

Health Systems Resilience: A Systems Analysis



A Case Study of Maternal Health Service Provision in OR Tambo District, Eastern Cape, in the Context of Chronic Poor Health Performance

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HEALTH SYSTEMS RESILIENCE

Health Systems Resilience: A Systems Analysis is a project which seeks to apply a systems dynamics approach to understand, predict and identify mechanisms that influence the resilience of health systems in contexts of adversity. Resilience has emerged as a dominant concept underpinning development assistance and humanitarian support in contexts vulnerable – through conflict or natural disaster – to crisis. A systems dynamic approach, which lends itself to group model building through intensive, participatory consultation with stakeholders and representation and refinement of models using graphical systems tools, offers an effective means of exploring the determinants of systems vulnerability and resilience.

The project is implemented by the Mailman School of Public Health, Columbia University in collaboration with the School of Public Health, University of the Western Cape (UWC). The work is funded by DFID through the ReBUILD program coordinated by the Liverpool School of Tropical Medicine and Queen Margaret University, Edinburgh.

A series of three case studies were planned during the course of the project. The first, a historical analysis, considered measures addressing the disruption of HIV services in Cote d'Ivoire following the disputed presidential election of 2010¹. The second case study focused on circumstances in the health sector in the Yobe State, northern Nigeria, in response to the Boko Haram insurgency which began around 2011 and continues to the present day.² This final case study focuses on a more chronic health systems failure in one province in South Africa – Eastern Cape, in OR Tambo District.

¹ Lembani, M, de Pinho, H, Delobelle, P, Zarowsky, C. & Ager, A. (2014) A case study of technical assistance to HIV services in Cote d'Ivoire in the context of civil unrest following the disputed presidential election of 2010. Report to the ReBUILD Consortium. New York: MSPH, Columbia University

² Lembani, M, Mohammed, A, Abdulwahab, A, Garba, A., de Pinho, H, Delobelle, P, Zarowsky, C. & Ager, A. (2014) A case study of Health Service Provision in Yobe State, Nigeria in the Context of the Boko Haram Insurgency. Report to the ReBUILD Consortium. New York: MSPH, Columbia University.

BACKGROUND

As in other areas of public service, the South African health sector faces regular and violent, service delivery protests; difficult labour relations; widespread concerns about lack of accountability at multiple levels; and a highly politicized operating environment. Additionally, the country faces an extremely high burden of disease, with the world's largest burden of HIV – and the world's largest and most rapidly scaled-up program of anti-retroviral therapy – putting an already frail health system to the test.

The Eastern Cape reports among the poorest health and health service indicators in the country, and has been the focus of two major reports^{3 4} focusing on health system failure and lack of accountability, with subsequent widespread media coverage. Its health system is widely considered to be both weak and highly politicized, with some clinics, individuals, and hospitals singled out as exceptions. It is also the site of major investments by the national government and international partners to seek to turn indicators around. These investments reflect the serious commitment to change at many levels and sites in the Eastern Cape, but also evoke conflict and blame between levels and jurisdictions of the system as well as creating a significant administrative burden in juggling frequent and uncoordinated field visits, situation analyses, and interventions by the many partners offering assistance.

The Eastern Cape can be characterized as being in a state of 'chronic emergency' on technical, health systems, and socio-political levels. It therefore provides an instructive complement to the other case studies in this series, offering insight into the contribution of systems dynamics analysis to a crisis context marked not by civil conflict but rather broader 'dysfunctionality' and politicization within

³ TAC & SECTION 27 NSP Review (2013) Death and Dying in the Eastern Cape: An investigation into the collapse of a health system.

⁴ "Stop Making Excuses": Accountability for maternal health care in South Africa. 2011. Human Rights Watch <https://www.hrw.org/sites/default/files/reports/sawrd0811webwcover.pdf>

which, nonetheless, delivery of some services continues. Site selection was also on the basis that, among the five Districts in the Eastern Cape, OR Tambo stands out as the worst performing District, especially in the area of maternal mortality.

The case study was completed in collaboration with a WOTRO-funded project, 'Mainstreaming a health systems approach to delivery of maternal health services: transdisciplinary research in Rwanda and South Africa' (MH-SAR)", which implemented participatory action research of health system approaches to improving maternal health. This case study aimed to complement this work, using an explicit systems lens for analysis.



Map of Eastern Cape Province, South Africa.
Source: <http://gis.ecprov.gov.za/>

METHODOLOGY

The study followed a structured methodology with four distinct phases. The first focused on problem analysis with selected stakeholders to define the focus and boundaries of the case study. These discussions were held at District and Province level with decision makers in the maternal health sector. A problem statement was formulated which focused analysis on barriers to better performance with respect to maternal health indicators in the district and potential strategies to address these. Further interviews were then scheduled with stakeholders relevant to systems analysis of these barriers and strategies. Interviewees included Provincial, District and sub-District health managers, health facility staff and

patients, pharmacists, emergency transport managers and the drug supply depot manager. The interviews sought to solicit information from a broad spectrum of stakeholders in order to understand the problem from all sides. In total, 20 persons were interviewed.

In the second phase of work, preliminary data analysis and planning, four project researchers reviewed interview transcripts and independently identified key emergent issues. Researchers then jointly consolidated these key issues into themes, specified in the form of variables. An interrelationship diagram (IRD, Figure 1) was developed which highlighted major linkages between variables, and identified what appeared to be key drivers (influencing many variables) and outcomes (influenced by many variables). Working with two District planning team members to form a group model building (GMB) planning team, researchers used the IRD to surface a 'seed model' (Figure 2) to be used as the preliminary basis for model building in the subsequent GMB workshop. A program for this was developed, with specific scripts adopted to structure discussion through successive stages of the workshop.⁵



Participants discuss a systems model showing how health systems function in OR Tambo.

⁵ After Andersen and Richardson, 1997; Luna-Reyes et al. 2006; Hovmand et al. 2012 etc.

