A FRAMEWORK TO ALIGN PATIENT RECORDS MANAGEMENT PRACTICES WITH HEALTHCARE PROVISIONS IN THE PUBLIC HOSPITALS IN LIMPOPO PROVINCE

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Abstract

Records management frameworks have always played a central role in ensuring effective records management in organisations, but if not properly aligned with business systems and workflow, patients' records become difficult to manage effectively. The ineffective management of records creates problems for service providers or records end-users and their clients. For instance, records may be lost or misfiled, which eventually makes it impossible for patients healthcare service providers or records end-users and their clients to access the patient's health and medical history. This study sought to propose a framework for use by healthcare institutions to align their medical records management processes with the healthcare service business process or workflow in the Limpopo province, South Africa. The researcher used a questionnaire to collect quantitative data, supported by data collected using the observation method. The author discovered that the current practice of records management in the healthcare institutions of the Limpopo province in South Africa is not aligned with healthcare service delivery, which has a negative impact on the safety and security of medical records. This resulted in healthcare providers not having access to the medical records of their patients, which is vital in assessing patients' medical status. The recommendation made here is that healthcare institutions should use a recommended medical records management framework to align their records management processes with healthcare service delivery, so as to strengthen safety and security and allow healthcare providers appropriate access to medical records, as part of the workflow process.

Keywords: patient records; electronic system; records management; medical records; healthcare

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Introduction and background to the study

A medical record is a critical asset for healthcare institutions, as it ensures that healthcare providers are able to trace patients' backgrounds regarding their healthcare problems and past treatments. Therefore, one objective of this study was to investigate whether the records management practices for patients' records are aligned with healthcare business processes and to propose an appropriate framework for healthcare institutions in the Limpopo province of South Africa. This is to ensure continuity in terms of treatment options. Qualified healthcare professionals such as doctors and nurses are responsible for treating patients in hospitals. During this process, they use previously produced medical records and add to the same files more records details produced that contain important information that can be used in the future for further treatment and care of the same patient (International Records Management Trust [IRMT] 1999:81). The records thus produced need to be managed properly to ensure that they are accurate, comprehensive, up to date and accessible at all times. This is because proper recordkeeping helps service providers to offer good medical care to patients. If records are not properly managed, healthcare services may be negatively affected (IRMT 1999:1; Marutha & Ngulube 2012:54; Sinha & Shenoy 2013:330; Dang et al. 2014:538; Marutha 2016:101). This is why the other objective of this study was to determine the current state of medical records management in the healthcare institutions of the Limpopo province of South Africa. For instance, the result of poor medical records management may be inadequate treatment, errors in diagnosis and even incorrect prescriptions (IRMT 1999:1; Marutha & Ngulube 2012:43). Among others, records that require proper care include patients' case notes/files, X-rays, specimens, drug records and registers (IRMT 1999:1).

Properly managed records assist hospital management and healthcare providers/workers with the smooth running of the hospital's administration; the regular disposal of records that are no longer needed; tidy records storage; and proper access to, or timely retrieval of, required records. Properly managed records save time and other resources for the hospital and its clients/patients (IRMT1999:1; Boonstra & Broekhuis 2010:2; Sinha & Shenoy 2013:343). Healthcare workers and management not only use healthcare records to strengthen accountability in respect of the prior healthcare actions they took, but also to collect and compile statistical reports and provide data for research purposes (IRMT 1999:1). Clinicians and nurses use medical records to make decisions about future processes which unfold as part of their healthcare offering (Marutha 2011:67). Effective hospital records management requires, among others, information on policy, precedents, legal rights and obligations, personnel, finance, buildings, equipment and other resources (IRMT 1999:1; Chinyemba & Ngulube 2005; Marutha 2011:67; Sinha & Shenoy2013:330). Failure to manage healthcare records properly will result in hospitals being unable to meet their managerial and administrative needs.

Hence, medical records management has a significant correlation with healthcare service delivery: poorly maintained medical records may negatively impact on healthcare service delivery and vice versa. If medical records are not properly managed, they are often lost, destroyed or needlessly retained. Furthermore, ineffective government departments are usually unable to produce evidence of what they did to support their healthcare business continuity (Shepherd 2006:7; Sinha & Shenoy 2013:343). For instance, in supporting the above statement, Monama (2013:5) mentions that outpatients at Mankweng Hospital complained to the public protector that they were forced to queue for long periods before receiving assistance, because the records management employees took long to retrieve their medical records/files from storage, or were unable to retrieve files. In contrast, the negative impact of improperly managed records may be counteracted if medical records management is aligned with healthcare workflow processes.

Furthermore, the absence of medical records may limit or hamper healthcare service delivery. At worst, some healthcare services may be impeded altogether due to ineffective medical records management. Failure to create complete and authentic records or maintain them may have more serious consequences for healthcare services (Shepherd 2006:7; Sinha & Shenoy 2013:330; Dang et al. 2014:538). A pertinent example is a situation reported by Maponya (2013:6) relating to a Polokwane Hospital oncologist's failure to treat a patient due to a missing medical file.

The process of improving the quality of healthcare service delivery largely depends on improved medical records management, which means that authentic medical records must also be accessible. For instance, the process of rendering proper healthcare services depends on users having access to accurate information prior to business transactions, which can be used to improve performance or render the appropriate healthcare service (Bordoloi & Islam 2012:110; Sinha & Shenoy 2013:330). Therefore, information is also compiled from records created during business transactions and related activities. If the information in these records is incomplete, invalid or inaccurate, it may produce misleading knowledge. In the absence of a proper recordkeeping framework, much of the information may just be estimations. Healthcare institutions may thus use misleading or erroneous data when making critical decisions, solving problems or reporting to different levels of authority in the healthcare services institution (Wright & Odama 2012:147-149). Proper records management ensures that quality data are the foundation from which accurate knowledge is derived – knowledge which must support organisational decision-making and problem-solving (Anova Health Institute 2012).

Medical records management approaches also have an impact on the way healthcare professionals render services. Thus, for these professionals to change from paper-based records management to electronic recordkeeping, a paradigm shift in the way they do business is needed. Some healthcare professionals are daunted by the challenge of moving from paper-based to electronic records management (ERM). The challenge lies in them having to change their working culture, rather than the financial implications of

introducing electronic medical records (EMR) per se; hence they tend to be resistant (Boonstra & Broekhuis 2010: 2; Weeks 2013:141-142). This is why, in many healthcare institutions, professionals still store medical histories (information on diagnoses and prescribed medication) in a paper-based format, and only utilise electronic healthcare records system (EHRs) or electronic medical records system (EMRs) for capturing information about patients' administrative and financial information for billing purposes (Marutha 2011: 206; Weeks 2013: 143–145). Paper-based records are not obsolete – they may still be used as backup for records in electronic format, and as far as daily administrative duties are concerned, because they can easily and timeously be retrieved and shared on the healthcare business process. However, the healthcare business process and information system need to be aligned.

