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Assessing the practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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Complete List of Authors:	Mukinda, Fidele; University of the Western Cape Faculty of Community and Health Sciences, School of Public Health George, Asha S. ; University of the Western Cape Faculty of Community and Health Sciences, School of Public Health Van Belle, Sara; Institute of Tropical Medicine, Antwerp, Department of Public Health Schneider, Helen; University of the Western Cape, School of Public Health
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3 **Assessing the practice of Death Surveillance and Response for Maternal,**
4 **Newborn and Child Health: A framework and application to a South**
5 **African Health District**
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11 Fidele Kanyimbu Mukinda^{1*}, Asha George^{1,2}, Sara Van Belle³, Helen Schneider^{1,2}
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16 ¹School of Public Health, University of the Western Cape, Cape Town, South Africa.

17 ²South African Medical Research Council (MRC)/Health Services and Systems Unit,
18 Cape Town, South Africa
19

20 ³Institute of Tropical Medicine, Belgium.
21
22

23
24 *Corresponding author. School of Public Health, University of the Western Cape,
25 Robert Sobukwe Road, Private Bag X17 Bellville 7535, Cape Town, South Africa
26
27

28 Email: fmukinda@uwc.ac.za
29
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32 **Keywords:** Accountability; Death Surveillance and Response; Maternal, newborn
33 and child health; Framework; District health system; Qualitative study
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Abstract

Objective: The development and application of a framework to assess the functioning and practices of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study design, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of frontline health managers and providers involved with maternal, neonatal and child DSR.

Primary outcome measures: Functioning and practices of maternal, perinatal, neonatal and child death surveillance and response.

Results: DSR mechanisms were integrated into the organizational routines of the district. Compulsory 24-hour death reporting and 48-hour review, Confidential Enquiry into Maternal Death and ongoing review and response mechanisms (Perinatal/Child Problem Identification Programme and a forum referred to as Monitoring and Response Unit) were among the forms of DSR identified. The functioning of DSR mechanisms varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger fault-finding and sanctioning than other forms of DSR. The proposed framework provides an opportunity to systematically and holistically address the modifiable factors and proactively setting up evidence-based actions at provider, system and community levels to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It also puts forward a framework of elements and enabling organizational processes for the functioning of these mechanisms.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of death surveillance and response (DSR) at the district level and evaluates the functioning of DSR mechanisms in a South African district using the framework.
- The key elements of the functioning are the use of **‘no-name, no-blame’, following a holistic approach to identify factors related to death, responsive capacity building and institutionalisation.**
- Leadership support, multidisciplinary team participation, and integrated care through better coordination between primary healthcare facilities, district hospitals, and district office, provide an enabling context for DSR processes to work effectively.
- For successful implementation of DSR processes, consideration should be on the contextual factors that make DSR effective from the frontline health professionals’ perspective.
- **Applying the framework to one rural district might be a limitation to generalisability; however, the framework may be of value in similar settings.**

INTRODUCTION

The UN put accountability for maternal, newborn and child health (MNCH) on the global agenda, placing three interrelated accountability processes at the centre of its 'Global Accountability Framework', namely, monitoring, reviewing and response.¹ Death surveillance and response (DSR) is the means to translate these accountability processes across many health systems, aiming to improve the quality of maternal, neonatal and child health care, and eliminate preventable deaths.²⁻⁵

Death Surveillance and Response entails a continuous cycle of identification, notification and review of maternal or child deaths followed by actions toward improving the quality of care and preventing future deaths.⁶ Its essence is, therefore, the capacity to record, review and respond to each death using affordable, effective and evidence-based actions linked to the findings.⁵

There is now a well-established tradition of DSR in Low- and Middle-Income Countries (LMICs), focusing primarily on maternal deaths.^{2,4,6-10} In facilities and contexts where maternal deaths are relatively rare, maternal 'near-miss' cases are also being audited.⁵ More recently, LMICs have begun including the review of perinatal and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death Surveillance and Response (MPDSR);¹¹⁻¹³ and in some instances, DSR extended to under-five deaths.¹⁴⁻¹⁶

In addition to facility-based processes, community-based DSR is recommended where a high proportion of deliveries (and deaths) occur outside of health facilities, and where community participation is crucial to implementing identified key actions.^{5,11} In this regard, verbal and social autopsies have been developed as a participatory tool for community-based DSR, exploring clinical and social causes of death from the community perspective.¹⁷⁻¹⁹

DSR processes are typically defined nationally but implemented at facility level with support from and coordination by local or district teams.^{20,21} Although there are no globally standardised approaches,⁴ the literature points to several elements underpinning effective DSR processes. This includes the analysis of modifiable factors

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3 involved, the tone of the review process and the range of participation elicited. The
4 analysis of modifiable factors underlying maternal and child deaths can be attributed
5 to the ‘three delays’ in care-seeking and utilisation: **(i) the delay in deciding to**
6 **seek care early; (ii) the delay in reaching a health facility; (iii) the delay in**
7 **providing or receiving adequate care at the facility.**^{6,22-25}
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13 In formulating a response, the literature on DSR recommends moving away from
14 identifying and sanctioning individuals,²⁶ and towards the setting up of non-punitive
15 ‘no-blaming’ approaches that foster collective and individual participation.^{2,20} Such
16 approaches are less likely to result in ignoring the incident or the temptation to defer
17 responsibility onto others.^{2,3,5}
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22 DSR processes ideally involve a multidisciplinary team with the representation of a
23 range of clinicians (nursing, medical and other professionals), managers and support
24 staff (such as information officers). This brings together the array of provider
25 knowledge and skills, together with commitments from managers to enhance
26 ownership of the findings and turn recommendations into concrete actions.^{2,5,6}
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32 South Africa has a long-standing history, going back to the mid-1990s, of maternal,
33 neonatal and child DSR that has become integrated into the routine functioning of
34 frontline health services. DSR processes are linked to three ministerial committees
35 established in 1998, namely the National Committee for Confidential Enquiry into
36 Maternal Deaths (NCCEMD),²⁷ the National Perinatal and Neonatal Morbidity and
37 Mortality Committee (NaPeMMCo);²⁸ and the Committee on Morbidity and Mortality
38 in Children under 5 years (CoMMiC).²⁹ These committees function at national level
39 with mandates exercised at local (health district) level through three of the DSR
40 processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the
41 Perinatal Problem Identification Programmes (PPIP), and the Child under-five
42 Problem Identification Programmes (CHIP). These mechanisms are situated in a
43 dense and complex accountability ecosystem at the frontline of health provision.³⁰
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54 There have been significant reductions in maternal, neonatal and child mortality in
55 South Africa over the last decade, attributed principally to the prevention and
56 treatment of HIV.³¹ However, despite a long history and institutionalised practice,
57 there is little understanding of the role of DSR implementation and functioning in this
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3 mortality reduction. Clear guidance on how best to assess this functioning is also
4 lacking; one study showed no association between consistent auditing and perinatal
5 mortality rates.³²
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9 Given the lack of standardisation and consensus on elements for assessing the
10 functioning of DSR and the opportunity to assess district level experience in South
11 Africa, this paper develops a framework to assess DSR functioning using the criteria
12 drawn from the literature (Table 1) and based on field observations and interviews
13 with frontline providers and managers. It then uses the framework to describe the
14 forms and functioning of maternal, neonatal and child DSR mechanisms at district
15 level in South Africa; and explores the context that makes them effective in the eyes of
16 frontline managers and providers.
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27 **METHODOLOGY**

28 **Definitions**

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30 **In this paper, the term Death Surveillance and Response (DSR) refers to**
31 **all death reporting and review processes related to maternal and child**
32 **health, even if they do not have all the ideal components. They include**
33 **phenomena commonly reported in the literature such as Maternal Death**
34 **Review (MDR) or Audit, Maternal Death Surveillance and Response**
35 **(MDSR), Maternal and Perinatal Death Surveillance and Response**
36 **(MPDSR), or surveillance and review of child deaths.**
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46 **Conceptual framework**

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48 **We combined the WHO Continuous Action Framework to eliminate**
49 **preventable deaths,⁶ the ‘Three Delays’ framework,²² and other elements**
50 **identified in the literature^{2,4,6,20} to assess the DSR processes. These are**
51 **outlined in Box 1 and Table 1. The framework distinguishes between (i) the**
52 **modifiable causes of death as per the three delays model; (ii) the**
53 **surveillance process (what, how, who); and (iii) the types of responses**
54 **triggered, whether proactive or reactive. These elements provide a holistic**
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3 **and comprehensive assessment of the various steps and processes**
4 **involved in DSR. Given that mortality reductions require coordination**
5 **across levels,³³ the framework adopts an area-based approach, using the**
6 **most decentralised structures of in health systems coordination, notably**
7 **the sub-district, as its unit of analysis.**
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10 11 12 13 **Study design**

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16 We conducted a descriptive, exploratory qualitative case study of the forms and
17 functioning of maternal, neonatal and child DSR processes applying the framework
18 (Table 1).
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20 21 22 **Study Setting**

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25 The study was conducted in one of the three health districts in Mpumalanga Province
26 situated in the north-east of South Africa. The District has a population of about 1.1
27 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It
28 contains one regional hospital, eight district hospitals, and 76 primary healthcare
29 facilities, distributed among seven sub-districts.
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34 The study district was targeted for health systems strengthening support because of
35 high maternal and child mortality. ³⁴ Intensified efforts were specifically made to
36 strengthen DSR in the district over several years, building on long-standing processes
37 (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and
38 Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides, DSR
39 processes were accompanied by improved district clinical support with the
40 introduction of district clinical specialist teams (DCST) and a new mechanism of
41 coordination, referred to as the Monitoring and Response Unit (MRU). These
42 initiatives were widely regarded as having impacted positively on maternal and child
43 mortality in the District.³⁵
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52 53 **Study sample and Data collection**

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56 The sub-districts were selected in a prior study as representing the range of buy-in to
57 one particular DSR strategy.³³ We combined semi-structured interviews, non-
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3 participant observation of meetings with a desk review of key documents as data
4 sources for this study.
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10 ***In-depth interviews***

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13 We conducted 45 in-depth, individual interviews with purposefully selected
14 respondents among those involved with maternal, neonatal and child DSR from two
15 of the seven sub-districts and the district office. Respondents were either members of
16 the enquiry or audit team or participants in one of the death surveillance and response
17 meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers
18 (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital
19 CEOs (N=2), hospital nursing managers (N=4), facility and hospital operational
20 managers (professional nurses heading a ward in a hospital or managing a primary
21 healthcare facility [N=5]), medical officers (N=7), professional nurses (N=3), allied
22 health professionals (N=5), emergency service manager (N=1), and facility
23 information managers (N=2). A semi-structured interview guide was developed and
24 pre-tested.
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35 ***Non-participant observation***

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38 From May 2018 to September 2019, for a total 59 days distributed over one to three
39 weeks in each of the two sub-districts, we conducted non-participant field
40 observations and interviews by engaging in various activities and meetings related to
41 Maternal, Neonatal and Child DSR in which health system actors were actively
42 engaged in. A structured observation sheet was designed for this purpose.³⁰ We
43 observed the following meetings: PPIP and CHIP, MRU, morbidity and mortality,
44 clinical audit, clinical governance and patient safety committee. We also reviewed the
45 agendas and minutes of these meetings for additional information.
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53 During this fieldwork, three maternal deaths occurred in the district and we were able
54 to observe one formal district meeting and engage in informal discussions with district
55 actors on the unfolding maternal death enquiry process.
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59 **Data management and analysis**

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3 Interview recordings were transcribed verbatim, and observation and reflection notes
4 compiled. All data were coded using Atlas.ti version 8, and a thematic analysis was
5 used to analyse the data.³⁶ Key themes were identified following both a deductive
6 approach based on a preset list of themes from the criteria of DSR functioning and
7 inductively wherever new insights were identified.³⁷ The themes were grouped into
8 two categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the
9 findings were presented to respondents in various meetings or individual meetings to
10 verify and validate the results.
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17 **Ethics considerations**

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20 This study was approved by the Biomedical Science Research Ethics Committee and
21 the Provincial Health Research Committee. All interviews proceeded with signed
22 informed consent.
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26 **Patient and public involvement**

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28 Patients or the public were not involved in the design, conduct, reporting or
29 dissemination plans of this study.
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37 **RESULTS**

38 **Forms of maternal, neonatal and child DSR mechanisms**

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41 **Table 2 presents a summary of all maternal, neonatal and child DSR**
42 **mechanisms observed in the district, their purpose and functioning, as**
43 **well as their objectives. Five mechanisms were specific to MNCH (24-hour**
44 **Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). An additional two,**
45 **which also dealt with maternal, neonatal and child deaths, the Morbidity**
46 **and Mortality, and Clinical Audit/Clinical Governance meetings, were general**
47 **facility-based morbidity and mortality and clinical audit/governance**
48 **mechanisms.**
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57 **The following sections describe both the processes and actors involved in**
58 **the implementation of these instruments specific to the maternal,**
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3 **neonatal and child DSR strategies (their forms) and how actors perceived**
4 **their implementation compared to elements articulated in our conceptual**
5 **framework (their functioning).**
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9 ***a. Compulsory 24-hour reporting, 48-hour review***
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12 Any maternal, perinatal, neonatal or child death is mandatorily recorded at facility
13 level where the death occurred and reported within 24 hours internally to the district
14 office, and externally to the Department of Home Affairs for issuing of a death
15 certificate. This is the standard operating procedure applied in all facilities in South
16 Africa. In the study district, following the introduction of the MRU and the DCST, a
17 district-level system was also established to review all maternal and under-5 child
18 deaths within 48 hours, independent of other processes. This process of 24-hour
19 recording and reporting and 48-hour case review was referred to as a 'real-time death
20 reporting';³⁸ it allowed for actions to be taken as quickly as possible to address
21 modifiable factors.
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25 Following a maternal death, we observed the district MNCH programme manager and
26 DCST members visiting the facility to conduct an audit and review the clinical
27 management of the case, identify any gaps, and analyse the causes of deaths for
28 discussion in subsequent enquiry processes. Opportunities for training and skills
29 upgrading were identified. A report with recommendations was sent to the district
30 manager who activated the confidential enquiry specific for maternal death events.
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34 ***b. Confidential Enquiry into Maternal Death (CEMD)***
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38 The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa
39 in 1997 and involves a standardized process of reporting and auditing. Maternal
40 deaths, in addition to being reported to the district and Home Affairs, are also reported
41 to the provincial MNCH coordinator within 24 hours, who allocates a unique number.
42 A copy of the patient folder and a completed Maternal Death Notification Form
43 (MDNF) are included in the report and submitted to a team of provincial assessors
44 (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the
45 facility to enquire about the causes of death, as well as any avoidable or modifiable
46 factors. The resulting annual and triennial reports and recommendations (not
47 including detailed individual cases) are disseminated to Provincial and District
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3 structures and academic institutions for collation with general recommendations for
4 action, such as training on the Essential Steps in the Management of Obstetric
5 Emergencies (ESMOE).³⁹⁻⁴¹
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9 In addition to the provincial assessors, actors involved in the CEMD at district and
10 facility levels were observed to consist of: the district manager (or a representative),
11 quality assurance manager, primary health care and hospital services manager, labour
12 relations and corporate services, and a member of the DCST, the hospital chief
13 executive officer, (CEO), the nursing service and clinical managers, as well as the
14 specific health providers directly involved to explain or justify any decisions or actions
15 taken that resulted in maternal death.
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22 ***c. Ongoing Review and Response Structures***

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24 As indicated, several routine meeting structures are established for auditing and
25 responding to maternal, perinatal/neonatal and child deaths (Table 2). From our
26 observation, three of these meetings involving multidisciplinary actors were specific
27 to MNCH, namely, the Perinatal Problem Identification Programme (PPIP), the
28 under-five Child Problem Identification Programme (CHIP) and the Monitoring and
29 Response Unit (MRU).
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36 *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

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38 From our observations, the PPIP/CHIP review meetings took place monthly at a
39 facility level. The meeting consisted of systematically auditing the patient file related
40 to death, comparing the management of the case against standard treatment protocols
41 and guidelines. Through discussion, participants were able to identify gaps in clinical
42 management, and set up improvement plans, including capacity-building needs.
43 Preventive and early detection measures in PHC facilities were also identified.
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49 The meetings were never used to point fingers, or name or blame providers involved
50 in the management of the case. However, the respondents raised the possibility of
51 sanction if at any stage gross negligence was documented.
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55 *‘...We are taking every death very seriously. One death is too many deaths,*
56 *we have to make sure that we follow up on our kids and also on our health*
57 *care workers [at PHC] the entry point where the neonatal was first attended*
58 *so that we can check on whether the child was attended according to protocol*
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3 *and if not then consequential management needs to be applied'* [Hospital
4 CEO].
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7 A multidisciplinary team of actors attended the meetings: (i) from primary health care
8 facilities: operational managers, nurses and data capturers; (ii) from the district
9 hospital: doctors and nurses (mostly those involved in midwifery/obstetrics,
10 gynaecology and paediatrics), ward operational managers, medical and nursing
11 managers, hospital CEOs, as well as the information manager; (iii) from the district
12 office: the DCST members and MNCH cluster programme managers. In most cases,
13 the meeting was chaired by the clinical manager or the medical officer in charge of
14 obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.
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21 *Monitoring and Response Unit (MRU)*

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23 The MRU meetings were convened monthly at sub-district and bi-monthly at district
24 level. From the guiding document, the MRU brings together a multidisciplinary team
25 of actors, including managers (PHC, hospital), clinicians, information officers. The
26 aim is to enhance the governance of MNCH by frontline managers and providers and
27 to improve coordination between the various actors as well between levels of care. At
28 district level, the meetings were chaired by the district manager or a representative,
29 usually, the MCWH coordinator or the district quality assurance manager, while at
30 sub-district level, the MRU meeting was chaired by the CEO of the district hospital or
31 a representative. Participation was expanded to other stakeholders such as academic
32 partners, NGOs and other government departments (notably the South African Social
33 Security Agency) and community representatives to address the modifiable causes of
34 maternal and child deaths.
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44 The MRU reviewed performance indicators and identified follow-up on actions to
45 address the modifiable causes of death, with particular emphasis placed on the 24-
46 hour compulsory death reporting and 48-hour review process. The MRU emphasized
47 the '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death.
48 A particular focus of the MRU was on responsiveness involving pro-active measures
49 to addressing the identified modifiable factors through teamwork and skills building
50 and the integration of the primary health care system in preventive actions at
51 community level.
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59 **Functioning of maternal, neonatal and child DSR mechanisms**

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3 Table 3 presents an application of the framework and a descriptive summary of the
4 functioning of each of the DSR mechanisms observed in practice. In this section, we
5 report on the overall functioning of DSR, drawing across all the forms of DSR observed
6 and the views expressed by the respondents about them. We present key themes that
7 emerged as critical from the elements outlined in Table 1.
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10 11 12 **a. The ‘no-name, no-blame’ approach**

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14 From our observations and the respondents’ views, the perinatal and child
15 (PPIP/CHIP) and the MRU meetings promoted the ‘no-name, no-blame’ approach.
16 The chairperson of the death review meeting ensured that confidentiality was
17 maintained throughout and that no one was blamed for the occurrence of the adverse
18 event. Otherwise, respondents noted that the meeting could be transformed into a
19 ‘punishment exercise’ that would discourage actors’ participation:
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25 *‘..The perinatal meeting itself is not making anybody accountable. The*
26 *meeting itself is about discussing things, it is not to point to individuals,*
27 *because it’s going to be discouraging for the people [to attend] if it’s a*
28 *punishment exercise...’ [DCST].*
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32 This ‘no-name, no-blame’ approach fostered a high level of commitment to the review
33 meetings that resulted in a common understanding of individual and system
34 challenges faced. It also fostered mutual support when people were proactively
35 working as a team.
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40 *‘Before there was blaming, blaming, blaming [...] No-one is blaming anyone*
41 *anymore because we do understand the challenges, we are part of the system,*
42 *we are in the [same] basket’ [EMS manager].*
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45 Policy documents formally claim that the CEMD also follows a ‘no-name, no-blame’
46 approach. However, based on interviews and observations in practice, the CEMD
47 process in the study district was conducted and experienced very differently to the
48 other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of
49 maternal death from higher-level management (national department of health),
50 seeking to assign individual responsibility and frequently triggering reactive sanction
51 and punitive action in the district, seeking to assign individual responsibility.
52 Respondents reported suspensions, referrals to the labour office, litigations and court
53 cases involving frontline professionals (Excerpt 1). These processes were managed
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3 through quality assurance structures (e.g. adverse event committees) and were
4 associated with a particular language of sanction – such as ‘consequence
5 management’.
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8 *‘So the meetings that we usually have with the quality assurance and the*
9 *maternity doctors and the sisters in charge [...] those [meetings] push us to be*
10 *more accountable [...] it’s not like the perinatal meeting, [where] we don’t*
11 *mention the doctors who did what, we just present the case. With those ones*
12 *[quality assurance], it pushes you to be more accountable because the file is*
13 *there, we all discuss what’s in the file. So, whoever was the attending doctor is*
14 *more accountable, feels more accountable’ [Medical officer].*
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24 ***b. Following a holistic (three delays) approach to identifying and*** 25 ***acting on modifiable factors*** 26

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28 Review meetings were observed to follow the ‘three delays’ approach to identifying
29 factors (especially modifiable factors – Excerpt 1) associated with the occurrence of
30 death events and to take collective responsibility and proactively set up key actions to
31 prevent further events (Table 3). This analysis was enabled by the presence of
32 stakeholders across levels - from primary health care facilities to district clinical
33 specialist teams and programme managers.
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41 ***c. Integrating training and support from higher-level management*** 42

43 One of the key moments of the review meetings was to identify the modifiable causes
44 of death and translating them into training and learning opportunities for frontline
45 managers and providers, as well as system improvement and community education.
46 From our observation, the presence of senior managers from the district office, district
47 hospital and other partners in the review meetings created a sense of trust and space
48 for empowering providers with knowledge and tools for better performance. Nurses
49 were able to present cases and engage in discussions with doctors. Whenever gaps
50 were identified, a collective decision on key actions to prevent future events was taken
51 with support from the management.
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3 *'The meeting is to highlight things, training, educational issues and to bring*
4 *the people, the team together [DCST].*
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9 Another perceived core value of the DSR process was learning from the death events
10 to come up with quality improvement strategies to prevent similar events in the future.
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13 *'After we discuss we all come up with ... if I can say, opinions of what actually*
14 *transpired or what could have happened for this baby to demise and what we*
15 *could have done differently to help the baby. Maybe for the other babies who*
16 *are coming in the near future who present the same way, what can we change*
17 *to be able to help them' [Medical Officer].*
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22 The learning and training were extended to primary health care facilities; minutes of
23 the meetings and reminders of the guidelines were circulated; and regular visits to
24 facilities were conducted by the district team, reinforcing what was shared in the
25 meetings and allowing those who were absent from the meeting to be capacitated with
26 needed skills.
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31 By bringing together district and sub-district actors, DSR meetings acted as a lever for
32 more transparency between levels, in sharing frustrations and most especially the
33 sharing of good practices.
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37 *'I can say that [DSR meeting] is strengthening the communication between*
38 *the sub-districts and the district and because of that I don't see any problem*
39 *that might hinder us to progress, because that is where we are sharing our*
40 *frustrations and sharing our best practices' [District programme manager].*
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44 The role of the DCST in providing clinical guidance, mentorship and in-service
45 training was observed as key in addressing the modifiable factors related to provider
46 gaps in clinical knowledge. DCST also played a role in enabling professional teamwork.
47 In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his
48 view during discussions, the DCST intervened and emphasized that everyone's opinion
49 counted.
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57 ***d. Bringing together a multidisciplinary team of actors*** 58 59 60

