certain high-risk groups, or to treat individuals selectively (after some form of diagnosis like a urine dipstick, or microscopic examination) depends on the endemic level (prevalence and intensity of *Schistosoma* infection in a population). WHO guidelines are available to this respect (Guidelines for the evaluation of soil-transmitted helminthiasis and schistosomiasis at community level – WHO/CTD/SIP/98.1).

Annex 1.F: Malaria treatment

Type of intervention: Provision of early diagnosis and effective treatment of malaria at community level through SOS interventions in sub-Saharan Africa.

Morbidity in children under 5 in the absence of intervention:

1–3 clinical episodes of malaria per child

3–7% of clinical episodes are severe (potentially life threatening) malaria

1–2% of severe episodes result in neurological sequelae

10% prevalence of malaria-associated anaemia

Mortality in the absence of intervention: Malaria contributes to 25% of the under-five mortality rate in sub-Saharan Africa.

Intervention's impact on morbidity: While hard data are not available on the impact of community-based malaria disease management interventions, significant reduction can be expected in the incidence of severe malaria, neurological sequelae and prevalence of anaemia (probably >30%).

Intervention's impact on mortality: Significant reduction of total malaria mortality rate (as an effect of impact on both direct and indirect malaria mortality rates). Few uncontrolled studies have shown >20% reduction in mortality.

Type of drugs: Effective first-line treatment of malaria (chloroquine in sensitive areas, sulfadoxine-pyrimethamine or amodiaquine)

Mode of administration/implementation: Pre-packaging of drugs, training of providers/dispensers and health education of the community to improve compliance. Delivery from SOS through permanent human resources in the community, such as village health agents, women groups, school teachers, etc. System in place to ensure high turnover of pre-packaged drugs (maximum one month) to avoid drug degradation from sunlight and humidity.

Equipment needed for administration/implementation: Drugs in pre-packaged forms (sealed plastic bags with full individual course adjusted for age/weight), training materials for providers and health education materials for the community. For each dispenser: water-resistant bag for transport of drugs, and registration book/pencil for patient recording.

Required means of disposal for this equipment: Not applicable.

Target population age group: Children under five years of age in areas of intense transmission. All age groups in areas of moderate or low transmission.

Criteria for inclusion of individuals: All febrile patients detected by palpation or history of recent fever (within the previous 2 days).

Criteria for exclusion of individuals: None.

Adverse events: No significant adverse events when these drugs are used for treatment of malaria.

Number for times per year the intervention must take place to be effective: All year round even in areas with seasonal malaria.

Required qualifications for administration/implementation: Preferably ability to read and write for recording, albeit specific forms can be devised for recording by illiterate village health workers.

Required follow-up of treatment: Continuous presence of drug providers in the village to detect early and (possibly) refer treatment failures.

Qualifications required for follow-up: Same as for administration/implementation.

Consequences of non-compliance of follow-up: Mismanagement of treatment failures, evolution into severe malaria or chronic anaemia, patient distrust in the intervention and change in health-seeking behaviour.

Does the intervention require health education: Yes.

Duration of protection of one intervention: Not applicable (maximum 3 days?)

Specific transport and storage conditions: None (see above "mode of administration/ implementation").

Weight/volume of drugs/equipment per unit or smallest packaging: Up to a maximum of 20g (vol. = 15ml? for a sealed plastic bag with 2–3 tabs).

Annex 1.G: Iodine supplementation

Type of intervention: In areas where iodine deficiency disorders (IDD) are a severe public health concern and there is an absence of any salt iodization programme and one is not planned for within 1–2 years, oral iodized oil capsules may be provided.

Morbidity in absence of intervention: people affected by iodine deficiency will have cretinism, goitre, reduced mental function and increased neonatal mortality.

Mortality in absence of intervention: stillborns, miscarriages.

Intervention's impact on morbidity: elimination of IDD such as goitre and cretinism.

Intervention's impact on mortality: decrease in number of still births, miscarriages.

Type of drugs: iodized oil – capsule form annually

Pregnant women 300–480 mg

Non pregnant women 400–960 mg

Infants 100–300 mg

1 – 5 yrs 300–480 mg

5 – 15 yrs 400–960 mg

males 400–960 mg

Mode of administration/implementation: oral.

Equipment needed for the administration/implementation: Good logistics.