Healthcare business process management and information system alignment

In healthcare institutions, healthcare information systems (HISs) and EHRs play an important role in tracking "every detail of a patient's interactions with healthcare providers" (Kemsley 2018), in addition to documenting healthcare activities conducted manually during the process of rendering a healthcare service. In so doing, healthcare institutions are able to comply with legislative requirements and provide healthcare services of a very high standard (Kemsley 2018). However, such information systems need to be improved to provide additional benefits. For instance, electronic medical records may be more complete; may order entries for physicians (using specific computer programs); allow healthcare providers to avoid medical errors; enable users to track healthcare activities/events; and generally save on costs and save patients' lives (Buttigieg, Dey & Gausi 2016). It is high time that healthcare institutions realised that "it's no longer feasible to rely on manual processes" and healthcare standards have to be optimised (Kemsley 2018). Worldwide, populations are aging, medical costs are rising, best practices are changing at supersonic speed, there is an explosion of data and payment methods are being reformed. For those reasons, automation in healthcare processes has become a necessity, rather than a luxury (Kemsley 2018).

Furthermore, "business process management (BPM) technologies also need to be applied within health care environments to improve quality of care, compliance, and efficiency" (Kemsley 2018). "The integration of BPM with the line-of-business HIS/EHR systems is critical to providing an efficient environment that allows health care workers to focus on the patient. BPM can help manage processes and data across all aspects of patient care, connecting the right person with the right task and information at the right time, while providing the ability to quickly adapt processes to changing requirements." (Kemsley 2018).

Buttigieg et al (2016) argue that BPM can help healthcare institutions face most of their challenges and problems, provided they employ a system that is integrated to manage

business performance and "end-to-end processes on an on-going basis" (Buttigieg et al 2016). "With BPM, patient care quality and administrative efficiency are no longer conflicting goals in health care processes" (Kemsley 2018). BPM can be used to systematically adapt business process management systems for standardisation, improved oversight and workflow (Smart Solutions 2018). According to Kemsley (2018), the following are the benefits derived from applying BPM to healthcare processes:

- Errors will be reduced and patient safety will be improved, since standard processes and protocols will be enforced.
- Clinicians will be allowed to focus only on patient care, since non-value-added tasks (such as notification scheduling) will be automated.
- Healthcare processes will be monitored, predicted and improved before a patient is discharged.
- The misallocation and management of resources can be tracked and resolved in a timely manner.
- Time-sensitive conditions can be identified and automated at an earlier stage, thanks to the monitoring and analysis of vital signs.
- Savings can be effected in terms of time, inventory and other resources.
- Administrative paperwork can be reduced by adhering to quality data capturing and compliance metrics.

To elaborate, Kemsley (2018) states, "BPM has expanded from its roots in workflow and integration to become a collection of technologies for improving business processes. BPM integrated into industry-specific applications, such as HIS/EHR, provides management and monitoring of business processes within that informational context".

Healthcare BPM is capable of modelling business processes, and executing structured dynamic processes. It is also capable of incorporating business rules into structured and dynamic processes, to ensure compliance with regulations and best practice. In addition, BPM has a process intelligence, which analytically collects data during process execution to reflect context and key performance indicators formulated by analysing and displaying results (Kemsley 2018). Kemsley (2018) further describes process modelling, structured process execution and dynamic process execution as follows:

> Process modeling allows a process analyst to create graphical, flowchartlike process definitions, which can contain both human and automated tasks. Modeling can also include analysis and optimization techniques such as process simulation, where a process runs in a simulated runtime environment to identify bottlenecks, determine resource requirements, and compare what-if scenarios before it moves to a live production environment (Kemsley 2018).

Structured process execution runs the predefined process model for each new case, with little variation. Human tasks are assigned to people or roles; automated tasks run scripts or make calls to other systems. These are essentially automated versions of the procedure manuals, checklists, standard forms, and guidelines that form the backbone of standard hospital procedures, plus the capture of metrics that document adherence to the standards. These processes are deeply integrated with hospital information systems – often to the point where they appear to be part of the HIS – and interface with sensors and devices to automate and respond to the capture of patient vital statistics. Most of the data related to the process are structured EHR data stored in the HIS/EHR system (Kemsley 2018).

Dynamic process execution or goal-oriented case management, allows a participant to create tasks for a specific case on the fly. These processes predominate in outpatient chronic care management scenarios, where the actions at any given point are highly dependent on the current context. The care processes may not be fully defined in advance, but created as the case manager, patient, and practitioners select specific activities while the case progresses. Tasks may not need to be executed in any particular order, but simply exist on a checklist of items to be completed. Although there will be some amount of structured EHR data as part of the case information, a case usually includes a permanent case folder that can contain various content artifacts, including unstructured documents (Kemsley 2018).

Review of records management frameworks

In establishing a records management framework, the records survey, coupled with the design, development, implementation, control and review of the records system, is a fundamental tool for any records manager. These activities will enable the smooth establishment of a functional records management framework (Yusof & Chell 2000:69; Yusuf & Chell 2005:72). This is because the records survey/audit will give the records manager detailed information about what and how organisational records are created, kept, utilised and eventually disposed of. For this reason, records surveys are considered the primary mechanism for monitoring and improving records management activities (Chaterera, Ngulube & Rodrigues 2014:366-367).

To improve records management practices, the records manager must ensure that all records produced by the organisation are identified, examined, monitored and inspected through the records survey/audit. This includes identifying information about records such as 'quantity, physical form, type, location, physical condition, storage facilities, use and rate of accumulation' (Chaterera et al 2014:366-367). The records survey supports the public records management framework by influencing changes or improving on fundamental records management activities such as "records appraisal, developing a

vital records management programme, and creating retention and disposal schedules" (Ndenje-Sichalwe, Ngulube & Stilwell 2011:271; Chaterera et al 2014:367).

However, the records manager needs the full support and commitment of the organisation's top management (Boonstra & Broekhuis 2011:11; Ngoepe & Van der Walt 2010:84), as well as the willingness of political leadership (Harris 2007:3; Ngoepe & Ngulube 2015:2) in any endeavour to improve or develop a records management programme framework. This implies that the framework/model should be adopted as part of overall organisational objectives aimed at improving service delivery (Ngoepe & Van der Walt 2010:84; Ndenje-Sichalwe et al 2011:271). Hence, organisational leadership must view a sound records management model as a necessity for the organisation. That will help to ensure that records are properly managed and preserved, from creation to disposal, through the deployment of well-trained staff, and the appropriate governance tools, systems and technology (Ngoepe & Van der Walt 2010:83-84). There are several aspects to consider in developing a records management framework. For instance, before engaging such a model, the organisation should consider issues related to "records survey; system design; development; implementation; control and review" (Ndenje-Sichalwe et al 2011:271; Ngoepe 2016; Ngoepe & Ngulube 2016). Organisations must also develop strategy, policy, procedures, classification systems, a retention schedule, a vital records schedule and a disaster preparedness and recovery plan prior to introducing any records management programme model (Ngoepe 2016).