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3 As indicated, DSR meetings were intended to be driven by a multidisciplinary team of
4 actors including medical, nursing and other professionals, and across levels
5 (community, PHC and hospital).
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9 In one particular sub-district, where the organizational culture and the leadership
10 style of senior managers promoted collaboration between primary health care facilities
11 and hospital, the process of DSR was functioning effectively.
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14 *‘...we only receive the mother during the process of giving birth, and when the*
15 *woman is now complicated with pre-eclampsia of which I think that this*
16 *would have been prevented at the first place; so we are involving the primary*
17 *health care level to come to the perinatal meetings so that they can hear*
18 *exactly about the progress of the woman because, for us, as a hospital, we do*
19 *not have the liberty of starting the woman on antenatal care, whereas the PHC*
20 *are the ones who might have been able to pick up on some problems during*
21 *the antenatal period. So, for them being involved in these perinatal meetings*
22 *is quite vital [...] not coming is also is a transgression on its own’ [Hospital*
23 *CEO].*
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32 Also important was the presence of key champions amongst middle managers and
33 medical and nursing clinicians who created and nurtured a community of practice for
34 sharing knowledge and learning.
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37 In one sub-district, participants expressed excitement at attending meetings, and the
38 venues were sometimes overflowing with participants.
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41 *[I]: So why do you think that meeting is taken seriously?*

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43 *[R]: It’s the commitment of the medical managers, the commitment of the*
44 *managers and also the operational managers in maternity wards and the*
45 *doctors [Manager, DO].*
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51 At these meetings, each step taken in the care pathway (from PHC to the referral
52 hospital) was carefully scrutinized and improvement plans with timelines, monitoring
53 and a responsible person were developed:
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57 *‘Because when you put those quality [measures] you start from your ward,*
58 *...you put as well the responsible people because when you put some measures*
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3 *you need to monitor, to come and see if it's working. And you need to give the*
4 *timeline... you monitor if it's going well, you sustain, if there is something you*
5 *need to review or if it's not going well'* [Clinical manager].
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9 Where identified modifiable factors leading to maternal, perinatal, neonatal or child
10 death were related to the patient or community, hospital board chairpersons were
11 contacted to facilitate the dialogues within the community and identify key actions
12 together with the community leaders to address the identified problem. However, the
13 community was not usually implicated directly in DSR processes.
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17 This degree of functioning was not universal, and there was variation across facilities
18 and sub-districts in the levels of team involvement, particularly of staff from PHC
19 facilities and hospital actors. In instances where doctors and nurses, managers and
20 providers, or PHC facilities and hospitals were not working as a solidified team,
21 accountability mechanisms were flawed resulting in poor referral systems, 'blame
22 games' and the deferring of responsibility in case of death events.
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31 ***e. DSR process institutionalized***

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33 Even if functioning at different levels, DSR processes in this district were anchored
34 into routines in all facilities, with standardised agendas and supportive supervision
35 from the DCST and the MNCH district programme coordinators. The DSR was
36 perceived to contribute to improving the quality of care and outcomes in facilities:
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40 *'I think the perinatal meetings are there and they are there forever. It's like an*
41 *auditing process, it's impossible to run maternity service without this*
42 *[perinatal meeting]'* [DCST].
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46 The perceived benefit and value of DSR processes, particularly the review and
47 response meetings, were repeatedly emphasized by the respondents as a motivation to
48 highlight DSR processes as an integrated part of the core activities addressing
49 maternal and child mortality in the district.
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56 **DISCUSSION**

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3 While WHO guidelines outline the necessary steps in conducting death
4 surveillance and response,⁶ there is little holistic guidance on how this is
5 to be achieved in health systems. By collating elements from the literature
6 into a conceptual framework it was possible to explore the factors
7 enabling or constraining DSR functioning in one district. This framework
8 may be of value in other similar settings.
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14 Maternal, neonatal and child DSR is well established in the South African
15 district health system. Across the five forms of DSR directly related to
16 maternal and child deaths in the study district, we found a range of
17 practice as per the framework. The process in most instances followed the
18 'no-name, no-blame' approach as stipulated in the guiding documents.
19 There was also holistic approaches to identifying causes of death, efforts
20 to integrate training and support from higher levels, facilitation of multi-
21 disciplinary teams, and elements of institutionalisation of DSR in the
22 district.
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31 In certain instances, however, the no-name no-blame approach was
32 contradicted by an organisational culture of blaming and punishment
33 following events of maternal death. Here the emphasis was on identifying
34 and sanctioning the persons responsible for death incidents and on
35 curbing the institutional ramifications of the incident, instead of using it
36 as an organisational learning event to prevent further incidents.⁴² Such
37 blame cultures in a healthcare organisation can be a source of an
38 increased number of medical errors.⁴³
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46 Death events, particularly maternal deaths, are considered to be a
47 barometer of a health system's performance. In this regard, DSR
48 processes can be constrained by the fear of revealing malpractice and poor
49 health system performance, and DSR processes can become politicized
50 and maternal deaths under-reported by bureaucrats unwilling to disclose
51 system failures.⁴⁴ In our study setting, DSR processes were facilitated by
52 a high-level political commitment from the national government to
53 compulsory and transparent reporting and reviewing of all cases of
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3 **maternal or child deaths and implementation of measures to avoid future**
4 **deaths from identified modifiable factors.**
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8 **In this study, ‘no name, no blame’ approaches were observed to facilitate**
9 **the active participation of various actors, especially those directly linked**
10 **to death incidents and the possibility of embracing responsibility for the**
11 **incident.⁴⁵ Thus, DSR processes can create a sense of interpersonal trust**
12 **and trust in the health care organization, key for generating learning and**
13 **improvement. In contrast, as noted in Kenya, the lack of trust, the fear of**
14 **blame or individualised disciplinary action conditioned frontline**
15 **professionals to be reluctant in disclosing data on maternal death.¹⁷**
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23 **As proposed by Deis *et al.*⁴⁶ DSR meetings can be transformed into**
24 **instruments of system improvement using a systematic approach that**
25 **incorporates the ‘three delays’ model for action including the providers,**
26 **the health system and the communities in identifying and addressing**
27 **modifiable factors related to death events. This means that DSR processes**
28 **should not only seek to identify and correct frontline providers’ and**
29 **managers’ practices but also health system and structural factors at the**
30 **community level,²⁰ A holistic approach was made possible through the use**
31 **of standardised protocols and guidelines for DSR that integrated**
32 **reporting and feedback mechanisms.⁴²**
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41 **Another important element of successful DSR observed was the inclusion**
42 **and engagement of a multidisciplinary team of actors from various**
43 **professional backgrounds and managers. This created a space to address**
44 **not only health system-related problems⁴⁶ but also problems related to**
45 **social structural factors (e.g. social exclusion, poverty). Where these**
46 **functioned effectively, DSR platforms intersected individual and**
47 **collective competency and responsibility for MNCH, enabling a**
48 **community of practice that recognised the contribution and value of all**
49 **levels, from PHC facilities to district hospitals actors. Furthermore,**
50 **inclusion of various stakeholders into DSR processes can also facilitate**
51 **social autopsies given that some maternal and child deaths occur outside**
52 **of health facilities. Similarly, a study in four Sub-Saharan African**
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3 **countries reported** interdisciplinary teamwork with good communication amongst
4 staff and active participation of staff as enablers of the DSR process.⁴⁷ **In contrast,**
5 **where actors from PHC facilities and hospitals, or when doctors and**
6 **nurses, managers and providers, are disconnected, it resulted in a poor**
7 **referral process, blame games and deferring of responsibility or**
8 **avoidance of accountability. Melberg *et al.*⁴⁴ referred to a ‘defensive**
9 **referral’ as a result of fear of being blamed for maternal death incident.**

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16 **When encouraged by leadership support, DSR processes can become a**
17 **platform for common learning, knowledge sharing and quality**
18 **improvement.⁴⁸ Effective DSR system, according to Kerber *et al.* ⁴⁹ needs**
19 **engaged leadership and use of guidelines and protocols that ensure the**
20 **complete cycle of the audit system.⁵⁰**

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26 **This study was conducted in one district at a particular moment in time.**
27 **While the forms of DSR are likely to be repeated elsewhere, the study**
28 **findings related to the functioning of DSR are not generalisable given the**
29 **management investments made. However, the findings have analytical**
30 **relevance in illuminating DSR in best-case scenarios and the triangulated**
31 **nature of the data provide confidence in the data collected.**

32 33 34 35 36 37 **CONCLUSION**

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40 The success of DSR processes resides in the intersection of many contextual factors
41 such as the commitment of a multidisciplinary team of actors and support from district
42 managers, the integration of primary healthcare and district hospitals, and the
43 establishment of a space for mutual trust and learning anchored within the
44 organisational culture of health facilities. A holistic approach is essential to address
45 the modifiable factors identified, translate them into long-term organisational
46 learning opportunities, and set up evidence-based ‘real-time’ cost-effective response.
47 This requires building human resources capabilities at all levels, fostering a no-
48 sanctioning atmosphere, a sound learning culture, a monitoring and supervision
49 system, a high-level political commitment, in addition to establishing clear
50 communication channels between actors.
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List of abbreviations

CEO: Chief Executive Officer

CEMD: Confidential Enquiry into Maternal Deaths

CHIP: Child under-five Problem Identification Programme

DCST: District Clinical Specialist Team

DSR: Death surveillance and response

MNCH: Maternal, Newborn and Child Health

PPIP: Perinatal Problem Identification Programme

REFERENCES

1. United Nations Commission on information accountability for Women's and Children's Health. *Keeping promises, measuring results*. New York: United Nations;2013.
2. de Kok B, Imamura M, Kanguru L, Owolabi O, Okonofua F, Hussein J. Achieving accountability through maternal death reviews in Nigeria: a process analysis. *Health Policy Plan*. 2017.
3. Mills S. *Maternal Death Audit as a Tool Reducing Maternal Mortality*. Washington DC: World Bank;2011. 77799.
4. Smith H, Ameh C, Roos N, Mathai M, Broek NVD. Implementing maternal death surveillance and response: a review of lessons from country case studies. *BMC Pregnancy Childbirth*. 2017;17(233):1-11.
5. World Health Organization. *Beyond the numbers: Reviewing maternal deaths and complications to make pregnancy safer*. Geneva: WHO;2004.

- 1
2
3 6. World Health Organization. *Maternal Death Surveillance and Response*.
4 Geneva: WHO;2013.
- 5
6 7. Bandali S, Thomas C, Hukin E, et al. Maternal Death Surveillance and Response
7 Systems in driving accountability and influencing change. *Int J Gynaecol*
8 *Obstet*. 2016;135(3):365-71.
- 9
10 8. Kongnyuy EJ, Mlava G, van den Broek N. Facility-based maternal death review
11 in three districts in the central region of Malawi: an analysis of causes and
12 characteristics of maternal deaths. *Womens Health Issues*. 2009;19(1):14-20.
- 13
14 9. Ochejele S, Musa J, Abdullahi MJ, Odusolu P, Attah DI, Aloba G. Maternal
15 death surveillance and response system in Northern Nigeria. *Trop J Obstet*
16 *Gynaecol*. 2019;36(2).
- 17
18 10. Pearson L, deBernis L, Shoo R. Maternal death review in Africa. *Int J Gynaecol*
19 *Obstet*. 2009;106(1):89-94.
- 20
21 11. Ayele B, Gebretnsae H, Hadgu T, et al. Maternal and perinatal death
22 surveillance and response in Ethiopia: Achievements, challenges and prospects.
23 *PLoS One*. 2019;14(10):1-24.
- 24
25 12. Bandali S, Thomas C, Wamalwa P, et al. Strengthening the "P" in Maternal and
26 Perinatal Death Surveillance and Response in Bungoma county, Kenya:
27 implications for scale-up. *BMC Health Serv Res*. 2019;19(1):611.
- 28
29 13. Halim A, Dewez JE, Biswas A, Rahman F, White S, van den Broek N. When,
30 Where, and Why Are Babies Dying? : Neonatal Death Surveillance and Review
31 in Bangladesh. *PLoS One*. 2016;11(8).
- 32
33 14. Krug A, Pattinson R. *Saving Children 2004: A survey of child healthcare in*
34 *South Africa*. South Africa: National Department of Health;2004.
- 35
36 15. Patrick ME, Stephen CR. Child PIP: Making mortality meaningful by using a
37 structured mortality review process to improve the quality of care that children
38 receive in the South African health system. *SAJCH*. 2008;2(2):38-42.
- 39
40 16. South Africa Every Death Counts Writing Group. Every death counts: use of
41 mortality audit data for decision making to save the lives of mothers, babies,
42 and children in South Africa. *The Lancet*. 2008;371(9620):1294-304.
- 43
44 17. D'Ambruoso L, van der Merwe M, Wariri O, et al. Rethinking collaboration:
45 developing a learning platform to address under-five mortality in Mpumalanga
46 province, South Africa. *Health Policy and Planning*. 2019;34(6):418-29.
- 47
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53
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60

18. Mahato PK, Waithaka E, van Teijlingen E, Pant PR, Biswas A. Social autopsy: a potential health-promotion tool for preventing maternal mortality in low-income countries. *WHO South-East Asia Journal of Public Health*. 2018;7(1).
19. Biswas A, Halim MA, Dalal K, Rahman F. Exploration of social factors associated to maternal deaths due to haemorrhage and convulsions : Analysis of 28 social autopsies in rural Bangladesh. *BMC Health Services Research*. 2016;16(1).
20. Smith H, Ameh C, Godia P, et al. Implementing Maternal Death Surveillance and Response in Kenya: Incremental Progress and Lessons Learned. *Global Health: Science and Practice*. 2017;5(3):345-54.
21. De Brouwere V, Delvaux T, Leke RJ. Achievements and lessons learnt from facility-based maternal death reviews in Cameroon. *BJOG*. 2014;121 Suppl 4:71-4.
22. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med*. 1994;38(8):1091-1110.
23. Barnes-Josiah D. The "Three delays" as a framework for examining maternal mortality in Haiti. *Soc Sci Med*. 1998;46(8):981-93.
24. Pattinson R, Kerber K, Waiswa P, et al. Perinatal mortality audit: counting, accountability, and overcoming challenges in scaling up in low- and middle-income countries. *Int J Gynaecol Obstet*. 2009;107:S113- 22.
25. Rhoda N, Velaphi S, Gebhardt G, Kauchali S, Barron P. Reducing neonatal deaths in South Africa: Progress and challenges. *S Afr Med J*. 2011;108:S9-16.
26. Mayne J. Addressing attribution through contribution analysis. Using performance measures sensibly. *The Canadian Journal of Program Evaluation*. 2001;16(1):1-24.
27. National Department of Health. Second Interim Report on Confidential Enquiries into Maternal Deaths in South Africa: Maternal Deaths for 1999. In. Pretoria, South Africa: NDOH; 1999.
28. National Department of Health. National Perinatal Morbidity and Mortality Committee Report 2008-2010 (NaPeMMCo). In. South Africa2010.
29. National Department of Health. 1st Triennial Report of the Committee on Morbidity and Mortality in Children Under 5 Years (CoMMiC). In. South Africa2011.

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 - 60
30. Mukinda FK, Van Belle S, George A, Schneider H. The crowded space of local accountability for maternal, newborn and child health: A case study of the South African health system. *Health Policy and Planning*. 2020;35(3):279–90.
31. Shung-King M, Lake L, Sanders D, Hendricks M. *South African ChildGauge 2019: Child and adolescent health*. Cape Town: Children’s Institute, University of Cape Town;2019.
32. Allanson ER, Pattinson RC. Quality-of-care audits and perinatal mortality in South Africa. *Bull World Health Organ*. 2015;93(6):424-8.
33. Schneider H, George A, Mukinda F, Tabana H. District governance and improved maternal, neonatal and child health in South Africa: pathways of change. *Health Systems & Reform*. 2020;6(1):1-12.
34. Bac M, Pattinson RC, Bergh AM. Changing priorities in maternal and perinatal health in Gert Sibande District, South Africa. *S Afr Med J*. 2019;109(11).
35. Schneider H, McKenzie A, Tabana H, Mukinda F, George A. *Evaluation of health system strengthening initiatives for improving the quality and outcomes of maternal, neonatal and child health care in four South African districts*. Cape Town, South Africa: School of Public Health, SAMRC Health Services to Systems Research Unit, University of the Western Cape;2017.
36. Green J, Thorogood N. *Qualitative Methods for Health Research*. 4th ed. London: Sages Publications; 2018.
37. Azungah T. Qualitative research: deductive and inductive approaches to data analysis. *Qualitative Research Journal*. 2018;18(4):383-400.
38. Cupido J. *Reducing Maternal, Neonatal and Under 5 Child Deaths by linking the Ideal Clinic and the MRU model*. Gert Sibande: Health;2018.
39. Moodley J, Pattinson RC, Fawcus S, Schoon MG, Moran N, Shweni PM. The Confidential Enquiry into Maternal Deaths in South Africa: a case study. *BJOG*. 2014;121:53-60.
40. National Department of Health. *Saving Mothers 2008-2010: Fifth Comprehensive Report on Confidential Enquiries into Maternal Deaths in South Africa*. Pretoria2011.
41. National Department of Health. *Saving Mothers 2011-2013: Sixth report on confidential enquiries into maternal deaths in South Africa*. Pretoria2014.

- 1
2
3 42. Hussein J, Okonofua F. Time for Action: Audit, Accountability and Confidential
4 Enquiries into Maternal Deaths in Nigeria. *Afr J Reprod Health* 2012;16(1):9-
5 14.
6
- 7
8 43. Khatri N, Brown GD, Hicks LL. From a blame culture to a just culture in health
9 care. *Health Care Manage Rev.* 2009;34(4):312-22.
10
- 11 44. Melberg A, Mirkuzie AH, Sisay TA, Sisay MM, Moland KM. 'Maternal deaths
12 should simply be o': politicization of maternal death reporting and review
13 processes in Ethiopia. *Health Policy Plan.* 2019;34(7):492-8.
14
- 15 45. Kuipers S, Hart P. Accounting for Crises. In: Bovens M, Goodin RE, Schillemans
16 T, eds. *The Oxford Handbook of Public Accountability USA*: Oxford University
17 Press; 2014:589-602.
18
- 19 46. Deis JN, Smith KM, Warren MD, et al. Transforming the Morbidity and
20 Mortality Conference into an Instrument for Systemwide Improvement. In:
21 Henriksen K, Battles JB, Keyes MA, Grady ML, eds. *Advances in Patient
22 Safety: New Directions and Alternative Approaches*. Vol 2. Rockville (MD):
23 Agency for Healthcare Research and Quality; 2008.
24
- 25 47. Maternal and Child Survival Program. A Regional Assessment of Facility-Level
26 Maternal and Perinatal Death Surveillance and Response Systems in Four Sub-
27 Saharan African Countries. USAID; 2018. Available at:
28 [https://www.mcsprogram.org/resource/regional-assessment-facility-level-
29 maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-
30 african-countries/](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/) (Accessed: 16 August 2020).
31
- 32 48. Lewis G. The cultural environment behind successful maternal death and
33 morbidity reviews. *BJOG.* 2014;121:24-31.
34
- 35 49. Kerber KJ, Mathai M, Lewis G, et al. Counting every stillbirth and neonatal
36 death through mortality audit to improve quality of care for every pregnant
37 woman and her baby. *BMC Pregnancy Childbirth.* 2015;15 Suppl 2:S9.
38
- 39 50. Bergh A-M, Pattinson R, Belizán M, et al. Completing the audit cycle for quality
40 care in perinatal, newborn and child health. In. University of Pretoria: MRC
41 Research Unit for Maternal and Infant Health Care Strategies; 2010:1-45.
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4 first draft with input from AG, HS and SVB. All authors edited the manuscript and
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32 approved by the Biomedical Science Research Ethics Committee of the University of
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35 Informed consent was signed before interviews and data are presented anonymously.
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48 **Authors' information**

49
50 Fidele Kanyimbu Mukinda: PhD Candidate, School of Public Health, University of the
51 Western Cape, Cape Town, South Africa; Orcid ID: 0000-0002-0764-6213
52
53

54
55 Sara Van Belle: Senior lecturer, Institute of Tropical Medicine, Nationalestraat 155,
56 2000 Antwerp, Belgium
57
58
59
60

Asha George: Professor, School of Public, University of the Western Cape, Cape Town, South Africa; Orcid ID: 0000-0002-5968-1424

Helen Schneider: Professor, School of Public and SAMRC Health Services to Systems Research Unit, University of the Western Cape, Cape Town, South Africa; Orcid ID: 0000-0002-0418-1828

Box 1: WHO's Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system ⁶

<i>Identify and notify deaths</i>	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
<i>Review maternal deaths</i>	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
<i>Analyse and make recommendations</i>	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
<i>Respond and monitor response</i>	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Excerpt 1 (From DSR meeting and discussion with respondents)

Case one: A pregnant patient who had never attended antenatal care session presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case two: A young primigravida who was followed up since the early stage of the pregnancy, but because of a failure to treat high blood pressure, she died. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Following a holistic approach to identifying modifiable causes			
<i>‘Three Delays’</i> ^{**}	1 st Delay in Deciding and seeking Care	2 nd Delay in identifying and reaching a Health Facility	3 rd Delay in receiving adequate appropriate care
II. Surveillance process (What and How?) ^{**}			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response ^{**}	1. Continuous action (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Using cost-effective and evidence-based actions		
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actors participation (Who?) ^{***}		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
	9. Community participation in review and response (social and verbal autopsy)		
III. Actions (Pro-active & Reactive)			
▪ <i>Provider level</i>	Capacity Building, In-service Training		
▪ <i>System level</i>	Health System Improvement, Provision of resources		
▪ <i>Community level</i>	Community Education		

References: ^{*23}; ^{**2,4-6}

Table 2. Death Surveillance and Response Mechanisms – Purpose, Functioning and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child <5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

Table 3: Functioning of DSR Mechanism in practice and compared to elements from the literature

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PPIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/Clinical Governance
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	No-naming, No-blaming;	No-naming, No-blaming,	No-naming, No-blaming, Auditing and Quality Assurance	No-naming, No-blaming, Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

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Matching to the elements for the functioning of DSR mechanisms	1. Following a holistic approach to identifying modifiable causes	x			x	x		
	2. Continuous action (Death auditing, review, communication, and feedback)	x	x		x	x	x	x
	3. Using cost-effective and evidence-based actions	x			x	x	x	x
	4. Confidentiality (no naming), No-blaming, non-punitive tone of the process	x	x		x	x	x	x
	5. Integrating learning and response, quality improvement, health system strengthening, and community education				x	x		
	6. Institutional support culture at all levels of the health system	x	x		x	x	x	x
	7. Multidisciplinary teams				x	x		
	8. Integration across levels of care				x	x		x
	9. Involvement and commitment of the managers to act on the findings				x	x		
	10. Community participation in review and response							

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Assessing the practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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3 1 **Assessing the practice of Death Surveillance and Response for Maternal,**
4 2 **Newborn and Child Health: A framework and application to a South**
5 3 **African Health District**
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11 5 Fidele Kanyimbu Mukinda^{1*}, Asha George^{1,2}, Sara Van Belle³, Helen Schneider^{1,2}
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16 7 ¹School of Public Health, University of the Western Cape, Cape Town, South Africa.

17 8 ²South African Medical Research Council (MRC)/Health Services and Systems Unit,
18 9 Cape Town, South Africa
19

20 10 ³Institute of Tropical Medicine, Belgium.
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23
24 11 *Corresponding author. School of Public Health, University of the Western Cape,
25 12 Robert Sobukwe Road, Private Bag X17 Bellville 7535, Cape Town, South Africa
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28 13 Email: fmukinda@uwc.ac.za
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33 15 **Keywords:** Accountability; Death Surveillance and Response; Maternal, newborn
34 16 and child health; Framework; District health system; Qualitative study
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1 **Abstract**

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7 **Objective:** The development and application of a framework to assess the functioning
8 and practices of maternal, perinatal, neonatal and child death surveillance and
9 response (DSR) mechanisms at a health district level.