Required means of disposal for this equipment: none

Target population age group: IDD – pre-school children and pregnant women

Criteria for inclusion of individuals: Provide to all individuals in populations at risk (especially vulnerable are children and pregnant women). Public health concern when total goitre rate in school age children is > 5%.

Criteria for exclusion of individuals: patients more than 40 years.

Adverse events: No adverse events if appropriate doses are given.

Number of times per year the intervention must take place to be effective: once a year.

Required qualifications for the administration/implementation: none.

Required follow-up of treatment: on annual basis if required.

Qualifications required for follow-up: same as initial requirement but need to initiate salt iodization programme.

Consequence of non-compliance of follow up: IDD.

Does the intervention require health education: nutrition education.

Duration of protection of one intervention: one year.

Specific transport and storage conditions: none.

Weight/volume of drugs/equipment per unit or smallest packaging: no answer

Comments: Iodine supplements for areas of severe endemic not yet reached by iodized salt, which is the preferred strategy. The use of iodized oil should not divert health authorities from implementing a programme of salt iodization.

Annex 1.H: Iron supplementation

Type of intervention: Prevention and control of iron deficiency anaemia (IDA).

Morbidity in absence of intervention: no precise figure, but more than 50% of preschool children and pregnant women in developing countries suffer from IDA.

Mortality in absence of intervention: maternal mortality is increased because of IDA.

Intervention's impact on morbidity: reduction of IDA.

Intervention's impact on mortality: reduction of maternal mortality.

Type of drugs: Iron/foliate tablets. 60 mg iron, 400 mg folic acid for pregnant women.

12.5 mg iron and 50 mg folic acid for pre-school children

Mode of administration/implementation: Oral.

Equipment needed for the administration/implementation: Good logistics.

Required means of disposal for this equipment: no special disposal system required.

Target population age group: Infants, pregnant women and if possible childbearing age women.

Criteria for inclusion of individuals:

All pregnant women with haemoglobin levels below 11.0

Non-pregnant women with haemoglobin levels below 12.0

Children (6 months–5 years) with haemoglobin levels below 11.0

Children (5–11 years) with haemoglobin levels blow 11.5

Children (12–13 years) with haemoglobin levels below 12.0

Criteria for exclusion of individuals: severely malnourished children

Adverse events: No adverse events if appropriate doses are given. But minor side-effects causing problems of compliance.

Number of times per year the intervention must take place to be effective: daily intake for several months.

Required qualifications for the administration/implementation: none.

Required follow-up of treatment: monitoring of iron levels.

Qualifications required for follow-up: same as initial requirements.

Consequence of non-compliance of follow-up: IDA levels remain depleted.

Does the intervention require health education: nutrition education.

Duration of protection of one intervention: one day, if provide only one capsule.

Specific transport and storage conditions: none.

Weight/volume of drugs/equipment per unit or smallest packaging:

Comments: Iron supplement can contribute to prevent IDA, but cases of anaemia in developing countries are also due to other causes (hookworms, malaria, infection, micronutrient deficiency). It is essential to combine iron supplements with other public health measures to obtain the full benefit on health of iron supplement. Note, there are separate guidelines for treatment of severe anaemia (hb<7.0g/dl) which require different dosage.

Annex 1.I: Lymphatic filariasis

Type of intervention: mass chemotherapy: albendazole with either Di Ethyl Carbamazine or ivermectin

Morbidity in absence of intervention: variable from country to country and within country

Mortality in absence of intervention: negligible

Intervention's impact on morbidity: prevents lymphatic filariasis infection and, therefore morbidity, disability and economic loss in all endemic populations. Improves health of children and women of child bearing age by intestinal de-worming effect

Intervention's impact on mortality: nil

Type of drugs: tablets

Mode of administration/implementation: oral administration

Equipment needed for the administration/implementation: nil, except a simple tool for measuring height for calculation of dose of ivermectin, like a stick marked for different height ranges for calculation of dose.

Required means of disposal for this equipment: no disposal required.

Target population age group: above two years in case of the DEC + albendazole combination (excluding countries where onchocerciasis is coendemic); above five years in case of ivermectin + albendazole combination (in countries with coendemic onchocerciasis). Areas with loa loa infection to be excluded.