The National Archives of Australia (2003:26) discusses four models of records management programmes in relation to geographical location and control tools (policies, staff and reporting/structural techniques). These four records management models, which are discussed in detail by Ngoepe (2016), include the centralised, decentralised, devolved and combination models. In the *centralised* model, records are managed at a single central location, using a single policy and one group of records management staff, and controlled by one records manager in the organisation. The *decentralised* model sees many different records management sub-units being established in diverse geographical locations, as channelled by organisational branches, regions or service areas. In this model, different records management teams are structured and allocated to manage records within a specific geographical area, with their area records manager reporting to the overall/corporate records manager at head office (National Archives of Australia 2003:26; Ngoepe 2016).

In the *devolved* model, which is similar to the decentralised model, the only difference is that the corporate records manager only takes part in policy and standards development, rather than assuming a supervisory role in respect of the records management staff at the different respective branches/regions. The *combination* model incorporates aspects of the other models. For instance, central records management staff may be established and overseen by a corporate records manager who develops policies, procedures and

standards to ensure that the records manager and staff at regional offices take full responsibility for managing the records within their own geographical area or branch (National Archives of Australia 2003:26; Ngoepe 2016).

Ngoepe (2016) warns that each type of records management model has advantages and disadvantages. This means an organisation may adopt a specific kind of model based on its unique organisational, environmental and operational suitability. For instance, if an organisation accesses records via a central head office, the centralised model may be ideal. Alternatively, for those that provide access via the regions or branches, the decentralised or combined models may be best suited. The records management model is a fundamental necessity in any organisation, because "as long as records management functions operate like an unguided missile without proper planning and models to guide implementation, all the initiatives that are already in place are bound to fail" (Ngoepe 2016).

Considerations of electronic records management in improving medical records management

The government now knows that improving their system does not require an old manual mode of working system since people nowadays are used to service rendered using technology (Sinclair 2002:371). In most countries, organisations, especially the government, prefer to use technology to manage a large number of records produced every day during business transactions and communications to improve services delivered (Tafor 2003:72). Technology leads to the production of electronic records, which enable individual users to access quality, timely, effective and efficient records. The organisations are also able to complete their work quicker, with less effort, with quality, less money and in compliance with laws and regulations. This implies that technology may also help to improve public healthcare service in the public hospitals. More importantly, organisations may need to consider the functionality of an Electronic Records and Document Management System (ERDMS) from its reliability, backup for disaster recovery and its ability to manage those records, whether paper, electronic or multimedia (Johnston & Bowen 2005:134; Tafor 2003:75; Ojo 2009:99; Marutha 2011:37).

However, there are also several challenges associated with the implementation of electronic records management system. These includes but are not limited to a lack of management support, general records management and system training, and resistance to change (Gunnlaugsdottir 2008:33-34). Other challenges relating to the implementation of electronic records management or the implementation experienced by the eastern and southern African countries include a lack of records capturing and preservation e-system; a lack of operational knowledge; a lack of plans, procedures and policies; inappropriate legislations; no budget; no security and access control; and understaffing (Wamukoya & Mutula 2005:70; Mnjama 2005:458-459). Generally,

inhibitors are a lack of training, legal and regulatory tools (Nengomasha 2003: 66), a lack of ICT, political will, infrastructure and not enough human resources (Ojo, 2009:95). Organisations need to have records managers and staff with special expertise to give special care to records in an electronic format or medium since they need to lay a good foundation in adopting the new technology. Otherwise, it may lead to a chaotic situation that may also lead to high records chaos to an extent that records disappear or fade (Tafor 2003:73-75; Marutha 2011:40). Records managers are also supposed to be interdependent with the ICT manager since "in a digital environment where there are no physical strongrooms, information professionals can no longer claim a monopoly of custodianship" (Currall & Moss 2008:69).

Problem statement

Timeously responding to medical records requests on the part of healthcare providers is a daily problem in healthcare institutions in the Limpopo province of South Africa. During healthcare service delivery, doctors and nurses require a patient's medical history if they are to render a service to follow up on patients, especially those with chronic illnesses (Marutha & Ngulube 2012:41; Marutha & Ngoepe 2017:6). A patient's health-related background information is reflected in his/her medical records, and often when those records are requested, there might be a delay or they may never be provided if records practitioners cannot locate them (Marutha & Ngoepe 2017:6). This may be the result of a failure to align healthcare business processes with medical records management practices (Luthuli 2017:22). Therefore, this article seeks to propose a framework through which to align medical records management with healthcare business processes.

Purpose and objectives of the study

The main purpose of this study is to propose a framework for the Limpopo province of South Africa that allows healthcare institutions to incorporate patient records management into their healthcare business processes. The objectives of this study are as follows:

- To determine the current state of patient records management in the healthcare institutions in the Limpopo province of South Africa.
- To investigate whether patients' records management practices are aligned with healthcare business processes in the healthcare institutions in the Limpopo province of South Africa.

- To propose a framework for appropriately aligning patient records management practices with healthcare business processes in the healthcare institutions in the Limpopo province of South Africa.

Research methodology

The study utilised a questionnaire to collect quantitative data, which were triangulated with observation and interviews, to clarify the statistical data in a discussion of the findings. The stratified simple random sampling method was utilised to draw a sample for the study using the Human Resource (HR) staff establishment Microsoft Office spreadsheet. The target population for the study was all 40 hospitals in the Limpopo province of South Africa. The 40 hospitals are spread throughout the province according to the five districts in Limpopo, and not per local municipality. Hence, a questionnaire was distributed to 306 (49%) officials out of the total of 622 records management officials in 40 hospitals located within the five districts of Limpopo as guided by the Raosoft sample-size calculator. Observations were conducted at all these hospitals to support the statistical data reported by the questionnaires. Interviews and document and/or system analyses were used to clarify the conditions under observation. During the observation, the researcher used the convenience-sampling method for interviews to keep on clarifying the situations and conditions under observation. Situations clarified using interviews during observation include system functionalities, patient records creation and patient records management activities on the patient records management workflow and healthcare business process.

