

## Short Communication

**Village registers for vital registration in rural Malawi****E. Singogo<sup>1</sup>, E. Kanike<sup>1</sup>, M. van Lettow<sup>1,2</sup>, F. Cataldo<sup>1</sup>, R. Zachariah<sup>3</sup>, K. Bissell<sup>4,5</sup> and A. D. Harries<sup>4,6</sup>**<sup>1</sup> *Dignitas International, Zomba, Malawi*<sup>2</sup> *Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada*<sup>3</sup> *Operational Research Unit, Operational Centre Brussels, Médecins Sans Frontières, Luxembourg, Luxembourg*<sup>4</sup> *International Union Against Tuberculosis and Lung Disease, Paris, France*<sup>5</sup> *The University of Auckland, Auckland, New Zealand*<sup>6</sup> *London School of Hygiene & Tropical Medicine, London, UK***Abstract**

Paper-based village registers were introduced 5 years ago in Malawi as a tool to measure vital statistics of births and deaths at the population level. However, usage, completeness and accuracy of their content have never been formally evaluated. In Traditional Authority Mwambo, Zomba district, Malawi, we assessed 280 of the 325 village registers with respect to (i) characteristics of village headmen who used village registers, (ii) use and content of village registers, and (iii) whether village registers provided accurate information on births and deaths. All village headpersons used registers. There were 185 (66%) registers that were regarded as 95% completed, and according to the registers, there were 115 840 people living in the villages in the catchment area. In 2011, there were 1753 births recorded in village registers, while 6397 births were recorded in health centre registers in the same catchment area. For the same year, 199 deaths were recorded in village registers, giving crude death rates per 100 000 population of 189 for males and 153 for females. These could not be compared with death rates in health centre registers due to poor and inconsistent recording in these registers, but they were compared with death rates obtained from the 2010 Malawi Demographic Health Survey that reported 880 and 840 per 100 000 for males and females, respectively. In conclusion, this study shows that village registers are a potential source for vital statistics. However, considerable inputs are needed to improve accuracy of births and deaths, and there are no functional systems for the collation and analysis of data at the traditional authority level. Innovative ways to address these challenges are discussed, including the use of solar-powered electronic village registers and mobile phones, connected with each other and the health facilities and the District Commissioner's office through the cellular network and wireless coverage.

**keywords** operational research, vital statistics, village registers, Malawi

**Introduction**

The systematic recording of births and deaths, referred to as vital registration (VR), is an important routine activity to help in tracing and assessing the progress countries are making towards reaching the targets in the 2015 health-related United Nations Millennium Development Goals (MDG) (Mwagomba *et al.* 2010; Zachariah *et al.* 2011). In developed countries, this registration system is electronic, and for many years, the collection of vital statistics has been a core component of public health. Vital statistics are also important for planning, implementation, evaluation and formulation of health and social policies.

In Africa, it is a different story because the majority of people are born and die without leaving any trace of a legal record (Setel *et al.* 2007). Although many African countries have made concerted efforts through training institutions and other organisations to promote civil registration systems, the challenge has always been to set up a viable system that efficiently and regularly captures reliable birth and mortality statistics (Koyanagi & Shibuya 2010; Rajaratnam *et al.* 2010). All of the countries that have established some type of VR seem to be struggling with systems that are weak and often only function on a sporadic and incomplete basis. The resulting lack of reliable statistics poses a challenge for public administration services and impairs policy development.

E. Singogo *et al.* **Vital registration in Malawi**

As an alternative, in the absence of a well-developed VR system to capture reliable mortality and birth statistics from the routine health information systems, surveys have been largely used to provide this type of information (Mathers *et al.* 2005; Zachariah *et al.* 2011). In Malawi, population censuses carried out every 10 years and demographic health surveys (DHS) every 4 years are the major sources of birth and mortality data. Between these surveys, birth rates and death rates are estimated and may be inaccurate (Zachariah *et al.* 2011). Other sources of population data are disease-specific surveys such as the Malaria Indicator Survey (MIS) and other such surveillances.