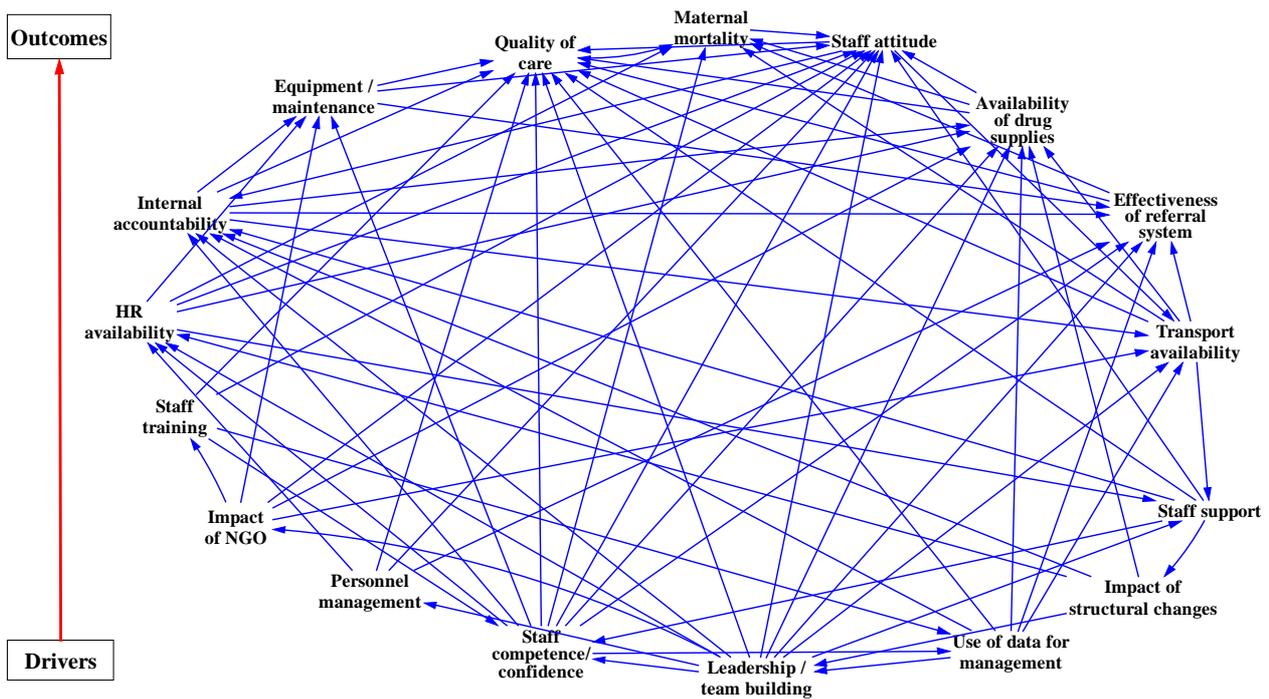


Figure 1: Interrelationship Diagram

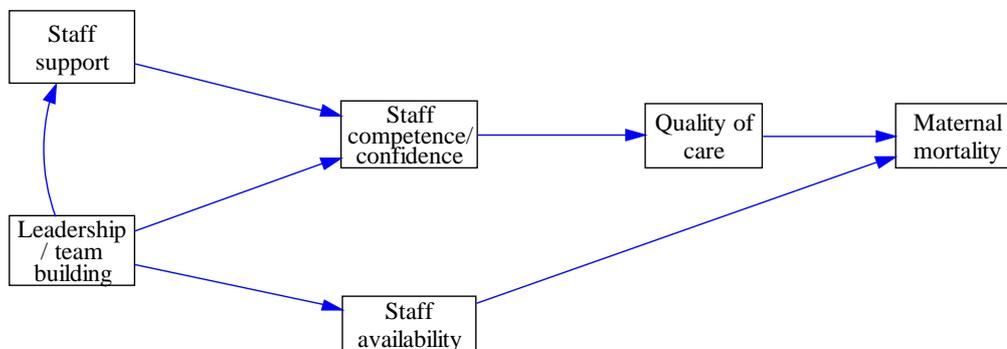


Figure 2: Seed Model

The third phase comprised the GMB workshop itself, which was a one-day session held in September 2014. 23 persons - identified by the planning team as representing key perspectives on the functioning of health systems in OR Tambo District with respect to maternal health - participated. Participants comprised representatives from the Provincial headquarters, the District health office, the sub-District health office, the hospitals, the Emergency services unit, and non-governmental organization (NGO) partners.

Of note, the workshop marked the first occasion that many of the participants had met together to discuss the poor maternal health indicators in OR Tambo district.

The Group Model Building Process

To ensure that the GMB process produced the intended outcomes in a mixed group of participants, including higher and lower level managers, the facilitator began the workshop with a series of activities that served to 'level the playing field', orientate the participants to

the purpose of the workshop, and force participants to challenge the assumptions they held regarding the problem. In doing so, the facilitator sought to challenge participants' mental models by using a series of activities that highlighted the importance of focusing on the wider system rather than viewing from a single perspective that viewed an aspect of the situation in isolation.

With this initial setup, participants were asked to draw 'rich pictures'⁶ in groups of five or six persons, sketching out the situation pregnant women face in OR Tambo District. Using pictures and few words, and drawing upon multiple perspectives, participants were encouraged to move away from a linear description of the problem towards reflecting a more complex, dynamic situation with multiple stakeholders interacting over time. The rich picture exercise generated a lot of discussion among participants and surfaced many of issues that had been discussed in the preceding interviews.

The research team then presented the findings from thematic analysis of these interviews. This provided an opportunity for participants to confirm the salience and definitions of variables identified, as well as proposed additional variables that were relevant to support explanatory analysis. The next script prompted groups to develop an IRD to indicate major interlinkages among variables, encouraging deeper understanding of some of the complex system dynamics driving the health system.

Participants confirmed a 'seed model' surfaced from the IRD, and this was used as a starting point for groups to develop a preliminary systems model. Using the IRD and rich pictures as reference points, each group developed on a flipchart a causal loop diagram (CLD) that reflected the systems dynamics driving maternal health outcomes in the district. Facilitators worked with the different groups and captured the group (CLD) using Vensim PLE software⁷. These

models were then consolidated into a single CLD and discussed. The GMB session ended with reflection among participants about the changes needed to rectify the poor maternal indicators in OR Tambo District, participants brainstorming in groups to develop plans to implement system changes suggested by their analysis.

