Multiple Forces Working in Unison: The Case of Rapid Improvement of Vital Statistics in South Africa Post-1996

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Abstract

In a period of about five years, from 1997 to 2002, South Africa remarkably improved the coverage and production of its vital statistics. This period witnessed the entrance of South Africa into the select league of countries that publish statistics on multiple causes of death and that make use automatic coding of causes of death. These achievements were accomplished through multiple forces working in unison. Some of the important factors contributing to the achievement were lessons learned from study tours to Australia, Sweden and the USA. The paper describes these lessons and how they were adapted to suit the South African reality. Comparison is made between the status of demographic statistics by the end of apartheid and in the post-apartheid era. Stakeholder relationships that shaped the transformation of demographic statistics in the new South Africa are also discussed.

Introduction

Out of the eight Millennium Development Goals, three are directly health-related. These are; goal 4 on reducing child mortality, goal 5 on improving maternal health and goal 6 on combating HIV/AIDS, malaria and other diseases. The indicators needed for monitoring progress towards achieving these goals come from health information systems. Globally, health information systems need to be strengthened in order to produce realistic indicators and meaningful progress reports. In many countries, some of the data feeding into the health information system are obtained from the civil registration/vital statistics system (CR/VS system) and South Africa is one of such countries.

Prior to the 1990s, national coverage of vital statistics was very low in South Africa (Bah 1999a). But during the late 1990s, Statistics South Africa (Stats SA), the Department of Health (DoH) and the Department of Home Affairs (DHA) made concerted efforts to improve coverage of birth and death registration. These efforts saw the raising of awareness of the importance of vital registration, introduction of new death registration forms, inclusion of nurses and village headmen in the registration process and conversion from ICD-9 to ICD-10 coding. This has paid off well, and South Africa is now producing timely statistics on causes of death. In addition, it is publishing statistics on multiple causes of death and has automated the selection of underlying cause of death. National completeness of death registration is now very high, estimated at 90% or higher. Through these remarkable efforts, South Africa has shown that it is possible, within a decade, to turn the tables around from defective vital statistics to commendable ones of high standard. These positive results have been widely acclaimed in the literature (Groenewald and Pieterse 2007; Lopez et al. 2007; Setel et al. 2007).

The first premise in this paper is that during the late 1990s multiple forces were at work to improve the CR/VS system in South Africa. The second is that the interventions or measures put in place in the late 1990s worked. Therefore, the first aim of the paper is to identify those interventions or measures and link them to specific improvements. The second is to place the interventions/measures in the wider context of the literature on improving CR/VS systems. While all aspects of vital statistics were improved during the study period, the paper concentrates mostly on mortality and cause of death. The paper draws on the experience of the author, who was heading the section dealing with vital statistics from 1997 to 2003. In that sense, a lot of the material presented here is based on primary, first-hand information.

The following section gives a brief overview of the evolution of the CR/VS system in South Africa to the end of apartheid. Following that, each aspect involved in the improvement of the system is analyzed. The paper concludes with a synthesis of these aspects and contextualizes them in light of the literature on the improvement of the CR/VS system.

Summary of the Evolution of Collecting Demographic Statistics in South Africa to the End of the Apartheid Era

The Union of South Africa was formed in 1910, and the modern history of the CR/VS system started with the formation of the national statistics office in the war year of 1914. The significant dates in the history of the development of CR/VS in post-Union South Africa are 1924, 1950, 1991 and 1992. A description of the relevant pieces of legislation enacted during these years and their main features is shown in Table 1.