Participants selected for interviews during observation include 12 clinicians in 12 hospitals on the healthcare service business process, 40 nurses in 40 hospitals on the healthcare service business process and 40 records management practitioners in 40 hospitals who took the researcher through the records management business process, while discharging their functions during the observation. Clinicians were only accessed for interviews in 12 hospitals since they were not always available for the researcher in other hospitals during the observation process due to their scarcity. It is worth noting that the interviews were not structured and were only used to clarify some things that were not clear during observation. In other words, there were not many questions to ask. This implies that there were a total number of 92 interview participants. The interviews lasted for the duration of the observation period per hospital, estimated at about one hour per interview, and recording was done in the form of taking notes as participants responded. Data from different techniques, questionnaires, interviews, observation, system analysis and document analysis were triangulated and analysed thematically using themes from the objectives of the study. The response rate for the distributed questionnaires was 71 per cent (217). The study utilised the Raosoft sample-size calculator to determine the acceptable sample size out of the total population. This

online calculator found the sample acceptable, since it gave a confidence level of more than 95 per cent and a four per cent margin of error.

Presentation and discussion of the findings

Organisations need to thoroughly research and identify the framework that is best suitable to their environment and mode of operation, because there are different kinds of framework for records management and if the wrong framework is adopted, it may result in chaos (Ngoepe 2016). The researcher asked respondents whether their existing medical records management framework contributed positively to the safety and security of such records throughout their life cycle: 9.7 per cent (21) of respondents answered in the affirmative, 78.8 per cent (171) answered in the negative, while 11.5 per cent (25) were unsure/failed to answer. Figure 1 illustrates the responses in detail. This confirms that the medical records management frameworks in use did not guarantee the safety and security of records, from creation to disposal. This is because, among other hiccups (as noted during the observations and interviews) the frameworks lacked records backup and file-tracking functions, especially at the records creation stage.

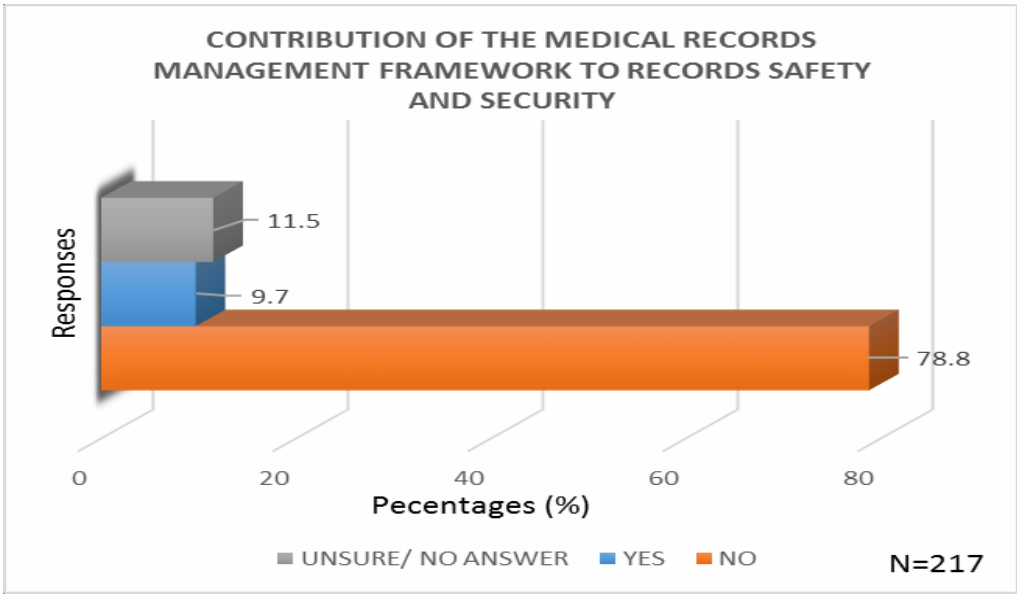

Figure 1: Contribution of the medical records management frameworks to the safety and security of records

From Table 1 it is evident that the system used for the healthcare business process was unable to detect when patients' records were created at healthcare institutions – a situation confirmed by the majority of respondents who replied in the negative to the statement. As observed and clarified during the interviews, the system framework did not detect records creation since records were created manually in the absence of records management officials to control in the records in the hospitals.

Table 1: Participants' responses to records management framework statements (N=217)

Statements	YES		NO		UNSURE/ NO ANSWER	
	NUMBER	%	NUMBER	%	NUMBER	%
1. The patient records management system on the healthcare business process has the ability to track the act of records creation	23	10.6	161	74.2	33	15.2
2. The patient records management system on the healthcare business process is capable of providing an audit trail for any activity involving it throughout the life cycle	13	5.9	188	86.7	16	7.4
3. Records management framework is incorporated into the healthcare business process	44	20.3	145	66.8	28	12.9
4. The electronic records management system is utilised throughout the records management business process on the healthcare workflow	17	7.9	185	85.2	15	6.9
5. The healthcare business process records management framework was used to create and manage medical records electronically, using the business administration system	33	15.1	170	78.4	14	6.5

NOTE: NO=Number % = Percentages

The framework system used on the healthcare service workflow was unable to create an audit trail for the records manager, from date of creation to present as more respondents stated that it was not capable of doing so in Table 1. The system was thus unable to supply a records audit trail, as it could not track medical files' creation, movement or disposal. No other records management functional activities were covered by the system, as observed and verified during the interviews.

As reported in Table 1, the medical records management framework was not aligned with, or integrated into the workflow as respondents confirmed that no such integration existed. There were no medical records management techniques on workflow, since, during the business process, medical records were moved (by the patient) from one healthcare service station to the next. In consulting rooms and wards, records management staff were not sure about what might be happening with the records, since the records were handled in their absence and there was no electronic system to track and update them regarding new records created or the types of records contained in the files. These are some of the key reasons why the medical records management in the healthcare institutions are not well embedded into the healthcare service delivery.

Further to that, as confirmed by majority of respondents, Table 1 also reports that the institutions' medical records management frameworks did not utilise an electronic system. The medical records management frameworks did not align to the use of the e-system, hence the existing system was unable to track file movements and/or cover any other records management functionalities, in addition to not capturing records metadata and/or scanned images. This is why the system could not provide a comprehensive records audit trail.

Kemsley (2018) attests that healthcare quality may effectively be improved with the integration of business process and electronic health records into one system for the management of both patients and records or data as created during healthcare business. This will help clinicians to improve patient care, as well as the creation and access to the right information at the right time. In the Limpopo hospitals, the medical records on the framework were not managed using a healthcare business administration system, as confirmed by respondents in Table 1. Clearly, the business electronic system was not being used for medical records management, but only for capturing patients' personal details and billing them. Other patient records (containing information about prescriptions, treatments, diagnoses, etc.) were created in paper format. Generally, paper-based medical records contain detailed information (patients' billing and personal particulars that were captured in the electronic healthcare system). As illustrated in Figure 2, the records were not only handled by the healthcare service providers listed in the framework, but also by the clients/patients (as observed by the researcher). This is because in the workflow system, patients took their medical records from one service point to another during the healthcare service delivery process.