Phase four involved documentation, refinement and dissemination of study findings. Refinement of the model was based upon post-workshop reflection and analysis, facilitated by a follow-up meeting of a sub-group of researchers and Eastern Cape stakeholders in October 2014, and incorporation of data provided from the DHMIS⁸ database. A feedback workshop was organized in May 2015 to share the refined model and discuss policy and practice implications of the presented analysis with relevant stakeholders.

STUDY FINDINGS

From the interview analysis, and subsequent GMB discussions with participants, seventeen variables were identified and confirmed as key to reflect current health systems functioning in OR Tambo District. These included quality of care, maternal mortality, impact of structural changes, (internal) accountability, human resources (HR) availability, availability of equipment, transport availability, effectiveness of the referral system, staff attitudes, commitment and motivation, staff support/personnel management, staff competencies, confidence & empowerment, staff training, drug supply, leadership and team building, impact of NGO support and use of data for management.

During the GMB discussion, leadership and team building emerged as the key drivers of maternal health service challenges, while the key outcome was endorsed as persistent poor quality of maternal health service delivery in health facilities, except for those where good leadership and teamwork were present. All variables are elaborated below.

⁶ A detailed pictorial representation of a scenario

⁷ Vensim PLE for Windows Version 6.1 is a simulation software freely available for educational purposes from

<http://vensim.com/>

⁸ District Health Management Information Systems

Table 1: OR Tambo District MNCWH¹ Indicators (April - June 2014 Quarter)

Indicator	Baseline 2013/14	April-June 2014	Target 2014/15
ANC visit <20 weeks	34.4%	35.4%	40.0%
Delivery rate in facility	78.0%	83.7%	94.5%
Still birth in facility rate	26/1000	22/1000	25/1000
ANC clients initiated on ART	69.2%	83.5%	90.0%
Maternal mortality rate	230/100,000	201/100,000	110/100,000
Mother post natal visit within 6 days rate	31.0%	36.8%	50.0%
Immunisation coverage	58.0%	64.4%	90.0%
Inpatient death under 1 year rate	21.7%	29.9%	15.0%
Inpatient death under 5 years rate	16.2%	22.1%	13.0%

Source: OR Tambo DHIS

Quality of care

Participants of the GMB workshop reported that quality of care, as a key outcome of the health system, is directly affected by many other variables, in particular HR availability, staff attitudes, commitments & motivation staff competencies, drug and equipment availability, and emergency transport service. These variables are crucial to ensuring good maternal health services and inadequacy of any of them may cause serious challenges to service delivery. The participants suggested that all these six factors were deficient in OR Tambo, resulting in preventable maternal and child mortality and ranking the District last in terms of maternal deaths in the entire Province.⁹

Maternal mortality

Due to the poor quality of maternal services in OR Tambo, the resultant outcome has been high maternal mortality, and high infant and under five year mortality, as indicated in Table 1. According to these figures, most indicators show slow progress and are labelled in the category of little or no progress from baseline¹⁰ to the first quarter. According to Provincial recommendations, the aim is to register at least ten percent success for each indicator by the end of the first quarter of the

financial year¹¹. However, in some cases there was a regression, for example an increase in inpatient death rates by about eight percent for infants and six percent for under five year olds. Although estimated maternal mortality was reduced from 230 to 201 per 100,000 live births, the rate also missed its target for this quarter.¹²

Workshop participants also attributed the high maternal death rate in the District to the late presentation of pregnant women at the health facility, resulting in a lack of timely assistance. This was associated with the poor level of transport and network infrastructure that denied women the flexibility to reach health facilities in time (i.e. transport is usually offered when conditions get critical). To address this issue, the District had engaged community health workers and health promoters to educate women about the importance of early visits. Although this partly helped to resolve the problem, some patients noted that poor service delivery in the facility and bad nursing attitudes discouraged them from visiting health facilities in time.

Table 2 compares the same performance indicators but makes a comparison between the first quarter of 2014/15 with the equivalent quarter of 2013/14 (rather than the full-year 2013/14).

⁹ http://www.rmchsa.org/wp-content/uploads/2013/05/Tenth_Interim_Report_Maternal_Deaths-2011_2012-Final-Corrected.pdf accessed 16.02.15

¹⁰ Baseline 2013/2014 is annual figure to end of March 2014

¹¹ Financial year begins in April

¹² Acknowledging the wide confidence interval in estimates of district-level MMR on a quarterly basis

Table 2: MNCWH Indicators in OR Tambo District: One year comparison

Indicator	April-June 2013	April-June 2014	Target 2014/15
ANC visit <20 weeks	32.2%	35.4%	40.0%
Delivery rate in facility	74.0%	83.7%	94.5%
Still birth in facility rate	26/1000	22/1000	25/1000
ANC clients initiated on ART	60.2%	83.5%	90.0%
Maternal mortality rate	206/100,000	201/100,000	110/100,000
Mother post natal visit within 6 days rate	29.0%	36.8%	50.0%
Immunisation coverage	53.0%	64.4%	90.0%
Inpatient death under 1 year rate	23.1%	29.9%	15.0%
Inpatient death under 5 years rate	17.5%	22.1%	13.0%

Source: OR Tambo DHIS

This comparison indicated a similar picture, with apparent progress on some indicators (such as the initiation of ANC clients on ART, facility delivery rate and facility stillbirth rate) but others deteriorating (including inpatient under one-year death rate and inpatient under-five years death rate).

HR availability and staff attitudes, commitment and motivation

Interviews with key informants revealed that staff shortages at all levels were a huge challenge in the District. Midwives reported often working under pressure, as they had to perform many duties and work long shifts in turn affecting their attitude, commitment and motivation. They also perceived managers to be indifferent toward their welfare. Health managers complained of having to oversee many different programmes, in turn affecting their performance in terms of providing staff support. However, this problem is also related to the geographical location and social factors that impede the District's efforts to attract and retain health workers. Workers are generally not motivated to work in the District and leave after a short time. The rural nature of the District is a major factor but so too, it was suggested, is the lack of support to staff. Rural allowances seem to lack impact because some places are too rural to be compensated by rural allowances that are standardized for the whole district. Health workers hence prefer to stay at District headquarters rather than going to rural areas where there are no paved roads. These areas are often not even visited by the District and sub-District managers due to transport

challenges and staff shortages, in turn increasing the frustration and demotivation of staff at facility level.

