

Assessment of the District Health Information System in the North West Province

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INTRODUCTION

Effective healthcare monitoring requires functional health information systems (HISs) to produce quality, real time information for decision making. The DHIS is used to record information on facility-based services, infrastructure, human resources and community-based campaigns. Data quality from the District Health Information System (DHIS) is a grave concern especially when manual paper-based processes are mixed with incompatible computerised systems. Several apprehensions regarding the quality of data generated by the DHIS were reported. Researchers from the Faculty of Health Sciences, North-West University, were invited by the North West Department of Health to conduct a 360° assessment of the DHIS within the Province. The project was funded by the Belgian-South African Study & Consultancy Fund of the Belgian-South African Development Cooperation. Ethic approval was obtained from the Health Research Ethics Committee of the North-West University (NWU-00023-15A).

This study provides empirical evidence on the realisation of the DHIS within the Dr Kenneth Kaunda (DKK) and Bojanala Platinum (referred to as Bojanala only) Districts, North West Province (NWP). It presents a multi-level assessment of the performance of the DHIS in the North West Province, in order to identify strategies to improve data-informed decision-making. The focus was to assess **input factors, processes and current and future usage** of routine health information data.

CLARIFICATION OF KEY CONCEPTS

- INFORMATION SYSTEM** "provides information support to the decision-making process at each level of an organisation" (World Health Organization [WHO], 2007).
- HEALTH INFORMATION SYSTEM (HIS)** "integrates data-collection, processing, reporting and use of information necessary to improve health service effectiveness and efficiency through better management at all levels of health services (WHO, 2008).
- HEALTH MANAGEMENT INFORMATION SYSTEM (HMIS)** "information system especially designed to assist in the management and planning of health programmes, as opposed to delivery of care" (WHO, 2009).
- DISTRICT HEALTH INFORMATION SYSTEM (DHIS)** "open source software platform for reporting, analysis and dissemination of data for all health programs, developed by Health Information Systems Programme (HISP)" (2016).

RESEARCH AIM

The aim was to assess the DHIS in the DKK and Bojanala District in the NWP regarding the following:

- PHASE 1: Input factors assessment** (technical, organisational and behavioural) that may influence the DHIS.
- PHASE 2: Process factors** (e.g. collection, transmission, processing, analysis, display, quality checking of data and feedback) and **compliance assessment**.
- PHASE 3: Usage assessment** of current and future routine health information for managerial and patient care decisions, aimed at improving the performance of the entire system.

The research setting was all levels of care within the following two districts (see Table 1 – below).

Table 1: Municipalities with major towns/cities in the DKK and Bojanala Districts

Dr Kenneth Kaunda District	Bojanala Platinum District
Ventersdorp: Tshing, Ventersdorp.	Kgetleng River: Borolelo, Derby, Koster, Nooitgedacht, Reagile, Swartkoppies.
Maquassi Hills: Wolmaranstad, Makwassie, Leeudoringstad.	Madibeng: Brits, Ga-Rankuwa, Hartebeespoort, Mooi-nooi, Pelindaba, Sonop.
Matlosana: Buffelsfontein, Dominionville, Hartbeesfontein, Jouberton, Kanana, Khayalihe, Khuma, Klerksdorp, Orkney, Stilfontein, Tigane, Vaal Reefs.	Rustenburg: Rustenburg, Rooikoppies, Kroondal, Bafokeng.
Tlokwe: Ikageng, Mohadin, Potchefstroom, Promosa.	Moses Kotane: Bafokeng, Dinokaneng, Mogwase, Sun City, Zwartklip.
	Moretele: Makapanstad.

METHODOLOGY

Project outline	Methodology per phase
Data collection, analysis, interpretation	<ul style="list-style-type: none"> Descriptive cross-sectional study design: <ul style="list-style-type: none"> Data collected from all levels of service delivery within the DKK and Bojanala. Eight (8) facility/level-of-care-specific questionnaires related to the input, output and process factors of the DHIS completed, analysed, interpreted. All inclusive sample of estimated target population of 1 410 participants invited. Data collection on different service-levels implied fluctuating sample sizes despite all-inclusive sampling. Qualitative, interpretive descriptive, contextual design: <ul style="list-style-type: none"> Individual interviews with 23 managers associated with the DHIS. Semi-structured questions. Thematic analysis of transcriptions.
Collaborative interpretation	Preliminary results with reciprocal clarification, reflections and recommendations shared with the two participating districts in a seminar format. Conducted in June 2016.
Dissemination to Department of Health.	Integration of results according to pattern matching towards final conclusions and recommendations and presented to executive management at the Provincial Department of Health, Mahikeng, on 28 June 2016.

Sources and processes accessed and followed in development of data collection tools:

Studied national/international validated assessment tools (e.g. MEASURE Evaluation, WHO, Prism Tools), explored previous studies and literature.

