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Representativeness of suspected measles cases reported in a southern district of Nigeria

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ABSTRACT

Objective: To compare the characteristics of suspected measles cases at the health facilities and to determine the representativeness of the data. **Methods:** We visited 25 hospitals in the Aniocha Local Government Area (LGA) of Delta State, Nigeria, from which information on reportable diseases was collected. In particular, the suspected measles cases in their registries between January 1, 2007, and June 30, 2008, were reviewed. We compared the characteristics, including age, sex, location, and month of reporting, of the suspected cases with the LGA surveillance records. **Results:** In the LGA records, 10% cases involved individuals older than 14 years, compared with 20% in the same age group in the health facility records. Based on geographic location, 53% of the measles cases among the hospital records came from a single location, in contrast to only 30% of the cases among the LGA records. An analysis considering time revealed that 30% of the cases in the LGA records occurred in August 2007, whereas 20% of hospital cases were reported in February and May 2008 combined. **Conclusions:** The two record types differed considerably in all of the characteristics used in this comparison.

1. Introduction

The importance of a high-quality surveillance system for disease control activities has been described extensively[1-3]. In September 1998, the World Health Organisation-Regional Committee for Africa (WHO/AFRO) adopted the Integrated Disease Surveillance and Response (IDSR) strategy to strengthen the weak national surveillance and effective response to priority communicable diseases in Africa[4]. The goal of the IDSR is to improve the ability of the districts, called Local Government Areas (LGA), in Nigeria to detect and respond to diseases and conditions that cause high rates of death, illness, and disability within their catchment areas. Nigerian health authorities have since adopted this strategy, and the priority diseases, surveillance structure, flow of information, monitoring indicators and other details have been well articulated[4].

The burden of measles, a highly infectious disease in both developing and industrialised nations, has been well reported[5,6]. In 2000, the WHO/AFRO adopted a plan to reduce the measles mortality in member nations by more than 50% before the year 2005[7,8]. The plan included the provision of a second opportunity for measles vaccination for all children in a wide age range, primarily through supplemental immunisation activities, and it also included the enhancement of measles surveillance through measles case-based surveillance with laboratory confirmation. However, the implementation of the plan did not commence until December 2005. According to the measles surveillance guidelines, any clinician's diagnosis of measles or illness consistent with the case definition of rash, fever and cough, coryza, or conjunctivitis should be reported as suspected measles. In addition, all patients with suspected measles should have blood collected for serologic confirmation[8].

Since the commencement of the programme in Nigeria, large numbers of suspected measles cases have been reported and investigated, although the actual number of cases in the community is unknown[8,9]. To determine the completeness of the reporting of suspected measles cases, we conducted a review of suspected measles cases in the registries at all health facilities and in the

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surveillance records at the LGA health department in Aniochia LGA of Delta State in southern Nigeria. Using a capture-recapture technique, we estimated the reporting completeness to be 11.5%[9]. In this report, we compare the characteristics of the suspected cases at the health facilities with those of the cases reported at the LGA to determine the representativeness of the reported data. This measure can indicate the quality of the measles case-based surveillance system in the LGA.

2. Materials and methods

2.1. Study setting

The study was conducted in the Aniocha-south LGA of Delta State, comprising the Isheagu, Ogwashi-uku, Ejeme-aniogor, Nsukwa, Ewulu, Umule and Ubulu-okih townships. Delta State is one of the 36 States of the Federal Republic of Nigeria and is located in the south-south geopolitical zone. The Aniocha-south LGA is one of 25 LGAs of Delta State with its administrative headquarters in Ogwashi-uku. This LGA is geographically located between latitude 6 ° 11′ and 6 ° 15′ north and longitude 6 ° 25′ and 6 ° 47′ east[8]. It is one of the Igbo-speaking LGAs in the Delta State, with a population of 40 605 (2006 census). There are 25 registered health facilities, including 2 secondary health care facilities and 16 primary health centres, scattered across the LGA. The remaining registered health facilities are mission hospitals (2) and clinics/hospitals owned by private individuals (3). The LGA has a surveillance officer and an assistant, who are officials of the LGA health department. Information on suspected measles cases is sent to the surveillance office from all of the health facilities through the IDSR case-based reporting forms[10,11].

2.2. Sources of data

We visited all 25 hospitals in the Aniocha-south LGA of Delta State, Nigeria, where the Disease Surveillance and Notification (DSN) officers collected information on notifiable diseases. We also visited the surveillance office of the LGA. The measles cases that were diagnosed in each of the health facilities between January 1, 2007, and June 30, 2008, were ascertained through a review of the outpatient and inpatient registries. Data on the individual cases, including age, sex, address, and date of diagnosis, were collected. Data on the suspected measles cases that were reported to the DSN officer in the LGA during the same period were obtained from the LGA office. Ethical clearance to conduct the evaluation was obtained from the Delta State Ministry of Health Ethics council.