At many healthcare institutions, professionals still store medical histories in a paper-based format, and only utilise the electronic healthcare records system for capturing information about patients' administrative and financial information for billing purposes (Marutha 2011:206; Weeks 2013:143-145). Records in the Limpopo hospitals were not created and managed electronically in the healthcare business process. For the current medical records management framework, see Figure 2. In the healthcare institutions

under investigation, medical records were created manually and were also not managed electronically using the business administration system – that system was used to capture personal information and billing data per se, instead of being used for paper-based records movement tracking and the creation of an audit trail. The only aid which the system offered in terms of medical records management was a unique patient number, which was generated automatically during the patient's first visit to the healthcare facility. This number, which was used to file medical records, was usually verified through the system before the records practitioners went to the shelves for retrieval. Generally, records were created manually and managed using a manual system. Figure 2 illustrates the medical records management process as part of the current healthcare service workflow.

The paper-based records shown with the colour-coded lines with the paper-based records icon were created in all the seven healthcare service points. The black arrow from the records icon shows that the paper-based records were taken to the building for storage and safekeeping after creation. Another black arrow shows that the same records were retrieved, accessed or used for all the seven healthcare service points during service delivery. On the other hand, electronic records creation is also shown with colour-coded lines with the computer icon. The black arrow pointing from computer to server shows how the electronic records were stored for eventual safekeeping in the server. Access is also illustrated with black arrows from two different storages, one for paper-based records and the other for electronic records with the clinician icon to different healthcare service points. Electronic records are only used for cashier and patient administration as in the illustration, while paper-based records are used for all seven service points because it captures all patients' records, and the electronic records system only captured financial and demographic (personal) information of the patients. In the bottom of Figure 2, there are some notes to show the meaning for the different types of arrows. For instance, the first arrow shows patients' movement on the workflow carrying the files, the second one shows files' movement on the workflow and the third one shows the returning of paper-based records files for filing to the custody.

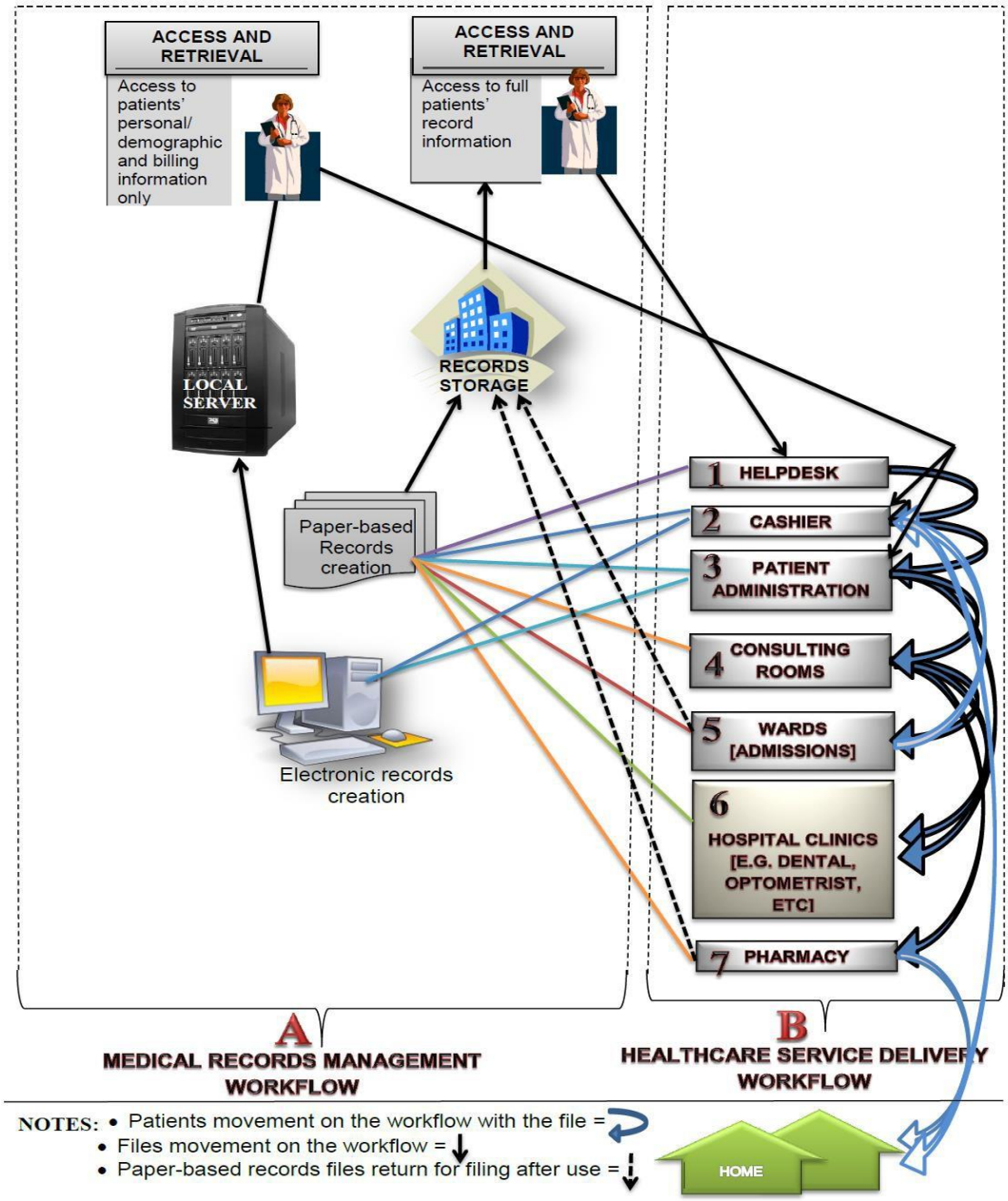

Figure 2: The current state of patients' records creation and management in the healthcare service delivery workflow in Limpopo hospitals

Conclusion

The current state of medical records management in healthcare institutions in Limpopo requires urgent attention, if healthcare practitioners are to render their services with ease. For instance, the failure of a records management system to track a record's creation and movement poses a very serious security threat, which may directly affect a patient's health and could prevent healthcare practitioners from delivering the appropriate service. In some instances, without medical records, doctors either take the risk of treating patients in the dark (ignorant of their medical history) or refrain from taking a risk to treat patients (avoid prescribing a treatment that may endanger the patient). The central solution to all these challenges is for institutions to ensure that medical records management practices are embedded in their healthcare service delivery system. That will allow healthcare practitioners to access medical information via the same system they use to render healthcare services. In other words, the two business processes – medical records management and healthcare service delivery – must be aligned. To achieve this, the author proposes two different alternative frameworks to ensure that healthcare institutions have a baseline or source against which to benchmark in order to improve the current state of their medical records. Improved records management will improve the state of healthcare service delivery, bringing more benefits to patients and staff (in both domains). Patient satisfaction, healthcare services, patients' waiting time/turnaround time and access to information may improve, while litigations and complaints may very well be reduced.