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12 **Design:** A framework of elements covering analysis of causes of death, and processes
13 of review and response was developed and applied to the smallest unit of coordination
14 (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive
15 qualitative case study design, based on observations of DSR practices and interviews.

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20 **Setting:** Rural South African health district (sub-districts and district office).

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22 **Participants:** A purposive sample of 45 frontline health managers and providers
23 involved with maternal, neonatal and child DSR.

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26 **Primary outcome measures:** Functioning and practices of maternal, perinatal,
27 neonatal and child death surveillance and response.

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30 **Results:** DSR mechanisms were integrated into the organizational routines of the
31 district. Compulsory 24-hour death reporting and 48-hour review, Confidential
32 Enquiry into Maternal Death and ongoing review and response mechanisms
33 (Perinatal/Child Problem Identification Programme and a forum referred to as
34 Monitoring and Response Unit) were among the forms of DSR identified. The
35 functioning of DSR mechanisms varied across sub-districts and between forms of
36 DSR. Some forms of DSR, notably those involving maternal deaths, with external
37 reporting and accounting, were more likely to trigger fault-finding and sanctioning
38 than other forms of DSR, which were more proactive in supporting evidence-based
39 actions at provider, system and community levels to prevent future deaths.

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42 **Conclusions:** This study provides an empirical example of the everyday practice of
43 DSR mechanisms at a district level. It also puts forward a framework of elements and
44 enabling organizational processes for the functioning of these mechanisms that may
45 be of value in similar settings elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices and the findings may have limited generalisability;**
- **However, the framework and appraisal methods may be of value in similar settings elsewhere.**

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INTRODUCTION

3 The United Nations (UN) put accountability for maternal, newborn and child health
4 (MNCH) on the global agenda, placing three interrelated accountability processes at
5 the centre of its 'Global Accountability Framework', namely, monitoring, reviewing
6 and response.¹ Death surveillance and response (DSR) has become the means to
7 operationalise these accountability processes across many health systems, aiming to
8 improve the quality of maternal, neonatal and child health care, and eliminate
9 preventable deaths.²⁻⁵

10 Death Surveillance and Response entails a continuous cycle of identification,
11 notification and review of maternal or child deaths followed by action to improve the
12 quality of care and prevent future deaths.⁶ Its essence is, therefore, the capacity to
13 record, review and respond to each death using affordable, effective and evidence-
14 based actions linked to the findings.⁵

15 There is now a well-established tradition of DSR in Low- and Middle-Income
16 Countries (LMICs), focusing primarily on maternal deaths.^{2,4,6-10} In facilities and
17 contexts where maternal deaths are relatively rare, maternal 'near-miss' cases are also
18 being audited.⁵ More recently, LMICs have begun including the review of perinatal and
19 neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death
20 Surveillance and Response (MPDSR);¹¹⁻¹³ and in some settings, DSR extends to under-
21 five deaths.¹⁴⁻¹⁶

22 In addition to facility-based processes, community-based DSR is recommended where
23 a high proportion of deliveries (and deaths) occur outside of health facilities, and
24 where community participation is crucial to implementing identified key actions.^{5,11} In
25 this regard, verbal and social autopsies have been developed as a participatory tool for
26 community-based DSR, exploring clinical and social causes of death from a
27 community perspective.¹⁷⁻¹⁹

28 DSR processes are typically defined nationally but implemented at facility level with
29 support from and coordination by local or district teams.^{20,21} Although there are no
30 globally standardised approaches,⁴ the literature points to several elements

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3 1 underpinning effective DSR processes, encompassing analysis of modifiable factors
4 involved, the tone of the review process and the range of participants involved.
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8 3 The analysis of modifiable factors underlying maternal and child deaths has been
9 codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in**
10 **deciding to seek care early; (ii) the delay in reaching a health facility; (iii)**
11 **the delay in providing or receiving adequate care at the facility.**^{6,22-25}
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16 7 In formulating a response, the literature on DSR recommends moving away from
17 identifying and sanctioning individuals,²⁶ and towards the setting up of non-punitive
18 'no-blaming' approaches that foster collective and individual participation.^{2,20} Such
19 approaches are less likely to result in ignoring the incident or the temptation to defer
20 responsibility onto others.^{2,3,5}
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25 12 DSR processes ideally involve a multidisciplinary team with the representation of a
26 range of clinicians (nursing, medical and other professionals), managers and support
27 staff (such as information officers). This brings together the array of provider
28 knowledge and skills, together with commitments from managers to enhance
29 ownership of the findings and turn recommendations into concrete actions.^{2,5,6}
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35 17 South Africa has a long-standing history, going back to the mid-1990s, of maternal,
36 neonatal and child DSR that has become integrated into the routine functioning of
37 frontline health services. DSR processes are linked to three ministerial committees
38 established in 1998, namely the National Committee for Confidential Enquiry into
39 Maternal Deaths (NCCEMD),²⁷ the National Perinatal and Neonatal Morbidity and
40 Mortality Committee (NaPeMMCo);²⁸ and the Committee on Morbidity and Mortality
41 in Children under 5 years (CoMMiC).²⁹ These committees function at national level
42 with mandates exercised at local (health district) level through three of the DSR
43 processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the
44 Perinatal Problem Identification Programmes (PPIP), and the Child under-five
45 Problem Identification Programmes (CHIP). These mechanisms are situated in a
46 dense and complex accountability ecosystem at the frontline of health provision.³⁰
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57 29 There have been significant reductions in maternal, neonatal and child mortality in
58 South Africa over the last decade, attributed principally to the prevention and
59 treatment of HIV.³¹ However, despite a long history and institutionalised practice,
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3 1 there is little understanding of the role of DSR implementation and functioning in this
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5 2 mortality reduction. Clear guidance on how best to assess this functioning is also
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7 3 lacking; one study showed no association between consistent auditing and perinatal
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9 4 mortality rates.³²

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11 5 Given the lack of standardisation and consensus on elements for assessing the
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13 6 functioning of DSR and the opportunity to assess district level experience in South
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15 7 Africa, this paper develops a framework to assess DSR functioning using the criteria
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17 8 drawn from the literature (Table 1) and based on field observations and interviews
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19 9 with frontline providers and managers. It then uses the framework to describe the
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21 10 forms and functioning of maternal, neonatal and child DSR mechanisms at district
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23 11 level in South Africa; and explores the context that makes them effective in the eyes of
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25 12 frontline managers and providers.

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27 13 This paper seeks to answer the following question: How can the forms and functioning
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29 14 of accountability mechanisms for maternal, neonatal and child health be holistically
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31 15 assessed at district level in South Africa?
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Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Following a holistic approach to identifying modifiable causes			
'Three Delays' *	1 st Delay in Deciding and seeking Care	2 nd Delay in identifying and reaching a Health Facility	3 rd Delay in receiving adequate appropriate care
II. Surveillance process (What and How?)**			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous action (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Using cost-effective and evidence-based actions		
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actors participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
9. Community participation in review and response (social and verbal autopsy)			
III. Actions (Pro-active & Reactive)			
▪ Provider level	Capacity Building, In-service Training		
▪ System level	Health System Improvement, Provision of resources		
▪ Community level	Community Education		

References: *23; **2,4-6; ***6,33

1 METHODOLOGY

2 Definitions

3 **In this paper, the term Death Surveillance and Response (DSR) refers to**
4 **all death reporting and review processes related to maternal and child**
5 **health, even if they do not have all the ideal components of DSR. They**
6 **include phenomena commonly reported in the literature such as Maternal**
7 **Death Review (MDR) or Audit, Maternal Death Surveillance and Response**
8 **(MDSR), Maternal and Perinatal Death Surveillance and Response**
9 **(MPDSR), or surveillance and review of child deaths.**

10 Conceptual framework

11 **We conducted a search of the literature using the above terms and**
12 **consulted with experts in the field to identify the elements of well-**
13 **functioning DSR. On the basis of these, a conceptual framework was**
14 **developed. We combined the WHO Continuous Action Framework to**
15 **eliminate preventable deaths,⁶ the ‘Three Delays’ framework,²² and other**
16 **elements identified in the literature^{2,4,6,20} to assess the DSR processes.**
17 **These are outlined in Box 1 and Table 1. The framework distinguishes**
18 **between (i) the modifiable causes of death as per the three delays model;**
19 **(ii) the surveillance process (what, how, who); and (iii) the types of**
20 **responses triggered, whether proactive or reactive. These elements**
21 **provide a holistic and comprehensive assessment of the various steps and**
22 **processes involved in DSR. Given that mortality reductions require**
23 **coordination across levels,³⁴ the framework adopts an area-based**
24 **approach, using the most decentralised structures of in health systems**
25 **coordination, notably the sub-district, as its unit of analysis.**

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<p>Box 1: WHO’s Four components of continuous action in Maternal Death Surveillance and Response (MDSR) system</p>

Identify and notify deaths	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
Review maternal deaths	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
Analyse and make recommendations	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
Respond and monitor response	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

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2 Study design

3 We conducted a descriptive, exploratory qualitative case study of the forms and
4 functioning of maternal, neonatal and child DSR processes applying the framework
5 (Table 1).

6 Study Setting

7 The study was conducted in one of the three health districts in Mpumalanga Province
8 situated in the north-east of South Africa. The District has a population of about 1.1
9 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It
10 contains one regional hospital, eight district hospitals, and 76 primary healthcare
11 facilities, distributed among seven sub-districts.

12 The study district was targeted for health systems strengthening support because of
13 high maternal and child mortality.³⁵ Intensified efforts were specifically made to

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3 1 strengthen DSR in the district over several years, building on long-standing processes
4 (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and
5 2 Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these,
6 3 DSR processes were accompanied by improved district clinical support with the
7 4 introduction of district clinical specialist teams (DCST) and a new mechanism of
8 5 coordination, referred to as the Monitoring and Response Unit (MRU). These
9 6 initiatives were widely regarded as having impacted positively on maternal and child
10 7 mortality in the District.³⁶ In these respects, therefore, the District could be regarded
11 8 as having relatively well-functioning DSR at the time of the research. Although not
12 9 nationally representative, it was nevertheless well suited for the qualitative exploration
13 10 of criteria in a DSR assessment framework.
14 11

12 **Study sample and Data collection**

13 The sub-districts were selected in a prior study as representing the range of buy-in to
14 one particular DSR strategy.³⁴ We combined semi-structured in-depth interviews,
15 non-participant observation of meetings with a desk review of key documents as data
16 sources for this study.

17 ***Semi-structured in-depth interviews***

18 We conducted 45 semi-structured in-depth, individual interviews with purposefully
19 selected respondents among those involved with maternal, neonatal and child DSR
20 from two of the seven sub-districts and the district office. Respondents were either
21 members of the enquiry or audit team or participants in one of the death surveillance
22 and response meetings (MRU, PPIP, CHIP). Participants consisted of district
23 programme managers (N=10) and members of the district clinical specialist team
24 (DCST) (N=3), hospital chief executive officer (CEOs) [N=2], hospital nursing
25 managers (N=4), facility and hospital operational managers (professional nurses
26 heading a ward in a hospital or managing a primary healthcare facility [N=5]), medical
27 officers (N=7), professional nurses (N=3), allied health professionals (N=5),
28 emergency service manager (N=1), and facility information managers (N=2). A semi-
29 structured interview guide was developed and pre-tested (Supplementary Appendix
30 File 1).

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3 1 Interviews were conducted by the first author as part of a wider study. To ensure
4 2 privacy and confidentiality, interviews were held in the respondent's office or in the
5 3 boardroom outside the meeting time. With respondents' signed consent and
6 4 permission, the interviews were audiotaped and transcribed verbatim. The interviewer
7 5 took notes during and after the interview and summarised the interview on a pre-
8 6 designed coversheet.³⁰ All audio files and transcripts were reviewed by the authors to
9 7 ensure quality.

8 ***Non-participant observation***

9 9 From May 2018 to September 2019, for a total 59 days distributed over one to three
10 10 weeks in each of the two sub-districts, we conducted non-participant field
11 11 observations by engaging in various activities and meetings related to Maternal,
12 12 Neonatal and Child DSR in which health system actors were actively engaged in. A
13 13 structured observation sheet was designed for this purpose.³⁰ We observed the
14 14 following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit,
15 15 clinical governance and patient safety committee. During a meeting, apart from the
16 16 general observation schedule, we specifically observed the structure of the meeting,
17 17 standard agenda, actors involved, presentation and discussion of cases, decision
18 18 process, and related actions (capacity building, provision of resources or community
19 19 engagement). Discussions of cases focused on the identification of causes of death
20 20 based on the 'three delays' approach. We also reviewed the agendas and minutes of
21 21 these meetings.

22 22 During this fieldwork, three maternal deaths occurred in the district and we were able
23 23 to observe one formal district meeting and engage in informal discussions with district
24 24 actors on the unfolding maternal death enquiry process linked to these three deaths.

25 **Data management and analysis**

26 26 Interview recordings were transcribed verbatim, and observation and reflection notes
27 27 compiled by the first author (PhD student). All data were coded using Atlas.ti version
28 28 8, and a thematic analysis was used to analyse the data.³⁷ Key themes were identified
29 29 following both a deductive approach based on a preset list of themes from the criteria
30 30 of DSR functioning and inductively wherever new insights were identified.³⁸ Details of
31 31 the analysis process are reported in Mukinda, Van Belle, Schneider³⁹ The themes were

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3 1 grouped into two main categories, namely, 1) the forms and 2) the functioning of DSR.
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5 2 Finally, the findings were presented to respondents in various meetings or individual
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7 3 meetings to verify and validate the results.
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9 4 **Positionality, reflexivity and ethics considerations**

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12 5 Interviews and participant observation can face ethical challenges given the sensitive
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14 6 nature of a research topic that can potentially expose hidden realities.⁴⁰ The conduct
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16 7 of this study was facilitated by our previous engagements in the study setting, and
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18 8 subsequently as part of the first author's PhD study. These involved a period of
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20 9 immersion and observation, which allowed for the building of trust with participants,
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22 10 and to be able to contextualise and interpret the interviews and observations. To
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24 11 minimise descriptive and interpretive biases, regular feedback and discussion of the
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26 12 findings were conducted during follow-up meetings in the district; and iterative
27
28 13 processes engaged between the first author (PhD student) and the co-authors (PhD
29
30 14 supervisors) involving continuous questioning of the understanding of data and
31
32 15 reviewing of findings.

33
34 16 This study was approved by the Biomedical Science Research Ethics Committee and
35
36 17 the Provincial Health Research Committee. All interviews proceeded with signed
37
38 18 informed consent.

39 19 **Patient and public involvement**

40
41 20 Patients or the public were not involved in the design, conduct, reporting or
42
43 21 dissemination plans of this study.
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46 23 47 48 24 **RESULTS**

49 25 **Forms of maternal, neonatal and child DSR mechanisms**

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52 26 **Table 2 presents a summary of all maternal, neonatal and child DSR**
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54 27 **mechanisms observed in the district, their purpose and functioning, as**
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56 28 **well as their objectives. Five mechanisms were specific to MNCH (24-hour**
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58 29 **Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). An additional two,**
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3 1 **which also dealt with maternal, neonatal and child deaths**, the Morbidity
4 and Mortality, and Clinical Audit/Clinical Governance meetings, **were general**
5 **facility-based morbidity and mortality and clinical audit/governance**
6 **mechanisms.**
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11 5 **The following sections describe both the processes and actors involved in**
12 **the implementation of the instruments specific to the maternal, neonatal**
13 **and child DSR strategies (their forms) and how actors perceived their**
14 **implementation compared to elements articulated in our conceptual**
15 **framework (their functioning).**
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Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child<5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

a. Compulsory 24-hour reporting, 48-hour review

Any maternal, perinatal, neonatal or child death is mandatorily recorded at facility level where the death occurred and reported within 24 hours internally to the district office, and externally to the Department of Home Affairs for issuing of a death certificate. This is the standard operating procedure applied in all facilities in South Africa. In the study district, following the introduction of the MRU and the DCST, a district-level system was also established to review all maternal and under-5 child deaths within 48 hours, independent of other processes. This process of 24-hour recording and reporting and 48-hour case review was referred to as a 'real-time death reporting';⁴¹ it allowed for actions to be taken as quickly as possible to address modifiable factors, such as correcting a skills or staffing gap, provision of resources, or community education.

Following a maternal death, we observed the district MNCH programme manager and DCST members visiting the facility to conduct an audit and review the clinical management of the case, identify any gaps, and analyse the causes of deaths for discussion in subsequent enquiry processes. Opportunities for training and skills upgrading were identified. A report with recommendations was sent to the district manager who activated the confidential enquiry specific for maternal death events.

b. Confidential Enquiry into Maternal Death (CEMD)

The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa in 1997 and involves a standardized process of reporting and auditing. Maternal deaths, in addition to being reported to the district and Home Affairs, are also reported to the provincial MNCH coordinator within 24 hours, who allocates a unique number. A copy of the patient folder and a completed Maternal Death Notification Form (MDNF) are included in the report and submitted to a team of provincial assessors (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the facility to enquire about the causes of death, as well as any avoidable or modifiable factors. The resulting annual and triennial reports and recommendations (not including detailed individual cases) are disseminated to Provincial and District structures and academic institutions for collation with general recommendations for action, such as training on the Essential Steps in the Management of Obstetric Emergencies (ESMOE).⁴²⁻⁴⁴

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3 1 In addition to the provincial assessors, actors involved in the CEMD at district and
4 facility levels were observed to consist of: the district manager (or a representative),
5 2 quality assurance manager, primary health care and hospital services manager, labour
6 3 relations and corporate services, and a member of the DCST, the hospital chief
7 4 executive officer, (CEO), the nursing service and clinical managers, as well as the
8 5 specific health providers directly involved to explain or justify any decisions or actions
9 6 taken that resulted in maternal death.
10 7

16 8 ***c. Ongoing Review and Response Structures***

19 9 As indicated, several routine meeting structures are established for auditing and
20 10 responding to maternal, perinatal/neonatal and child deaths (Table 2). From our
21 11 observation, three of these meetings involving multidisciplinary actors were specific
22 12 to MNCH, namely, the Perinatal Problem Identification Programme (PPIP), the
23 13 under-five Child Problem Identification Programme (CHIP) and the Monitoring and
24 14 Response Unit (MRU). Strong involvement of a facilitator from the National
25 15 Department of Health was observed as one of the enabling factors of these meetings,
26 16 a factor unique to the study setting.

34 17 *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

36 18 From our observations, the PPIP/CHIP review meetings took place monthly at a
37 19 facility level. The meeting consisted of systematically auditing the patient file related
38 20 to death, comparing the management of the case against standard treatment protocols
39 21 and guidelines. Through discussion, participants were able to identify gaps in clinical
40 22 management, and set up improvement plans, including capacity-building needs.
41 23 Preventive and early detection measures in PHC facilities were also identified.

46 24 In complying with the DSR guideline, the meetings were never used to point fingers,
47 25 or name or blame providers involved in the management of the case. However, the
48 26 respondents raised the possibility of sanction if at any stage gross negligence was
49 27 documented.

54 28 *‘...We are taking every death very seriously. One death is too many deaths,*
55 29 *we have to make sure that we follow up on our kids and also on our health*
56 30 *care workers [at PHC] the entry point where the neonatal was first attended*
57 31 *so that we can check on whether the child was attended according to protocol*

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3 1 *and if not then consequential management needs to be applied* [Hospital
4 CEO].
5 2
6

7 3 A multidisciplinary team of actors attended the meetings: (i) from primary health care
8 facilities: operational managers, nurses and data capturers; (ii) from the district
9 hospital: doctors and nurses (mostly those involved in midwifery/obstetrics,
10 gynaecology and paediatrics), ward operational managers, medical and nursing
11 managers, hospital CEOs, as well as the information manager; (iii) from the district
12 office: the DCST members and MNCH cluster programme managers. In most cases,
13 the meeting was chaired by the clinical manager or the medical officer in charge of
14 obstetrics and gynaecology, or by a nurse operational manager of the maternity ward.
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21 *Monitoring and Response Unit (MRU)*

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23 12 The MRU meetings were convened monthly at sub-district and bi-monthly at district
24 level. From the guiding document, the MRU brings together a multidisciplinary team
25 of actors, including managers (PHC, hospital), clinicians, information officers. The
26 aim is to enhance the governance of MNCH by frontline managers and providers and
27 to improve coordination between the various actors as well between levels of care. At
28 district level, the meetings were chaired by the district manager or a representative,
29 usually, the MCWH coordinator or the district quality assurance manager, while at
30 sub-district level, the MRU meeting was chaired by the CEO of the district hospital or
31 a representative. Participation was expanded to other stakeholders such as academic
32 partners, NGOs and other government departments (notably the South African Social
33 Security Agency) and community representatives to address the modifiable causes of
34 maternal and child deaths.
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44 24 The MRU reviewed performance indicators and identified follow-up on actions to
45 address the modifiable causes of death, with particular emphasis placed on the 24-
46 hour compulsory death reporting and 48-hour review process. The MRU emphasized
47 the '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child death.
48 A particular focus of the MRU was on responsiveness involving pro-active measures
49 to addressing the identified modifiable factors through teamwork and skills building
50 and the integration of the primary health care system in preventive actions at
51 community level.
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1 **Functioning of maternal, neonatal and child DSR mechanisms**

2 Tables 3a and b presents an application of the framework and a descriptive summary
3 of the functioning of each of the DSR mechanisms observed in practice. In this section,
4 we report on the overall functioning of DSR, drawing across all the forms of DSR
5 observed and the views expressed by the respondents about them. We present key
6 themes that emerged as critical from the elements outlined in Table 1.

7 ***a. The ‘no-name, no-blame’ approach***

8 From our observations and the respondents’ views, the perinatal and child
9 (PPIP/CHIP) and the MRU meetings promoted the ‘no-name, no-blame’ approach.
10 The chairperson of the death review meeting ensured that confidentiality was
11 maintained throughout and that no one was blamed for the occurrence of the adverse
12 event. Otherwise, respondents noted that the meeting could be transformed into a
13 ‘*punishment exercise*’ that would discourage actors’ participation:

14 *‘..The perinatal meeting itself is not making anybody accountable. The*
15 *meeting itself is about discussing things, it is not to point to individuals,*
16 *because it’s going to be discouraging for the people [to attend] if it’s a*
17 *punishment exercise...’ [DCST].*

18 This ‘no-name, no-blame’ approach fostered a high level of commitment to the review
19 meetings that resulted in a common understanding of individual and system
20 challenges faced. It also fostered mutual support when people were proactively
21 working as a team.

22 *‘Before there was blaming, blaming, blaming [...] No-one is blaming anyone*
23 *anymore because we do understand the challenges, we are part of the system,*
24 *we are in the [same] basket’ [EMS manager].*

25 Policy documents formally claim that the CEMD also follows a ‘no-name, no-blame’
26 approach. However, based on interviews and observations in practice, the CEMD
27 process in the study district was conducted and experienced very differently to the
28 other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of
29 maternal death from higher-level management (national department of health),
30 seeking to assign individual responsibility and frequently triggering reactive sanction
31 and punitive action in the district. Respondents reported suspensions, referrals to the
32 labour office, litigations and court cases involving frontline professionals (Excerpt 1).

1 This was one of the constraining factors of DSR functioning. These processes were
 2 managed through quality assurance structures (e.g. adverse event committees) and
 3 were associated with a particular language of sanction – such as ‘consequence
 4 management’.