2.3. Representativeness of data

The characteristics of the measles cases from the health facility registries and those from the LGA surveillance office were compared in terms of sex distribution, age groupings (younger than 5 years, 5-14 years, older than 14 years), locations of the cases, and month of diagnosis. The numbers of cases in each of these subcategories were represented as a proportion of the total number of cases from that source. The differences in proportions were evaluated using the *Chi*-squared test.

3. Results

Based on a review of the records from the health facilities, we identified 15 suspected measles cases with onsets within the reviewed period, and we identified 10 cases in the surveillance records at the LGA surveillance office. The ratios of males to females in the health facility records and in the LGA surveillance office were 3:2 and 4:1, respectively (P=0.85). When we compared the age distributions of the two types of records, we found that 10% of the cases in the LGA records involved individuals who were older than 14 years, compared with 20% of cases in the health facility records (P=0.6) (Figure 1).

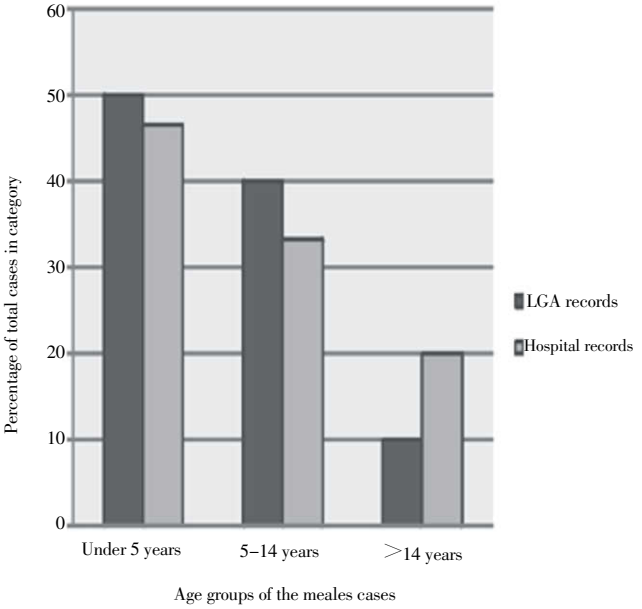


Figure 1. Age distributions of measles cases from the LGA records and the hospital records between January 2007 and June 2008.

When we examined the geographic locations of the measles cases, we found that four of the seven towns in the LGA had cases in the LGA records, with three towns each having 30% of the total cases and one other town having the remaining

10%. In the hospital records, one town had 53% of the cases, and two towns each had 7% (Figure 2).

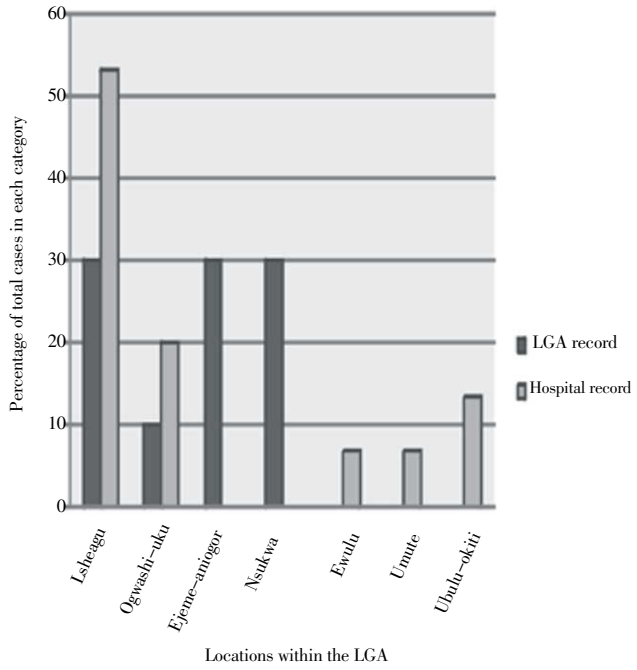
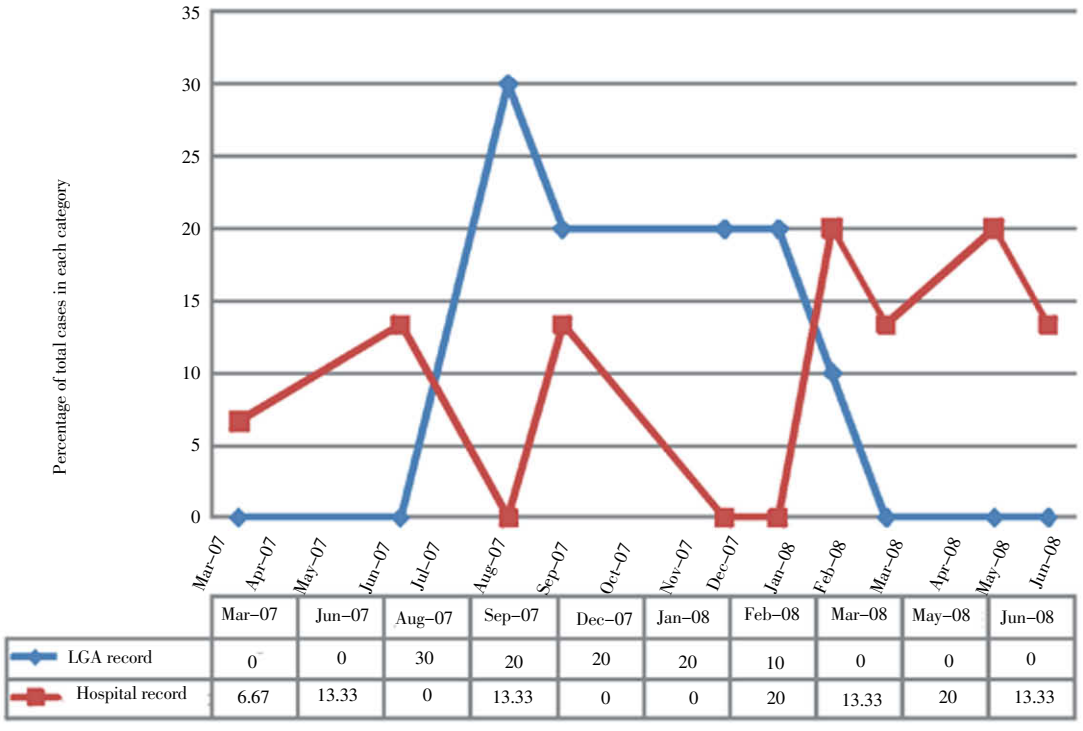