Recommendations of the study

Healthcare institutions in Limpopo need to revisit their medical records management frameworks to ensure that they help each organisation to ensure the safety and security of its medical records. This will give greater peace of mind to healthcare providers, since the necessary records will always be readily accessible. Those institutions need to ensure that sound records management practices are embedded in their healthcare business processes by implementing a healthcare system that is used effectively for records management. This will enable healthcare providers to access records as they render healthcare services to patients on the same e-system. It will further allow records management practitioners to track the creation of medical records, along with any other business transactions/activities conducted on a medical file/record. This will lead to greater accountability in terms of usage and prevent damage to medical records, as the records management framework system can provide an audit trail for any activity involving these records throughout their life cycle, if each is captured with the appropriate metadata. In this way, the records management framework will be incorporated into healthcare business processes, since medical records management and healthcare services will be rendered on the same business process flow. Each organisation must ensure that its ERM system is utilised across the records management framework as it pertains to the healthcare workflow. Healthcare institutions must

further ensure that their records management frameworks create and manage medical records electronically, using the business administration system and backing it up with paper-based records. This will solve the problem of patients having to fetch and carry their medical files, which may easily be damaged or stolen. Furthermore, files may be compromised if contaminated with a patient's bodily fluids (blood, sputum), and an unstable individual might tamper with the data.

In improving their records management programmes/systems, hospitals in Limpopo may need to revisit their present mode of records management. To this end, they can adhere to one of two alternative models/frameworks which the researcher proposes, based on the findings of this study. Depending on the challenges a hospital faces, it may opt to continue producing records in a paper-based format, and back them up by scanning and capturing data into the e-system, with appropriate metadata. It can then use the scanned e-records when rendering a service, or continue using paper-based records (see Figure 3). Alternatively, a hospital may opt to create its records electronically, using an appropriate e-records system, and print out backup records to be kept in paper-based format. Such institutions can rely on their e-records for service delivery, but print and only use paper-based records for disaster recovery (see Figure 4). Both frameworks work to ensure the safety, security and smooth sharing of medical records information across the relevant units, healthcare facilities and hospitals (public or private, within the province or across the country), as well as districts and provincial offices. Paper-based records may only be used as a backup in case a disaster affects the electronic records. The backup may comprise both paper-based files and electronic records stored on a server, as illustrated in Figures 3 and 4. To achieve this, the records management system must be embedded in the healthcare service business processes or workflow. Healthcare institutions must be able to share patient information at different levels, since patients may move from one facility to another. In addition, other levels in healthcare programmes (district office, head office) must be able to access information at their level of operation for monitoring and management purposes. Other healthcare facilities (health centres, clinics, vertical programmes) may require a patient record-sharing platform connection for the case when patients appeal to them for medical assistance. As healthcare businesses collaborate on processes, so planning for the termination and disposition of medical records becomes imperative (see Figures 3 and 4), as a way of continuously resolving the problem of storage space in both electronic and paper-based formats.

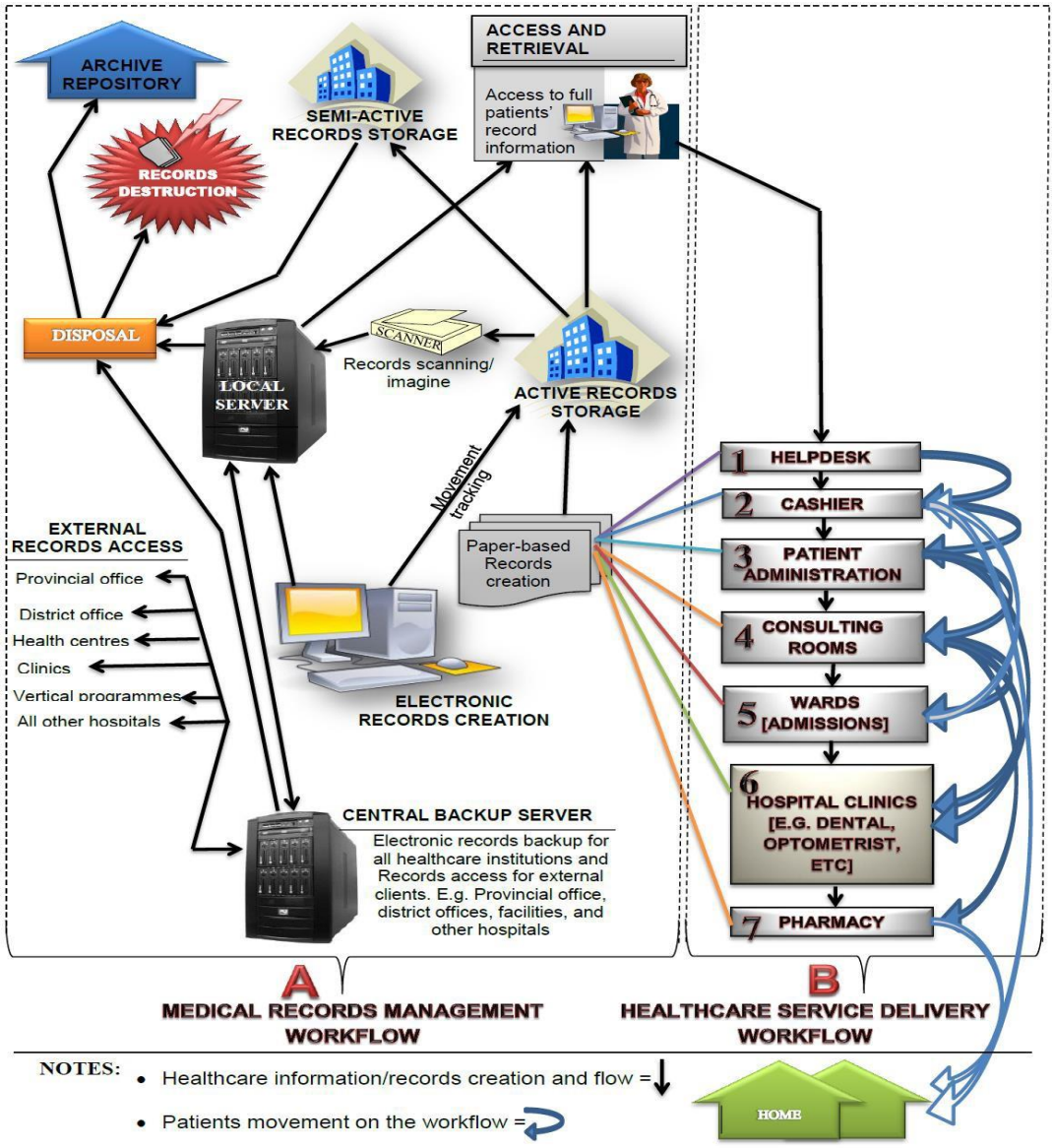

Figure 3: Proposed framework for the creation of paper-based records with an electronic records management system back-up and sharing on the healthcare service delivery workflow