Despite these challenges it was recognized that some health workers remain committed to their work and try to provide a good quality service. Many of the nurses interviewed indicated that they originated from the District and felt a sense of responsibility to serve their own people, even though working conditions were difficult. These nurses did not indicate any intention of quitting their jobs, their commitment constituting an important source of resilience within the system.

Staff training, competencies, confidence and empowerment

Both interviewees and subsequent GMB participants indicated that staff competencies and confidence had been adversely affected by structural reforms in training and work arrangements. It was widely observed that the calibre of nurses in health facilities in terms of practical experience was no longer sufficient to work independently. Firstly, because the training curriculum was more theory-based than practical, nurses were deployed in health facilities without adequate experience, leading to an increase in referrals that would otherwise have been dealt with at a lower level. In the process of referring patients, lives were lost due to inadequate emergency transport or due to the time lag between transferring patients from one facility to another. Participants at the GMB session suggested that these unnecessary referrals

happened because nurses did not feel empowered or confident enough to take on certain risks for fear of being held accountable in case of mismanagement.

Second, the direct deployment of nurses from training schools to clinics meant that nurses had no opportunity to gain the experience required to run a clinic. Previously, when hospitals worked alongside health centres and clinics, hospitals were responsible for allocating competent and well-experienced nurses to staff health centres and clinics after training, and for exposing them to different departments. Now, however, there was a disconnect between secondary and primary care provision in OR Tambo District; the sub-District now oversaw health centres and clinics and was directly responsible for employing and deploying workers, many of whom were new and lacked any prior experience.

Staff support

During the GMB discussion, the issue of staff support was clearly reported as vital to the performance of the health system in OR Tambo District. After careful analysis of the factors that participants felt most affected operation of the health system, participants noted that staff support was one of the keys to unblocking the challenges being experienced. As discussed earlier, most health workers complained about the lack of support from managers that demotivated them and led to poor performance. In the worst case scenario, this resulted in resignation, thereby losing staff that were already hard to attract. Or, as a nurse in one of the health facilities indicated:

"We are working under a lot of frustrations without any proper supervision and when the supervisor comes, she is not encouraging us at all."

Staff support was hence found to be a key prerequisite to systems strengthening because, as discussed in the previous section, most nurses in health centres and clinics were inexperienced and required a lot of support to grow in confidence and competence. They needed to feel that someone cared and

acknowledged their effort, which was lacking at present. Nurses reported that they yearned for that support and encouragement. When asked if the frequent clinic visits by researchers to collect data and by managers who conducted regular monitoring disturbed their work, the nurses indicated rather that these visits motivated them, because it made them feel recognized. They believed that with every visit they were able to learn something new and at the same time present their challenges, which sometimes were dealt with faster after managers experienced the situation in reality rather than when these problems were noticed in a report. There seemed to be a better appreciation of the situation when managers visited the clinic.

For their part, managers from sub-District level also recognized that they frequently failed to provide adequate support to staff, but they blamed this on the lack of resources, especially transport facilities, to conduct facility visits. Some managers also indicated that they got frustrated with nurses who did not implement what they were trained to do. Interviews and GMB discussions alike indicated a lack of understanding of the support needs of staff and workable solutions on both sides.

Personnel management

The issue of personnel management was mainly associated with HR availability and retention, as key informants indicated that staff recruitment took too long, sometimes resulting in a loss of candidates. It was reported that the process sometimes took over six months from the day the post was advertised to the date of recruitment. By this time some candidates would have applied for other jobs and when they were approached by the District they simply turned down the offer. Apart from the delays in recruitment, informants also observed that there were many 'acting' positions in the District whereby managers has been assuming the responsibilities of a more senior position for many years. These persons felt abused because of being paid salaries of a lower position when actually performing jobs at a

senior level. One manager bitterly expressed her frustration:

"I am resigning because I have been acting in this position for a long time and I have not been given the post. I have asked the District several times but they did not do anything until now and I was told the post has been frozen. I have so many projects to manage and yet I am not compensated for the work I do. I am tired now and I have decided to resign."

These kinds of sentiments were expressed by staff who felt frustrated as it seemed no one listened to their frustrations or tried to address their concerns.

Personnel management is hence an area that needs to be developed in the District to ensure staff retention and quick recruitment of vacant positions. To some extent the decentralisation of recruitment could assist to expedite staff recruitment processes. For example, some lower level positions such as drivers, cleaners and others could be dealt with at facility or sub-District level rather than having everything centralised at Provincial level. One example is the health centre where the research team found an ambulance without a driver: people were waiting for the Province to initiate the recruitment process and there was no clarity when this would happen.



A Health Point in OR Tambo District

Drug supply and equipment availability

Many health workers interviewed in health facilities complained about the shortage of drug supplies and basic equipment. For example, many facilities reported lacking

pregnancy test kits and blood pressure monitors. However, upon further analysis it was realized that the problem was often due to lack of maintenance rather than complete absence of the equipment. It was also noticed that the District did not have enough technicians to maintain the equipment. One facility manager pointed out that there was only one technician in the District, based at the Nelson Mandela Academic hospital, but he was too busy to attend to other facilities. Health facilities were allowed to take their faulty equipment back to the dealer, but it took long to be released because the government was often unable to pay the bill in time.

As for the shortage of drugs, interviews with pharmacists at the sub-District and District level revealed that the main challenge was the lack of staff to process orders from the clinics and health centres. When orders were received, these were often wrong and required correction at sub-District level before being sent to the depot. This increased the amount of time to order drugs because the sub-District had limited capacity to attend to all health facilities within their catchment area. Since the health centres and clinics did not have qualified pharmacy assistants, a nurse or auxiliary worker had to compile the orders, but due to lack of knowledge regarding appropriate drug units they sometimes ordered the wrong quantities. If this mistake was not picked at the sub-District level, the depot ended up dispatching lots of drugs, in turn resulting in stock-outs that affected other facilities.