5 *‘So the meetings that we usually have with the quality assurance and the*
 6 *maternity doctors and the sisters in charge [...] those [meetings] push us to be*
 7 *more accountable [...] it’s not like the perinatal meeting, [where] we don’t*
 8 *mention the doctors who did what, we just present the case. With those ones*
 9 *[quality assurance], it pushes you to be more accountable because the file is*
 10 *there, we all discuss what’s in the file. So, whoever was the attending doctor is*
 11 *more accountable, feels more accountable’* [Medical officer].

Excerpt 1 (From DSR meeting and discussion with respondents)*

Case 1: A pregnant patient who had never attended antenatal care presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case 2: A young primigravida who was followed up since the early stage of the pregnancy, but died because of a failure to treat her high blood pressure. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a ‘backstreet abortion’, a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

*The ‘three delays’ approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

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3 1 ***b. Following a holistic (three delays) approach to identifying and***
4 ***acting on modifiable factors***
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7 3 Review meetings were observed to follow the ‘three delays’ approach to identifying
8 factors (especially modifiable factors – Excerpt 1) associated with the occurrence of
9 4 death events and to take collective responsibility and proactively set up key actions to
10 5 prevent further events (Tables 3a and b). However, as depicted in Table 3b, some DSR
11 6 mechanisms do not follow the ‘three delays. This analysis was enabled by the presence
12 7 of stakeholders across levels - from primary health care facilities to district clinical
13 8 specialist teams and programme managers. Because of the managerial orientation of
14 9 MRU, the three delays mostly focused on the system factors for action, while
15 10 PPIP/CHIP meetings were mostly clinically oriented to providers and, to some extent,
16 11 patient’s factors. In both cases, any matters related to community engagement were
17 12 discussed with the board chairpersons to liaise with the community leadership.
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1 **Table 3a: Summary of the functioning of DSR Mechanism in practice**

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/Clinical Governance
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	No-naming, No-blaming;	No-naming, No-blaming,	No-naming, No-blaming, Auditing and Quality Assurance	No-naming, No-blaming, Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

1 **Table 3b: Functioning of DSR Mechanism compared to elements from the literature**

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/ Clinical Governance
Matching to the elements for the functioning of DSR mechanisms	I. Following a holistic approach to identifying modifiable causes	✓		✓	✓		
	II. Surveillance process (What and How?)						
	1. Continuous action (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based actions	✓		✓	✓	✓	✓
	3. Confidentiality (no naming), No-blaming, non-punitive tone of the process	✓	✓	✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
8. Involvement and commitment of the managers to act on the findings			✓	✓			

9. Community participation in review and response						
III. Actions (Pro-active & Reactive)						
▪ <i>Provider level</i>	✓	✓	✓	✓	✓	✓
▪ <i>System level</i>		✓	✓	✓		
▪ <i>Community level</i>				✓		

Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

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4 **1 c. Integrating training and support from higher-level management**

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6 2 One of the key moments of the review meetings was to identify the modifiable causes
7 3 of death and translating them into training and learning opportunities for frontline
8 4 managers and providers, as well as system improvement and community education.
9 5 From our observation, the presence of senior managers from the district office, district
10 6 hospital and other partners in the review meetings created a sense of trust and space
11 7 for empowering providers with knowledge and tools for better performance. Nurses
12 8 were able to present cases and engage in discussions with doctors. Whenever gaps
13 9 were identified, a collective decision on key actions to prevent future events was taken
14 10 with support from the management.

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16 11 *‘The meeting is to highlight things, training, educational issues and to bring*
17 12 *the people, the team together [DCST].*

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28 14 Another perceived core value of the DSR process was learning from the death events
29 15 to come up with quality improvement strategies to prevent similar events in the future.

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32 16 *‘After we discuss we all come up with ... if I can say, opinions of what actually*
33 17 *transpired or what could have happened for this baby to demise and what we*
34 18 *could have done differently to help the baby. Maybe for the other babies who*
35 19 *are coming in the near future who present the same way, what can we change*
36 20 *to be able to help them’ [Medical Officer].*

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41 21 The learning and training were extended to primary health care facilities; minutes of
42 22 the meetings and reminders of the guidelines were circulated; and regular visits to
43 23 facilities were conducted by the district team, reinforcing what was shared in the
44 24 meetings and allowing those who were absent from the meeting to be capacitated with
45 25 needed skills.

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50 26 By bringing together district and sub-district actors, DSR meetings acted as a lever for
51 27 more transparency between levels, in sharing frustrations and most especially the
52 28 sharing of good practices.

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55 29 *‘I can say that [DSR meeting] is strengthening the communication between*
56 30 *the sub-districts and the district and because of that I don’t see any problem*

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3 1 *that might hinder us to progress, because that is where we are sharing our*
4
5 2 *frustrations and sharing our best practices'* [District programme manager].
6

7 3 The role of the DCST in providing clinical guidance, mentorship and in-service
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9 4 training was observed as key in addressing the modifiable factors related to provider
10
11 5 gaps in clinical knowledge. DCST also played a role in enabling professional teamwork.
12
13 6 In one instance, where a doctor was trying to dismiss a nurse's opinion and impose his
14
15 7 view during discussions, the DCST intervened and emphasized that everyone's opinion
16
17 8 counted.
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20 10 ***d. Bringing together a multidisciplinary team of actors***
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22 11 As indicated, DSR meetings were intended to be driven by a multidisciplinary team of
23
24 12 actors including medical, nursing and other professionals, and across levels
25
26 13 (community, PHC and hospital).
27

28 14 This was achieved in one particular sub-district, where the organizational culture and
29
30 15 the leadership style of senior managers promoted collaboration between primary
31
32 16 health care facilities and hospital.
33

34 17 *'...we only receive the mother during the process of giving birth, and when the*
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36 18 *woman is now complicated with pre-eclampsia of which I think that this*
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38 19 *would have been prevented at the first place; so we are involving the primary*
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40 20 *health care level to come to the perinatal meetings so that they can hear*
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42 21 *exactly about the progress of the woman because, for us, as a hospital, we do*
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44 22 *not have the liberty of starting the woman on antenatal care, whereas the PHC*
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46 23 *are the ones who might have been able to pick up on some problems during*
47
48 24 *the antenatal period. So, for them being involved in these perinatal meetings*
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50 25 *is quite vital [...] not coming is also is a transgression on its own'* [Hospital
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52 26 CEO].
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54 27 Also important was the presence of key champions amongst middle managers and
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56 28 medical and nursing clinicians who created and nurtured a community of practice for
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58 29 sharing knowledge and learning.
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60 30 In one sub-district, participants expressed excitement at attending meetings, and the
31
32 venues were sometimes overflowing with participants.

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3 1 *[I]: So why do you think that meeting is taken seriously?*

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5 2 *[R]: It's the commitment of the medical managers, the commitment of the*
6 *managers and also the operational managers in maternity wards and the*
7 *doctors [Manager, DO].*

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10 5 At these meetings, each step taken in the care pathway (from PHC to the referral
11 hospital) was carefully scrutinized and improvement plans with timelines, monitoring
12 and a responsible person were developed:

13 8 *'Because when you put those quality [measures] you start from your ward,*
14 *...you put as well the responsible people because when you put some measures*
15 *you need to monitor, to come and see if it's working. And you need to give the*
16 *timeline... you monitor if it's going well, you sustain, if there is something you*
17 *need to review or if it's not going well' [Clinical manager].*

18 13 Where identified modifiable factors were related to the patient or community, hospital
19 board chairpersons were contacted to facilitate the dialogues within the community
20 and identify key actions together with the community leaders to address the identified
21 problem. However, the community was not usually implicated directly in DSR
22 processes.

23 18 It is important to note that this degree of functioning was not universal, and there was
24 variation across facilities and sub-districts in the levels of team involvement,
25 particularly of staff from PHC facilities and hospital actors. In instances where doctors
26 and nurses, managers and providers, or PHC facilities and hospitals were not working
27 as a solidified team, accountability mechanisms were flawed resulting in poor referral
28 systems, 'blame games' and the deferring of responsibility in case of death events.

29 ***e. DSR process institutionalized***

30 26 DSR processes in this district were anchored into routines in all facilities, with
31 standardised agendas and supportive supervision from the DCST and the MNCH
32 district programme coordinators. The DSR processes were perceived not only to
33 contribute to improving the quality of care and outcomes in facilities...

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2
3 1 *'I think the perinatal meetings are there and they are there forever. It's like an*
4 *auditing process, it's impossible to run maternity service without this*
5 2 *[perinatal meeting]' [DCST].*
6
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9 4 ...but also to facilitate the integration of people and services

10
11 5 *'When we started MRU [...] we were blaming each other, but the more we*
12 *discussed and saw how it fits, we feel now the problem is not within us, [but]*
13 6 *with our resources [...] Now we feel we are part of the institution; before*
14 7 *[MRU] we felt that EMS was not part of the hospital [EMS].*
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18 9 The perceived benefit and value of DSR processes, particularly the review and
19 response meetings, were repeatedly emphasized by the respondents as a motivation to
20 10 continue with and integrate them into the core activities of maternal and child in the
21 11 district.
22 12

23
24 13 However, institutionalising appropriate DSR processes across all levels of the District
25 14 was not an easy or completed task. DSR processes faced challenges at an individual
26 15 level (blaming, sanctioning), institutional or service level (shortage of skilled
27 16 personnel), or system levels (ineffective referral system). We also observed variations
28 17 in the level of support and involvement of local leadership and primary healthcare
29 18 facilities in DSR processes.
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36 37 19 **DISCUSSION**

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40 20 **While WHO guidelines outline the necessary steps in conducting death**
41 21 **surveillance and response,⁶ there is little holistic guidance on how this is**
42 22 **to be achieved in health systems. By collating elements from the literature**
43 23 **into a conceptual framework it was possible to explore the factors**
44 24 **enabling or constraining DSR functioning in one district. This framework**
45 25 **may be of value in other similar settings. It can be used by researchers or**
46 26 **health service managers to explore the functioning of the DSR system,**
47 27 **diagnose challenges and promote an inclusive organisational culture of**
48 28 **holistic scrutiny into the causes of death.**
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56 29 **Maternal, neonatal and child DSR is well established in the South African**
57 30 **district health system. Across the five forms of DSR directly related to**
58 31 **maternal and child deaths in the study district, we found a range of**
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3 1 **practices. The process in most instances followed the ‘no-name, no-blame’**
4 **approach as stipulated in the guiding documents. There was also holistic**
5 **approaches to identifying causes of death, efforts to integrate training and**
6 **support from higher levels, facilitation of multi-disciplinary teams, and**
7 **elements of institutionalisation of DSR in the district. The latter requires**
8 **a systemic supportive environment and organisational culture at all levels**
9 **that are linked to annual planning and budgeting to support the**
10 **implementation of actions.⁴⁵ In these regards, the study District had**
11 **clearly benefitted from the DSR system strengthening interventions**
12 **implemented over a number of years.**

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22 11 **In certain instances, however, the no-name no-blame approach was**
23 **contradicted by an organisational culture of blaming and punishment,**
24 **particularly following maternal deaths. Here the emphasis was on**
25 **identifying and sanctioning the persons responsible for death incidents**
26 **and on curbing the institutional ramifications of the incident, instead of**
27 **using it as an organisational learning event to prevent further incidents.⁴⁶**
28 **However, this level of scrutiny was not observed in instances of perinatal**
29 **deaths, showing the difference between maternal and perinatal DSR**
30 **processes. Such blame cultures in a healthcare organisation can be a**
31 **source of an increased number of medical errors.⁴⁷**

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40 21 **Death events, particularly maternal deaths, are considered to be a**
41 **barometer of a health system’s performance. In this regard, DSR**
42 **processes can be constrained by the fear of revealing malpractice and poor**
43 **health system performance, and DSR processes can become politicized**
44 **and maternal deaths under-reported by bureaucrats unwilling to disclose**
45 **system failures.⁴⁸ In our study setting, DSR processes were facilitated by**
46 **a high-level political commitment from the national government to**
47 **compulsory and transparent reporting and reviewing of all cases of**
48 **maternal or child deaths and implementation of measures to avoid future**
49 **deaths from identified modifiable factors.**

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58 31 **In this study, ‘no name, no blame’ approaches were observed to facilitate**
59 **the active participation of various actors, especially those directly linked**
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3 1 to death incidents and the possibility of embracing responsibility for the
4 incident.⁴⁹ Thus, DSR processes can create a sense of interpersonal trust
5 and trust in the health care organization, key for generating learning and
6 improvement. In contrast, as noted in Kenya, the lack of trust, the fear of
7 blame or individualised disciplinary action conditioned frontline
8 professionals to be reluctant in disclosing data on maternal death.¹⁷
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15 7 As proposed by Deis *et al.*⁵⁰ DSR meetings can be transformed into
16 instruments of system improvement using a systematic approach that
17 incorporates the 'three delays' model for action including the providers,
18 the health system and the communities in identifying and addressing
19 modifiable factors related to death events. This means that DSR processes
20 should not only seek to identify and correct frontline providers' and
21 managers' practices but also health system and structural factors at the
22 community level,²⁰ A holistic approach was made possible through the use
23 of standardised protocols and guidelines for DSR that integrated
24 reporting and feedback mechanisms.⁴⁶
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33 17 Another important element of successful DSR observed was the inclusion
34 and engagement of a multidisciplinary team of actors from various
35 professional backgrounds and managers. This created a space to address
36 not only health system-related problems⁵⁰ but also problems related to
37 social structural factors (e.g. social exclusion, poverty). Where these
38 functioned effectively, DSR platforms intersected individual and
39 collective competency and responsibility for MNCH, enabling a
40 community of practice that recognised the contribution and value of all
41 levels, from PHC facilities to district hospitals actors. Furthermore, the
42 inclusion of various stakeholders into DSR processes can also facilitate
43 social autopsies given that some maternal and child deaths occur outside
44 of health facilities. Similarly, a study in four Sub-Saharan African
45 countries reported interdisciplinary teamwork with good communication amongst
46 staff and active participation of staff as enablers of the DSR process.⁵¹ In contrast,
47 where actors from PHC facilities and hospitals, or when doctors and
48 nurses, managers and providers were disconnected, it resulted in a poor
49 referral process, blame games and deferring of responsibility or
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60 33 referral process, blame games and deferring of responsibility or

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3 1 avoidance of accountability. Melberg *et al.*⁴⁸ referred to a ‘defensive
4 2 referral’ as a result of fear of being blamed for maternal death incident.

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7 3 When encouraged by leadership support, DSR processes can become a
8 4 platform for common learning, knowledge sharing and quality
9 5 improvement.⁴⁵ Effective DSR system, according to Kerber *et al.* ⁵² needs
10 6 engaged leadership and use of guidelines and protocols that ensure the
11 7 complete cycle of the audit system.⁵³

17 8 18 19 20 9 Limitations

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23 10 The statements of lived experiences of DSR processes and resulting
24 11 accountability mechanisms by the respondents could have been what they
25 12 thought to be the right answer reflecting a social desirability bias in their
26 13 responses. Being observed, respondents could have behaved differently
27 14 (‘Hawthorne effect’). We did indeed observe instances of where the
28 15 absence of the national facilitator led to a slackening of meeting processes.
29 16 Furthermore, respondents’ self-reports and accounts could have led to an
30 17 overstatement of phenomena. We sought to minimise these biases by
31 18 prolonged immersion in the field and supplementing formal interviews
32 19 with observations and informal conversations.^{30,54}

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41 20 This study was conducted in one district at a particular moment in time.
42 21 While the forms of DSR are likely to be repeated elsewhere, the study
43 22 findings related to the functioning of DSR are not generalisable given the
44 23 management investments made. However, the findings have analytical
45 24 relevance in illuminating DSR in best-case scenarios and the triangulated
46 25 nature of the data provide confidence in the data collected.

51 52 53 26 CONCLUSION

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56 27 The success of DSR processes resides in the intersection of many contextual factors
57 28 such as the commitment of a multidisciplinary team of actors and support from district
58 29 managers, the integration of primary healthcare and district hospitals, and the
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1 establishment of a space for mutual trust and learning anchored within the
2 organisational culture of health facilities. A holistic approach is essential to address
3 the modifiable factors identified, translate them into long-term organisational
4 learning opportunities, and set up evidence-based, 'real-time' responses.

5
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26 **ORCID iDs:**

27 Fidele Kanyimbu Mukinda: <https://orcid.org/0000-0002-0764-6213>

28 Sara Van Belle: <https://orcid.org/0000-0003-2074-0359>

29 Asha George: <https://orcid.org/0000-0002-5968-1424>

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3 1 Helen Schneider: <https://orcid.org/0000-0002-0418-1828>
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8 3 **REFERENCES**
9

- 10 4 1. United Nations Commission on information accountability for Women's
11 Children's and Health. *Keeping promises, measuring results*. New York:
12 United Nations;2013.
13
14 6
15 7 2. De Kok B, Imamura M, Kanguru L, Owolabi O, Okonofua F, Hussein J.
16 Achieving accountability through maternal death reviews in Nigeria: a process
17 analysis. *Health Policy and Planning*. 2017;32:1083–1091.
18
19 9
20 10 3. Mills S. *Maternal Death Audit as a Tool Reducing Maternal Mortality*.
21 Washington DC: World Bank;2011. 77799.
22
23 11
24 12 4. Smith H, Ameh C, Roos N, Mathai M, Broek NVD. Implementing maternal
25 death surveillance and response: a review of lessons from country case studies.
26 *BMC Pregnancy Childbirth*. 2017;17(233):1-11.
27
28 14
29 15 5. World Health Organization. *Beyond the numbers: Reviewing maternal deaths
30 and complications to make pregnancy safer*. Geneva: WHO;2004.
31
32 16
33 17 6. World Health Organization (WHO). Maternal Death Surveillance and
34 Response. In. Geneva, Switzerland: World Health Organization 2013:1-118.
35
36 19 7. Bandali S, Thomas C, Hukin E, et al. Maternal Death Surveillance and Response
37 Systems in driving accountability and influencing change. *Int J Gynaecol
38 Obstet*. 2016;135(3):365-371.
39
40 21
41 22 8. Kongnyuy EJ, Mlava G, van den Broek N. Facility-based maternal death review
42 in three districts in the central region of Malawi: an analysis of causes and
43 characteristics of maternal deaths. *Women's Health Issues*. 2009;19(1):14-20.
44
45 24
46 25 9. Ochejele S, Musa J, Abdullahi MJ, Odusolu P, Attah DI, Aloba G. Maternal
47 death surveillance and response system in Northern Nigeria. *Tropical Journal
48 of Obstetrics and Gynaecology*. 2019;36(2).
49
50 27
51 28 10. Pearson L, deBernis L, Shoo R. Maternal death review in Africa. *Int J Gynaecol
52 Obstet*. 2009;106(1):89-94.
53
54 30
55 11. Ayele B, Gebretnsae H, Hadgu T, et al. Maternal and perinatal death
56 surveillance and response in Ethiopia: Achievements, challenges and prospects.
57 *PLoS One*. 2019;14(10):1-24.
58
59
60

- 1
2
3 12. Bandali S, Thomas C, Wamalwa P, et al. Strengthening the "P" in Maternal and
4 Perinatal Death Surveillance and Response in Bungoma county, Kenya:
5 implications for scale-up. *BMC Health Serv Res.* 2019;19(1):611.
6
- 7
8 13. Halim A, Dewez JE, Biswas A, Rahman F, White S, van den Broek N. When,
9 Where, and Why Are Babies Dying? : Neonatal Death Surveillance and Review
10 in Bangladesh. *PLoS ONE.* 2016;11(8).
11
- 12
13 14. Krug A, Pattinson R. *Saving Children 2004: A survey of child healthcare in*
14 *South Africa.* South Africa: National Department of Health;2004.
15
- 16
17 15. Patrick ME, Stephen CR. Child PIP: Making mortality meaningful by using a
18 structured mortality review process to improve the quality of care that children
19 receive in the South African health system. *SAJCH.* 2008;2(2):38-42.
20
- 21
22 16. South Africa Every Death Counts Writing Group. Every death counts: use of
23 mortality audit data for decision making to save the lives of mothers, babies,
24 and children in South Africa. *The Lancet.* 2008;371(9620):1294-1304.
25
- 26
27 17. D'Ambruso L, van der Merwe M, Wariri O, et al. Rethinking collaboration:
28 developing a learning platform to address under-five mortality in Mpumalanga
29 province, South Africa. *Health Policy and Planning.* 2019;34(6):418-429.
30
- 31
32 18. Mahato PK, Waithaka E, van Teijlingen E, Pant PR, Biswas A. Social autopsy: a
33 potential health-promotion tool for preventing maternal mortality in low-
34 income countries. *WHO South-East Asia Journal of Public Health.* 2018;7(1).
35
- 36
37 19. Biswas A, Halim MA, Dalal K, Rahman F. Exploration of social factors
38 associated to maternal deaths due to haemorrhage and convulsions : Analysis
39 of 28 social autopsies in rural Bangladesh. *BMC Health Services Research.*
40
41 2016;16(1).
42
- 43
44 20. Smith H, Ameh C, Godia P, et al. Implementing Maternal Death Surveillance
45 and Response in Kenya: Incremental Progress and Lessons Learned. *Global*
46 *Health: Science and Practice.* 2017;5(3):345-354.
47
- 48
49 21. De Brouwere V, Delvaux T, Leke RJ. Achievements and lessons learnt from
50 facility-based maternal death reviews in Cameroon. *BJOG.* 2014;121 71-74.
51
- 52
53 22. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci*
54 *Med.* 1994;38(8):1091-1110.
55
- 56
57 23. Barnes-Josiah D. The "Three delays" as a framework for examining maternal
58 mortality in Haiti. *Soc Sci Med.* 1998;46(8):981-993.
59
60

- 1
2
3 1 24. Pattinson R, Kerber K, Waiswa P, et al. Perinatal mortality audit: counting,
4 accountability, and overcoming challenges in scaling up in low- and middle-
5 2 income countries. *Int J Gynaecol Obstet.* 2009;107:S113- S122.
6
7 3
8 4 25. Rhoda N, Velaphi S, Gebhardt G, Kauchali S, Barron P. Reducing neonatal
9 deaths in South Africa: Progress and challenges. *S Afr Med J.* 2011;108:S9-S16.
10 5
11 6 26. Mayne J. Addressing attribution through contribution analysis. Using
12 performance measures sensibly. *The Canadian Journal of Program*
13 *Evaluation.* 2001;16(1):1-24.
14 7
15 8
16 9 27. National Department of Health. Second Interim Report on Confidential
17 Enquiries into Maternal Deaths in South Africa: Maternal Deaths for 1999. In.
18 Pretoria, South Africa: NDOH; 1999.
19 10
20 11
21 12 28. National Department of Health. National Perinatal Morbidity and Mortality
22 Committee Report 2008-2010 (NaPeMMCo). In. South Africa: NDOH; 2010.
23 13
24 14 29. National Department of Health. 1st Triennial Report of the Committee on
25 Morbidity and Mortality in Children Under 5 Years (CoMMiC). In. Pretoria,
26 South Africa: NDOH; 2011.
27 15
28 16
29 17 30. Mukinda FK, Van Belle S, George A, Schneider H. The crowded space of local
30 accountability for maternal, newborn and child health: A case study of the
31 South African health system. *Health Policy and Planning.* 2020;35(3):279–
32 290.
33 18
34 19 31. Shung-King M, Lake L, Sanders D, Hendricks M. *South African ChildGauge*
35 *2019: Child and adolescent health.* Cape Town: Children’s Institute, University
36 of Cape Town;2019.
37 21
38 22 32. Allanson ER, Pattinson RC. Quality-of-care audits and perinatal mortality in
39 South Africa. *Bull World Health Organ.* 2015;93(6):424-428.
40 23
41 24 33. World Health Organization. *Improving the quality of Paediatric care:*
42 *Operational guide for facility-based audit and review of paediatric mortality.*
43 Geneva: World Health Organization;2018.
44 25
45 26 34. Schneider H, George A, Mukinda F, Tabana H. District Governance and
46 Improved Maternal, Neonatal and Child Health in South Africa: Pathways of
47 Change. *Health Systems & Reform.* 2020;6(1):e1669943-1669941-e1669943-
48 1669912.
49 28
50 29
51 30
52 31
53 32
54
55
56
57
58
59
60

