1.0. DISEASE SURVEILLANCE – AND EARLY WARNING AND RESPONSE NETWORK (EWARN)

1.1. Training and orientation on AFP/Yellow fever surveillance

During this period when South Sudan is faced with an outbreak of yellow fever WHO and its EWARN partners have expanded yellow fever surveillance to the whole of Eastern Equatoria region. As part of this effort, training and orientation for health workers, polio AFP surveillance staff and community leaders were carried out.

1.1.1. Training of health workers and AFP surveillance officers

WHO EWARN and Polio program organized and conducted 2-day integrated AFP/Yellow fever surveillance trainings in 6 different locations in Eastern Equatoria. A total of 140 health workers, polio field staff and community leaders were trained. The workshops were conducted in Yei, Katigiri, Bamurye, Kajokaji, Tal and Narus. More similar trainings are planed for Ikotos, Chukudum, Lohutok, Lobone and Nimule. The aim of these trainings is to sensitize health workers, polio field staff and community to be alert to detect and report any suspected case yellow fever promptly so that timely action and response can be carried out.

The main topics stressed during the training included a brief background on yellow fever, the recent outbreak of yellow fever in Sudan, epidemiology of yellow fever, recommended case definition of yellow fever, the rationale for yellow fever surveillance and the role of participants in early detection and reporting all suspected cases yellow fever.

1.1.2. North/South and Cross Border Meeting on YF

WHO South Sudan and UNICEF/OLS organized a one day meeting to discuss how to coordinate the response to the yellow fever outbreak in Torit County with the GOS and cross border coordination with Uganda and Kenya. The meeting was held on August 7th, 2003 at Hilton Hotel Nairobi. A total of 19 participants representing 6 governments, UN agencies and NGOs from Sudan north, Sudan south, ESARO, Kenya and Uganda attended the one-day meeting.

The objectives of the meeting were:

- To share information on the Yellow fever response in Sudan northern and southern sectors, as well as in neighboring Kenya and Uganda so as to state where we are now.
- To identify any gap areas not only between the north’s and the south’s Yellow Fever vaccination campaigns in Eastern Equatoria, but also gaps inside each part of the territory.
Discuss ways to ensure complete coverage.

The meeting listened to presentations on the response effort to the YF outbreak in Torit County from Sudan north and southern sectors, and overviews of yellow fever in Uganda and Kenya. The gap areas were discussed in a group and presented during a plenary session.

At the end of the meeting the following recommendations were adopted:

1.2 Sudan: Northern Sector
- YF campaign to be extended to Gap Areas identified
- Intensification of surveillance activities
- Cross-border coordination (weekly exchange of Information & Updates by WHO)

1.3 Sudan: Southern Sector
- Sero-conversion and vector surveys to be considered
- Post vaccination survey to ascertain vaccination coverage.
- Train and engage local community members for vaccination in insecure area (LRA, EDF, Militia areas).
- Introduce routine Yellow Fever vaccination in the areas not covered during the campaign.
- Cluster EPI coverage survey to be done - September
- Need to agree on whether mop-up campaigns are needed, or not.
- Cross-border coordination (weekly exchange of Information & Updates by WHO)
- Improved Social mobilization in all subsequent campaigns
- EWARN teams to be expanded to cover each county for the Southern Sudan.

1.4 Uganda
- MoH should contact partners/donors for Resource mobilization to cover the operational costs for the YF campaign as vaccines are awaited.
- Implementation of the vaccination campaigns as soon as all requirements are available.
- Continued surveillance.
- As a result of this meeting, will recommend to YF Taskforce in Uganda that YF vaccination in southern Sudan bordering districts is a priority.
- Uganda MoH should be more vigilant (plan for mobilization, resources etc.)
- Training in Emergency Preparedness and Response Training
- Cross-border coordination (weekly exchange of Information & Updates by WHO)

1.5 Kenya
- To include pregnant women in their target population for the vaccination campaign in Turkana district, as per WHO guidelines.
- Cross-border surveillance to cover epidemic prone and other priority diseases in the border districts.
- Strengthen/revitalize Yellow fever sentinel sites.
- Cross-border coordination (weekly exchange of Information & Updates by WHO)
- Kenyan MoH should be more vigilant (push for urgent mass vaccination, mobilization, resources etc.)

1.6 Regional
- Regional (EMRO/AFRO) Contingency Plan should have a flexible Emergency stock of 40,000 Yellow Fever vaccines (this covers two weeks - enough time to order the vaccine and cost about 16,000 US dollars)

1.7 Cross-Cutting
- More information needed on any adverse effects observed after Yellow Fever vaccination. Forms used for Vaccination in Sudan are available at www.unsudanig.org
- Vaccination cards for verifying and validating coverage and for easily identifying those that have been vaccinated should be provided.

