REPORT

Evaluation of community-based surveillance for Guinea worm, South Sudan, 2006

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Abstract

Background: Guinea worm disease (dracunculiasis) is an ancient parasitic disease and is set to be the next disease eradicated from the world and the first to be overcome without a vaccine or treatment. South Sudan and Ghana account for more than 95% of global dracunculiasis. **Methods and Materials:** We used the Students field guide for surveillance evaluation to assess surveillance objectives, usefulness of the system, operation procedures, costs, and attributes of the South Sudan community-based surveillance system. **Results:** The guinea worm surveillance system has met its objectives; it is active, simple, flexible, sensitive, stable, and moderately acceptable. The data source is slightly biased; the system costs $2,006,610 U.S. dollars a year to operate. **Conclusion:** Community-based surveillance for guinea worm is a good example of a surveillance system on which an integrated disease surveillance system can be based in countries with poor surveillance capacity. This makes its potential value to public health practice very high.

Key words: *Guinea worm, endemic-villages, community-based-surveillance, village volunteers, Integrated Disease surveillance, South Sudan*

This report was cited in Southern Sudan Integrated Disease Surveillance and Response Assessment Report, 2007. A paper on the current situation, which takes into account the recommendations listed here, is being prepared by Samuel Makoy.

Background

Guinea worm disease (dracunculiasis) is targeted as the next disease to be eradicated from the world and the first to be overcome without a vaccine or other medical treatment [1]. It is currently endemic in nine countries, with South Sudan and Ghana accounting for more than 95% of global cases [2].

Guinea worm disease is contracted when stagnant water, contaminated with microscopic water fleas carrying infective larvae, is consumed. Inside a human's abdomen, guinea worm larvae mature and grow, some as long as 3 feet. After a year, the guinea worm slowly emerges through an agonizingly painful blister in the skin. Guinea worms can take up to two months to be completely removed, and even then, secondary infections may occur. Victims often immerse their limbs in water, seeking relief from the burning sensation caused by emerging guinea worms and thus re-contaminate drinking water [3].

The guinea worm disease cycle can be stopped by:

- preventing persons with an emerging guinea worm from entering sources of drinking water
- constructing boreholes or deep wells
- treating water with the chemical Abate larvicide
- filtering or boiling all drinking water. Filtering water is highly effective, especially when coupled with other strategies, such as health education (Figure 1).

The guinea worm surveillance system in South Sudan

Guinea worm infection in South Sudan occurs throughout the year in endemic areas with contaminated water sources but infection is at a peak in April through October; all sexes and ages are at risk but the 14-45 year age group is most affected because of their greater mobility [4].

Figure 1. Showing Filters for drinking water (Source: Southern Sudan Guinea Worm Mid-year 2006 report).

The community-based surveillance programme in 2006 covers all the States in South Sudan with the exceptions of areas in Upper Nile, Jongeli and Eastern Equatoria. These are not covered due to:

- the vastness of areas and poor road communications,
- the shifting populations among the pastoralist communities
- the influxes of returnees into endemic communities or from the latter to non-endemic communities and
- insecurity [4].

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The objectives of the guinea worm surveillance system are to:

- Estimate the magnitude of guinea worm disease in the population at risk, and
- Detect, monitor and contain the cases.

The aim of this evaluation of the community-based surveillance programme for guinea worm was to determine how the programmes operates and what value it can provide to the Ministry of Health to help establish an integrated disease surveillance and response (IDSR) system.

Methods and Materials

From June to August 2006, we reviewed records (of health education, filter distribution, cases, etc.) from 2005, and interviewed village volunteers, area supervisors, field officers, the State Coordinators, and the National Coordinator using the Surveillance Evaluation Student Guide [5] in selected endemic guinea worm areas. We assessed surveillance objectives, operation procedures, costs, and the usefulness and other attributes of the system. Excel 8.0 2005 data was collected from the Data Manager based in Loki, Kenya and analyzed using Epi Info 3.3.2.

Figure 2 shows the number of cases in each State, whereas Table 1 shows the most endemic counties in the ten States of South Sudan. We chose Eastern Equatoria State to represent a high endemic area and Central Equatoria State to represent a low endemic area [5]. Within Eastern Equatoria State, Kapoeta North county and Riwoto payam (high endemic) and in Central Equatoria State, Terekeka County and Tali payam (low endemic) were chosen. A case was defined as any individual exhibiting a skin lesion with emergence of a guinea worm [6].

Table 1. High endemic counties in South Sudan in 2005

	County	No of cases	% of total cases
1	Kapoeta North	2,605	46.8
2	Awerial	699	12.6
3	Gogrial West	481	8.6
4	Kapoeta East	398	7.2
5	Tonj North	235	4.2
6	Tonj East	197	3.5
7	Fangak	165	3
8	Wau	150	2.7
9	Kapoeta South	128	2.3
10	Pibor	121	2.2