Table 1. Sentinel events in the evolution of collecting demographic statistics in South Africa up to the end of the apartheid era

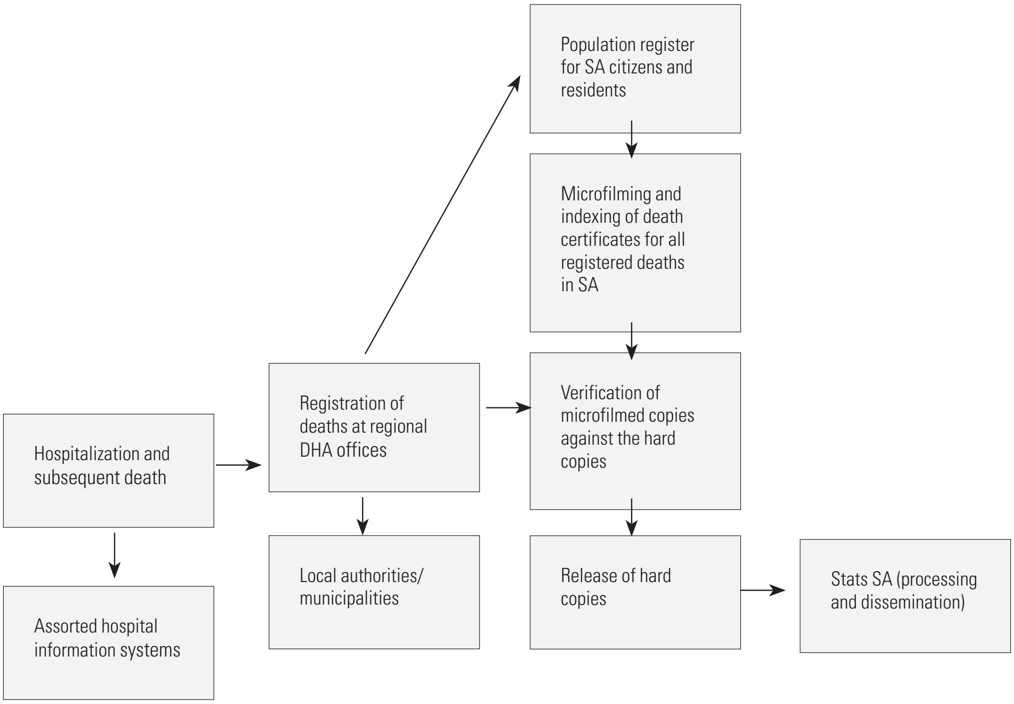
Year	Legislation enacted	Main features
1924	Births and Deaths Registration Act (Act 17 of 1923)	Uniformity in vital registration throughout the Union of South Africa
1950	Population Registration Act of 1950	The introduction of the race identifier into the population register and the provision of the legal basis for apartheid
1991	Population Register Repeal Act of 1991	The dropping of the race identifier from the population register
1992	Births and Deaths Registration Act of 1992 (Act 51 of 1992)	The act that resembled the previously comprehensive Act 17 of 1923

Act 17 of 1923 paved the way for uniformity in vital registration throughout the union. This act, which became effective in 1924, laid the foundation for the CR/VS system and remained in place for the next six decades. It was replaced by a similarly comprehensive act, the Births and Deaths Registration Act of 1992 (Act 51 of 1992) (Khalfani et al. 2005). In the period between 1924 and 1992, the CR/VS system experienced highs and lows through the "making," "unmaking" and "new making" phases (Bah 1999a). In 1950, the Population Registration Act was enacted and this led to the introduction of the race identifier into the population register This law remained in place for the next 40 years and was only revoked by the Population Register Repeal Act of 1991, which saw the dropping of the race identifier from the population register.

During apartheid, the population register information system was used mostly for producing race-based identity documents and other legal documents such as birth, death and marriage certificates. However, in spite of its name, it played a marginal role in the production of vital statistics. Birth statistics were obtained from the births register that fed into the population register, while death statistics were obtained through processing the actual death notification forms. Vital statistics produced during this era came from the other registers that fed into the population register. These registers captured current events, whereas the population register cumulatively captured vital events.