Criteria for inclusion of individuals: all above two or five years, depending upon drug combination, residing in defined endemic area.

Criteria for exclusion of individuals: pregnant and breastfeeding women; children below the age of two years for DEC + albendazole combination and below five years for ivermectin + albendazole combination; severely sick individuals.

Adverse events: mostly mild and self-limiting.

Number of times per year the intervention must take place to be effective: at least once a year.

Required qualifications for the administration/implementation: no specific qualification required. Should understand simple instructions, and preferably be able to write numbers.

Required follow-up of treatment: passive follow-up for adverse-events if any.

Qualifications required for follow up: none.

Consequence of non-compliance of follow up: no answer

Does the intervention require health education: yes.

Duration of protection of one intervention: one year.

Specific transport and storage conditions: none.

Weight/volume of drugs/equipment per unit or smallest packaging: no answer

Comments: the Programme for Elimination of Lymphatic Filariasis envisages the administration of mass chemotherapy to the population at risk. Mass chemotherapy can be achieved by either DEC-fortified salt or mass administration once annually of drug combination of albendazole with DEC or ivermectin. DEC cannot be given in areas with coexistent onchocerciasis – most of Africa and the Americas – where ivermectin needs to be administered.

DEC, ivermectin and albendazole are already being administered in many countries for filariasis and helminthiasis. Community-directed treatment strategies have also been implemented.

Annex 1.J: Guinea worm eradication

Type of intervention: Guinea worm eradication.

Morbidity: in absence of intervention, not predictable. However, occurrence of new cases is seasonal and can be very high, up to 80–100% of the population of a village. Factors influencing transmission from one year to the next are mostly climatic.

Mortality: in absence of intervention, low. However, a substantial number of unattended patients will develop secondary infections of the emerging worm wounds, which will develop into septicaemia. Multiple worm emergence (can be more than 10 at a time) and immunosuppression makes patients particularly vulnerable to septicaemia.

Intervention impact: highly effective impact on morbidity and mortality (direct relationship). The reduction of incidence can reach 90% when appropriate prevention steps are adopted (case-containment strategy, health education, improvement of drinking water quality).

Drugs: not available to treat cases. They do not exist. Furthermore, no immunity is acquired on infection. Thus drinking contaminated water will cause single or multiple infections year after year (emergence of the worm takes approximately 12 months after infection).

Prevention: measures are implemented through trained health personnel and Village Based Volunteers. They execute the case-containment strategy (active case search, early detection and detection), the distribution of filter cloth (monofilament nylon), and the mobilization of the community through health education messages on safe drinking water. At national level, prevention can be implemented by providing villagers with safe water sources (bore holes, deep wells and piped water).

Equipment and material: required for logistics and preventive measures. Supervising health staff will need transportation for monthly supervision visits and Village Based Volunteers to go from household to household (at least one vehicle, motorbikes and bicycles). Prevention requires nylon fine-mesh filter cloth, and medical kit for wound management (emerging worm). Kits include basic instruments (scissors, tweezers, etc.) bandages, gauze, disinfectant, antibiotic ointment.

Disposal of case containment material: not needed.

Target population: general. No particular age group is less affected than another. Young children are probably more exposed to infection by lack of attention to preventive measures.

Criteria for inclusion: regarding preventive measures, all guinea worm infected individuals must be attended to (cases contained) and all water sources must be prevented from becoming contaminated. This is the only condition for interruption of transmission of the disease.

Criteria for exclusion: there is no exception in implementing preventive measures.

Adverse events: none.

Frequency of interventions: surveillance of guinea worm must be maintained throughout the year. The seasonal pattern of transmission of the disease, however, will cause an annual period of activity upsurge. The high transmission season can occur either during the rainy or the dry season, depending on the areas concerned. It is rather rare that two high transmission seasons occur in the same area.

Qualifications required of staff for programme implementation: all staff and volunteers must be trained to ensure proper implementation of supervision and prevention activities. Equipment and material must be available on time, so timely distribution and use can take place. Information flow must be smooth. Data collected at village level must move regularly, on a monthly basis, to the district, province and national level, so any guinea worm case increase can be immediately identified and attended to.