In 2007, the Malawi Government through the National Registration Bureau introduced a decentralised registration system based on paper-based village registers. The system was implemented in a phased manner, and by March 2011, village registers had been distributed to all districts in the country. These registers are supposed to be used by village headpersons (VH) to document information about the number of people living in a village and new births and deaths. We hypothesised that these registers could be a potential source for obtaining vital registration statistics. There is no published information about whether this system is working, and in particular, whether VH have a working register or how well these registers are maintained. In one Traditional Authority (TA) in rural Malawi, we thus aimed to assess (i) characteristics of village headmen who used village registers, (ii) usage and content of village registers, and (iii) whether village registers provided accurate information on births and deaths.

**Materials and methods**

This was a retrospective cross-sectional review of registers in villages within Traditional Authority Mwambo, Zomba district, Malawi. In October 2010, village registers were introduced in Zomba district, which has a population of 670 000 and is divided into 10 TAs with 1460 VH (Malawi National Statistical Office (NSO) 2008). Mwambo TA was chosen for the study based on convenience sampling: there is a good network of roads making it relatively easy to visit health centres and village headmen; it is one of the largest TAs in Zomba district; and it is well known for its good working relationship with a multitude of stakeholders. Village headmen in Zomba, as elsewhere in the country, are chosen by the community. The headman serves his or her time, and when the headman dies, the title passes on within the same family to the senior child. The position for many years past has been on a voluntary basis. However, in the last 10 years, the Government of Malawi has started to give VH honoraria as an appreciation of the

role that they play in ensuring that community projects are implemented.

In TA Mwambo, there are 325 VH, all recognised by the Government of Malawi, serving a population of about 150 000. Every village headman has a village register – these registers have hard covers and can contain information on up to 900 people (100 pages with nine rows on each page – one row for each person). Each row has a column for name, sex, date of birth, place of birth, name of parents or guardians, place of residence, birth certificate number, date of death and other details that might include cause of death.

Villages and VH within TA Mwambo were visited between February and March 2012. We collected information on the village headmen, the number of working registers (defined as registers being used to record village data) and the completeness of registers (defined as every row and every column in that row completed for a village). Vital statistics were collected and included number of people in the register, age, sex, births in 2011 and deaths in 2011. There were five health centres serving the population of TA Mwambo, and these were visited to cross-verify details of births recorded in the maternity register of each health centre in 2011. For each birth, the TA residence of the parents is recorded in the health register, and only births registered from TA Mwambo were listed for the purpose of the study. There were no valid records in the health centres for a comparison of deaths. In order to obtain some comparative data, the most recent 2010 Demographic Health Survey (DHS) was obtained for the country, and crude death rates per 100 000 population in the village registers were compared with results documented in the DHS (National Statistics Office, Zomba, Malawi & ICF Macro, Calverton, Maryland, USA 2011).

Five trained research assistants used a structured proforma to collect data that were then double entered into EpiData by two clerks. Analysis was conducted in STATA and MS Excel. Ethics approval was obtained from the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease, Paris, France and the National Health Sciences Research Committee (NHSRC), Malawi.

**Results**

Of a total of 325 VH, 323 (99%) had a working village register. Research assistants visited and collected data from 280 VH (87%) – the other 43 VH could not be visited because of transport, weather and financial constraints. Of the 280 VH visited, 228 (79%) were male and the median age was 50 years (range 21–90 years). There were 187

E. Singogo *et al.* **Vital registration in Malawi**

(68%) VH who were illiterate, and they used local secretaries to enter village population data in the registers.

There was not one register that had all columns and rows fully completed. There were 185 (66%) registers which had fewer than 50 rows incompletely filled out (these registers were 94% completed). According to village registers, there were 115 840 people living in the villages including 53 328 (46%) males. The age distribution for the 114 074 people whose age was recorded is shown in Table 1.