In the case of deaths, production of vital statistics during the apartheid era was stalled by the legal requirements of the population register. The process of compiling vital statistics is shown in Figure 1. Minimal information was extracted from death registration forms and entered in the population register. The forms were then sent for microfilming and subsequently for verification. After verification, the civil registration system had no further use for the forms and they were sent to the national statistics office for processing. However, the verification stage could be long, resulting in substantial delays in the production of death statistics. This was unsatisfactory for both users and policy makers. The situation continued till the mid-1990s.

Figure 1. Institutional arrangements for producing death statistics in South Africa prior to the intervention



DHA = Department of Home Affairs.

By the end of apartheid in the mid-1990s, producing demographic statistics faced several challenges. The first was to make national statistics geographically and racially inclusive, covering previously excluded population groups and geographic areas. The second was to improve the relevance of the data for policy making. This partly involved improving the lag time between the year of collection and the year of publication, as well as the professionalism in the analysis and reporting of vital statistics. The third challenge was to exploit the population register to meet demographic data needs.

Prioritization by Government

The new South Africa that emerged at the end of apartheid was faced with the challenging task of transforming all major government institutions, including Stats SA. During the post-apartheid era, the main driver for the transformation of vital statistics was the Government of National Unity (GNU), through the Reconstruction and Development Programme (RDP). The RDP outlined a framework in which goals to be achieved within the period 1995 to 2000 were spelled out. One of the cornerstones of the RDP framework was redistribution of resources and services to redress the inequalities of previous regimes. Subsequent to this, a number of departments, including the DoH, contextualized the RDP goals by issuing their own RDP white papers. The DoH was quick to constitute the National Health Information System for South Africa (NHIS/SA) committee in 1994. The committee's broad objective was to develop a National Health Information System for South Africa that began at the local level and fed into district, provincial and national levels, and included the private and public sectors. In a discussion paper titled *Towards a National Policy and Strategy for a National Information System for South Africa* (NHIS/SA), one of the problem statements dealt with births and deaths legislation. It stated that the then-existing births and deaths legislation governing vital records needed revisions to support the revised health information system. Revisions should be done in such a way that they could be used for producing health indicators that allowed monitoring of apartheid-generated disparity in access to healthcare and health status. For example, specific levels of disaggregation would include race, sex, age, geographic location and socio-economic status.

Prioritization by Donors

With the end of apartheid, the international community opened up to South Africa. Many donor organisations offered various forms of assistance to the government to help support the massive transformation that was underway. As with other government organizations, Stats SA was a beneficiary of donor assistance from international organisations such as AUSAID (Australia) and SIDA (Sweden) among others. With sponsorship from these organizations and in some cases from other donors such as UNICEF, several staff members working in vital statistics were sent overseas for study tours, visits or short-term training. One study tour was made to Australia in 1997, another to Sweden in 1999, and multiple visits were made to the US in 2001, 2002 and 2003. Details are given in Appendix I (Australia), Appendix II (Sweden) and Appendix III (US). Lessons learned from the tours guided and informed most of the planning and decision making in the VS component of the CR/VS system.

Training, Seminars and Workshops

Training needs for improving the CR/VS system were diverse. On the VS side, some needs were satisfied internally (within South Africa) while others were satisfied externally (out of South Africa). Stats SA provided generic training to staff members to improve their computer and statistical skills. In the VS section, other specific training was given to staff members as required. Senior coders were sent for internal training in coding using ICD-10. These coders were later responsible for training newly recruited coders. Programmers were sent for internal training on Visual Basic to equip them to develop new systems. A statistician, a programmer and coders were sent for external training on multiple causes of death and for automation in processing causes of death data.

On the CR side, Stats SA, the DoH and the DHA made concerted efforts to improve coverage of death registration. These efforts saw the raising of awareness of the importance of vital registration, introduction of new death registration forms and inclusion of nurses and village headmen in the registration process. Several seminars were organized at different times. The DoH and DHA organized training workshops on the completion of the new death registration forms. At the end of these workshops, Stats SA organized a national workshop on the vital statistics system. This workshop involved the DoH, DHA, provincial Stats SA offices and major users of vital statistics data.