Programme follow-up: regular, monthly, supervision of VBV must take place. Supervisors are not necessarily health staff; they can be teachers, agriculture extension workers or other personalities of the village. Supervision of supervisors must take place from time to time. No supervision results in loss in motivation followed by inadequate prevention activities at all levels. One of the important roles of supervision is the replenishment of VBV case-containment material.

Health education: essential at all levels. Individual and community participation and compliance in prevention measures depends on understanding.

Storage specifics for programme material: although filter cloth requires no particular attention, rolls of cloth must be protected from rodents. Medical kits must be renewed regularly (for gauze sterility and antibiotic cream effectiveness). The pesticides Abate used for intermediate host destruction (Cyclops) must be kept in its drum and out of public reach.

Weight and volume of containment material per kit (VBV pack): enough for the management of approximately 8–10 cases. Each kit is approximately 1.5 kg. Thirty kits would occupy a space of one cubic meter. The number of kits required must be based on the number of endemic villages and case predictions. In villages under surveillance where transmission has been interrupted, a single kit would be sufficient to contain any case that might occur, in a timely fashion. Replenishing material for the kit must be based on field requests for the content of the kit (see programme follow-up).

Integration of activities: the guinea worm VBV network can be used successfully for other activities. When the number of cases of guinea worm has been reduced, VBV can and are often willing to participate in other activities. The VBV network in war-affected areas, where no health services are available, is particularly useful as volunteers can deliver, to a limited extent, health-related services.

Annex 1.K: Environmental management for disease vector control

Type of intervention: Environmental management for disease vector control (malaria, schistosomiasis, filariasis, dengue/dengue haemorrhagic fever, leishmaniasis, Chagas disease).

Morbidity: varies per region and per disease, substantial burden of disease due to Vector Borne Diseases in sub-Saharan Africa, South and South-East Asia, parts of the Western Pacific and foci in the Americas.

Mortality: malaria > 1 million/year, but attribution to environmental risk factors complex and varies per region.

Intervention's impact on morbidity: intervention aims at transmission risk reduction, so it:

1) contributes to the sustainability of disease-oriented interventions;
2) supports health of vulnerable groups with no or irregular access to health services; and
3) reduces infection intensity.

Intervention's impact on mortality: difficult to attribute – transmission reduction rather than disease reduction.

Type of drugs: N.A.

Mode of administration/implementation: strategic risk assessment followed by design and implementation of location-specific environmental management measures and monitoring of transmission indicators.

Equipment needed for implementation: varies from simple shovel/spade type tools, and materials for personal protection (nets, screens) to hydraulic structures in irrigation schemes and strategically located cattle sheds where zoo prophylaxis can be practised.

Required means of disposal: can be re-utilized.

Target population: depending on disease/region: entire community or groups within the community that are, because of behaviour, occupation, immune status or living conditions, exposed to increased risks.

Criteria for inclusion: should be community driven.

Criteria for exclusion: not applicable

Adverse events: major climatic/demographic changes that disturb the balance of risk factors

Number of times the intervention must take place: this is not a discrete intervention but an ongoing process, requiring regular monitoring and incentives.

Required qualifications for implementation: sound knowledge of vector biology and ecology; capacity to engage the local community in a participatory approach.

Required follow-up: monitoring.

Qualifications: as previously mentioned.

Consequence of non-compliance: increased transmission risks, increased morbidity/mortality.

Does the intervention require health education: yes, on:

1) environmental management measures (possibly with agriculture extension);
2) monitoring of transmission risk factors and transmission indicators.

Duration of protection:

1) Environmental modification: long-term effect (years);
2) Environmental manipulation needs repeated action.

Specific transport/storage conditions: depends on disease/region; generally no special conditions

Weight/volume: N/A

Comments: this is an environmental health approach of an exclusively preventive nature, of a strong intersectoral nature.

Annex 1.L: Onchocerciasis

Type of intervention: onchocerciasis control.

Morbidity in absence of intervention: high prevalence of the disease and of blindness within the endemic population.

Mortality in absence of intervention: nil.

Intervention's impact on morbidity: notable reduction of the prevalence of the disease and of the blindness.

Intervention's impact on mortality: nil.

Type of drugs: Mectizan (ivermectin).

Mode of administration/implementation: oral.

Equipment needed for the administration/implementation: registration book, height-measuring stick.

Required means of disposal for this equipment: nothing special.

Target population age group: persons from five years old.