Figure 2. Distributions of measles cases in the LGA and hospital records by township between January 2007 and June 2008.

Utilising the month of reporting to compare the measles records in the hospital surveillance records with those in the LGA surveillance records, we found that the health facilities' records showed that 20% of cases occurred in both February and May 2008 and that only 6.67% of cases occurred in March 2007. The LGA records showed that 30% of cases occurred in August 2007 and that 10% occurred in February 2007 (Figure 3).

4. Discussion

To generalise the findings from the surveillance data to the population at large, the data should accurately reflect the characteristics of the disease events under surveillance[2]. These characteristics generally constitute time, place and person. This study examined the representativeness of case-based measles surveillance in the Aniocha LGA of Delta State, Nigeria, by reviewing records and comparing the frequency and distribution of suspected measles cases found in the LGA surveillance record with those found in the health facilities' records. The sensitivity of the LGA measles surveillance system during the same period has been described previously[9]. In this study, we found differences in the distributions of cases based on age, sex, location and month of reporting. The importance of these differences must be considered in the context of the need for a satisfactory surveillance system. The review of health centre data found that the percentage of the suspected measles cases in persons older than 14 years was 10%, compared with 20% in the same age group found in the LGA surveillance records. This finding contrasts with the finding of a study



	Mar-07	Jun-07	Aug-07	Sep-07	Dec-07	Jan-08	Feb-08	Mar-08	May-08	Jun-08
LGA record	0	0	30	20	20	20	10	0	0	0
Hospital record	6.67	13.33	0	13.33	0	0	20	13.33	20	13.33

Figure 3. Distributions of measles cases in the LGA and hospital records by month of reporting between January 2007 and June 2008.

that examined the reporting efficiency of a measles outbreak in New York[12]. The age distributions in the cases recorded in the New York City Health Department and those in the hospital records were similar[12].

We found large disparities between the two types of measles surveillance records when comparing geographic location and time of diagnosis. We found that only one measles case could be matched by our matching criteria of name, age, sex and location in our estimation of the completeness of reporting using the capture-recapture method[9]. This result implies that not all cases are being reported and that several population subgroups were systematically excluded from reporting by the inadequate surveillance system during the study period[2].

This study is limited by several factors, including the following: 1) the diagnosis recorded in the clinic registries were not confirmed measles cases but were accepted and treated as measles cases based on the surveillance case definition[13,14], 2) no community-based assessment was performed to determine the true incidence of measles in the community, and 3) the reliability of the cases documented by the health personnel responsible for the records at the health facilities may have been limited. Only available records could be reviewed.

High-quality surveillance data are needed to support decision making to control infectious diseases such as measles. The differences between the two sets of records suggest that some decisions made based on these records may not be correct and may slow progress toward achieving the goal of effective disease control. More representative surveillance data would ensure that the correct population or subgroups are targeted for intervention.

Conflict of interest statement

We declare that we have no conflict of interest.

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