The issue of human resource availability was also expressed at District level, where orders were usually received in manual form but needed to be processed in electronic form for pharmaceutical companies. This entailed extra work for the depot staff before orders could be sent off to the pharmaceutical companies. In addition, the depot was currently experiencing a severe lack of pharmacists to take care of the huge demand due to a recent increase in the number of demanders from 97 to 460. This was due to the fact that clinics and health centres had to order directly from the depot with their own demander codes,

instead of using only one demander code to order through the sub-District as previously. This top-down directive was implemented without providing time for preparation and it severely affected the District drug distribution in terms of transport and timely capturing of orders.

According to the depot manager, other factors were beyond his control. For example, he cited a situation when the manufacturer did not have the ingredients to produce certain drugs and therefore could not deliver on time, or when the allocation of some medicines for that particular year had been depleted and the manufacturer could not deliver more. In that case the depot had to use other channels to secure medication and this could take some time. Key informants mentioned these as the main factors impacting on drug availability, some of which require a higher-level involvement to work out possible solutions.

To tackle this issue, it was reported that health facilities usually shared drugs when others had more of the same drug in stock. This process was facilitated through the sub-District where the pharmacist or another person coordinated the arrangement and transfer of drugs from one facility to another. Sometimes the sub-District faced transport challenges and was unable to transport drugs from one facility to another, leading to lack of drug availability at some facilities. In these situations the health workers indicated that patients were given the facility phone number to call before collecting drugs to check for their availability. For critical conditions patients were encouraged to find other means of sourcing the medication.

Transport availability

Timely availability of emergency transport is a key factor in well-functioning health systems, but in OR Tambo District a number of health facilities reported major challenges in accessing maternal emergency ambulance services. This was depicted vividly through the GMB rich picture exercise, as well as being expressed regularly during interviews with nurses and facility managers. It was reported that ambulances sometimes took hours to

arrive after an emergency call. Some health facilities reported that the service to be functioning well, however, observing that the ambulance usually arrived within 30 minutes of calling. Emergency Medical Services (EMS) for other illnesses were generally reported to be struggling to meet demand due to an inadequate fleet of vehicles and insufficient trained staff to take calls from the operations centre and allocate and dispatch the vehicles in a timely manner.



Ambulance provision was considered a major issue across OR Tambo District

Sub-District EMS managers also reported gross negligence and insubordination from some staff who would refuse to take instructions from managers when assigned to collect a patient: they simply took the vehicle and challenged their manager to report this to relevant authorities.

Facility staff, District and sub-District managers also reported transport difficulties for meeting attendance or conducting supervision. A number of managers reported that they wanted to support the clinics and health centres through regular visits but were handicapped by the lack of transport. Some indicated they relied on NGOs who had more reliable and scheduled transport to health facilities where they worked. District managers therefore tried to plan supervision visits to fit with NGO schedules; the challenge being that manager visits were hence dependent on the routes of NGOs and not necessarily on where the need existed. Some managers reported using personal vehicles to visit health facilities but this was usually applicable only with the more easily accessible facilities.

Effectiveness of the referral system

OR Tambo District has demarcated areas where patients are supposed to visit health facilities according to their geographical area. This system, however, did not operate smoothly because patients sometimes preferred clinics outside the demarcated zones. One of the main reasons for this was the quality of care patients anticipated getting at a clinic. It was indicated that if patients perceived quality to be poor in a facility in their allocated zone, they would generally go to another facility outside their zone. Another reason mentioned by participants was that some facilities outside of the demarcated zone, and in particular hospitals, were more accessible compared with clinics in their own zone. While health workers generally reported that they never refused to provide services to a patient registered in another zone (nor, indeed, another District), many patients reported instances of being turned away.

Leadership and team building

Participants in the GMB session spent significant time discussing leadership and teamwork in the context of the health system in OR Tambo. Based on the experience of good and poorer performing hospitals within the District, participants felt that if there was to be any sustainable improvement in the District leadership and team building were key. The few facilities that performed well within the District were generally marked by dedicated leadership, teamwork and hard work. These well performing facilities were characterized by having regular staff meetings, sharing challenges and developing solutions as a team. Managers of those facilities were seen to support their staff and also, because the latter felt motivated and acknowledged, to secure greater retention. Managerial support was viewed as boosting confidence and, thereby, improving the quality of care.

Discussions during the GMB process clearly showed how important leadership and teamwork are in either improving or weakening the health system. This variable

was shown in the interrelationship diagram and the causal loop diagram to impact on a series of factors, such as staff attitude, commitment, motivation, competence, confidence and empowerment, HR availability and personnel management, drug & equipment availability, transport, quality of care and effective referral systems.

In one of the well performing facilities it was reported how the nurses work hard to improve service provision by, for example, developing culturally appropriate health education covering maternal health problems by distributing pamphlets in the local language in the community. The facility also has a feedback box where patients can leave their comments. The box is opened every month by an independent committee comprising of community leaders and clinic staff and comments read and discussed. If there is a need for action, the concerned parties are supposed to respond swiftly. Nurses in this facility appreciated the feedback system because of its transparency and accountability. It also helped them understand people's needs and enabled them to address problems in time.



Leadership and team building were a major focus of GMB discussion

Impact of NGO support

In both key informant interviews and GMB sessions, NGO support was reported to be an important issue for the health system. OR Tambo District has a number of NGOs that support the District in various ways, but there were expressions of scepticism about the effectiveness and accountability of many of these NGOs. Some participants indicated the need to create more effective working

arrangements between NGOs and the District to maximize efficiency. For example, there would be opportunities for more coordination in the effective use of transport.

Some NGOs were reported to be supportive in strengthening relevant human resources capability in the District, for example by recruiting health promoters who offered health education and assisted community members in seeking timely medical help. Another NGO was reported to be recruiting a District pharmacist which, although potentially addressing a key need, would create sustainability challenges if not well coordinated with the District. In another case, a health promoter indicated that although her contract expired that particular month, she had not received any communication regarding contract extension. Investigations suggested a lack of clarity in communication between the NGO employing her and sub-District management at the root of this uncertainty. It was widely acknowledged that there was a need for the District to work more closely with NGOs to understand their intentions and be better prepared to take over responsibilities or deal with gaps that were created when these NGOs phased out support.