Criteria for inclusion of individuals: persons from the age of five years and measuring 90 cm of height.

Criteria for exclusion of individuals: children under the age of five years or less than 90 cm in height; pregnant women; women who are breastfeeding a baby who is less than a week old; people who are very sick.

Adverse events: itching; oedema (sometimes generalized but usually localized, on the face, for example); fever; pain in any part of the body; dizziness or syncope; diarrhoea, etc.

Number of times per year the intervention must take place to be effective: once or twice a year.

Required qualifications for the administration/implementation: no special professional qualification is required. The distribution is done by the communities (community distributors who are community members trained for the distribution of the drug to their population).

Required follow-up of treatment: the monitoring and the supervision are done by health workers.

Qualifications required for follow-up: nurses, medical doctors or other qualified health workers.

Consequence of non-compliance of follow-up: wrong treatment of the population by community distributors (misdosages) or non-treatment, shortage of drug, etc.

Does the intervention require health education: yes.

Duration of protection of one intervention: About one year.

Specific transport and storage conditions: nil.

Note: the tablets cannot be used four months after the opening of the package (bottle).

Weight/volume of drugs/equipment per unit or smallest packaging: 500 tablets of 3 mg per bottle

Comments: most of the side-effects are temporary and may disappear within 24 or 48 hours. The exclusion criteria are also temporary.

Evaluation: both process and intervention evaluation are regularly undertaken. On average, entomological evaluation is done annually while epidemiological evaluation is every three years by the programme staff. In addition to this, programme evaluation is also carried out by a team of external experts at least every six years (corresponding to the duration of each funding phase) or any time at the request of the programme governing body. Such evaluations aim, among others, to assess programme achievements, to consequently readjust operational strategy where necessary and to better plan for the devolution of residual activities to the participating countries at the end of the programme.

Annex 2: Costing framework for SOS

Projected costs of SOS should be estimated in the project budget. In the budget all costs of planned activities according to resource items should be specified. During the course of SOS, expenditures should be closely monitored, and it should be ensured that these are kept in line with what was predicted in the budget. If at any time there is a mismatch between expenditures and budget, the budget must either be modified or there must be a change in activities to keep expenditures back on track.

The budget should be prepared using the "ingredient approach", which involves translating the general description of the service into specific resource requirements. All resources required should be listed along with the quantities of each resource, the unit price and for capital items, the expected life of the item. An example of a cost estimation for a long-tem budget preparation of a hypothetical SOS project is outlined in Table 10.

The following principles should be followed when estimating costs of SOS:

1) The value of capital items should be annualized so that these can be compared with recurrent costs in a useful way. The economic costs of capital items on an annualized basis should be calculated from the current value of the item, its useful life and a discount rate (as recommended by the economic planning office or the ministry of finance should be used).

2) If SOS share resources with district health services or other programmes, the costs of these should be estimated as "shared inputs". A proximation of the costs of shared inputs should be estimated by allocating a certain percentage of the total costs to the SOS services.

3) Cost estimates should reflect economic as well as financial costs. That is, even resource items that are not paid for by the SOS project, such as vaccines donated by a third party, should be included at their full value. Only if all inputs are included at their full value can cost estimates support the long-term sustainability of SOS.

Table 10. Example of profile for cost estimation of a SOS programme including immunization services, vitamin A supplementation, malaria bednets and malaria treatment

Input	Description (type and unit of measure)	Quantity (number of units) Q	Price per unit P	Useful life	Annulization factor	Annulized costs[4] (Q x P)/A
Capital Building space Vehicles Motor cycles Cold chain equipment Training, non-recurrent Social mobilization, non-recurrent						
Subtotal, capital						
Recurrent Medical officer Nurse Nursing assistant						
Subtotal, personnel						
Measles vaccine DTP vaccine Vitamin A capsules Chloroquine Primaquine Paracetamol						
Subtotal, drugs and vaccines						
AD syringes						
Subtotal, medical supplies						
Bednets Safety boxes Fuel Stationery Vaccination cards						
Subtotal, other supplies						
Cold chain, operation & maintenance Vehicles, operation & maintenance Buildings, operation & maintenance Training, recurrent Social mobilization, recurrent						
Subtotal, services						
Subtotal, recurrent						
Total						

[4] For recurrent costs the annulization factor is 1

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