Involvement of users and stakeholders

Major stakeholders during the post-apartheid period (and prior to it) included the DoH, the DHA and a broad group of national researchers. The DHA, DoH and Stats SA were partners in the CR/VS system and were interested in its improvement for different reasons. For the DHA, fulfillment of legal requirements and completeness of the population register were the primary goals, while for Stats SA, computing accurate demographic indicators for use by planners and policy makers were primary. For the DoH, primary goals were obtaining indicators to monitor health status and health disparities, and health policies to improve health outcomes. The broad group of national researchers had an ongoing interest in seeing improved and timely vital statistics. These statistics would be used for conducting research that would feed into government policy making.

At the policy level, the DoH and DHA formed a committee to oversee the transformation of the CR system. At the pragmatic level, Stats SA, the DoH and the DHA formed another committee to handle practical issues encountered in the CR/VS system. Stats SA consulted frequently with the broad group of national researchers to seek advice on any major moves it planned to make. Internally, the national Stats SA office involved the provincial Stats SA offices in field efforts for the improvement of the CR/VS system. There was generally a good working relationship between the different stakeholders as they all shared the common vision for the improvement of the CR/VS in South Africa.

Results of the Combined Efforts

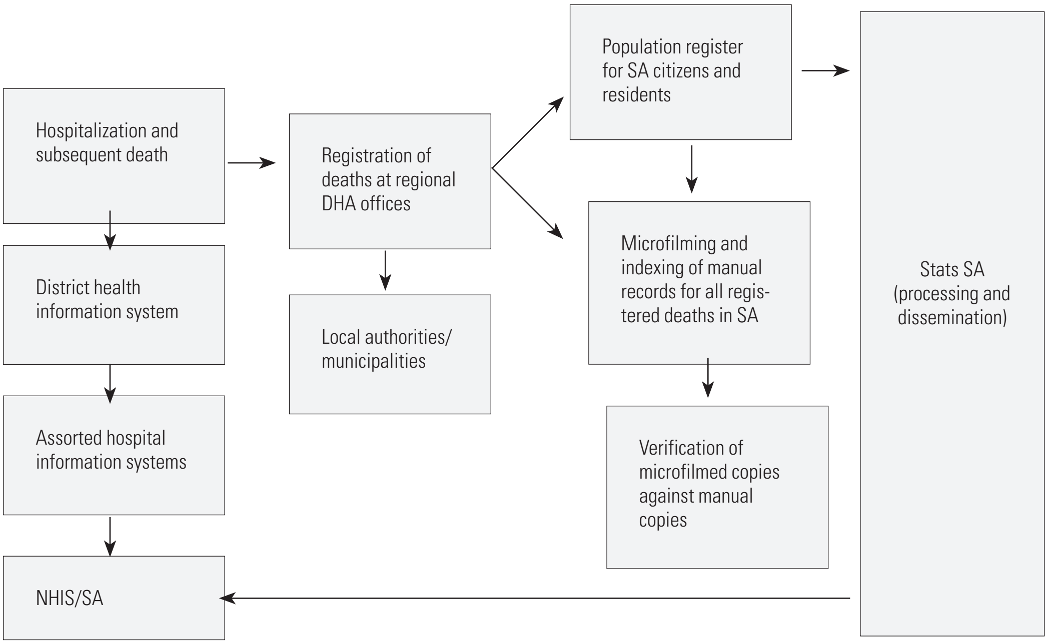
The need for timely mortality data and access to the medical certificate of death for coding causes of death necessitated a change in the CR/VS system. Three solutions were settled on. The first was to use the minimal information on deaths found in the population register (gender, birth date, and date and place of death) and publish an "advance release" of death statistics. The second was to laser print the microfilmed images of the death certificates prior to validation instead of waiting for hard copies that would be available years later. The third was to train a large group of nurses in coding and retain the best-performing ones as coders. With co-operation from the DHA, the new arrangement was put in place and the laser printing of the death certificates was outsourced to an external service provider. This new process for producing statistics on mortality and causes of death is shown in Figure 2. The project cost over a million US dollars for processing five years of data (1997–2001). It brought an end to the delay in producing causes-of-death statistics in South Africa. This approach was later terminated in 2003. The next phase is cutting production costs. The national statistics agency has already started using some forms automation for causes of death, and it is hoped that as this automation improves production costs will decrease.