- 1
2
3 1 35. Bac M, Pattinson RC, Bergh AM. Changing priorities in maternal and perinatal
4 health in Gert Sibande District, South Africa. *South African Medical Journal*.
5 2019;109(11):838-840.
6
7 3 36. Schneider H, McKenzie A, Tabana H, Mukinda F, George A. *Evaluation of*
8 *health system strengthening initiatives for improving the quality and*
9 *outcomes of maternal, neonatal and child health care in four South African*
10 *districts*. South Africa: School of Public Health, SAMRC Health Services to
11 Systems Research Unit, University of the Western Cape;2017.
12
13 5 37. Green J, Thorogood N. *Qualitative Methods for Health Research*. 4th ed.
14 London: Sages Publications; 2018.
15
16 9 38. Azungah T. Qualitative research: deductive and inductive approaches to data
17 analysis. *Qualitative Research Journal*. 2018;18(4):383-400.
18
19 11 39. Mukinda FK, Van Belle S, Schneider H. Perceptions and experiences of
20 frontline health managers and providers on accountability in a South African
21 health district. *International Journal for Equity in Health*. 2020;19(1):1-11.
22
23 12 40. Li J. Ethical Challenges in Participant Observation. *The Qualitative Report*.
24 2008 13(1):100-115.
25
26 13 41. Cupido J. *Reducing Maternal, Neonatal and Under 5 Child Deaths by linking*
27 *the Ideal Clinic and the MRU model*. Gert Sibande: DOH;2018.
28
29 14 42. Moodley J, Pattinson RC, Fawcus S, et al. The Confidential Enquiry into
30 Maternal Deaths in South Africa: a case study. *BJOG*. 2014;121 (Suppl 4):53-
31 60.
32
33 15 43. National Department of Health. *Saving Mothers 2008-2010: Fifth*
34 *Comprehensive Report on Confidential Enquiries into Maternal Deaths in*
35 *South Africa*. Pretoria2011.
36
37 16 44. National Department of Health. *Saving Mothers 2011-2013: Sixth report on*
38 *confidential enquiries into maternal deaths in South Africa*. Pretoria2014.
39
40 17 45. plementationLewis G. The cultural environment behind successful maternal
41 death and morbidity reviews. *BJOG: an international journal of obstetrics and*
42 *gynaecology*. 2014;121:24-31.
43
44 18 46. Hussein J, Okonofua F. Time for Action: Audit, Accountability and Confidential
45 Enquiries into Maternal Deaths in Nigeria. *Afr J Reprod Health*. 2012;16(1):9-
46 14.
47
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 1 47. Khatri N, Brown GD, Hicks LL. From a blame culture to a just culture in health
4 care. *Health Care Management Review*. 2009;34(4):312-322.
5 2
6 3 48. Melberg A, Mirkuzie AH, Sisay TA, Sisay MM, Moland KM. 'Maternal deaths
7 should simply be 0': politicization of maternal death reporting and review
8 processes in Ethiopia. *Health Policy and Planning*. 2019;34(7):492-498.
9 4
10 5
11 6 49. Kuipers S, Hart P. Accounting for Crises. In: Bovens M, Goodin RE, Schillemans
12 T, eds. *The Oxford Handbook of Public Accountability*. USA: Oxford University
13 Press; 2014:589-602.
14 7
15 8
16 9 50. Deis JN, Smith KM, Warren MD, et al. Transforming the Morbidity and
17 Mortality Conference into an Instrument for Systemwide Improvement. In:
18 Henriksen K, Battles JB, Keyes MA, Grady ML, eds. *Advances in Patient*
19 *Safety: New Directions and Alternative Approaches*. Vol 2. Rockville (MD):
20 Agency for Healthcare Research and Quality; 2008.
21 11
22 12
23 13
24 14 51. Maternal and Child Survival Program. A Regional Assessment of Facility-Level
25 Maternal and Perinatal Death Surveillance and Response Systems in Four Sub-
26 Saharan African Countries. USAID; 2018. Available at:
27 [https://www.mcsprogram.org/resource/regional-assessment-facility-level-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
28 [maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
29 [african-countries/](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/) (Accessed: 16 August 2020).
30 17
31 18
32 19
33 20 52. Kerber KJ, Mathai M, Lewis G, et al. Counting every stillbirth and neonatal
34 death through mortality audit to improve quality of care for every pregnant
35 woman and her baby. *BMC Pregnancy Childbirth*. 2015;15 Suppl 2:S9.
36 21
37 22
38 23 53. Bergh A-M, Pattinson R, Belizán M, et al. Completing the audit cycle for quality
39 care in perinatal, newborn and child health. In. University of Pretoria: MRC
40 Research Unit for Maternal and Infant Health Care Strategies; 2010:1-45.
41 24
42 25
43 26 54. Baxter K, Courage C, Caine K. Chapter 13 - Field Studies. In: Baxter K, Courage
44 C, Caine K, eds. *Understanding your Users (Second Edition)*. Boston: Morgan
45 Kaufmann; 2015:378-428.
46 27
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48 29
49
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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	<ul style="list-style-type: none"> ▪ Can you tell me about your current position/role in the (district) health system? <p><i>Probes: For how long have you been in that position?</i></p>
Accountability definition	<ul style="list-style-type: none"> ▪ Could you describe to me what accountability means to you? <p><i>Probes: What does it make you think of accountability? What does it mean 'being accountable to'?</i></p> <p><i>How would you relate your definition of accountability to MNCH?</i></p>
Challenges	<p>Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district?</p> <p><i>Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges</i></p>
<ul style="list-style-type: none"> - Line/forms, - Guidelines - Enablers - Barriers - Complaints 	<ul style="list-style-type: none"> ▪ In your working area, to whom do you think you are accountable and why? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Tell me about the reporting structure with regard to your role in the health systems?</i> - <i>To/from whom do you report/receive order/provide information/provide technical support/training/supervision</i> <ul style="list-style-type: none"> ▪ Are there any accountability guidelines/framework from the DOH that you are using? [<i>If yes, please describe</i>] ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	<ul style="list-style-type: none"> ▪ What's your experience/perception regarding teamwork and accountability for MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)</i> - <i>How will you characterise the attitude and commitment of teamwork regarding MNCH</i> - <i>What's your beliefs regarding MNCH and the value of accountability</i>

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	<ul style="list-style-type: none"> ▪ How do you perceive the performance of the team with regard to MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Do you share the same goals? How do you set up these goals [decision making process]</i> - <i>Can you comment on the level of participation and collaboration work environment?</i> - <i>How do you monitor group accountability for MNCH</i>
Adverse events	<ul style="list-style-type: none"> ▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Please elaborate</i> - <i>How is the climate within your team when it comes to adverse event?</i> <ul style="list-style-type: none"> ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
Improvement	<ul style="list-style-type: none"> ▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Does the investigation result in sanctions and/or learning? [Please elaborate]</i> - <i>If learning, how often does the training happen? By Whom?</i> - <i>How do you identify areas for improvement [beside when an adverse event occurs]?</i>
B. DEATH REVIEW MEETINGS	
Actors/Who?	<ul style="list-style-type: none"> ▪ Can you please describe who attends the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?</i>
Meeting	<ul style="list-style-type: none"> ▪ How would you describe the structure of the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who chairs, the agenda, how long, frequency, participation/engagement?</i> - <i>What are the drivers/facilitators/barriers to this [name] meeting and related processes?</i>

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	<ul style="list-style-type: none"> - <i>What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?</i>
Decision process	<ul style="list-style-type: none"> ▪ How would you describe the decision process during the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?</i>
Dealing with adverse events (deaths)	<ul style="list-style-type: none"> ▪ How do you deal with adverse events e.g. maternal or child death? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?</i> - <i>Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?</i> - <i>How do you see the problem of death in terms of accountability?</i> - <i>Do you have/know any policy/guideline for dealing with death event?</i>
	<ul style="list-style-type: none"> ▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? <p><i>Probes:</i></p>
	<ul style="list-style-type: none"> ▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Referral processes</i> - <i>Role of Provincial and National department of Health</i>
Actions/Outcomes	<ul style="list-style-type: none"> ▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>How sustainable are these actions? [Please elaborate]</i>
Conclusion	<ul style="list-style-type: none"> - Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

Title and abstract

<p>Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended</p>	Pg 1, L1-3
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	Pg 2, L1-28

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	Pg 4, L1 - Pg6, L2
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	Pg 6, L3-13

Methods

<p>Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**</p>	Pg 8, L1-pg9 L5
<p>Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	Pg12, L4-15
<p>Context - Setting/site and salient contextual factors; rationale**</p>	Pg 9, L6-pg10 L11
<p>Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	Pg10, L12-pg11, L7
<p>Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	Pg12, L17-22; Pg31, L11-15
<p>Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**</p>	Pg10, L14-pg11 L21

1 2 3 4 5	Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
6 7 8	Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
9 10 11 12	Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
13 14 15 16	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
17 18 19 20	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

23 24 25 26	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

32 33 34 35 36 37	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
38 39	Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

42 43 44	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
45 46	Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
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The practice of Death Surveillance and Response for Maternal, Newborn and Child Health: A framework and application to a South African Health District

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3 1 **The practice of Death Surveillance and Response for Maternal, Newborn**
4 2 **and Child Health: A framework and application to a South African Health**
5 3 **District**
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11 5 Fidele Kanyimbu Mukinda^{1*}, Asha George^{1,2}, Sara Van Belle³, Helen Schneider^{1,2}
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16 7 ¹School of Public Health, University of the Western Cape, Cape Town, South Africa.

17 8 ²South African Medical Research Council (MRC)/Health Services and Systems Unit,
18 9 Cape Town, South Africa

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21 10 ³Institute of Tropical Medicine, Belgium.

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23
24 11 *Corresponding author. School of Public Health, University of the Western Cape,
25 12 Robert Sobukwe Road, Private Bag X17 Bellville 7535, Cape Town, South Africa

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28 13 Email: fmukinda@uwc.ac.za
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32 15 **Keywords:** Accountability; Death Surveillance and Response; Maternal, newborn
33 16 and child health; Framework; District health system; Qualitative study
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Abstract

Objective: To assess the functioning of maternal, perinatal, neonatal and child death surveillance and response (DSR) mechanisms at a health district level.

Design: A framework of elements covering analysis of causes of death, and processes of review and response was developed and applied to the smallest unit of coordination (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive qualitative case study, based on observations of DSR practices and interviews.

Setting: Rural South African health district (sub-districts and district office).

Participants: A purposive sample of 45 frontline health managers and providers involved with maternal, perinatal, neonatal and child DSR. The DSR mechanisms reviewed included a system of real-time death reporting (24 hours) and review (48 hours), a nationally mandated Confidential Enquiry into Maternal Death and regular facility and sub-district mortality audit and response processes.

Primary outcome measures: Functioning of maternal, perinatal, neonatal and child death surveillance and response.

Results: While DSR mechanisms were integrated into the organizational routines of the district, their functioning varied across sub-districts and between forms of DSR. Some forms of DSR, notably those involving maternal deaths, with external reporting and accounting, were more likely to trigger reactive fault-finding and sanctioning than other forms, which were more proactive in supporting evidence-based actions at provider and system level, and to a limited extent in communities, in order to prevent future deaths.

Conclusions: This study provides an empirical example of the everyday practice of DSR mechanisms at a district level. It assesses such practice based on a framework of elements and enabling organizational processes that may be of value in similar settings elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices and the findings may have limited generalisability;**
- **However, the framework and appraisal methods may be of value in similar settings elsewhere.**

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INTRODUCTION

3 The United Nations (UN) put accountability for maternal, newborn and child health
4 (MNCH) on the global agenda, placing three interrelated accountability processes at
5 the centre of its 'Global Accountability Framework', namely, monitoring, reviewing
6 and response.¹ Death surveillance and response (DSR) has become one of the means
7 to operationalise these accountability processes in many health systems, with the view
8 to improving the quality of maternal, neonatal and child health care, and eliminate
9 preventable deaths.²⁻⁵

10 Death Surveillance and Response entails a continuous cycle of identification,
11 notification and review of deaths followed by action to improve the quality of care and
12 prevent future deaths.⁶ Its essence is, therefore, the capacity to record, review and
13 respond to each death using affordable, effective and evidence-based actions linked to
14 the findings.⁵

15 There is now a well-established tradition of DSR in Low- and Middle-Income
16 Countries (LMICs), focusing primarily on maternal deaths.^{2,4,6-10} In facilities and
17 contexts where maternal deaths are relatively rare, maternal 'near-miss' cases may
18 also be audited.⁵ More recently, LMICs have begun including the review of perinatal
19 and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death
20 Surveillance and Response (MPDSR);¹¹⁻¹³ and in some settings, DSR extends to under-
21 five deaths.¹⁴⁻¹⁶

22 In addition to facility-based processes, community-based DSR is recommended where
23 a high proportion of deliveries (and deaths) occur outside of health facilities, and
24 where community participation is crucial to implementing identified key actions.^{5,11} In
25 this regard, verbal and social autopsies have been developed as a participatory tool for
26 community-based DSR, exploring clinical and social causes of death from a
27 community perspective.¹⁷⁻¹⁹

28 DSR processes are typically defined nationally but implemented at facility level with
29 support from and coordination by local or district teams.^{20,21} Although there are no
30 globally standardised approaches,⁴ the literature points to several elements

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3 1 underpinning effective DSR processes, encompassing analysis of modifiable factors
4 involved, the tone of the review process and the range of participants involved.
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8 3 The analysis of modifiable factors underlying maternal and child deaths has been
9 codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in**
10 **deciding to seek care early; (ii) the delay in reaching a health facility; (iii)**
11 **the delay in providing or receiving adequate care at the facility.**^{6,22-25}
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16 7 In formulating a response, the literature on DSR recommends moving away from
17 identifying and sanctioning individuals,²⁶ and towards the setting up of non-punitive
18 'no-blaming' approaches that foster collective and individual participation.^{2,20} Such
19 approaches are less likely to result in ignoring the incident or the temptation to defer
20 responsibility onto others.^{2,3,5}
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25 12 DSR processes ideally involve a multidisciplinary team with the representation of a
26 range of clinicians (nursing, medical and other professionals), managers and support
27 staff (such as information officers). This brings together the array of provider
28 knowledge and skills, together with commitments from managers to enhance
29 ownership of the findings and turn recommendations into concrete actions.^{2,5,6}
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35 17 South Africa has a long-standing history, going back to the mid-1990s, of maternal,
36 newborn and child DSR that has become integrated into the routine functioning of
37 frontline health services. DSR processes are linked to three ministerial committees
38 established in 1998, namely the National Committee for Confidential Enquiry into
39 Maternal Deaths (NCCEMD),²⁷ the National Perinatal and Neonatal Morbidity and
40 Mortality Committee (NaPeMMCo);²⁸ and the Committee on Morbidity and Mortality
41 in Children under 5 years (CoMMiC).²⁹ These committees function at national level
42 with mandates exercised at local (health district) level through three of the DSR
43 processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the
44 Perinatal Problem Identification Programmes (PPIP), and the Child under-five
45 Problem Identification Programmes (CHIP). These mechanisms are situated in a
46 dense and complex accountability ecosystem at the frontline of health provision.³⁰
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57 29 There have been significant reductions in maternal, neonatal and child mortality in
58 South Africa over the last decade, attributed principally to the prevention and
59 treatment of HIV.³¹ However, despite a long history and institutionalised practice,
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3 1 there is little understanding of the role of DSR implementation and functioning in this
4 mortality reduction. Clear guidance on how best to assess this functioning is also
5 2 lacking; one study showed no association between consistent auditing and perinatal
6 3 mortality rates.³²
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11 5 Given the lack of standardisation and consensus on elements for assessing the
12 6 functioning of DSR, this paper proposes an assessment framework using criteria
13 7 drawn from the literature and then applies the framework to evaluate existing
14 8 maternal, peri/neonatal and child DSR mechanisms in one South African district.

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19 9 This paper thus seeks to answer the following question: Based on a comprehensive
20 10 assessment framework, how functional are the district's DSR mechanisms?
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25 26 12 **METHODOLOGY**

27 28 29 13 **Definitions**

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32 14 **In this paper, the term Death Surveillance and Response (DSR) refers to**
33 15 **all death reporting and review processes related to maternal and child**
34 16 **health, even if they do not have all the ideal components of DSR. They**
35 17 **include phenomena commonly reported in the literature such as Maternal**
36 18 **Death Review (MDR) or Audit, Maternal Death Surveillance and Response**
37 19 **(MDSR), Maternal and Perinatal Death Surveillance and Response**
38 20 **(MPDSR), or surveillance and review of child deaths.**

39 40 41 21 **Conceptual framework**

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48 22 A framework to assess the functioning of DSR mechanisms was developed using
49 23 criteria drawn from the literature and supplemented by field observations and
50 24 interviews with frontline providers and managers.

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54 25 **We conducted a search of the literature using the above terms and**
55 26 **consulted with experts in the field to identify the elements of well-**
56 27 **functioning DSR. On the basis of these, a conceptual framework was**
57 28 **developed. We combined the WHO Continuous Action Framework to**

1 eliminate preventable deaths,⁶ the ‘Three Delays’ framework,²² and other
 2 elements identified in the literature^{2,4,6,20} to assess the DSR processes.
 3 These are outlined in Box 1 and Table 1. The framework distinguishes
 4 between (i) the surveillance process (what, how, who); (ii) the
 5 identification of modifiable causes of death and investigation as per the
 6 three delays model; and (iii) the types of responses (actions) triggered,
 7 whether proactive or reactive. These elements provide a holistic and
 8 comprehensive assessment of the various steps and processes involved in
 9 DSR. Given that mortality reductions require coordination across levels,³³
 10 the framework adopts an area-based approach, using the most
 11 decentralised structures of in health systems coordination, notably the
 12 sub-district, as its unit of analysis.

**Box 1: WHO’s Four components of continuous action in Maternal Death
 Surveillance and Response (MDSR) system**

<i>Identify and notify deaths</i>	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
<i>Review maternal deaths</i>	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
<i>Analyse and make recommendations</i>	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
<i>Respond and monitor response</i>	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

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Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Surveillance process (What and How?)**			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous surveillance (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Recommending cost-effective and evidence-based practices		
	3. ‘No naming, no blaming’ (confidentiality, non-punitive tone of the process)		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actor participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
9. Community participation in review and response (social and verbal autopsy)			
II. Following a holistic approach to identifying modifiable causes			
‘Three Delays’*	1 st Delay in Deciding and seeking Care	2 nd Delay in identifying and reaching a Health Facility	3 rd Delay in receiving adequate appropriate care
III. Actions (Pro-active & Reactive)			
▪ Provider level	Capacity Building, In-service Training		
▪ System level	Health System Improvement, Provision of resources		
▪ Community level	Community Education		

References: *23; **2,4-6; ***6,34

1 **Study design**

2 We conducted a descriptive, exploratory qualitative case study of the forms and
3 functioning of maternal, neonatal and child DSR processes applying the framework
4 (Table 1).

5 ***Study Setting***

6 The study was conducted in one of the three health districts in Mpumalanga Province
7 situated in the north-east of South Africa. The District has a population of about 1.1
8 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It
9 contains one regional hospital, eight district hospitals, and 76 primary healthcare
10 facilities, distributed among seven sub-districts.

11 The study district was targeted for health systems strengthening support because of
12 high maternal and child mortality.³⁵ Intensified efforts were specifically made to
13 strengthen DSR in the district over several years, building on long-standing processes
14 (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and
15 Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these,
16 DSR processes were accompanied by improved district clinical support with the
17 introduction of district clinical specialist teams (DCST) and a new mechanism of
18 coordination, referred to as the Monitoring and Response Unit (MRU). These
19 initiatives were widely regarded as having impacted positively on maternal and child
20 mortality in the District.³⁶ In these respects, therefore, the District could be regarded
21 as having relatively well-functioning DSR at the time of the research. Although not
22 nationally representative, it was nevertheless well suited for the qualitative exploration
23 of functioning using a DSR assessment framework.

24 **The framework was applied to maternal, peri/neonatal and child DSR**
25 **mechanisms observed in the district, summarised in Table 2 and**
26 **described in the next section. Five mechanisms were specific to MNCH**
27 **(24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). An additional**
28 **two, which also dealt with maternal, neonatal and child deaths, the**
29 **Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, were**
30 **general facility-based morbidity and mortality and clinical**
31 **audit/governance mechanisms.**

Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child <5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

1 **Maternal, neonatal and child DSR mechanisms in the study setting**

2 **This section briefly describes DSR mechanisms that are specific to**
3 **maternal, neonatal and child health.**

4 ***a. Compulsory 24-hour reporting, 48-hour review***

5 Any maternal, perinatal, neonatal or child death is mandatorily recorded at the facility
6 where the death occurred and reported within 24 hours internally to the district office,
7 and externally to the Department of Home Affairs for issuing of a death certificate.
8 This is the standard operating procedure applied in all facilities in South Africa. In the
9 study district, following the introduction of the MRU and the DCST, a district-level
10 system was also established to review all maternal and under-5 child deaths within 48
11 hours, independent of other processes. This process of 24-hour recording and
12 reporting and 48-hour case review was referred to as ‘real-time death reporting’;³⁷ and
13 its purpose was to enable actions to be taken as quickly as possible to address
14 modifiable factors, such as correcting a skills or staffing gap, provision of resources, or
15 community education.

16 ***b. Confidential Enquiry into Maternal Death (CEMD)***

17 The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa
18 in 1997 and involves a standardized process of reporting and auditing. Maternal
19 deaths, in addition to being reported to the district and Home Affairs, are also reported
20 to the provincial MNCH coordinator within 24 hours, who allocates a unique number.
21 A copy of the patient folder and a completed Maternal Death Notification Form
22 (MDNF) are included in the report and submitted to a team of provincial assessors
23 (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the
24 facility to enquire about the causes of death, as well as any avoidable or modifiable
25 factors. The resulting annual and triennial reports and recommendations (without
26 details on individual cases) are disseminated to Provincial and District structures and
27 academic institutions for collation with general recommendations for action, such as
28 training on the Essential Steps in the Management of Obstetric Emergencies
29 (ESMOE).³⁸⁻⁴⁰

30 ***c. Ongoing Review and Response Structures***

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3 1 As indicated, several routine meeting structures are established for auditing and
4 2 responding to maternal, perinatal/neonatal and child deaths (Table 2).

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8 3 ▪ *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

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10 4 The PPIP/CHIP review meetings take place monthly at facility level. The meeting
11 5 consists of systematically auditing the patient file related to death, comparing the
12 6 management of the case against standard treatment protocols and guidelines.
13 7 Through discussion, participants identify gaps in clinical management and modifiable
14 8 factors related to the caregiver, provider or system, and set up improvement plans,
15 9 including capacity-building needs for the provider team. Data are entered into a
16 10 specifically designed software package. The meetings observed were chaired by the
17 11 clinical manager or the medical officer in charge of obstetrics and gynaecology, or by
18 12 a nurse operational manager of the maternity ward.