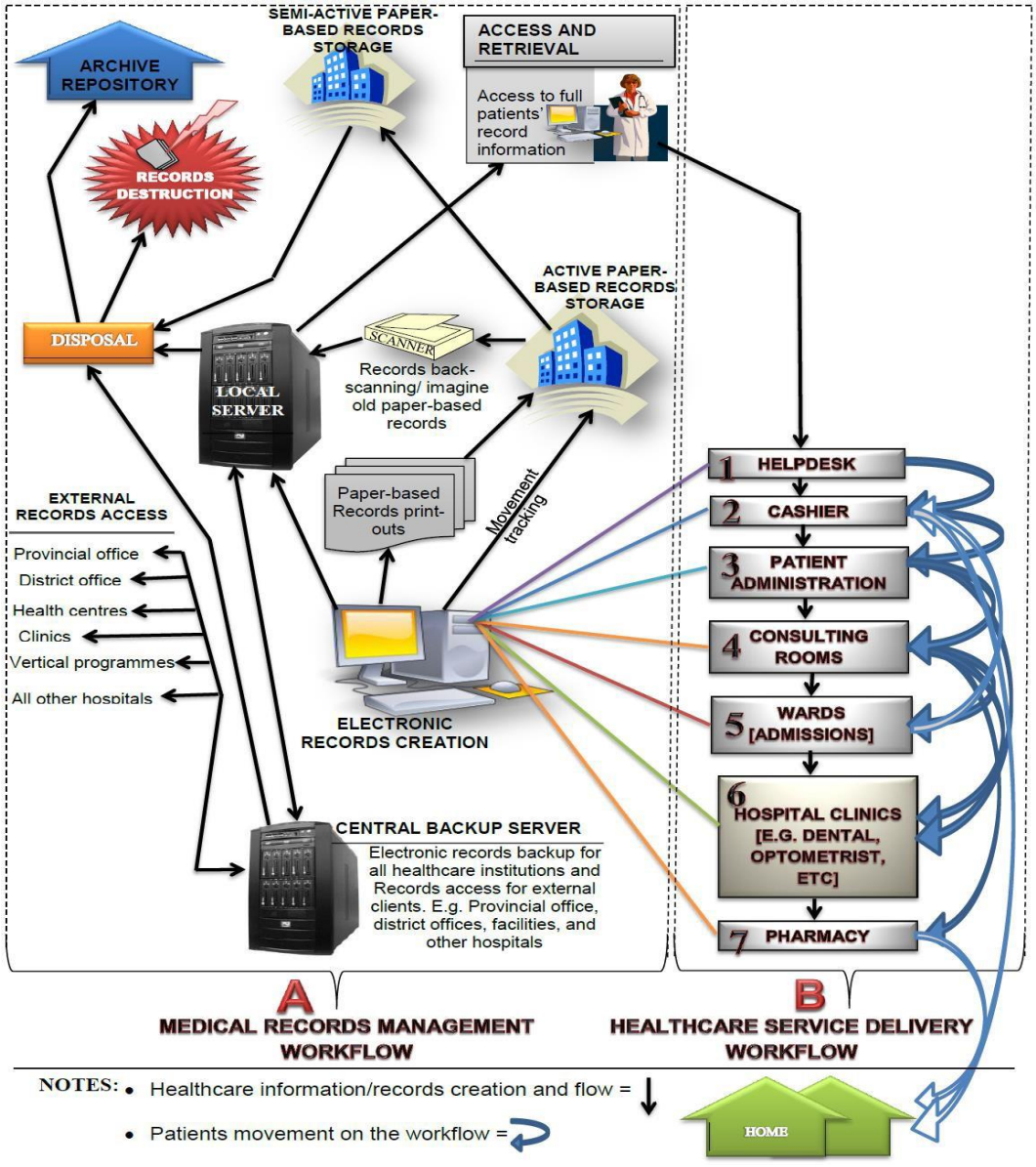

Figure 4: Proposed framework for electronic medical records creation with paper-based records management system back-up on the healthcare service delivery workflow

Although it is beyond the scope of this study, there are several scales of choices for medical records management systems that may assist the healthcare fraternity. The healthcare institutions within the province or within the entire country, or globally with all or certain countries may collaborate to share medical/patient/health records using one system or using different systems but having one neutral system to interlink them

or to ensure interoperability in their systems for patients' files (records or information) or for access or sharing purposes. In this collaboration, public healthcare institutions may also decide on whether to include the private healthcare institutions and practices so that they may also share the patients' records with them on the network at different levels. This will bring a solution to many problems and challenges since each patient will have one file within the scale of collaboration, whether provincial, national or worldwide/globally or even private/public healthcare platform. Therefore, in any healthcare institution where the patients consult, they do not have to open or create a new file. Instead, healthcare practitioners must be able to access the file created previously or initially in the other institution where the patient first consulted in the past. Healthcare practitioners, which include doctors and nurses, must be able to study/read the medical history to understand the patient's medical background, even if is the first time they see the patient or the patient consults for the first time in their healthcare institution. After conducting their diagnosis, treatments and prescriptions, they must also be able to add new records about the current state of a patient's illness, diagnosis, treatments and prescriptions. This will, on top of other solutions related to records management and sharing, assist healthcare practitioners to avoid repetition of prescriptions, diagnosis and even the treatments, which may be costly and/or risky to patients' health.

Focusing on the medical records management framework pattern in the Limpopo province, the province has been using the combination model, which is the relevant model recommended by this study. In other words, they combined both centralised and decentralised models for different elements of medical records management. For instance, they have a decentralised medical records management staff structure with the records manager reporting to hospital chief executive officer established at each hospital. Medical records are also decentralised as they are created, kept and managed within each hospital by local hospital medical records management staff. Overseeing managers and senior managers are appointed at the provincial office responsible to develop and implement policies and procedures, train staff, and inspect and monitor medical records management in the hospitals. The provincial office also appointed records managers at the district offices to assist with the coordination and implementation of policies and procedure guidelines and training. This is a relevant and recommended model for the Limpopo provincial healthcare sector due to the nature of the service and the records demand and medical records creation geographical area. However, with the relevant or suitable interoperable/interlinked electronic records management system, medical records may be readily available and accessible at any level of the healthcare service's organisational structure, be it hospital, district or provincial office. The healthcare practitioners and/or facilities based at different geographical areas may also be able to share, discuss and advise each other on the same patients or medical records and make decisions about patients' treatment and/or prescription.

This is one of the best models for public healthcare because the provincial department will have to control institutions with policies, procedures and standards, although the biggest disadvantage of the model is that they will face challenges regarding costs for a high number of staff appointed at each hospital, district and provincial office. The records storage and other resources like stationery and budget will have to be provided to all levels of operation.