A comparison of the sources of vital statistics and the uses they were put to during the apartheid and post-apartheid eras is shown in Table 2. During the former era, the population register had been used mostly for maintaining race-based identity documents, even though it had great potential for other uses that were realized only in the post-apartheid era.

Discussion

In South Africa, multiple forces were working in unison to achieve the goal of an improved CR/VS system in the late 1990s. It has been argued that the two core ingredients for the improvement were the commitment of the government and the importance that donors gave to the system (Mahapatra et al. 2007). Both factors were present in the post-apartheid South Africa. The Government of

Figure 2. Institutional arrangements for producing death statistics in South Africa after the intervention



DHA = Department of Home Affairs; NHIS/SA = National Health Information System for South Africa.

Table 2. Different sources of vital statistics and the uses to which they were put during the apartheid and post-apartheid eras

Source	Apartheid era	Post-apartheid era
Births register	Occurrence-based births statistics	
Marriage register	Occurrence-based marriage statistics	
Death notification form	Death statistics (after lengthy period of microfilming and verification)	Death statistics (speedily printed from microfilmed images- later terminated in 2003)
Population register (for the production of legal documents)	Identity document with race identifier Birth certificate Death certificate Marriage certificate Certificate of citizenship	Identity document without race identifier Birth certificate Death certificate Marriage certificate Certificate of citizenship
Population register (for the production of vital statistics)	None	Cumulative statistics on births Advance release of deaths statistics (later terminated)

National Unity that was formed at the end of apartheid was fully committed to improving the health status of all South Africans. Major transformations were made to the healthcare delivery system and the health information system (Ntsaluba and Pillay 1997). The commitment to improving the health information system continued during the 2000s and was further strengthened by the call for improving the quality of sources of data needed for meeting the Millennium Development Goals (Tshabala-Msimamg 2005). In the aftermath of apartheid, donors were keen on helping South

Africa improve its governance and for that purpose supported initiatives to improve the statistical basis for decision making and monitoring. The two core ingredients described above are necessary but not sufficient for the improvement of the vital statistics system, however. Another ingredient is needed, namely the driving process within the national statistics system. This driving process deals with the motivation of the producers of vital statistics, the learning curve they undertake, the expert help they get through field trips and co-operation with experienced stakeholders, and implementation of lessons learned and experience gained.

The paper has shown that a lot of experience was gained from the study tours and visits to Australia, Sweden and the US. The task faced was to implement the doable recommendations while taking into account the South African reality. Prior to the study tours, Stats SA had defined its priorities in the transformation of vital statistics. The first of these priorities involved improving the coverage of vital statistics. Stats SA had decided that it was going to play a proactive rather than passive role in the collection of vital statistics data. For that reason, Stats SA had started networking with stakeholders in the production of vital statistics. The study tours helped strengthen that resolve and provided ideas on how to do it more effectively. The tours helped Stats SA in exposing it to multiple-cause coding, in looking for innovative ways to expedite publication of vital statistics and in harnessing the potential of the population register.

Conclusion

One of the principles of official statistics is that “bilateral and multilateral cooperation in statistics contributes to the improvement of systems of official statistics in all countries” (United Nations 2008). This proved true in the case of South Africa. By the end of apartheid in the mid-1990s, demographic statistics in South Africa were in disarray and badly in need of transformation. Multiple forces were at play to help correct the shortcomings in the CR/VS system. On the VS side, the route followed was to learn from best practices in other countries and tailor the lessons learned to the South African context.