Integrated policies and standard operating procedures of National Department of Health.

Obtained face validity through biostatistician, Schools of Nursing Science and Pharmacy (population understood questions, adequate response options).

Obtained content validity from various experts in public health content and context aligned with objectives and practice).

Administration of data collection tools

Two (2) self-administered questionnaires: 1) Technical, organisational, behavioural assessment for operational managers, administrative officers, healthcare providers, 2) IT infrastructure.

Six (6) face-to-face interviews with a structured questionnaire: Assessment of process factors in 1) PHC facilities; 2) sub-district office; 3) district hospital; 4) district office; 5) EMS; 6) management.

One (1) face-to-face interview with a structured questionnaire with managers, followed thematic analysis and interpretive descriptive.

Three (3) different informed consent forms used: 1) self-administered questionnaires; 2) questionnaire completed during face-to-face interview; 3) participating in semi-structured, individual interviews.

Table 2: Multi-level distribution of questionnaires

		PHC facilities	Hospitals' HI Office	EMS	Sub-, Distr., Prov. Offices
INPUT FACTORS					
Resources	Human, documents, equipment, facilities	X	X	X	X
Training needs	Training needs	X	X	X	X
Management	Meetings, supervision, constrains, etc.	X	X	X	X
PROCESS FACTORS					
Health info mapping	Data collection tools, storing, submission, analysis, report writing, feedback, handling of records, etc.	X	X	X	
Responsibilities personnel	Ops managers / Unit managers / EMS Station manager / Shift managers	X	X	X	
	Health information officer		X		X
	Healthcare providers	X		X	
	Data-capturers / ward clerks / Adm. officers	X	X	X	X
	Health facility receptionist	X	X		
OUTCOME					
	Purpose of HI	X	X	X	X

CONCLUSIONS AND RECOMMENDATIONS

- Urgent need for multi-level, purposive training of DHIS to all service-levels.
- A top-down system depending on multiple hand-to-hand actions from bottom-up business processes compromise data quality.
- Migration from technology adoption towards integration in process with insufficient data usage.
- Connectivity, insufficient equipment and poor ICT maintenance detrimental to DHIS progress and unprepared for DHIS2.
- To consider operations software leading to once-off data capturing by health practitioners.

Recommendations were aligned with the eHealth Strategy of South Africa, see Table 3.

Table 3: Recommendations

TRAINING NEEDS
Purposive, structured training of all aspects of the DHIS to mobilise employees from system adoption to data integration.
STRENGTHENING ICT- AND SYSTEMS SPECIFIC REALITIES
<ul style="list-style-type: none"> Operations system exporting data to DHIS, to send data automatically through application programming interphase (APIs) and service bus technology. CRM systems for workflow optimisation. Technology implementation roadmap to optimise DHIS: 1st reliable Internet, 2nd backup servers, 3rd mobile devices. Service-level agreements with regional partners to increase service uptime and reliability. Field service software to optimise field service agents. Reliable connectivity essential. DHIS2 is software of choice, now get a partner to simplify day-to-day realities. Offline to online synchronisation of static information. HIS should dictate the processes to be followed by the system users. Operations system with additional cloud backup. Minimise human error through first point of entry of data on mobile applications with prepopulated fields by healthcare practitioners. Specific processes and business rules be imposed from central point.
COMPROMISED DATA QUALITY
<ul style="list-style-type: none"> Real-time dashboards to provide feedback to all role players. Translate benefits of DHIS to all service levels. End manual (paper) and computerized data capturing with first entry data captured by health practitioners as part of operational services. Strengthen information culture, interdependent responsibility towards data quality and active information use. Acknowledge champions in HIS.
LACK OF OWNERSHIP AND INSUFFICIENT DATA USAGE AS DATA IS EVERYBODY'S AND NOBODY'S BUSINESS
<ul style="list-style-type: none"> Empower healthcare practitioners to know system elements. Integrate operational solutions into everyday activities whilst DHIS-specific data are extracted. Business analysts knowledgeable about the contextual challenges of health systems in South Africa to function between health practitioners and information officers. Reconsider access rules. DHIS will always feed into APP reporting until users integrate information into broader decision-making.
HUMAN CAPITAL AND TECHNOLOGY ADOPTION
<ul style="list-style-type: none"> Direct data entry by health practitioners. eHealth awareness campaign to promote data quality as interdependent responsibility. Employee assistance for non-compliance on all service levels, rewards systems for meeting/exceeding performance targets. Immediate benefit for all through real time information. Domain experts from health practice into IT roles. Business analysts with health industry knowledge as fusion layer between DHIS, information officers, information managers, health practitioners Supervisory visits have automated audit trail. Business analysis: more staff needed versus decent operational software that enhances efficiency.

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