Despite these difficulties, some facilities reported working very well with NGOs. One facility manager noted:

“At least we are motivated by some NGOs who are trying to give us support, they helped us with some equipment like a BP machine and stethoscopes.”



Hospital infrastructure in one of the facilities reported to be well managed and supported by NGOs

A Chief Executive Officer of one of the hospitals also acknowledged the potential contribution from the NGO sector, stating:

“The NGOs have invested a lot in this hospital, some NGOs are supporting mothers in their homes, follow them if they are going for postnatal (care) and make sure they monitor them. One NGO has built some structures for us, including a resource centre where people hold meetings.”

These positive relationships and benefits with and from NGOs were commonly attributed to the leadership of the Clinical Manager who, despite the hospital being in a deeply rural area, was committed and effective in securing collaboration with various development partners.

Use of data for management and internal accountability

In the GMB session it was reported that the District held a lot of data on performance indicators, but that there was little use of this information to inform management for decision-making, partly due to weak internal accountability. Because managers were not feeling accountable, they did not take the time to study and interpret data in order to seek to change the status quo. This observation was seen to hold true at all levels of the system, from the clinic to the District level. One participant at the GMB session pointed to the lack of interest by managers in utilizing available data demonstrated by not responding to calls from the information office to discuss the generated information. It was acknowledged that timely use of data would assist management work in a focused manner to devise strategies for meeting targets.

The lack of transparency in the health system was also seen to contribute towards weak accountability. For example, clinic managers reported that they were unaware of their annual budget and uncertain if their orders for equipment would be followed-up. This resulted in them not feeling responsible, as they said they usually reported the problem to the sub-District and never received a reply.

Impact of structural changes

Interviews with managers who had worked in OR Tambo District for several years indicated that, since the democratic era, the District had undergone some significant structural changes. These had had a major impact on performance of the health system. One such change was, as noted earlier, creating a system where hospitals were no longer in control of health centres and clinics in their catchment area; the latter were now under the control of their respective sub-Districts. This resulted in newly appointed health workers typically having little opportunity to work under the supervision of experienced staff within a hospital setting before taking up responsibility at their clinics where they worked with little support.

The second major change involved the drug procurement process for clinics, which used to be channelled through hospitals but was changed to be managed by the sub-District office. Most recently this had led to a directive requiring clinics to directly order from the depot, because sub-Districts were considered inefficient in their discharge of this responsibility. Limited staff capacity, especially regarding qualified pharmacists, meant that there were now significant challenges in maintaining drug supplies.

A third structural change, which did not only affect the health sector, was related to the establishment of District and sub-District administrative offices. Key informants felt that this change had created unnecessary pressure on the health system, because it added another layer of authority and became an administrative burden when dealing with issues such as staff recruitment and procurement of equipment. Power relations and tensions were also problematic between the levels because some sub-District managers felt by-passed in their decision-making authority when District managers took decisions without consulting them. However, District managers also expressed concern that time was wasted by passing through the sub-District for each decision that needed to be taken at clinic level.

Systems dynamic modelling

Systems dynamic modelling through the development of CLDs helps stakeholders understand the complex interrelationships of factors in a system and identify potential leverage points for influencing systems performance. Figure 3 shows the consolidated CLD developed by the participants during the GMB session. The diagram mapped the relationships between the various factors discussed above that participants understood to be shaping the operation of the health system. These linkages include both linear chains of influence as well as feedback loops, where a circular chain of influence reflects complex systems dynamics.

From the CLD, GMB participants identified *leadership and team building, staff support and staff competence* as key leverage points within their scope of influence and authority, that could address the chronic underperformance of maternal and child health services in the OR Tambo district.

Participants explored the wider impact of these leverage points on other variables, tracing how strengthening leadership and team building would strengthen staff support, which in turn would serve to strengthen staff motivation and commitment. Increased staff confidence and competence would, through enhanced use of information, further strengthen leadership and team building. Where there was a failure of leadership and team building, as was widely acknowledged in the course of the GMB, this feedback loop becomes a vicious cycle. It was also noted that in the few examples in OR Tambo district where strong leadership was present in a facility, these same feedback loop dynamics worked to reinforce change in a positive manner, with staff in those facilities more motivated and health outcomes improved.

In the context of the OR Tambo district, participants also identified the dynamics associated with increased patient attendance, which increased workload, which served to extend waiting times, which would – over time - serve to reduce patient attendance, and hence balance demand for services.