- More efforts by all those concerned to discuss the issue of LRA to ensure coverage of Yellow Fever in gap areas due to LRA insecurity.
- During this period, need at cross border points for checking on yellow fever vaccination status (Kenya, Uganda and Sudan).
- Need for updating of Contingency plans (Region, Country, District, etc.)
- Need to improve our response mechanism
1.2. Preparedness, Detection and Response

1.2.1. Forecasting and preparedness
Due to substantial early rains throughout southern Sudan this year, EWARN has received many reports of upsurge of malaria from the regions. A significant number of medical evacuations among OLS field staff have also been observed. As the rains continue to pound most parts of the South with resulting floods we predict that more cases of malaria and other water borne disease are likely to be expected. Upper Nile and Bahr el Ghazal regions are the most affected.

1.2.2. Detection, verification and response
A total of 4 rumors of disease outbreak were reported to WHO/EWARN office in Loki choggio. Out of these only two were confirmed the rest were false rumors. Outbreaks of measles were confirmed in Lomohidang Payam in Torit County and Maridi County during the month of August.

The measles outbreak in Maridi was first reported in May/June. Mass vaccination was carried out in the affected districts at the time and the outbreak was reportedly contained. In the last week of July new cases began to reappear in the OPD and 19 cases were admitted in the hospital. A total of 47 cases including 24 deaths (CFR = 51%) were recorded by August 23, 2003. The strange thing noticed in this outbreak is that 27 of the cases including 14 deaths were among adults aged 15 – 45 years old and the high case fatality rate. Equally puzzling is the fact that in the last 3 consecutive years there has been outbreaks of measles and in all of them mass measles vaccination campaign were carried out in the area. UNICEF has also conducted measles and TT targeted mass vaccination in the same area last year. WHO/EWARN has ordered for further investigations in this outbreak. Blood specimens from 10 patients have been sent to Kenya Medical Research Institute (KEMRI) to be analyzed for measles and other viral aliquots.

In Chakari and Chorokol, Torit County a total of 9 children were diagnosed with measles. There were no deaths reported. DOT, WHO and UNICEF responded with case management and mass vaccination against measles. The outbreak has been controlled. There were no new cases reported in the last week of August.

1.2.3. Mass vaccination for YF completed in Nimule, Magwi County
As part of the continuing response to the yellow fever outbreak in Eastern Equatoria, an emergency vaccination against yellow fever was conducted between August 18th through August 31st, 2003 for a targeted population of 49,810 people in Nimule Payam, Magwi County. A total of 8,640 children aged 6 to 59 months were also targeted for vaccination against measles during the campaign. The campaign was spearheaded by American Refugees Committee (ARC) an American international NGO working in the area. DOT, CRS and the local counterpart, SRRC, assisted the NGO.

A total of 29,305 people aged above 6 months were vaccinated during the campaign giving coverage of 58.83%. The doses of YF vaccines used were 31,700 thus the vaccine wastage was 7.56%.

The number of children vaccinated against measles was 5,098 giving vaccination coverage of 59%. The vaccine wastage was 4.17%.

1.3. Two new MDs recruited for EWARN
Two Sudanese medical doctors were recruited for the vacant posts of public health coordinators for Equatoria and Bahr el Ghazal regions. This completes the list of PHC needed for the EWARN program.
Measles Outbreak: Maridi, WEQ
Recorded cases by age group
August 2003

1. POLIO IMMUNIZATION AND AFP SURVEILLANCE

Polio Eradication in southern Sudan: Progress to Date

The Regional Committee of the World Health Organization (WHO), Eastern Mediterranean Regional Office (EMRO) adopted a resolution to eliminate poliomyelitis in 1988. This article summarizes polio eradication activity in southern Sudan through August 2003. Despite tremendous achievement, southern Sudan must overcome many challenges to verify interruption of poliovirus transmission and maintain certification standard surveillance.

Supplemental Immunization Activities

The first SIA in southern Sudan was conducted in 1998. In 1999, activities were accelerated and by 2000 over 200 full-time staff were hired to conduct polio eradication activities. To eliminate gaps in coverage, sub-national immunization days (SNIDs) were conducted in the border areas and synchronized with the Central African Republic, Democratic Republic of Congo, Uganda, and Ethiopia. In 2000, multiple rounds of NIDs and SNIDs were organized. A house-to-house strategy was used to reach more children. All subsequent campaigns used a house-to-house strategy. During 2001 and 2002, extensive SIAs were conducted. Three rounds of NIDs and two SNIDs were carried out each year. In 2003, two rounds of NIDs were conducted and two SNIDs are planned for September and October.