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26 13 ▪ *Monitoring and Response Unit (MRU)*

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28 14 The MRU brings together a team of actors, including managers (PHC, hospital),
29 15 clinicians, information officers at sub-district and district levels, associated with the
30 16 system of local, real-time death reporting referred to above. The aim is to enhance the
31 17 governance of MNCH and to improve area-based coordination between the various
32 18 actors and levels of care. MRU meetings are intended to be convened monthly at sub-
33 19 district and bi-monthly at district level. At district level, the meetings observed were
34 20 chaired by the district manager or a representative, usually, the MNCH coordinator or
35 21 the district quality assurance manager, while at sub-district level, the MRU meeting
36 22 was chaired by the CEO of the district hospital or a representative.

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45 23 **Study sample and Data collection**

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47 24 The sub-districts were purposefully selected in a prior study as representing the range
48 25 of buy-in to one particular DSR strategy (MRU);³³ the implementation of DSR
49 26 mechanisms in these sub-districts was also perceived by district managers as
50 27 representative of what was happening in the district as a whole. We combined semi-
51 28 structured interviews, non-participant observation of meetings with a desk review of
52 29 key documents as data sources for this study.

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59 30 ***Semi-structured interviews***

1 We conducted 45 semi-structured, individual interviews with purposefully selected
2 respondents among those involved with maternal, neonatal and child DSR from two
3 of the seven sub-districts and the district office. Respondents were either members of
4 the enquiry or audit team or participants in one of the death surveillance and response
5 meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers
6 (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital
7 hospital chief executive officer (CEOs) [N=2], hospital nursing managers (N=4),
8 facility and hospital operational managers (professional nurses heading a ward in a
9 hospital or managing a primary healthcare facility [N=5]), medical officers (N=7),
10 professional nurses (N=3), allied health professionals (N=5), emergency service
11 manager (N=1), and facility information managers (N=2). A semi-structured interview
12 guide was developed and pre-tested (Supplementary Appendix File 1).

13 Interviews were conducted by the first author as part of a wider study. To ensure
14 privacy and confidentiality, interviews were held in the respondent's office or in the
15 boardroom outside the meeting time. With respondents' signed consent and
16 permission, the interviews were audiotaped and transcribed verbatim. The interviewer
17 took notes during and after the interview and summarised the interview on a pre-
18 designed coversheet.³⁰ All audio files and transcripts were reviewed by the authors to
19 ensure quality.

20 ***Non-participant observation***

21 From May 2018 to September 2019, for a total 59 days distributed over one to three
22 weeks in each of the two sub-districts, we conducted non-participant field
23 observations by engaging in various activities and meetings related to maternal,
24 peri/neonatal and child DSR in which health system actors were actively engaged. A
25 structured observation sheet was designed for this purpose.³⁰ We observed the
26 following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit,
27 clinical governance and patient safety committee. During a meeting, apart from the
28 general observation schedule, we specifically observed the structure of the meeting,
29 standard agenda, actors involved, presentation and discussion of cases, decision
30 process, and related actions (capacity building, provision of resources or community
31 engagement). We also reviewed the agendas and minutes of these meetings.

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2
3 1 During this fieldwork, three maternal deaths occurred in the district and we were able
4
5 2 to observe one formal district meeting and engage in informal discussions with district
6
7 3 actors on the unfolding maternal death enquiry process linked to these three deaths.
8

9 4 **Data management and analysis**

10
11
12 5 Interview recordings were transcribed verbatim, and observation and reflection notes
13
14 6 compiled by the first author (PhD student). All data were coded using Atlas.ti version
15
16 7 8, and a thematic analysis was used to analyse the data.⁴¹ Key themes were identified
17
18 8 following both a deductive approach based on a preset list of themes from the criteria
19
20 9 of DSR functioning and inductively wherever new insights were identified.⁴² Details of
21
22 10 the analysis process are reported elsewhere. ⁴³ The themes were grouped into two main
23
24 11 categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings
25
26 12 were presented to respondents in various meetings or individual meetings to verify
27
28 13 and validate the results.

29 14 **Positionality, reflexivity and ethics considerations**

30
31
32 15 Interviews and participant observation can face ethical challenges given the sensitive
33
34 16 nature of a research topic that can potentially expose hidden realities.⁴⁴ The conduct
35
36 17 of this study was facilitated by our previous engagements in the study setting, and
37
38 18 subsequently as part of the first author's PhD study. These involved a period of
39
40 19 immersion and observation, which allowed for the building of trust with participants,
41
42 20 and to be able to contextualise and interpret the interviews and observations. To
43
44 21 minimise descriptive and interpretive biases, regular feedback and discussion of the
45
46 22 findings were conducted during follow-up meetings in the district; and iterative
47
48 23 processes engaged between the first author (PhD student) and the co-authors (PhD
49
50 24 supervisors) involving continuous questioning of the understanding of data and
51
52 25 reviewing of findings.

53
54 26 This study was approved by the Biomedical Science Research Ethics Committee and
55
56 27 the Provincial Health Research Committee. All interviews proceeded with signed
57
58 28 informed consent.

59 29 **Patient and public involvement**

60 30

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3 1 Patients or the public were not involved in the design, conduct, reporting or
4
5 2 dissemination plans of this study.
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7

8 **RESULTS**

9 10 **Functioning of maternal, neonatal and child DSR mechanisms**

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12
13 5 Tables 3a and b presents an application of the framework and a descriptive summary
14
15 6 of the functioning of each of the DSR mechanisms observed in practice. We report on
16
17 7 the overall functioning of DSR, drawing across all the forms of DSR observed and the
18
19 8 views expressed by the respondents about them. We present key themes that emerged
20
21 9 as critical from the elements outlined in Table 1.

22 23 **a. Surveillance and reporting process**

24 25 **▪ Continuous surveillance cycle and evidence-based practices**

26
27 12 All DSR mechanisms followed a structured approach to death surveillance and
28
29 13 response, integrating recording and reporting of death, reviewing and classifying
30
31 14 causes and making recommendations for actions based on established guidelines for
32
33 15 MNCH. The MRU was most explicit in emphasising the completion of the surveillance
34
35 16 cycle in its '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child
36
37 17 death.

38 39 **▪ The 'no-name, no-blame' approach**

40
41 19 From our observations and the respondents' views, the perinatal and child
42
43 20 (PPIP/CHIP) and the MRU meetings were the most likely to promote the 'no-name,
44
45 21 no-blame' approach. The chairperson of the meeting ensured that confidentiality was
46
47 22 maintained throughout and that no one was blamed for the occurrence of the adverse
48
49 23 event. Otherwise, respondents noted that the meeting could be transformed into a
50
51 24 'punishment exercise' that would discourage actors' participation:

52
53 25 *'..The perinatal meeting itself is not making anybody accountable. The*
54
55 26 *meeting itself is about discussing things, it is not to point to individuals,*
56
57 27 *because it's going to be discouraging for the people [to attend] if it's a*
58
59 28 *punishment exercise...'* [DCST].

60
61 29 This 'no-name, no-blame' approach fostered a high level of commitment to the review
62
63 30 meetings that resulted in a common understanding of individual and system

1
2
3 1 challenges faced. It also fostered mutual support when people were proactively
4
5 2 working as a team.

6
7 3 *'Before there was blaming, blaming, blaming [...] No-one is blaming anyone*
8
9 4 *anymore because we do understand the challenges, we are part of the system,*
10
11 5 *we are in the [same] basket' [EMS manager].*

12
13 6 Even though the meetings were never used to point fingers, or name or blame
14
15 7 providers involved in the management of the case, the respondents raised the
16
17 8 possibility of sanction if at any stage gross negligence was documented.

18
19 9 *'...We are taking every death very seriously. One death is too many deaths,*
20
21 10 *we have to make sure that we follow up on our kids and also on our health*
22
23 11 *care workers [at PHC] the entry point where the neonatal was first attended*
24
25 12 *so that we can check on whether the child was attended according to protocol*
26
27 13 *and if not then consequential management needs to be applied' [Hospital*
28
29 14 *CEO].*

30
31 15 Policy documents formally claim that the CEMD also follows a 'no-name, no-blame'
32
33 16 approach. However, based on interviews and observations in practice, the CEMD
34
35 17 process in the study district was conducted and experienced very differently to the
36
37 18 other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of
38
39 19 maternal death from higher-level management within the district and beyond, seeking
40
41 20 to assign individual responsibility and frequently triggering reactive sanction and
42
43 21 punitive action. Respondents reported suspensions, referrals to the labour office,
44
45 22 litigations and court cases involving frontline professionals. This was one of the
46
47 23 constraining factors of DSR functioning. These CEMD processes were managed
48
49 24 through quality assurance structures (e.g. adverse event committees) and were
50
51 25 associated with a particular language of sanction – such as 'consequence
52
53 26 management'.

54
55 27 *'So the meetings that we usually have with the quality assurance and the*
56
57 28 *maternity doctors and the sisters in charge [...] those [meetings] push us to be*
58
59 29 *more accountable [...] it's not like the perinatal meeting, [where] we don't*
60
30 *mention the doctors who did what, we just present the case. With those ones*
31
32 *[quality assurance], it pushes you to be more accountable because the file is*
33 *there, we all discuss what's in the file. So, whoever was the attending doctor is*
more accountable, feels more accountable' [Medical officer].

1 **Table 3a: Summary of the functioning of DSR Mechanism in practice**

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/Clinical Governance
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	'No naming, no blaming'	'No naming, no blaming'	'No naming, no blaming', Auditing and Quality Assurance	'No naming, no blaming', Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

1 **Table 3b: Functioning of DSR Mechanism compared to elements from the literature**

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/ Clinical Governance
Matching to the elements for the functioning of DSR mechanisms	I. Surveillance process (What and How?)						
	1. Continuous surveillance (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based practices	✓		✓	✓	✓	✓
	3. No naming, No-blaming (Confidentiality, non-punitive tone of the process)	✓		✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
	8. Involvement and commitment of the managers to act on the findings			✓	✓		
9. Community participation in review and response							

II. Following a holistic approach to identifying modifiable causes						
	✓		✓	✓		
III. Actions (Pro-active & Reactive)						
▪ <i>Provider level</i>	✓	✓	✓	✓	✓	✓
▪ <i>System level</i>		✓	✓	✓		
▪ <i>Community level</i>				✓		

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2 Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

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4 1 ▪ *Integrating learning and institutional support from higher-level management*

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6 2 The DCST played a key role in providing clinical guidance, mentorship and in-service
7 3 training related to modifiable factors identified in the DSR. The involvement of a
8 4 facilitator from the National Department of Health was also observed as one of the
9 5 enabling factors in mobilizing higher level management support, a factor unique to the
10 6 study setting. By bringing together district and sub-district actors, DSR meetings acted
11 7 as a lever for more transparency between levels, in sharing frustrations and most
12 8 especially the sharing of good practices.

13
14 9 *'I can say that [DSR meeting] is strengthening the communication between*
15 10 *the sub-districts and the district and because of that I don't see any problem*
16 11 *that might hinder us to progress, because that is where we are sharing our*
17 12 *frustrations and sharing our best practices'* [District programme manager].

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28 14 Also important was the presence and commitment of key champions amongst middle
29 15 managers and medical and nursing clinicians who created and nurtured a community
30 16 of practice for sharing knowledge and learning.

31
32
33 17 In one sub-district, participants expressed excitement at attending meetings, and the
34 18 venues were sometimes overflowing with participants.

35
36
37 19 *'[I]: So why do you think that meeting is taken seriously?'*

38
39 20 *'[R]: It's the commitment of the medical managers, the commitment of the*
40 21 *managers and also the operational managers in maternity wards and the*
41 22 *doctors* [Manager, DO].

42
43
44
45 23 At these meetings, each step taken in the care pathway (from PHC to the referral
46 24 hospital) was carefully scrutinized and improvement plans with timelines,
47 25 monitoring and a responsible person were developed, facilitated by the involvement
48 26 and commitment of the managers in the meeting:

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51
52 27 *'Because when you put those quality [measures] you start from your ward,*
53 28 *...you put as well the responsible people because when you put some measures*
54 29 *you need to monitor, to come and see if it's working. And you need to give the*
55 30 *timeline... you monitor if it's going well, you sustain, if there is something you*
56 31 *need to review or if it's not going well'* [Clinical manager].

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3 1 One of the key moments of the review meetings was to identify the modifiable causes
4 of death and translating them into training and learning opportunities for frontline
5 2 managers and providers, as well as system improvement and community education.
6 3
7 4 The regular presence of DCST and programme managers in the review meetings
8 5 created a sense of trust and space for empowering providers with knowledge and tools
9 6 for better performance. Nurses were able to present cases and engage in discussions
10 7 with doctors. In one instance, where a doctor was trying to dismiss a nurse's opinion
11 8 and impose his view during discussions, the DCST intervened and emphasized that
12 9 everyone's opinion counted..

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19 10 *'The meeting is to highlight things, training, educational issues and to bring*
20 11 *the people, the team together [DCST].*

21
22
23 12 Another perceived core value of the DSR process was learning from the death events
24 13 to come up with quality improvement strategies to prevent similar events in the future.

25
26
27 14 *'After we discuss we all come up with ... if I can say, opinions of what actually*
28 15 *transpired or what could have happened for this baby to demise and what we*
29 16 *could have done differently to help the baby. Maybe for the other babies who*
30 17 *are coming in the near future who present the same way, what can we change*
31 18 *to be able to help them' [Medical Officer].*

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36 19 The learning and training were extended to primary health care facilities; minutes of
37 20 the meetings and reminders of the guidelines were circulated; and regular visits to
38 21 facilities were conducted by the district team, reinforcing what was shared in the
39 22 meetings and allowing those who were absent from the meeting to be capacitated with
40 23 needed skills.

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45 24 **▪ DSR process institutionalized**

46
47 25 DSR processes in this district were anchored into routines in all facilities, with
48 26 standardised agendas and supportive supervision from the DCST and the MNCH
49 27 district programme coordinators. The DSR processes were perceived not only to
50 28 contribute to improving the quality of care and outcomes in facilities...

51
52
53
54 29 *'I think the perinatal meetings are there and they are there forever. It's like an*
55 30 *auditing process, it's impossible to run maternity service without this*
56 31 *[perinatal meeting]' [DCST].*

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60 32 ...but also to facilitate the integration of people and services

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3 1 *'When we started MRU [...] we were blaming each other, but the more we*
4 *discussed and saw how it fits, we feel now the problem is not within us, [but]*
5 2 *with our resources [...] Now we feel we are part of the institution; before*
6 3 *[MRU] we felt that EMS was not part of the hospital [EMS].*
7
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9 4

10 5 The perceived benefit and value of DSR processes, particularly the review and
11 6 response meetings, were repeatedly emphasized by the respondents as a motivation to
12 7 continue with and integrate them into the core activities of maternal and child in the
13 8 district.

14 9 However, institutionalising appropriate DSR processes across all levels of the District
15 10 was not an easy or completed task. DSR processes faced challenges at an individual
16 11 level (blaming, sanctioning), institutional or service level (shortage of skilled
17 12 personnel), or system levels (ineffective referral system). We also observed variations
18 13 in the level of support and involvement of local leadership and primary healthcare
19 14 facilities in DSR processes.

20 15

- *Actors: Bringing together a multidisciplinary team of actors across levels*

21 16 As indicated, DSR mechanisms were intended to be driven by a multidisciplinary team
22 17 of actors including medical, nursing and other professionals, and across levels
23 18 (community, PHC and hospital). Indeed, a wide variety of actors participated in DSR
24 19 processes, most prominently in the case of the CEMD, where in addition to the
25 20 provincial assessors, the following actors from district and facility levels were
26 21 involved: the district manager (or a representative), quality assurance manager,
27 22 primary health care and hospital services manager, labour relations and corporate
28 23 services, a member of the DCST, the hospital chief executive officer, (CEO), the
29 24 nursing service and clinical managers, as well as the specific health providers directly
30 25 involved in the maternal death.

31 26 Participants in the PPIP/CHIP review meetings tended to be hospital based clinicians
32 27 with the support of district clinicians and, at times, primary health care managers;
33 28 while the MRU meeting sought to expand participation to other stakeholders such as
34 29 academic partners, non-governmental organisations, other government departments
35 30 (notably the South African Social Security Agency) and community representatives.

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2
3 1 In one particular sub-district, the organizational culture and the leadership style of
4 senior managers promoted collaboration between primary health care facilities and
5 hospitals in DSR.
6
7

8
9 4 ‘...we only receive the mother during the process of giving birth, and when the
10 woman is now complicated with pre-eclampsia of which I think that this
11 would have been prevented at the first place; so we are involving the primary
12 health care level to come to the perinatal meetings so that they can hear
13 exactly about the progress of the woman because, for us, as a hospital, we do
14 not have the liberty of starting the woman on antenatal care, whereas the PHC
15 are the ones who might have been able to pick up on some problems during
16 the antenatal period. So, for them being involved in these perinatal meetings
17 is quite vital [...] not coming is also is a transgression on its own’ [Hospital
18 CEO].
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26 14 In this sub-district, where identified modifiable factors were related to the patient or
27 community, hospital board chairpersons were contacted to facilitate the dialogues
28 within the community and identify key actions together with the community leaders
29 to address the identified problem. However, the community was not usually
30 implicated directly in DSR processes.
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36 19
37 20 It is important to note that this degree of functioning was not universal, and there was
38 variation across facilities and sub-districts in the levels of team involvement,
39 particularly of staff from PHC facilities and hospital actors. In instances where doctors
40 and nurses, managers and providers, or PHC facilities and hospitals were not working
41 as a solidified team, accountability mechanisms were flawed resulting in poor referral
42 systems, ‘blame games’ and the deferring of responsibility in case of death events.
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50 27 ***b. Following a holistic (three delays) approach to identifying and***
51 ***acting on modifiable factors***
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54 29 Review meetings were observed to follow the ‘three delays’ approach to identifying
55 factors (especially modifiable factors – Excerpt 1) associated with the occurrence of
56 death events and to take collective responsibility and proactively set up key actions to
57 prevent further events (Tables 3a and b). This was enabled by the presence of
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1 stakeholders across levels - from primary health care facilities to district clinical
 2 specialist teams and programme managers. Because of the managerial orientation of
 3 MRU, the three delays mostly focused on the system factors for action, while
 4 PPIP/CHIP meetings were clinically oriented towards provider and, to some extent,
 5 patient factors. In both cases, any matters related to community engagement were
 6 discussed with the board chairpersons to liaise with the community leadership.

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 16 **Excerpt 1 (From DSR meeting and discussion with respondents)***

17
 18 *Case 1:* A pregnant patient who had never attended antenatal care presented to the
 19 hospital with severe complications and subsequently died. The main modifiable
 20 factor identified was the delay in deciding and seeking care.

21
 22
 23
 24 *Case 2:* A young primigravida who was followed up since the early stage of the
 25 pregnancy, but died because of a failure to treat her high blood pressure. The
 26 modifiable factor identified was the delay in receiving adequate care.

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 28
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 31 *Case 3:* The patient was referred to a higher level hospital for a complication during
 32 labour, but the ambulance was delayed resulting in the death of the patient while
 33 still at the first level hospital. The modifiable factors identified were the lack of an
 34 effective referral system, adequate equipment and trained human resources.

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 39 *Case 4:* In a 'backstreet abortion', a patient was given misoprostol, used for medical
 40 termination of pregnancy. She developed complications and sought care at the
 41 hospital but could not be saved. One of the modifiable factors was that safe
 42 termination of pregnancy services were not sufficiently accessible.

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*The 'three delays' approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

8
 9 ***c. Implementation of actions***

10 Following the three delays model, the identified actions targeted the community
 11 (community education facilitated by the hospital board chairpersons and community
 12 leaders); the system (provision of resources); or the providers (skills building). Actions
 13 toward community were limited and only addressed by one DSR mechanism (MRU).

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3 1 We observed evidence of implementation of actions recommended from DSR
4 processes which were perceived to result in improved MNCH outcomes. For instance,
5 2 during the study period outreach training in surgical skills (caesarean section and
6 3 anaesthesia) was organized by a provincial team of specialists; DCST members were
7 4 actively involved in organising training and mentoring programmes; and the district
8 5 paediatrician supported facilities to set up and ensure availability and functioning of
9 6 the Continuous Positive Airway Pressure (CPAP) therapy machines for neonatal care.
10 7
11 8

9 DISCUSSION

10 **While WHO guidelines outline the necessary steps in conducting death**
11 **surveillance and response,⁶ there is little holistic guidance on how this is**
12 **to be achieved in health systems. By collating elements from the literature**
13 **into a conceptual framework it was possible to explore the factors**
14 **enabling or constraining DSR functioning in one district. This framework**
15 **may be of value in other similar settings. It can be used by researchers or**
16 **health service managers to explore the functioning of the DSR system,**
17 **diagnose challenges and promote an inclusive organisational culture of**
18 **holistic scrutiny into the causes of death.**

19 **Maternal, neonatal and child DSR is well established in the South African**
20 **district health system. Across the five forms of DSR directly related to**
21 **maternal and child deaths in the study district, we found a range of**
22 **practices. The surveillance process routinely emphasized on the ‘4R’s’**
23 **(‘Report, Review, Record, Respond’). In most instances, the process**
24 **followed the ‘No name, no blame’ approach as stipulated in the guiding**
25 **documents. There were also holistic approaches to identifying causes of**
26 **death, efforts to integrate training and support from higher levels,**
27 **facilitation of multi-disciplinary teams, and elements of**
28 **institutionalisation of DSR in the district. The latter requires a systemic**
29 **supportive environment and organisational culture at all levels that are**
30 **linked to annual planning and budgeting to support the implementation**
31 **of evidence-based actions.⁴⁵ In these regards, the study District had**

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3 1 clearly benefitted from the DSR system strengthening interventions
4 implemented over a number of years.
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8 3 In certain instances, however, the “no name, no blame” approach was
9 contradicted by an organisational culture of blame and punishment,
10 particularly following maternal deaths. Here the emphasis was on
11 identifying and sanctioning the persons responsible for death incidents
12 and on curbing the institutional ramifications of the incident, instead of
13 using it as an organisational learning event to prevent further incidents.⁴⁶
14 However, this level of scrutiny was not observed in instances of perinatal
15 deaths, showing the difference between maternal and perinatal DSR
16 processes. Such blame cultures in a healthcare organisation can be a
17 source of an increased number of medical errors.⁴⁷
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26 13 Death events, particularly maternal deaths, are considered to be a
27 barometer of a health system’s performance. In this regard, DSR
28 processes can be constrained by the fear of revealing malpractice and poor
29 health system performance, and DSR processes can become politicized
30 and maternal deaths under-reported by bureaucrats unwilling to disclose
31 system failures.⁴⁸ In our study setting, DSR processes were facilitated by
32 a high-level political commitment from the national government to
33 compulsory and transparent reporting and reviewing of all cases of
34 maternal or child deaths and implementation of measures to avoid future
35 deaths from identified modifiable factors.
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44 23 In this study, ‘no name, no blame’ approaches were observed to facilitate
45 the active participation of various actors, especially those directly linked
46 to death incidents and the possibility of embracing responsibility for the
47 incident.⁴⁹ Thus, DSR processes can create a sense of interpersonal trust
48 and trust in the health care organization, key for generating learning and
49 improvement. In contrast, as noted in Kenya, the lack of trust, the fear of
50 blame or individualised disciplinary action conditioned frontline
51 professionals to be reluctant in disclosing data on maternal death.¹⁷
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3 1 **As proposed by Deis *et al.*⁵⁰ DSR meetings can be transformed into**
4 **instruments of system improvement using a systematic approach that**
5 **incorporates the ‘three delays’ model for action including the providers,**
6 **the health system and the communities in identifying and addressing**
7 **modifiable factors related to death events. This means that DSR processes**
8 **should not only seek to identify and correct frontline providers’ and**
9 **managers’ practices but also health system and structural factors at the**
10 **community level,²⁰ A holistic approach was made possible through the use**
11 **of standardised protocols and guidelines for DSR that integrated**
12 **reporting and feedback mechanisms.⁴⁶**