Given that a high level of coverage of vital events has been achieved, the short-term priority for Stats SA, the DoH and other stakeholders is to improve the quality of the data, especially that of death certification. Several researchers have called attention to this in the past and have made recommendations in this regard (Bah 2003; Bah 2005; Groenewald and Pieterse 2007). While Stats SA coding staff have been trained in coding at the four-digit level of ICD-10, a plan for moving to that level has had to be shelved until the quality of death certification data has improved. Different innovative approaches have to be put in place for improving the quality of certification of causes of death. In addition to implementing training programs on certification and a query system for badly completed death certificates, a system of rewarding/shaming could be introduced. Hospitals whose staff are thorough in completing death certificates (above a pre-specified percentage) would be included in the list of Stats SA “statistics-friendly hospitals,” while those who do not take certification seriously would be listed as “statistics-unfriendly hospitals.” If such lists were published every year and drew sufficient notice, hospitals would take them seriously and give more attention to the quality of certification of their staff.

Another short-term measure that Stats SA could put in place is to provide “South–South” training to officials from national statistics offices from other developing countries, beginning with some of its neighbouring countries in Southern Africa. Funding could be short-term and training could easily be shared between Stats SA and the statistics office of the neighbouring sending country or countries. In imparting training to other countries, South Africa would be helping them to improve the statistical basis of their decision-making processes and their monitoring of progress toward achieving their Millennium Development Goals.

In the long term, Stats SA could use its decades-old database of deaths to develop a Death Index and use such an index for record linkage and other studies. Once Stats SA has used the index for research, it could organize workshops to train researchers on the index’s potential and utility.

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Appendix I: The Study Tour to Australia and Lessons Learned

The aim of the trip was to learn from the Australian Bureau of Statistics (ABS) about their system of collection, analysis and dissemination of statistics. We visited the ABS Brisbane office and the Canberra head office. Among the topics covered were vital statistics, Aboriginal demographic statistics and population projections. For each of these topics, one or more of the following issues were looked at: relationships with users and stakeholders, data flow and capture, computer systems used, issues of coverage and quality of data, confidentiality, documentation and publications, research, logistical and administrative matters and human resources development. The main topics of interest learned from the visit to Australia can be grouped under the following points:

1. Effective use of query programs to improve coverage and quality
2. Use of automation to save time and costs and improve on quality
    - Use of "front end" computer programs
    - Use of computer-assisted coding
3. Effective networking with stakeholders
4. Giving serious attention to user requests
5. Size of publications – trimmed but detailed
6. Range of publications – diverse thematic issues in addition to the standard releases
7. Forum for discussing new ideas – issue papers, discussion papers

In Australia, the production of demographic statistics also faced a few problems. They included legislative bottlenecks, coverage problems, incomplete documentation in a few areas, lack of national identity numbers, non-standardized births and deaths data coming in from the states and the centralization/decentralization dilemma. One troublesome legislative bottleneck is the requirement that administrative forms used for processing demographic statistics be returned to the source (the so-called return-to-source clause). Against these odds, the ABS have achieved excellent levels of coverage of vital events.

The trip to Australia was very helpful in putting into perspective the ingredients for improving the coverage and quality of vital statistics. The trip brought home the following points: key to the improvement of coverage is, first, linking the actors/institutions involved in the vital events with the registration centres through legislation; second, having effective networking between the official statistical organization, the registrars and the actor/institution involved with the vital events; and third, instituting an effective query program involving Stats SA provincial offices, which would be critical in improving both quality and coverage.