During NIDs, over 7000 vaccinators are hired temporarily and trained to deliver vaccine in southern Sudan. Every village (or boma, or cattle camp, etc) is mapped and each vaccination team is assigned the areas they are expected to cover during each day of the campaign. Logistical needs are addressed and a
distribution plan for vaccine, cold boxes, ice (if there is no cold chain in the area), tally sheets, and supplies is developed. A social mobilization plan is also developed for each region. Due to the lack of media in southern Sudan, alternative methods are used such as sporting events, concerts and plays.

At least once a year, the field staff from northern and southern Sudan come together for the North-South Coordination meeting. During the meeting, they map out "gap areas" between the programs and arrange for these areas to be covered during the SIA's. They also brief each other on the status of the program in each region. Updated data is shared weekly between the WHO and UNICEF offices in Khartoum and Nairobi. In addition, cross-border meetings are attended yearly by polio staff and NIDs are synchronized with neighboring countries whenever possible.

**Results of Supplemental Immunization Activities**

The quality of successive SIAs improved. In the 1998 NID campaign, 809,245 children were vaccinated. In 2002, 1.3 million children under 5 years of age were vaccinated during the last NID round. The overall results of the 2000-2003 campaigns can be found in Table 2 below. The impressive 2002 SNID and 2003 NID achievements resulted from the first unimpeded humanitarian access since the polio program began.

**Table 2: Results of Supplemental Immunization Activities, southern Sudan 2000-2003**

<table>
<thead>
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<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
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<td>1,012,037</td>
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<tr>
<td>SNID Round 2</td>
<td>527,017</td>
<td>542,767</td>
<td>1,108,316</td>
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</table>

**AFP Surveillance**

AFP surveillance was initiated in late 1998. Given the logistical constraints in southern Sudan, surveillance was introduced in phases. With the acceleration of polio eradication activities in 1999, and the hiring of over 200 field staff in 2000, the surveillance system was strengthened and spread to every region.

Active surveillance visits are conducted by field assistants in more than 400 sentinel sites throughout southern Sudan. Initial and detailed case investigations, specimen collection, and sixty-day follow-up investigations are conducted by focal points and, when possible, medical officers. The specimens are frozen and flown to Nairobi on OLS chartered planes where they are transported to the Kenya Medical Research Institute (KEMRI) for initial tests. Isolates requiring intra-typic differentiation (ITD) are sent to the WHO-AFR regional reference laboratory in South Africa.

Each year, all international and national focal points receive an intensive training on AFP. Attendees return to their respective regions and conduct training workshops for all county supervisors and field assistants. In addition, a training for sentinel site workers has been introduced.
Data is collected in the field and sent by pouch to the national level in Nairobi. Case notification and arrangements for stool specimens are communicated immediately through radio and email. Zero reports and work plans are submitted monthly. Data management has been improved by: the revision of AFP surveillance guidelines and forms, installation of IFA software, and increased analysis of AFP data.

**AFP Surveillance Indicators**

Southern Sudan is achieving certification standard surveillance. Since 2000, southern Sudan has exceeded the WHO-established minimum AFP reporting rate of 1 non-polio AFP case per 100,000 children aged <15 years, which indicates a sensitive surveillance system. In 2003, the annualized rate is 2.39.

The second key indicator of the quality of AFP surveillance is a minimum of 80% adequate stool specimens collected for all persons with AFP. The target was met for the first time in 2002 after steady improvement in this indicator, and is currently 82%.

At the end of 2001, southern Sudan (as part of Sudan) changed from the clinical classification scheme to the virological classification scheme. This change was implemented retroactively for 2001. In March 2002, the southern Sudan Expert Review Group met for the first time and classified the 17 pending cases from 2001 (those that had inadequate stool collection and no wild virus isolated and residual paralysis/patient died/patient lost to follow-up). The Expert Review Group classified 6 of these pending cases as non-polio AFP and 11 cases as polio-compatible. The Expert Review Group met quarterly in 2002 and classified 12 cases: 11 were classified as non-polio AFP and 1 as polio-compatible. The decrease in compatible cases in 2002 is due to an increase in information about each case: a detailed case investigation by a medical officer is now required for every AFP case. In 2003, the expert review committee has classified 4 cases; all were discarded.

Low-level transmission of wild poliovirus in southern Sudan was identified in 1999 and again in 2001. Poliovirus type 1 was isolated from one case in Ruweng, Upper Nile in April 2001. No further wild virus has been isolated from northern or southern Sudan.

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