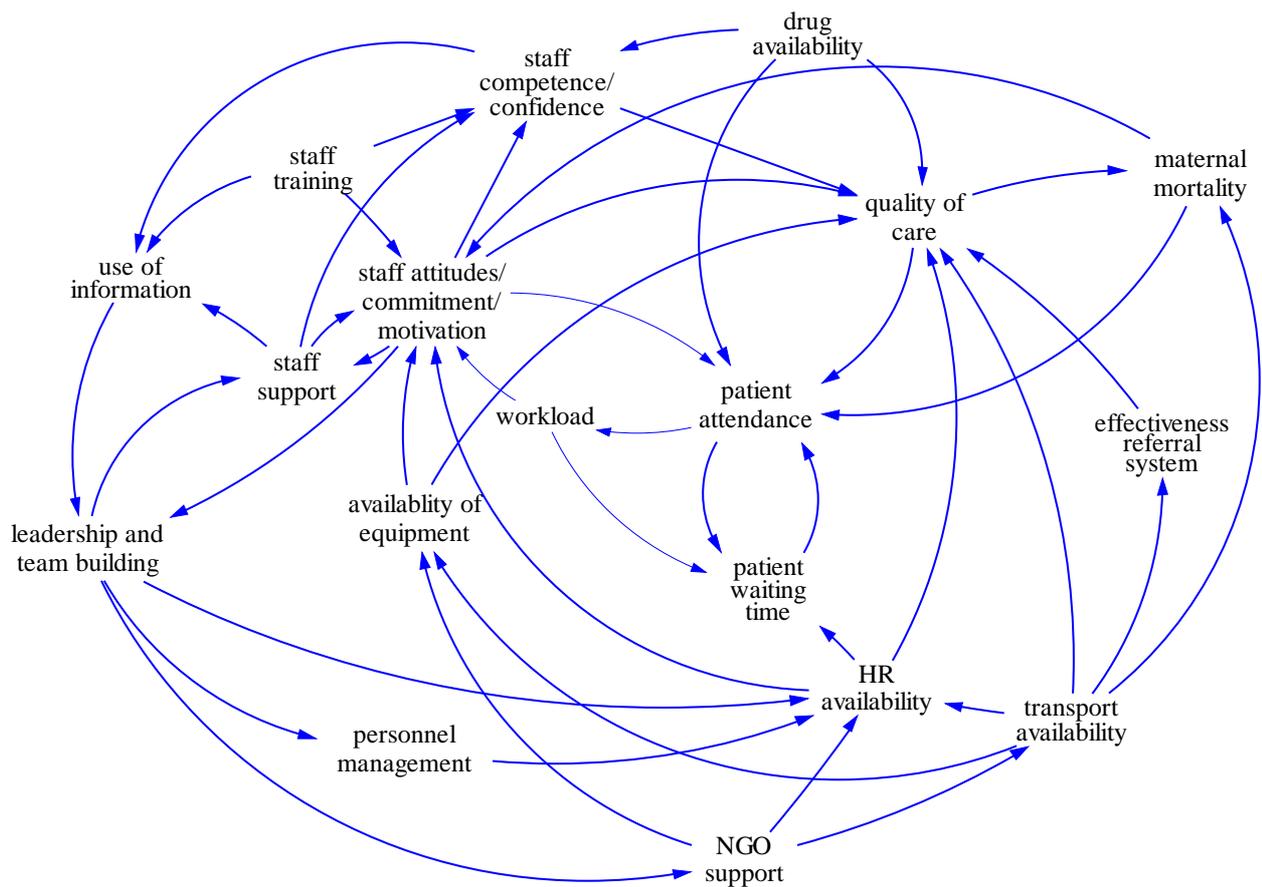


Figure 3: Preliminary causal loop diagram representing factors influencing maternal mortality in OR Tambo District developed during group model building

Besides these key leverage points, other factors that participants identified as requiring focused attention were *effective collaboration with NGOs* (a dimension of teamwork which also reflects effective leadership), *resource availability* (both a critical input and again a reflection of the effectiveness of leadership in securing other essential inputs), and *use of information*. It was observed that valuable information was generated to guide managers in their work priorities, but was rarely meaningfully used.

Through understanding these dynamics, participants began to identify strategies to address the under performance of the OR Tambo district health system.

During phase four of the study, the CLD was further refined and more detailed systems dynamics surfaced. Figure 4 plots the same CLD but in a form that highlights the intersecting feedback loops and major

pathways of influence identified through group discussion to which management attention would be usefully directed.

Leadership and team building, drugs, transport and HR availability, and effective referral systems were recognized as important drivers closely linked with other factors within the system. Five key feedback loops were identified: the interaction amongst these feedback loops gives rise to the specific dynamics underpinning maternal health outcomes within the OR Tambo district.

As recognised in the course of the GMB, quality of leadership has pervasive influence on the overall performance of the system by linkage to numerous factors and feedback loops, including staff motivation (*reinforcing feedback loop R1*) and capacity building (*reinforcing feedback loop R3*). But, the extent to which the *R1 loop* could become a virtuous cycle is dependent upon its interaction with a

number of other feedback loops. Without attention to managing workload (*balancing feedback loop B2*) and linked to this patient waiting times and satisfaction (*balancing feedback loop B1*), the impact of improving leadership and staff support on staff competence and staff attitudes is diminished.

Creating a virtuous cycle to improve quality of care (*reinforcing feedback loop R2*) not only relies on inputs into the system such as drugs and HR availability, but also the influence of effectiveness of management, including personnel management, at the district and the provincial levels; effective referral systems which are directly impacted by the availability of transport from one level of health care to the next; and attention to workload (*balancing feedback loop 2*).

CONCLUSION

Examination of the health system in OR Tambo identified many challenges affecting performance of the system. And yet, in some regards OR Tambo District has paradoxically exhibited a high level of systems resilience, as shown by the continuation of service delivery, despite these multiple challenges.

To understand this paradox required a deeper analysis of the dynamics driving the system. This analysis revealed that most of these factors were impacted by a few pivotal issues. In the small pockets of the OR Tambo district where these issues had been addressed more functional health service with improved health outcomes had resulted. These islands of good practice served to confirm those pivotal issues as sources of resilience.