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22 11 **Another important element of successful DSR observed was the inclusion**
23 **and engagement of a multidisciplinary team of actors from various**
24 **professional backgrounds and managers. This created a space to address**
25 **not only health system-related problems⁵⁰ but also problems related to**
26 **social structural factors (e.g. social exclusion, poverty). Where these**
27 **functioned effectively, DSR platforms intersected individual and**
28 **collective competency and responsibility for MNCH, enabling a**
29 **community of practice that recognised the contribution and value of all**
30 **levels, from PHC facilities to district hospitals actors. Furthermore, the**
31 **inclusion of various stakeholders into DSR processes can also facilitate**
32 **social autopsies given that some maternal and child deaths occur outside**
33 **of health facilities. Similarly, a study in four Sub-Saharan African**
34 **countries reported interdisciplinary teamwork with good communication amongst**
35 **staff and active participation of staff as enablers of the DSR process.⁵¹ In contrast,**
36 **where actors from PHC facilities and hospitals, or when doctors and**
37 **nurses, managers and providers were disconnected, it resulted in a poor**
38 **referral process, blame games and deferring of responsibility or**
39 **avoidance of accountability. Melberg *et al.*⁴⁸ referred to a ‘defensive**
40 **referral’ as a result of fear of being blamed for maternal death incident.**

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55 30 **When encouraged by leadership support, DSR processes can become a**
56 **platform for common learning, knowledge sharing and quality**
57 **improvement.⁴⁵ Effective DSR system, according to Kerber *et al.* ⁵² needs**
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3 **1 engaged leadership and use of guidelines and protocols that ensure the**
4 **2 complete cycle of the audit system.⁵³**

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7
8 **3 Finally, DSR processes were able to systematically and proactively identify**
9 **4 and plan actions based on the framework. Though tracking**
10 **5 implementation of these actions can be limited in scope, this study**
11 **6 nevertheless presented evidence of responsive action implemented as**
12 **7 part of DSR.**

17 **8 Limitations**

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20 **9 The statements of lived experiences of DSR processes by the respondents**
21 **10 could have been what they thought to be the right answer reflecting a**
22 **11 social desirability bias in their responses. Being observed, respondents**
23 **12 could have behaved differently ('Hawthorne effect'). We did indeed**
24 **13 observe instances of where the absence of the national facilitator led to a**
25 **14 slackening of meeting processes. Furthermore, respondents' self-reports and**
26 **15 accounts could have led to an overstatement of phenomena. We sought to**
27 **16 minimise these biases by prolonged immersion in the field and**
28 **17 supplementing formal interviews with observations and informal**
29 **18 conversations.^{30,54}**

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31
32 **19 This study was conducted in one district at a particular moment in time.**
33 **20 While the forms of DSR are likely to be repeated elsewhere, the study**
34 **21 findings related to the functioning of DSR are not generalisable given the**
35 **22 management investments made. However, the findings have analytical**
36 **23 relevance in illuminating DSR in best-case scenarios and the triangulated**
37 **24 nature of the data provide confidence in the data collected.**

49 **25 CONCLUSION**

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52 **26 The success of DSR processes resides in the intersection of many contextual factors**
53 **27 such as the commitment of a multidisciplinary team of actors and support from district**
54 **28 managers, the integration of primary healthcare and district hospitals, and the**
55 **29 establishment of a space for mutual trust and learning anchored within the**
56 **30 organisational culture of health facilities. A holistic approach is essential to address**

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3 1 the modifiable factors identified, translate them into long-term organisational
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5 2 learning opportunities, and set up evidence-based, 'real-time' responses.
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10 4 **Contributors:** FKM designed the study, collected, analysed the data, and wrote the
11
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13
14 6 approved the final version.

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36
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39 19 approved by the Biomedical Science Research Ethics Committee of the University of
40
41 20 the Western Cape (Reference number: BM17/10/8) and by the Mpumalanga
42
43 21 Provincial Health Research Committee (Reference number: MP_201801_004).
44
45 22 Informed consent was signed before interviews and data are presented anonymously.

46
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49 24 **ORCID iDs:**

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51 25 Fidele Kanyimbu Mukinda: <https://orcid.org/0000-0002-0764-6213>

52
53 26 Sara Van Belle: <https://orcid.org/0000-0003-2074-0359>

54
55 27 Asha George: <https://orcid.org/0000-0002-5968-1424>

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57 28 Helen Schneider: <https://orcid.org/0000-0002-0418-1828>
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REFERENCES

1. United Nations Commission on information accountability for Women's Children's and Health. *Keeping promises, measuring results*. New York: United Nations;2013.
2. De Kok B, Imamura M, Kanguru L, Owolabi O, Okonofua F, Hussein J. Achieving accountability through maternal death reviews in Nigeria: a process analysis. *Health Policy and Planning*. 2017;32:1083–1091.
3. Mills S. *Maternal Death Audit as a Tool Reducing Maternal Mortality*. Washington DC: World Bank;2011. 77799.
4. Smith H, Ameh C, Roos N, Mathai M, Broek NVD. Implementing maternal death surveillance and response: a review of lessons from country case studies. *BMC Pregnancy Childbirth*. 2017;17(233):1-11.
5. World Health Organization. *Beyond the numbers: Reviewing maternal deaths and complications to make pregnancy safer*. Geneva: WHO;2004.
6. World Health Organization (WHO). Maternal Death Surveillance and Response. In. Geneva, Switzerland: World Health Organization 2013:1-118.
7. Bandali S, Thomas C, Hukin E, et al. Maternal Death Surveillance and Response Systems in driving accountability and influencing change. *Int J Gynaecol Obstet*. 2016;135(3):365-371.
8. Kongnyuy EJ, Mlava G, van den Broek N. Facility-based maternal death review in three districts in the central region of Malawi: an analysis of causes and characteristics of maternal deaths. *Women's Health Issues*. 2009;19(1):14-20.
9. Ochejele S, Musa J, Abdullahi MJ, Odusolu P, Attah DI, Aloba G. Maternal death surveillance and response system in Northern Nigeria. *Tropical Journal of Obstetrics and Gynaecology*. 2019;36(2).
10. Pearson L, deBernis L, Shoo R. Maternal death review in Africa. *Int J Gynaecol Obstet*. 2009;106(1):89-94.
11. Ayele B, Gebretnsae H, Hadgu T, et al. Maternal and perinatal death surveillance and response in Ethiopia: Achievements, challenges and prospects. *PLoS One*. 2019;14(10):1-24.

12. Bandali S, Thomas C, Wamalwa P, et al. Strengthening the "P" in Maternal and Perinatal Death Surveillance and Response in Bungoma county, Kenya: implications for scale-up. *BMC Health Serv Res.* 2019;19(1):611.
13. Halim A, Dewez JE, Biswas A, Rahman F, White S, van den Broek N. When, Where, and Why Are Babies Dying? : Neonatal Death Surveillance and Review in Bangladesh. *PLoS ONE.* 2016;11(8).
14. Krug A, Pattinson R. *Saving Children 2004: A survey of child healthcare in South Africa.* South Africa: National Department of Health;2004.
15. Patrick ME, Stephen CR. Child PIP: Making mortality meaningful by using a structured mortality review process to improve the quality of care that children receive in the South African health system. *SAJCH.* 2008;2(2):38-42.
16. South Africa Every Death Counts Writing Group. Every death counts: use of mortality audit data for decision making to save the lives of mothers, babies, and children in South Africa. *The Lancet.* 2008;371(9620):1294-1304.
17. D'Ambruso L, van der Merwe M, Wariri O, et al. Rethinking collaboration: developing a learning platform to address under-five mortality in Mpumalanga province, South Africa. *Health Policy and Planning.* 2019;34(6):418-429.
18. Mahato PK, Waithaka E, van Teijlingen E, Pant PR, Biswas A. Social autopsy: a potential health-promotion tool for preventing maternal mortality in low-income countries. *WHO South-East Asia Journal of Public Health.* 2018;7(1).
19. Biswas A, Halim MA, Dalal K, Rahman F. Exploration of social factors associated to maternal deaths due to haemorrhage and convulsions : Analysis of 28 social autopsies in rural Bangladesh. *BMC Health Services Research.* 2016;16(1).
20. Smith H, Ameh C, Godia P, et al. Implementing Maternal Death Surveillance and Response in Kenya: Incremental Progress and Lessons Learned. *Global Health: Science and Practice.* 2017;5(3):345-354.
21. De Brouwere V, Delvaux T, Leke RJ. Achievements and lessons learnt from facility-based maternal death reviews in Cameroon. *BJOG.* 2014;121 71-74.
22. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med.* 1994;38(8):1091-1110.
23. Barnes-Josiah D. The "Three delays" as a framework for examining maternal mortality in Haiti. *Soc Sci Med.* 1998;46(8):981-993.

- 1
2
3 1 24. Pattinson R, Kerber K, Waiswa P, et al. Perinatal mortality audit: counting,
4 accountability, and overcoming challenges in scaling up in low- and middle-
5 2 income countries. *Int J Gynaecol Obstet.* 2009;107:S113- S122.
6
7 3
8 4 25. Rhoda N, Velaphi S, Gebhardt G, Kauchali S, Barron P. Reducing neonatal
9 deaths in South Africa: Progress and challenges. *S Afr Med J.* 2011;108:S9-S16.
10 5
11 6 26. Mayne J. Addressing attribution through contribution analysis. Using
12 performance measures sensibly. *The Canadian Journal of Program*
13 *Evaluation.* 2001;16(1):1-24.
14 7
15 8
16 9 27. National Department of Health. Second Interim Report on Confidential
17 Enquiries into Maternal Deaths in South Africa: Maternal Deaths for 1999. In.
18 Pretoria, South Africa: NDOH; 1999.
19 10
20 11
21 12 28. National Department of Health. National Perinatal Morbidity and Mortality
22 Committee Report 2008-2010 (NaPeMMCo). In. South Africa: NDOH; 2010.
23 13
24 14 29. National Department of Health. 1st Triennial Report of the Committee on
25 Morbidity and Mortality in Children Under 5 Years (CoMMiC). In. Pretoria,
26 South Africa: NDOH; 2011.
27 15
28 16
29 17 30. Mukinda FK, Van Belle S, George A, Schneider H. The crowded space of local
30 accountability for maternal, newborn and child health: A case study of the
31 South African health system. *Health Policy and Planning.* 2020;35(3):279–
32 290.
33 18
34 19
35 20
36 21 31. Shung-King M, Lake L, Sanders D, Hendricks M. *South African ChildGauge*
37 *2019: Child and adolescent health.* Cape Town: Children’s Institute, University
38 of Cape Town;2019.
39 22
40 23
41 24 32. Allanson ER, Pattinson RC. Quality-of-care audits and perinatal mortality in
42 South Africa. *Bull World Health Organ.* 2015;93(6):424-428.
43 25
44 26 33. Schneider H, George A, Mukinda F, Tabana H. District Governance and
45 Improved Maternal, Neonatal and Child Health in South Africa: Pathways of
46 Change. *Health Systems & Reform.* 2020;6(1):e1669943-1669941-e1669943-
47 1669912.
48 27
49 28
50 29
51 30 34. World Health Organization. *Improving the quality of Paediatric care:*
52 *Operational guide for facility-based audit and review of paediatric mortality.*
53 Geneva: World Health Organization;2018.
54 31
55 32
56
57
58
59
60

- 1
2
3 1 35. Bac M, Pattinson RC, Bergh AM. Changing priorities in maternal and perinatal
4 health in Gert Sibande District, South Africa. *South African Medical Journal*.
5 2019;109(11):838-840.
6
7 3
8 4 36. Schneider H, McKenzie A, Tabana H, Mukinda F, George A. *Evaluation of*
9 *health system strengthening initiatives for improving the quality and*
10 *outcomes of maternal, neonatal and child health care in four South African*
11 *districts*. South Africa: School of Public Health, SAMRC Health Services to
12 Systems Research Unit, University of the Western Cape;2017.
13
14 7
15 8
16 9 37. Cupido J. *Reducing Maternal, Neonatal and Under 5 Child Deaths by linking*
17 *the Ideal Clinic and the MRU model*. Gert Sibande: DOH;2018.
18
19 10
20 11 38. Moodley J, Pattinson RC, Fawcus S, et al. The Confidential Enquiry into
21 Maternal Deaths in South Africa: a case study. *BJOG*. 2014;121 (Suppl 4):53-
22 60.
23
24 13
25 14 39. National Department of Health. *Saving Mothers 2008-2010: Fifth*
26 *Comprehensive Report on Confidential Enquiries into Maternal Deaths in*
27 *South Africa*. Pretoria2011.
28
29 16
30 17 40. National Department of Health. *Saving Mothers 2011-2013: Sixth report on*
31 *confidential enquiries into maternal deaths in South Africa*. Pretoria2014.
32
33 18
34 19 41. Green J, Thorogood N. *Qualitative Methods for Health Research*. 4th ed.
35 London: Sages Publications; 2018.
36
37 21 42. Azungah T. Qualitative research: deductive and inductive approaches to data
38 analysis. *Qualitative Research Journal*. 2018;18(4):383-400.
39
40 22
41 23 43. Mukinda FK, Van Belle S, Schneider H. Perceptions and experiences of
42 frontline health managers and providers on accountability in a South African
43 health district. *International Journal for Equity in Health*. 2020;19(1):1-11.
44
45 25
46 26 44. Li J. Ethical Challenges in Participant Observation. *The Qualitative Report*.
47 2008 13(1):100-115.
48
49 28 45. plementationLewis G. The cultural environment behind successful maternal
50 death and morbidity reviews. *BJOG: an international journal of obstetrics and*
51 *gynaecology*. 2014;121:24-31.
52
53 30
54 31 46. Hussein J, Okonofua F. Time for Action: Audit, Accountability and Confidential
55 Enquiries into Maternal Deaths in Nigeria. *Afr J Reprod Health*. 2012;16(1):9-
56 14.
57
58 33
59
60

- 1
2
3 1 47. Khatri N, Brown GD, Hicks LL. From a blame culture to a just culture in health
4 care. *Health Care Management Review*. 2009;34(4):312-322.
5 2
6 3 48. Melberg A, Mirkuzie AH, Sisay TA, Sisay MM, Moland KM. 'Maternal deaths
7 should simply be 0': politicization of maternal death reporting and review
8 processes in Ethiopia. *Health Policy and Planning*. 2019;34(7):492-498.
9 4
10 5
11 6 49. Kuipers S, Hart P. Accounting for Crises. In: Bovens M, Goodin RE, Schillemans
12 T, eds. *The Oxford Handbook of Public Accountability*. USA: Oxford University
13 Press; 2014:589-602.
14 7
15 8
16 9 50. Deis JN, Smith KM, Warren MD, et al. Transforming the Morbidity and
17 Mortality Conference into an Instrument for Systemwide Improvement. In:
18 Henriksen K, Battles JB, Keyes MA, Grady ML, eds. *Advances in Patient*
19 *Safety: New Directions and Alternative Approaches*. Vol 2. Rockville (MD):
20 Agency for Healthcare Research and Quality; 2008.
21 11
22 12
23 13
24 14 51. Maternal and Child Survival Program. A Regional Assessment of Facility-Level
25 Maternal and Perinatal Death Surveillance and Response Systems in Four Sub-
26 Saharan African Countries. USAID; 2018. Available at:
27 [https://www.mcsprogram.org/resource/regional-assessment-facility-level-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
28 [maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
29 [african-countries/](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/) (Accessed: 16 August 2020).
30 17
31 18
32 19
33 20 52. Kerber KJ, Mathai M, Lewis G, et al. Counting every stillbirth and neonatal
34 death through mortality audit to improve quality of care for every pregnant
35 woman and her baby. *BMC Pregnancy Childbirth*. 2015;15 Suppl 2:S9.
36 21
37 22
38 23 53. Bergh A-M, Pattinson R, Belizán M, et al. Completing the audit cycle for quality
39 care in perinatal, newborn and child health. In. University of Pretoria: MRC
40 Research Unit for Maternal and Infant Health Care Strategies; 2010:1-45.
41 24
42 25
43 26 54. Baxter K, Courage C, Caine K. Chapter 13 - Field Studies. In: Baxter K, Courage
44 C, Caine K, eds. *Understanding your Users (Second Edition)*. Boston: Morgan
45 Kaufmann; 2015:378-428.
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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	<ul style="list-style-type: none"> ▪ Can you tell me about your current position/role in the (district) health system? <p><i>Probes: For how long have you been in that position?</i></p>
Accountability definition	<ul style="list-style-type: none"> ▪ Could you describe to me what accountability means to you? <p><i>Probes: What does it make you think of accountability? What does it mean 'being accountable to'?</i></p> <p><i>How would you relate your definition of accountability to MNCH?</i></p>
Challenges	<p>Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district?</p> <p><i>Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges</i></p>
<ul style="list-style-type: none"> - Line/forms, - Guidelines - Enablers - Barriers - Complaints 	<ul style="list-style-type: none"> ▪ In your working area, to whom do you think you are accountable and why? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Tell me about the reporting structure with regard to your role in the health systems?</i> - <i>To/from whom do you report/receive order/provide information/provide technical support/training/supervision</i> <ul style="list-style-type: none"> ▪ Are there any accountability guidelines/framework from the DOH that you are using? [<i>If yes, please describe</i>] ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	<ul style="list-style-type: none"> ▪ What's your experience/perception regarding teamwork and accountability for MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)</i> - <i>How will you characterise the attitude and commitment of teamwork regarding MNCH</i> - <i>What's your beliefs regarding MNCH and the value of accountability</i>

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	<ul style="list-style-type: none"> ▪ How do you perceive the performance of the team with regard to MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Do you share the same goals? How do you set up these goals [decision making process]</i> - <i>Can you comment on the level of participation and collaboration work environment?</i> - <i>How do you monitor group accountability for MNCH</i>
Adverse events	<ul style="list-style-type: none"> ▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Please elaborate</i> - <i>How is the climate within your team when it comes to adverse event?</i> <ul style="list-style-type: none"> ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
Improvement	<ul style="list-style-type: none"> ▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Does the investigation result in sanctions and/or learning? [Please elaborate]</i> - <i>If learning, how often does the training happen? By Whom?</i> - <i>How do you identify areas for improvement [beside when an adverse event occurs]?</i>
B. DEATH REVIEW MEETINGS	
Actors/Who?	<ul style="list-style-type: none"> ▪ Can you please describe who attends the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?</i>
Meeting	<ul style="list-style-type: none"> ▪ How would you describe the structure of the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who chairs, the agenda, how long, frequency, participation/engagement?</i> - <i>What are the drivers/facilitators/barriers to this [name] meeting and related processes?</i>

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	<ul style="list-style-type: none"> - <i>What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?</i>
Decision process	<ul style="list-style-type: none"> ▪ How would you describe the decision process during the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?</i>
Dealing with adverse events (deaths)	<ul style="list-style-type: none"> ▪ How do you deal with adverse events e.g. maternal or child death? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?</i> - <i>Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?</i> - <i>How do you see the problem of death in terms of accountability?</i> - <i>Do you have/know any policy/guideline for dealing with death event?</i>
	<ul style="list-style-type: none"> ▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? <p><i>Probes:</i></p>
	<ul style="list-style-type: none"> ▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Referral processes</i> - <i>Role of Provincial and National department of Health</i>
Actions/Outcomes	<ul style="list-style-type: none"> ▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>How sustainable are these actions? [Please elaborate]</i>
Conclusion	<ul style="list-style-type: none"> - Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

Title and abstract

<p>Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended</p>	Pg 1, L1-3
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	Pg 2, L1-28

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	Pg 4, L1 - Pg6, L2
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	Pg 6, L3-13

Methods

<p>Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**</p>	Pg 8, L1-pg9 L5
<p>Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	Pg12, L4-15
<p>Context - Setting/site and salient contextual factors; rationale**</p>	Pg 9, L6-pg10 L11
<p>Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	Pg10, L12-pg11, L7
<p>Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	Pg12, L17-22; Pg31, L11-15
<p>Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**</p>	Pg10, L14-pg11 L21

1 2 3 4 5	Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
6 7 8	Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
9 10 11 12	Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
13 14 15 16	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
17 18 19 20	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

23 24 25 26	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

32 33 34 35 36 37	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
38 39	Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

42 43 44	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
45 46	Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

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3 1 **The practice of Death Surveillance and Response for Maternal, Newborn**
4 2 **and Child Health: A framework and application to a South African Health**
5 3 **District**
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11 5 Fidele Kanyimbu Mukinda^{1*}, Asha George^{1,2}, Sara Van Belle³, Helen Schneider^{1,2}
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16 7 ¹School of Public Health, University of the Western Cape, Cape Town, South Africa.

17 8 ²South African Medical Research Council (MRC)/Health Services and Systems Unit,
18 9 Cape Town, South Africa

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21 10 ³Institute of Tropical Medicine, Belgium.

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23
24 11 *Corresponding author. School of Public Health, University of the Western Cape,
25 12 Robert Sobukwe Road, Private Bag X17 Bellville 7535, Cape Town, South Africa

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28 13 Email: fmukinda@uwc.ac.za
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32 15 **Keywords:** Accountability; Death Surveillance and Response; Maternal, newborn
33 16 and child health; Framework; District health system; Qualitative study
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1 **Abstract**

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3 **Objective:** To assess the functioning of maternal, perinatal, neonatal and child death
4 surveillance and response (DSR) mechanisms at a health district level.

5 **Design:** A framework of elements covering analysis of causes of death, and processes
6 of review and response was developed and applied to the smallest unit of coordination
7 (sub-district) to evaluate DSR functioning. The evaluation design was a descriptive
8 qualitative case study, based on observations of DSR practices and interviews.

9 **Setting:** Rural South African health district (sub-districts and district office).

10 **Participants:** A purposive sample of 45 frontline health managers and providers
11 involved with maternal, perinatal, neonatal and child DSR. The DSR mechanisms
12 reviewed included a system of real-time death reporting (24 hours) and review (48
13 hours), a nationally mandated Confidential Enquiry into Maternal Death and regular
14 facility and sub-district mortality audit and response processes.

15 **Primary outcome measures:** Functioning of maternal, perinatal, neonatal and
16 child death surveillance and response.

17 **Results:** While DSR mechanisms were integrated into the organizational routines of
18 the district, their functioning varied across sub-districts and between forms of DSR.
19 Some forms of DSR, notably those involving maternal deaths, with external reporting
20 and accounting, were more likely to trigger reactive fault-finding and sanctioning than
21 other forms, which were more proactive in supporting evidence-based actions at
22 provider and system level, and to a limited extent in communities, in order to prevent
23 future deaths.

24 **Conclusions:** This study provides an empirical example of the everyday practice of
25 DSR mechanisms at a district level. It assesses such practice based on a framework of
26 elements and enabling organizational processes that may be of value in similar settings
27 elsewhere.