In terms of administrative legalities, there were far fewer bottlenecks in South Africa than in Australia and, in some instances, South Africa enjoyed a relative advantage. In South Africa, ID numbers are present and, as a bonus, there is a population register, a national standard birth and death certificate and no return-to-source clause. This puts South Africa in a good position to catch up on coverage of vital statistics in a relatively short time. The main problem in South Africa in the mid-1990s was the incompleteness in coverage of vital events in rural areas and informal settlements, as well as differential coverage among the different population groups. In order to correct this shortcoming, there was discussion about making the hospitals registration centres for births and deaths. It was envisaged that since most of these events occurred in hospitals, their becoming registration centres would improve coverage. Even if this proved true, though, the trip to Australia has shown that coverage of vital events can still be improved when registration centres are separate from hospitals.

Appendix II: The Study Tour to Sweden and Lessons Learned

The trip to Sweden took place in June 1999 with the primary aim of studying population registration and applying the knowledge gained to South Africa. The ultimate aim was to widen the role of the South African population register in general, and improve the production of demographic statistics in particular. Staff from Stats SA and the DHA (the custodian of the population register) went on the trip. They studied the Swedish population registration system in depth and subsequently wrote a report that included 21 recommendations relevant to the South African population registration system and/or improving the CR/VS system in general (Bah 1999b). As some of the recommendations dealt with the improvement of the South African population register, and this lay in the DHA's jurisdiction, Status SA could have little effect on enforcement and implementation. The following recommendations were directly relevant to coding and processing of causes of death:

6. After gaining more experience in coding with ICD-10, Stats SA should explore the feasibility of moving over to the 4-digit level of coding. This has to be done in consultation with the major users of causes of death data.
7. Stats SA should seek to become part of the network of coders and to make proposal for South Africa to become a WHO collaborating centre for causes of death coding. Such a move would be of benefit to SADC. For this to become a reality, Stats SA needs to be exposed to the international discourse regarding current and emerging practices of coding and their automation.
8. Stats SA should continue its own route of using interactive computer assisted coding but incorporate the rules used in the ACME-TRANSAX-MICAR-SuperMICAR system, within its programs. This development should be shared with the international coding community" (Bah 1999b: 4).

As would be discussed later, Stats SA did act on the last two recommendations. In a follow-up to the visit, Statistics Sweden sent coding staff to Stats SA to help in their multiple-cause coding.

Appendix III: Multiple Visits to the US and Lessons Learned

Stats SA staff visited the US several times for different purposes. One staff member visited the National Center for Health Statistics (NCHS) to study the US vital statistics system and the processing and analysis of mortality statistics. One lesson learned was that co-operation among states formed the basis for producing good and timely statistics. Another important lesson involved the development of the mortality index and its use for wide-ranging research. The NCHS also conducted a "followback" survey on the deceased to enrich the data available from death certificates. The trip provided an opportunity for networking and the basis for other staff visits. Staff members were subsequently sent to the NCHS for training on multiple-cause coding and automatic coding (with funding provided by Statistics Sweden). Some of the recommendations from that visit are given below:

6.1 Stats SA are currently coding causes of death at the three-digit level. The training at the NCHS was conducted at the 4-digit level. The officials that are currently coding have all been trained to code at the 4-digit level. Stats SA should move to that level of coding as it provides more specific information on the cause of death. This move would be implemented in consultation with the major users of causes of death data

6.4 Stats SA's move towards automated coding should be gradually implemented in focused phases. The phasing of implementation would allow the officials enough time to become familiar with current changes before moving on to the next set of changes. The current move to semi-automated coding is in line with the proposed strategy.

6.5 The second set of priorities includes customising the existing programs to incorporate the changes on the new birth and death registration forms. These changes can run concurrently with preparations for full automation such as the compilation of the dictionary of medical terms that links the US English with South African English, Afrikaans and medical abbreviations used by local medical doctors (Mavimbela and Mentz 2001: 11).

Other staff members participated in the International Collaborative Efforts (ICE) meetings on automatic coding of causes of death, shared their work with colleagues and joined the network of coders.