In 2011, 1753 births were recorded in village registers, whereas in maternity registers for the five health centres serving the catchment area, 6397 births were recorded as coming from TA Mwambo. There were 199 deaths recorded in the village registers in 2011, giving a crude mortality rate of 172 per 100 000 registered people. Deaths stratified by sex and age and with crude sex-related and age-related death rates are shown in Table 2. Death rates were higher in children aged 1–14 and in adults aged 50 years and older. These death rates were

compared with those obtained for the country in the DHS 2010 Report (Table 2). The death rates reported in the country were several times higher than those obtained from the village registers.

## Discussion

This is the first study in sub-Saharan Africa to report on usage, content and value of village registers. Five years after the introduction of village registers in Malawi, we found that almost all VH used registers, although secretaries were frequently entrusted with entering data. Although no register was 100% complete, two-thirds had nearly 95% of data entered.

While births were recorded, the numbers were considerably lower than those obtained from maternity registers, even accounting for a proportion (13%) of village registers not inspected. This discrepancy could be due to delayed registration of new births in the village registers despite consistent sensitisations by VH on early registration, or to late or even no documentation by VH. We do not think that the discrepancy in the findings is due to births from other TAs being wrongly recorded in the health centre registers of Mwambo TA, as we only line-listed health centre births that were documented to occur in Mwambo TA. Deaths were recorded in the village registers, but we had no way of validating numbers as health centre records on deaths were poor and inconsistently documented, which is a limitation of the study. Nevertheless, we did compare village register deaths with those reported in the Malawi Demographic Health Survey in 2010, and they were several times lower than national figures. This puts a question mark over the accuracy of deaths recorded in the village registers.

Although there are some undoubted weaknesses of this study, the strengths are that this was a comprehensive review of more than 85% of village registers, and the same research assistants were all trained in the same way to collect data. This study shows that village registers are a potential source for vital statistics. However, considerable inputs are needed to improve accuracy and reliability of births and deaths. The main gaps are (i) insufficient supervision to ensure proper and complete documentation of data, (ii) no effective system in place to reconcile health facility and village-related data (births and deaths), and (iii) a high degree of illiteracy in VH. These issues compromise the quality of vital statistics which are necessary for monitoring progress towards MDGs (Regional Workshop on civil registration and vital statistics in Africa 2009; Fox *et al.* 2010).

A possible solution is to introduce a dedicated individual working on vital registration in the community to address

**Table 1** Age distribution of people registered in 280 villages in Traditional Authority Mwambo, Zomba district, Malawi

Age distribution	Numbers (%)
<1 year	1870 (2)
1–4 years	13 528 (12)
5–14 years	37 288 (33)
15–49 years	49 962 (44)
50 years and above	11 426 (9)
Total	114 074

**Table 2** Deaths recorded in 280 village registers in Traditional Authority Mwambo, Zomba district, Malawi, in 2011 and compared with 2010 Malawi DHS data

Sex and age distribution	Number of deaths (%)	Crude death rates in TA Mwambo per 100 000 population	2010 DHS Crude death rates in Malawi per 100 000 population
<b>Sex</b>			
Male	101 (51)	189	880
Female	96 (49)	153	840
Not recorded	2		
<b>Age group</b>			
<1 year	2 (1)	107	
1–4 years	29 (15)	214	
5–14 years	10 (5)	268	
15–49 years	75 (38)	150	860
50 years and above	83 (42)	726	

E. Singogo *et al.* **Vital registration in Malawi**

these identified gaps. Innovative ways to collect and collate data for each TA are also needed. There are currently no systems in place to ensure that VR data at VH level are collated at the T/A level, let alone the district level. Agreement has been reached with the Malawi National Registration Bureau to pilot solar-powered electronic registers and hand-held mobile devices that will be deployed at the village level, the health facility and the District Commissioner Office. These will be connected to the existing cellular phone networks in order to share information between VH, the group village headmen, the Traditional Authority, the health facility and the District Commissioner's Office. This will be pilot-tested and evaluated in a cluster of villages before being rolled out to other villages. This is in line with current thinking. A Global Summit was held in April 2013 in Bangkok by the Health Metrics Network and WHO on modernising vital registration systems. One area of discussion was around the opportunities that now exist to generate accurate data in real time using mobile phones and wireless coverage to collect and transmit vital registration data (Oomman *et al.* 2013). This sort of system, once set up, could be linked to verbal autopsies to obtain information on cause of death, and incentives could be provided to pay for each vital event that is accurately registered and verified. These are exciting times, but both technical and political solutions are needed if headway is to be made (Horton 2013). With the current international interest in Universal Health Coverage, it is crucial that vital registration be seen as an intrinsic component of this initiative with the 'count' firmly put into the accountability (Byass 2012).