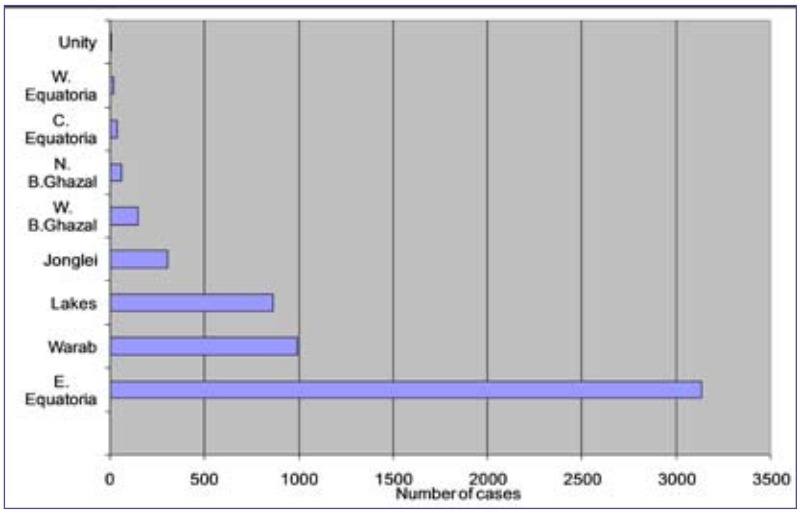

Figure 2. Endemic States in South Sudan in 2005

Results

The objectives of the guinea worm surveillance are to:

- Estimate the magnitude of guinea worm disease in the population at risk, and
- Detect, monitor and contain the cases.

The system is headed by the Resident Technical Advisor, human resource and data managers, six technical advisors, the National Coordinator, eight State coordinators, 54 field supervisors, 290 area supervisors and 8,849 village volunteers in the 1,085 endemic villages out of 9,832 villages in the 9 States under active surveillance in South Sudan.

The system has to be simple because most of the village volunteers are illiterate and it is easier for them to use pictures (showing emergence of the guinea worm) to identify cases. These are confirmed by the area supervisor with the entry, editing and analysis done by the data manager. As this means that the case definition has been met, there is no need for special or laboratory confirmation.

The system is flexible, and has also been used for polio campaigns, and Onchocerciasis Volvolus and Trachoma programmes. It was recently used in Eastern Equatoria to control an acute watery diarrhea outbreak. It is also stable as it is funded by the Carter Center, WHO, CDC and UNICEF. The training given to the village volunteers and area supervisors is short (1-3 days).

We obtained data from 5,565 cases from 9,832 villages under active surveillance. We estimated surveillance sensitivity to be 100%, since the case definition is very specific, "any individual exhibiting guinea worm" and the same cases reported by the volunteers are the cases reported at national level. In addition:

- Volunteers are meant to record the population and other data of each village in the register. This had been done

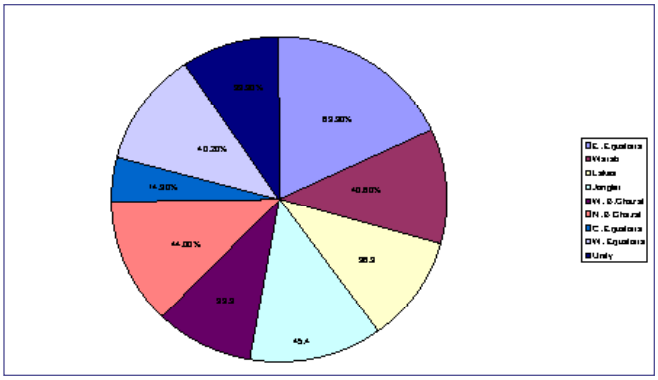

Figure 3. Rate of reporting by State

for only 238 (2.4%) out of the 9 832 villages under active surveillance.

- Case containment rate was 3.5 % (194/5565).
- 8% (454/5565) of all cases reported had accompanying patient forms. 6% were correctly completed (318/5565).

In 2005 the average reporting rate for each State was 40.5% (Figure 3). Guinea Worm Surveillance was covering 7.5 million people in 9 States in South Sudan and the system costs $2,006,610 U.S. dollars a year to operate.

Discussion

Our evaluation showed that the guinea worm surveillance system has met its objectives and was: active, simple, friendly (even when used with illiterate volunteers), had a very specific case definition, and needed no laboratory confirmation of disease. It was flexible (as the same design has been used for surveillance for polio, onchocerciasis, and trachoma), sensitive, stable (as it was securely funded although it did not have enough village volunteers to give optimal coverage), and moderately acceptable to the population. The data source is slightly biased (see Limitations below).

The information collected in the village records can clearly identify the group at risk by age, sex, unsafe water source and the number of households in the village. Unfortunately, in 2006, this information was not being used to implement effective interventions because most of it was deleted at the Data Manager Level in Loki.

Conclusion

Community-based surveillance for guinea worm is a good example of a surveillance system on which an integrated disease surveillance system can be based in countries with poor surveillance like South Sudan. This makes its potential value to public health practice very high.

Recommendations

1. Conduct a village-by-village search over the whole of South Sudan, at least once, to ascertain quickly the full extent of the disease's distribution - including the location and the intensity of local transmission. A realistic national plan of action for eradicating dracunculiasis from a country cannot be prepared without this kind of detailed information. Such national searches are also an invaluable resource for mobilizing national and international decision makers in support of the programme.

2. Design a form to report suspected cases (i.e. patient with pre-eruptive blister) so that cases are detected before infected persons can contaminate local sources of drinking water.

3. Establish a South Sudan guinea worm secretariat office in Juba to improve support and, where practicable, establish small sub-offices within State ministries of health to support field officers.

4. The Ministry of Health should review the training curriculum for village volunteers and area supervisors. Training should include supervisory skills and include a check list.

5. Provide incentives in kind in the form of salt and soap, or acknowledgement of the volunteers' contributions.

6. Coordinate with the Ministry of Water Resources and the water sector NGOs for provision of safe water supplies to endemic communities.

Limitations

1. Access constraints imposed by rains and road conditions precluded obtaining a large representative sample (selection bias).

2. The limited amount of time and personnel available for field work.

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