References

Anova Health Institute. 2012. Anova's Limpopo team improves data quality, 31 July, Available at: http://www.anovahealth.co.za/news/entry/anovas_limpopo_team_improves_data_quality/ (Accessed 15 July 2018).

Boonstra, A. & Broekhuis, M. 2010. Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC Health Service Research*: 1-17.

Bordoloi, P. & Islam, N. 2012. Knowledge management practices and healthcare delivery: A contingency framework. *Electronic Journal of Knowledge Management* 10(2): 110-120. Available: www.ejkm.com (Accessed 18 April 2013).

Buttigieg, S.C., Dey, P.K. & Gausi, D. 2016. Business process management in health care: Current challenges and future prospects. *Innovation and Entrepreneurship in Health* 3. Available at: https://www.dovepress.com/business-process-management-in-health-care-current-challenges-and-futu-peer-reviewed-fulltext-article-IEH# (Accessed 10 February 2018).

Chaterera, F., Ngulube, P. & Rodrigues, A. 2014. Records surveys in support of a framework for managing public records in Zimbabwe. *Information Development* (30)4: 366-377.

Chinyemba, A. & Ngulube, P. 2005. Managing records at higher education institution: A case study of the University of KwaZulu-Natal, Pietermaritzburg campus. *South African Journal of Information Management* 7(1). Available at: www.sajim.co.za/index.php/SAJIM/article/download/250/241_(Accessed 24 July 2018).

Currall, J. & Moss, M. 2008. We are archivists, but are we OK? *Records Management Journal* 18(1): 69-91.

Dang, V.M., Francois, P., Batailler, P., Seigneurin, A., Vittoz, J.P., Sellier, E. & Labarere, J. 2014. Medical record-keeping and patient perception of hospital care quality *International Journal of Health Care Quality Assurance* 27(6): 531-543.

Gunnlaugsdottir, J. 2008. As you sow, so you will reap: implementing ERMS. *Records Management Journal* 18(1): 21-39.

Harris, V. 2007. A South African archival tale, *ESARBICA Newsletter*, 21: 5-9. Available: http://www.esarbica.com/esarnews21.pdf (Accessed 18 January 2016).

International Records Management Trust. 1999. *Managing hospital records*. London: IRMT.

Johnston, G.P. & Bowen, D.V. 2005. The benefit of electronic records management systems: a general review of published and some unpublished cases. *Records Management Journal* 15(3): 131-140.

Kemsley, S. 2018. Business process management in health care, Web Exclusive. Available at: http://www.fortherecordmag.com/news/100314_exclusive.shtml (Accessed 10 February 2018).

Luthuli, L.P. 2017. Medical records management practices in public and private hospitals in Umhlathuze area, South Africa. MINF Dissertation. University of Zululand, KwaDlangezwa.

Maponya, F. 2013. No medical records, no treatment. *Sowetan Newspaper* 10 April: 6.

Marutha, N.S. 2011. Records management in support of service delivery in the public health sector of the Limpopo province in South Africa. MINF Dissertation. University of South Africa, Pretoria.

Marutha, N.S. 2013. *Records management in the South African public health sector: Practice, challenges, developments and needs.* Germany: LAP Lambert Academic.

Marutha, N.S. 2016. A framework to embed medical records management into the healthcare service delivery in Limpopo province of South Africa. PhD Thesis. University of South Africa, Pretoria.

Marutha, N.S. & Ngoepe, M. 2017. The role of medical records in the provision of public healthcare services in the Limpopo province of South Africa. *South African Journal of Information Management* 19(1): 1-8.

Marutha, N.S. & Ngulube, P. 2012. Electronic records management in the public health sector of the Limpopo province in South Africa. *Journal of the South African Society of Archivists* 45: 39-67.

Mnjama, N. 2005. Archival landscape in eastern and southern Africa. *Library Management* 26(8/9): 457-470.

Monama, T. 2013. Patients, staff spell it out to Madonsela: missing files, poor equipment still plague Mankweng. *Sowetan* 29 August: 5.

National Archives of Australia. 2003. *Overview of classification tools for records management*. Canberra: Business Centre ACT 2610.

Ndenje-Sichalwe, E., Ngulube, P. & Stilwell, C. 2011. Managing records as a strategic resource in the government ministries of Tanzania. *Information Development* 27(4): 264-279.

Nengomasha, C.T. 2003. Records management in the knowledge management age: Namibia context. *ESARBICA Journal* 22: 64-71.

Ngoepe, M. 2016. Records management models in the public sector in South Africa: Is there a flicker of light at the end of the dark tunnel? *Information Development* 32(3): 338-353.

Ngoepe, M. & Ngulube, P. 2016. A framework to embed records management into the auditing process in the public sector in South Africa. *Information Development* 32(4): 890-903.

Ngoepe, M. & Van der Walt, T. 2010. A framework for a records management programme: Lessons from the Department of Cooperative Governance and Traditional Affairs in South Africa, *Mousaion* 28(2): 82-106.

Ojo, T. 2009. Communication networking: ICT and health information in Africa. *Information Development* 22(2): 94-101.

Shepherd, E. 2006. Opinion piece: why are records in the public sector organizational assets? *Records Management Journal* 16(1): 6-12.

Sinclair, N. 2002. Black to future: Electronic records management in the twenty-first century. *Records Management Journal* 12(3): 103-107.

Sinha, R.K. & Shenoy, N. 2013. Assessment of oncology medical records as per NABH standards, *Journal of Health Management* 15(3): 329-343.

Smart Solutions. 2018. Healthcare and benefits of wise BPM implementation. Available at: https://www.smartersolutions.com/business-process-management-system-in-healthcare-enhancements.html (Accessed 10 February 2018).

Raosoft sample size calculator. n.d. Available at: http://www.raosoft.com/samplesize.html_(Accessed 17 August 2018).

Tafor, V. 2003. Digital technology – understanding the problems posed by information technology in generating and managing records from a third perspective. *ESARBICA Journal* 22: 72-77.

Wamukoya, J. & Mutula, S.M. 2005. E-records management and governance in East and Southern Africa. *Malaysian Journal of Library and Information Science* 10(2): 7-83. Available at: http://majlis.fsktm.um.edu.my/document.aspx?FileName=331.pdf (Accessed 17 August 2013).

Weeks, R.V. 2013. Electronic health records: managing the transformation from a paper-based to an electronic system, *Journal of Contemporary Management* 10: 135-155.

Wright, G. & Odama, A. 2012. Health data ownership and data quality: clinics in the Nyandeni District, Eastern Cape, South Africa, *Engineering Management Research* 1(2): 146-152.

Yusof, Z.M. & Chell, R.W. 2000. The records life cycle: An inadequate concept for technology-generated records, *Information Development* 16(3): 135-142.

Yosuf, Z.M. & Chell, R.W. 2005. *Issues in records management*. Malaysia: Universiti Kebangsaan.