**Acknowledgements**

This research was supported through an operational research course, which was jointly developed and run by the Centre for Operational Research, International Union Against Tuberculosis and Lung Disease, France, and the Operational Research Unit, Medecins sans Frontieres, Brussels-Luxembourg. Additional support for running the course was provided by the Centre for International Health, University of Bergen. We also acknowledge great contribution to this work by Mr Harry Phiri (district Commissioner-Zomba) and Mr. Tobias Lutepo (National Registration Bureau Officer for Zomba) through provision of logistical support during data collection and review sessions. The course was funded by an anonymous

donor and the Department for International Development, UK.

**References**

- Byass P (2012) The UN needs joined-up thinking on vital registration. *Lancet* 380, 1643.
- Fox MP, Brennan A, Maskew M, MacPhail P & Sanne I (2010) Using vital registration data to update mortality among patients lost to follow-up from ART programmes: evidence from the Themba Lethu Clinic, South Africa. *Tropical Medicine & International Health* 15, 405–413.
- Horton R (2013) Offline: I find such people intolerable. *Lancet* 381, 1444.
- Koyanagi A & Shibuya K (2010) What do we really know about adult mortality worldwide? *Lancet* 375, 1668–1670.
- Malawi National Statistical Office (NSO) (2008) Population and Housing Census, National Statistics Office, Zomba, Malawi.
- Mathers CD, Fat DM, Inoue M, Rao C & Lopez AD (2005) Counting the dead and what they died from: an assessment of the global status of cause of death data. *Bulletin of the World Health Organization* 83, 171–177.
- Mwagomba B, Zachariah R, Massaquoi M *et al.* (2010) Mortality reduction associated with HIV/AIDS care and antiretroviral treatment in rural Malawi: evidence from registers, coffin sales and funerals. *PLoS ONE* 5, e10452.
- National Statistics Office, Zomba, Malawi & ICF Macro, Calverton, Maryland, USA (2011) DHS Final Reports. Malawi DHS, 2010. ID, FR247. Available: <http://www.measuredhs.com/publications/publication-FR247-DHS-Final-Reports.cfm> (Accessed 29 April 2013).
- Oomman N, Mehl G, Berg M & Silverman R (2013) Modernising vital registration systems: why now? *Lancet* 381, 1336–1337.
- Rajaratnam JK, Marcus JR, Levin-Rector A *et al.* (2010) Worldwide mortality in men and women aged 15–59 years from 1970 to 2010: a systematic analysis. *Lancet* 375, 1704–1720.
- Regional Workshop on Civil Registration and Vital Statistics Systems in Africa Report (2009) *The African Statistical Journal* 9, 475–478. <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Atelier%20r%C3%A9gional%20sur%20l'E2%80%99enregistrement%20d'E2%80%99%C3%A9tat%20civil.pdf> (Accessed 10 December 2012)
- Setel PW, Macfarlane SB, Szreter S *et al.* (2007) A scandal of invisibility: making everyone count by counting everyone. *Lancet* 370, 1569–1577.
- Zachariah R, Mwagomba C, Misinde D *et al.* (2011) Vital registration in rural Africa: is there a way forward to report on health targets of the Millennium Development Goals? *Transactions of the Royal Society of Tropical Medicine and Hygiene* 105, 301–309.

**Corresponding Author** Anthony D. Harries, Old Inn Cottage, Vears Lane, Colden Common, SO21 1TQ Winchester, UK. E-mail: [adharris@theunion.org](mailto:adharris@theunion.org)