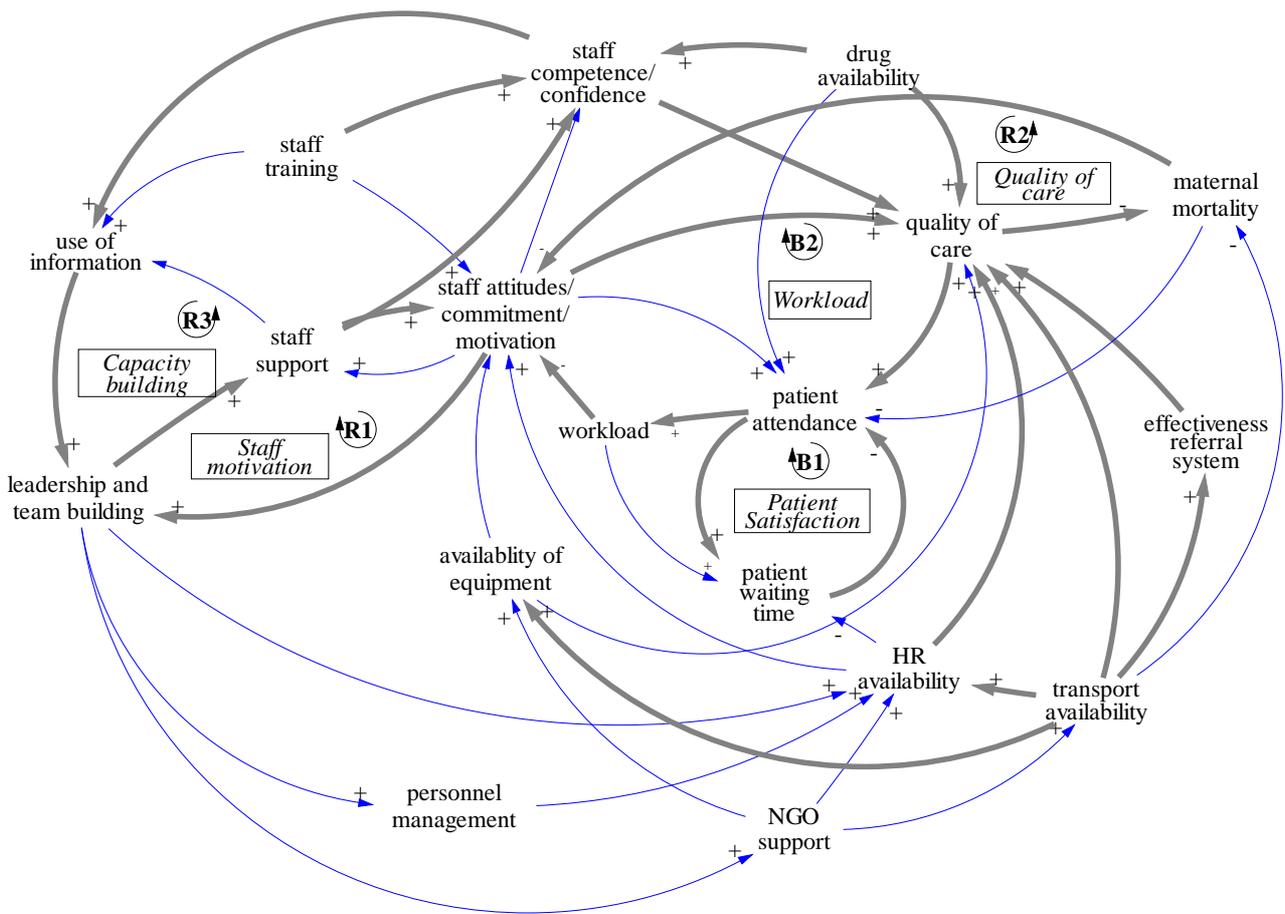


Figure 4: Causal loop diagram depicting key pathways of influence on maternal services within OR Tambo District

Participants of the GMB session acknowledged that after going through the systems mapping process their perception of which issues affected the system and how they affected the system had changed radically. Unlike many health systems in Sub Saharan Africa, they acknowledged that the OR Tambo district health system was adequately funded, and saw that their health system had a basic level of resources to build upon, including equipment, most of which simply required maintenance, and drugs, which were present in central stores but lacked an effective distribution mechanism. Many observed that the lack of HR was not the most critical aspect as had often been portrayed. Rather, the crucial factors to build drive better outcomes were issues such as the *mentoring and support of staff, leadership and team building, staff attitudes* as well as *the quality of care* provided. The revised causal loop diagram shows how each of these factors serve as leverage points at the intersection of specific feedback loops.

Participants in the GMB session felt that staff mentoring and support could not be achieved without good *leadership and teamwork*, and they agreed the importance of making this a key priority for addressing the chronic crisis of poor maternal performance in the district. While some facilities had been able to develop teamwork, in most facilities this aspect was acknowledged to be absent. Few managers had strong leadership capacity, though some did. It was recognized that the District had the responsibility to identify people with such skills and put them in strategic places to ensure the district as a whole will benefit.

However, simply identifying and relocating people with leadership skills is a necessary but not sufficient long term strategy given the systems dynamics revealed through the elaboration of the CLD. The presence of the workload (B2) and patient satisfaction (B1) balancing loops in the system will continue to generate resistance to change, and limit the desired outcome (improved quality of care and reduced maternal mortality) unless attention is paid to issues of workload and waiting time. In those instances in the OR Tambo district where strong leadership exists,

this has been achieved through improved personnel management, and NGO support.

These key points were the focus of discussion at the phase four multi-stakeholder workshop that shared findings with a broader audience (as well as stakeholders from Eastern Cape). The discussion began to unpack potential points for intervention to strengthen leadership, mentorship and teamwork in practical ways, whilst validating the many structural and infrastructural elements of routine health system inputs and functioning. *Building and maintaining trust* among various levels of staff, use and development of *social capital, improved accountability, checks and balances, use of informal collateral pathways, building up of institutional memory* and creating clear *decision spaces* were the major themes of this discussion. Progress in these areas was seen as crucial for securing motivated and collaborative staff – and their partners in and out of government – able to do their jobs. Conversely, without effective leadership (exercised at all levels), a sense of and mechanisms to support accountability, and both the trust and competencies needed for teamwork, available resources cannot be mobilized and deployed in the required manner.

In summary, participants in this process concluded that OR Tambo District would usefully focus upon a few key leverage points in order to mobilize and coordinate resources and address the chronic crisis of maternal health care underperformance. A few staff members in the system are highly committed, there are good examples of best practices of strong leadership and teamwork within the district to tap into, and there is a strong consensus amongst stakeholders of the need to change the *status quo*. Considering these key elements, focused efforts at key leverage points indicated by this systems analysis promises to build a stronger, more effective health system to address maternal needs in OR Tambo District.

KEY POINTS

- The Eastern Cape can be characterized as being in a state of 'chronic emergency' on technical, health systems, and socio-political levels
- OR Tambo District reports among the poorest health and health service indicators in the country
- A Group Model Building (GMB) approach to systems mapping assisted stakeholders in identifying key factors influencing maternal health service provision and the dynamics of their inter-connection
- Participants further used the GMB process to identify leverage points to mobilize and coordinate resources to address chronic underperformance
- District personnel prioritized leadership and team building, staff support and staff competence as issues within their scope of influence and authority to strengthen health systems performance
- Model refinement highlighted interconnected balancing and reinforcing feedback loops which suggest, in systems terms, a basis for observed instances of higher-level performance within a generally underperforming health system

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