Strength and limitations

- This paper puts forward a framework of elements for evaluating the functioning of maternal, newborn and child (MNC) death surveillance and response (DSR) at the district level.
- The functioning of DSR mechanisms in a South African district that had benefitted from DSR strengthening interventions was evaluated using the framework.
- Field observations of MNC DSR processes and interviews with frontline providers and managers were conducted.
- **The framework was applied to one rural district that had developed functioning DSR practices; it needs to be further tested and validated in other contexts.**
- **The framework and appraisal methods may be of value in similar settings elsewhere.**

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INTRODUCTION

3 The United Nations (UN) put accountability for maternal, newborn and child health
4 (MNCH) on the global agenda, placing three interrelated accountability processes at
5 the centre of its 'Global Accountability Framework', namely, monitoring, reviewing
6 and response.¹ Death surveillance and response (DSR) has become one of the means
7 to operationalise these accountability processes in many health systems, with the view
8 to improving the quality of maternal, neonatal and child health care, and eliminate
9 preventable deaths.²⁻⁵

10 Death Surveillance and Response entails a continuous cycle of identification,
11 notification and review of deaths followed by action to improve the quality of care and
12 prevent future deaths.⁶ Its essence is, therefore, the capacity to record, review and
13 respond to each death using affordable, effective and evidence-based actions linked to
14 the findings.⁵

15 There is now a well-established tradition of DSR in Low- and Middle-Income
16 Countries (LMICs), focusing primarily on maternal deaths.^{2,4,6-10} In facilities and
17 contexts where maternal deaths are relatively rare, maternal 'near-miss' cases may
18 also be audited.⁵ More recently, LMICs have begun including the review of perinatal
19 and neonatal deaths into DSR systems, referred to as Maternal and Perinatal Death
20 Surveillance and Response (MPDSR);¹¹⁻¹³ and in some settings, DSR extends to under-
21 five deaths.¹⁴⁻¹⁶

22 In addition to facility-based processes, community-based DSR is recommended where
23 a high proportion of deliveries (and deaths) occur outside of health facilities, and
24 where community participation is crucial to implementing identified key actions.^{5,11} In
25 this regard, verbal and social autopsies have been developed as a participatory tool for
26 community-based DSR, exploring clinical and social causes of death from a
27 community perspective.¹⁷⁻¹⁹

28 DSR processes are typically defined nationally but implemented at facility level with
29 support from and coordination by local or district teams.^{20,21} Although there are no
30 globally standardised approaches,⁴ the literature points to several elements

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3 1 underpinning effective DSR processes, encompassing analysis of modifiable factors
4 2 involved, the tone of the review process and the range of participants involved.

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8 3 The analysis of modifiable factors underlying maternal and child deaths has been
9 4 codified into the 'three delays' model of care-seeking and utilisation: **(i) the delay in**
10 5 **deciding to seek care early; (ii) the delay in reaching a health facility; (iii)**
11 6 **the delay in providing or receiving adequate care at the facility.**^{6,22-25}

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16 7 In formulating a response, the literature on DSR recommends moving away from
17 8 identifying and sanctioning individuals,²⁶ and towards the setting up of non-punitive
18 9 'no-blaming' approaches that foster collective and individual participation.^{2,20} Such
19 10 approaches are less likely to result in ignoring the incident or the temptation to defer
20 11 responsibility onto others.^{2,3,5}

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25 12 DSR processes ideally involve a multidisciplinary team with the representation of a
26 13 range of clinicians (nursing, medical and other professionals), managers and support
27 14 staff (such as information officers). This brings together the array of provider
28 15 knowledge and skills, together with commitments from managers to enhance
29 16 ownership of the findings and turn recommendations into concrete actions.^{2,5,6}

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35 17 South Africa has a long-standing history, going back to the mid-1990s, of maternal,
36 18 newborn and child DSR that has become integrated into the routine functioning of
37 19 frontline health services. DSR processes are linked to three ministerial committees
38 20 established in 1998, namely the National Committee for Confidential Enquiry into
39 21 Maternal Deaths (NCCEMD),²⁷ the National Perinatal and Neonatal Morbidity and
40 22 Mortality Committee (NaPeMMCo);²⁸ and the Committee on Morbidity and Mortality
41 23 in Children under 5 years (CoMMiC).²⁹ These committees function at national level
42 24 with mandates exercised at local (health district) level through three of the DSR
43 25 processes, namely, the Confidential Enquiry into Maternal Death (CEMD), the
44 26 Perinatal Problem Identification Programmes (PPIP), and the Child under-five
45 27 Problem Identification Programmes (CHIP). These mechanisms are situated in a
46 28 dense and complex accountability ecosystem at the frontline of health provision.³⁰

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52 29 There have been significant reductions in maternal, neonatal and child mortality in
53 30 South Africa over the last decade, attributed principally to the prevention and
54 31 treatment of HIV.³¹ However, despite a long history and institutionalised practice,

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3 1 there is little understanding of the role of DSR implementation and functioning in this
4 mortality reduction. Clear guidance on how best to assess this functioning is also
5 2 lacking; one study showed no association between consistent auditing and perinatal
6 3 mortality rates.³²
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11 5 Given the lack of standardisation and consensus on elements for assessing the
12 6 functioning of DSR, this paper proposes an assessment framework using criteria
13 7 drawn from the literature and then applies the framework to evaluate existing
14 8 maternal, peri/neonatal and child DSR mechanisms in one South African district.
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19 9 This paper thus seeks to answer the following question: Based on a comprehensive
20 10 assessment framework, how functional are the district's DSR mechanisms?
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12 **METHODOLOGY**

13 **Definitions**

14 **In this paper, the term Death Surveillance and Response (DSR) refers to**
15 **all death reporting and review processes related to maternal and child**
16 **health, even if they do not have all the ideal components of DSR. They**
17 **include phenomena commonly reported in the literature such as Maternal**
18 **Death Review (MDR) or Audit, Maternal Death Surveillance and Response**
19 **(MDSR), Maternal and Perinatal Death Surveillance and Response**
20 **(MPDSR), or surveillance and review of child deaths.**
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21 **Conceptual framework**

22 A framework to assess the functioning of DSR mechanisms was developed using
23 criteria drawn from the literature and supplemented by field observations and
24 interviews with frontline providers and managers.
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25 **We conducted a search of the literature using the above terms and**
26 **consulted with experts in the field to identify the elements of well-**
27 **functioning DSR. On the basis of these, a conceptual framework was**
28 **developed. We combined the WHO Continuous Action Framework to**

1 eliminate preventable deaths,⁶ the ‘Three Delays’ framework,²² and other
 2 elements identified in the literature^{2,4,6,20} to assess the DSR processes.
 3 These are outlined in Box 1 and Table 1. The framework distinguishes
 4 between (i) the surveillance process (what, how, who); (ii) the
 5 identification of modifiable causes of death and investigation as per the
 6 three delays model; and (iii) the types of responses (actions) triggered,
 7 whether proactive or reactive. These elements provide a holistic and
 8 comprehensive assessment of the various steps and processes involved in
 9 DSR. Given that mortality reductions require coordination across levels,³³
 10 the framework adopts an area-based approach, using the most
 11 decentralised structures of in health systems coordination, notably the
 12 sub-district, as its unit of analysis.

**Box 1: WHO’s Four components of continuous action in Maternal Death
 Surveillance and Response (MDSR) system**

<i>Identify and notify deaths</i>	Identification and notification on an ongoing basis: Identification of suspected maternal deaths in facilities (maternity and other wards), followed by immediate notification (within 24 and 48 hours, respectively) to the appropriate authorities.
<i>Review maternal deaths</i>	Review of maternal deaths by local maternal death review committees: Examination of medical and non-medical contributing factors that led to the death, assessment of avoidability and development of recommendations for preventing future deaths, and immediate implementation of pertinent recommendations.
<i>Analyse and make recommendations</i>	Analysis and interpretation of aggregated findings from reviews: Reviews are made at the district level and reported to the national level; priority recommendations for national action are made based on the aggregated data.
<i>Respond and monitor response</i>	Respond and monitor response: Implement recommendations made by the review committee and those based on aggregated data analyses. Actions can address problems at the community, facility, or multi-sectoral level. Monitor and ensure that the recommended actions are being adequately implemented.

Table 1: Framework for the functioning of Maternal, Neonatal and Child Death Surveillance and Response

I. Surveillance process (What and How?)**			
Elements of effective Maternal, Neonatal and Child Death Surveillance and Response**	1. Continuous surveillance (full cycle) integrating death auditing, review, communication and feedback mechanism (identify and notify; review, analyse and make recommendations; respond and monitor response)		
	2. Recommending cost-effective and evidence-based practices		
	3. 'No naming, no blaming' (confidentiality, non-punitive tone of the process)		
	4. Integrating learning and response from DSR into continuing professional development, quality improvement, health system strengthening, and community education		
	5. Institutional support culture at all levels of the health system (management)		
	Actor participation (Who?)***		
	6. Driven by multidisciplinary teams (clinical, support, managerial)		
	7. Integration across levels from PHC facilities to hospitals, districts and higher levels		
	8. Involvement and commitment of the managers to act on the findings		
9. Community participation in review and response (social and verbal autopsy)			
II. Following a holistic approach to identifying modifiable causes			
'Three Delays' **	1 st Delay in Deciding and seeking Care	2 nd Delay in identifying and reaching a Health Facility	3 rd Delay in receiving adequate appropriate care
III. Actions (Pro-active & Reactive)			
▪ Provider level	Capacity Building, In-service Training		
▪ System level	Health System Improvement, Provision of resources		
▪ Community level	Community Education		

References: *23; **2,4-6; ***6,34

1 **Study design**

2 We conducted a descriptive, exploratory qualitative case study of the forms and
3 functioning of maternal, neonatal and child DSR processes applying the framework
4 (Table 1).

5 **Study Setting**

6 The study was conducted in one of the three health districts in Mpumalanga Province
7 situated in the north-east of South Africa. The District has a population of about 1.1
8 million, with the vast majority (61%) living in rural areas (Massyn et al., 2017). It
9 contains one regional hospital, eight district hospitals, and 76 primary healthcare
10 facilities, distributed among seven sub-districts.

11 The study district was targeted for health systems strengthening support because of
12 high maternal and child mortality.³⁵ Intensified efforts were specifically made to
13 strengthen DSR in the district over several years, building on long-standing processes
14 (24-hour reporting, Confidential Enquiry into Maternal Death [CEMD], and
15 Perinatal/Child Problem Identification Programmes [PPIP, CHIP]). Besides these,
16 DSR processes were accompanied by improved district clinical support with the
17 introduction of district clinical specialist teams (DCST) and a new mechanism of
18 coordination, referred to as the Monitoring and Response Unit (MRU). These
19 initiatives were widely regarded as having impacted positively on maternal and child
20 mortality in the District.³⁶ In these respects, therefore, the District could be regarded
21 as having relatively well-functioning DSR at the time of the research. Although not
22 nationally representative, it was nevertheless well suited for the qualitative exploration
23 of functioning using a DSR assessment framework.

24 **The framework was applied to maternal, peri/neonatal and child DSR**
25 **mechanisms observed in the district, summarised in Table 2 and**
26 **described in the next section. Five mechanisms were specific to MNCH**
27 **(24-hour Reporting and 48-hour Review, CEMD, PPIP, CHIP, MRU). An additional**
28 **two, which also dealt with maternal, neonatal and child deaths, the**
29 **Morbidity and Mortality, and Clinical Audit/Clinical Governance meetings, were**
30 **general facility-based morbidity and mortality and clinical**
31 **audit/governance mechanisms.**

Table 2. Death Surveillance and Response Mechanisms – Purpose, Frequency and Target

Observed Mechanisms	Purpose	Frequency	Target				Participants
			Maternal	Perinatal	Neonatal	Child <5	
24-hour Reporting, 48-hour Review	Specific to MNCH; Compulsory Death notification	Linked to death event	✓	✓	✓	✓	Facility; Patient Safety Committee (Sub-district and District)
Confidential Enquiry into Maternal Death (CEMD)	Specific to MNCH; Quality assurance; Compliance	Linked to death event	✓				National, Province, District, Hospital
Perinatal Problem Identification Programme (PPIP)	Specific to MNCH; Clinical; Includes perinatal and maternal death audit; Quality assurance	Monthly	✓	✓	✓		District, Hospital, PHC facilities
Child under-5 Problem Identification Programme (CHIP)	Specific to MNCH; Clinical; Audit; Quality assurance	Monthly				✓	District, Hospital, PHC facilities
Monitoring & Response Unit (MRU)	Specific to MNCH; Managerial; Multidisciplinary	Monthly/Bi-monthly	✓	✓	✓	✓	District, Hospital, PHC facilities
Morbidity & Mortality	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	Hospital
Clinical Audit/Clinical Governance	General (not specific to MNCH)	Monthly	✓	✓	✓	✓	District, Hospital, PHC facilities

1 **Maternal, neonatal and child DSR mechanisms in the study setting**

2 **This section briefly describes DSR mechanisms that are specific to**
3 **maternal, neonatal and child health.**

4 ***a. Compulsory 24-hour reporting, 48-hour review***

5 Any maternal, perinatal, neonatal or child death is mandatorily recorded at the facility
6 where the death occurred and reported within 24 hours internally to the district office,
7 and externally to the Department of Home Affairs for issuing of a death certificate.
8 This is the standard operating procedure applied in all facilities in South Africa. In the
9 study district, following the introduction of the MRU and the DCST, a district-level
10 system was also established to review all maternal and under-5 child deaths within 48
11 hours, independent of other processes. This process of 24-hour recording and
12 reporting and 48-hour case review was referred to as ‘real-time death reporting’;³⁷ and
13 its purpose was to enable actions to be taken as quickly as possible to address
14 modifiable factors, such as correcting a skills or staffing gap, provision of resources, or
15 community education.

16 ***b. Confidential Enquiry into Maternal Death (CEMD)***

17 The Confidential Enquiry into Maternal Death (CEMD) was introduced in South Africa
18 in 1997 and involves a standardized process of reporting and auditing. Maternal
19 deaths, in addition to being reported to the district and Home Affairs, are also reported
20 to the provincial MNCH coordinator within 24 hours, who allocates a unique number.
21 A copy of the patient folder and a completed Maternal Death Notification Form
22 (MDNF) are included in the report and submitted to a team of provincial assessors
23 (obstetrician, medical officer, midwife and anaesthetist). Assessors will go to the
24 facility to enquire about the causes of death, as well as any avoidable or modifiable
25 factors. The resulting annual and triennial reports and recommendations (without
26 details on individual cases) are disseminated to Provincial and District structures and
27 academic institutions for collation with general recommendations for action, such as
28 training on the Essential Steps in the Management of Obstetric Emergencies
29 (ESMOE).³⁸⁻⁴⁰

30 ***c. Ongoing Review and Response Structures***

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3 1 As indicated, several routine meeting structures are established for auditing and
4 2 responding to maternal, perinatal/neonatal and child deaths (Table 2).

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8 3 ▪ *Perinatal/Child Problem Identification Programme (PPIP/CHIP)*

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10 4 The PPIP/CHIP review meetings take place monthly at facility level. The meeting
11 5 consists of systematically auditing the patient file related to death, comparing the
12 6 management of the case against standard treatment protocols and guidelines.
13 7 Through discussion, participants identify gaps in clinical management and modifiable
14 8 factors related to the caregiver, provider or system, and set up improvement plans,
15 9 including capacity-building needs for the provider team. Data are entered into a
16 10 specifically designed software package. The meetings observed were chaired by the
17 11 clinical manager or the medical officer in charge of obstetrics and gynaecology, or by
18 12 a nurse operational manager of the maternity ward.

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26 13 ▪ *Monitoring and Response Unit (MRU)*

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28 14 The MRU brings together a team of actors, including managers (PHC, hospital),
29 15 clinicians, information officers at sub-district and district levels, associated with the
30 16 system of local, real-time death reporting referred to above. The aim is to enhance the
31 17 governance of MNCH and to improve area-based coordination between the various
32 18 actors and levels of care. MRU meetings are intended to be convened monthly at sub-
33 19 district and bi-monthly at district level. At district level, the meetings observed were
34 20 chaired by the district manager or a representative, usually, the MNCH coordinator or
35 21 the district quality assurance manager, while at sub-district level, the MRU meeting
36 22 was chaired by the CEO of the district hospital or a representative.

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45 23 **Study sample and Data collection**

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47 24 The sub-districts were purposefully selected in a prior study as representing the range
48 25 of buy-in to one particular DSR strategy (MRU);³³ the implementation of DSR
49 26 mechanisms in these sub-districts was also perceived by district managers as
50 27 representative of what was happening in the district as a whole. We combined semi-
51 28 structured interviews, non-participant observation of meetings with a desk review of
52 29 key documents as data sources for this study.

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59 30 ***Semi-structured interviews***

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3 1 We conducted 45 semi-structured, individual interviews with purposefully selected
4 respondents among those involved with maternal, neonatal and child DSR from two
5 2 of the seven sub-districts and the district office. Respondents were either members of
6 3 the enquiry or audit team or participants in one of the death surveillance and response
7 4 meetings (MRU, PPIP, CHIP). Participants consisted of district programme managers
8 5 (N=10) and members of the district clinical specialist team (DCST) (N=3), hospital
9 6 hospital chief executive officer (CEOs) [N=2], hospital nursing managers (N=4),
10 7 facility and hospital operational managers (professional nurses heading a ward in a
11 8 hospital or managing a primary healthcare facility [N=5]), medical officers (N=7),
12 9 professional nurses (N=3), allied health professionals (N=5), emergency service
13 10 manager (N=1), and facility information managers (N=2). A semi-structured interview
14 11 guide was developed and pre-tested (Supplementary Appendix File 1).
15 12

16 13 Interviews were conducted by the first author as part of a wider study. To ensure
17 14 privacy and confidentiality, interviews were held in the respondent's office or in the
18 15 boardroom outside the meeting time. With respondents' signed consent and
19 16 permission, the interviews were audiotaped and transcribed verbatim. The interviewer
20 17 took notes during and after the interview and summarised the interview on a pre-
21 18 designed coversheet.³⁰ All audio files and transcripts were reviewed by the authors to
22 19 ensure quality.
23 20

21 ***Non-participant observation***

22 21 From May 2018 to September 2019, for a total 59 days distributed over one to three
23 22 weeks in each of the two sub-districts, we conducted non-participant field
24 23 observations by engaging in various activities and meetings related to maternal,
25 24 peri/neonatal and child DSR in which health system actors were actively engaged. A
26 25 structured observation sheet was designed for this purpose.³⁰ We observed the
27 26 following meetings: PPIP and CHIP, MRU, morbidity and mortality, clinical audit,
28 27 clinical governance and patient safety committee. During a meeting, apart from the
29 28 general observation schedule, we specifically observed the structure of the meeting,
30 29 standard agenda, actors involved, presentation and discussion of cases, decision
31 30 process, and related actions (capacity building, provision of resources or community
32 31 engagement). We also reviewed the agendas and minutes of these meetings.
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3 1 During this fieldwork, three maternal deaths occurred in the district and we were able
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5 2 to observe one formal district meeting and engage in informal discussions with district
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7 3 actors on the unfolding maternal death enquiry process linked to these three deaths.
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9 4 **Data management and analysis**

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12 5 Interview recordings were transcribed verbatim, and observation and reflection notes
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14 6 compiled by the first author (PhD student). All data were coded using Atlas.ti version
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16 7 8, and a thematic analysis was used to analyse the data.⁴¹ Key themes were identified
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18 8 following both a deductive approach based on a preset list of themes from the criteria
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20 9 of DSR functioning and inductively wherever new insights were identified.⁴² Details of
21
22 10 the analysis process are reported elsewhere. ⁴³ The themes were grouped into two main
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24 11 categories, namely, 1) the forms and 2) the functioning of DSR. Finally, the findings
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26 12 were presented to respondents in various meetings or individual meetings to verify
27
28 13 and validate the results.

29 14 **Positionality, reflexivity and ethics considerations**

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32 15 Interviews and participant observation can face ethical challenges given the sensitive
33
34 16 nature of a research topic that can potentially expose hidden realities.⁴⁴ The conduct
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36 17 of this study was facilitated by our previous engagements in the study setting, and
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38 18 subsequently as part of the first author's PhD study. These involved a period of
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40 19 immersion and observation, which allowed for the building of trust with participants,
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42 20 and to be able to contextualise and interpret the interviews and observations. To
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44 21 minimise descriptive and interpretive biases, regular feedback and discussion of the
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46 22 findings were conducted during follow-up meetings in the district; and iterative
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48 23 processes engaged between the first author (PhD student) and the co-authors (PhD
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50 24 supervisors) involving continuous questioning of the understanding of data and
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52 25 reviewing of findings.

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54 26 This study was approved by the Biomedical Science Research Ethics Committee and
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56 27 the Provincial Health Research Committee. All interviews proceeded with signed
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58 28 informed consent.

59 29 **Patient and public involvement**

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3 1 Patients or the public were not involved in the design, conduct, reporting or
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5 2 dissemination plans of this study.
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8 3 **RESULTS**

9 10 4 **Functioning of maternal, neonatal and child DSR mechanisms**

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13 5 Tables 3a and b presents an application of the framework and a descriptive summary
14
15 6 of the functioning of each of the DSR mechanisms observed in practice. We report on
16
17 7 the overall functioning of DSR, drawing across all the forms of DSR observed and the
18
19 8 views expressed by the respondents about them. We present key themes that emerged
20
21 9 as critical from the elements outlined in Table 1.

22 23 10 **a. Surveillance and reporting process**

24 25 11 **▪ Continuous surveillance cycle and evidence-based practices**

26
27 12 All DSR mechanisms followed a structured approach to death surveillance and
28
29 13 response, integrating recording and reporting of death, reviewing and classifying
30
31 14 causes and making recommendations for actions based on established guidelines for
32
33 15 MNCH. The MRU was most explicit in emphasising the completion of the surveillance
34
35 16 cycle in its '4R's' approach i.e. 'Report, Review, Record, Respond' to a maternal or child
36
37 17 death.

38 39 18 **▪ The 'no-name, no-blame' approach**

40
41 19 From our observations and the respondents' views, the perinatal and child
42
43 20 (PPIP/CHIP) and the MRU meetings were the most likely to promote the 'no-name,
44
45 21 no-blame' approach. The chairperson of the meeting ensured that confidentiality was
46
47 22 maintained throughout and that no one was blamed for the occurrence of the adverse
48
49 23 event. Otherwise, respondents noted that the meeting could be transformed into a
50
51 24 'punishment exercise' that would discourage actors' participation:

52
53 25 *'..The perinatal meeting itself is not making anybody accountable. The*
54
55 26 *meeting itself is about discussing things, it is not to point to individuals,*
56
57 27 *because it's going to be discouraging for the people [to attend] if it's a*
58
59 28 *punishment exercise...'* [DCST].

60
61 29 This 'no-name, no-blame' approach fostered a high level of commitment to the review
62
63 30 meetings that resulted in a common understanding of individual and system

1
2
3 1 challenges faced. It also fostered mutual support when people were proactively
4
5 2 working as a team.

6
7 3 *'Before there was blaming, blaming, blaming [...] No-one is blaming anyone*
8
9 4 *anymore because we do understand the challenges, we are part of the system,*
10
11 5 *we are in the [same] basket' [EMS manager].*

12
13 6 Even though the meetings were never used to point fingers, or name or blame
14
15 7 providers involved in the management of the case, the respondents raised the
16
17 8 possibility of sanction if at any stage gross negligence was documented.

18
19 9 *'...We are taking every death very seriously. One death is too many deaths,*
20
21 10 *we have to make sure that we follow up on our kids and also on our health*
22
23 11 *care workers [at PHC] the entry point where the neonatal was first attended*
24
25 12 *so that we can check on whether the child was attended according to protocol*
26
27 13 *and if not then consequential management needs to be applied' [Hospital*
28
29 14 *CEO].*

30
31 15 Policy documents formally claim that the CEMD also follows a 'no-name, no-blame'
32
33 16 approach. However, based on interviews and observations in practice, the CEMD
34
35 17 process in the study district was conducted and experienced very differently to the
36
37 18 other DSR mechanisms. The CEMD process typically resulted in intense scrutiny of
38
39 19 maternal death from higher-level management within the district and beyond, seeking
40
41 20 to assign individual responsibility and frequently triggering reactive sanction and
42
43 21 punitive action. Respondents reported suspensions, referrals to the labour office,
44
45 22 litigations and court cases involving frontline professionals. This was one of the
46
47 23 constraining factors of DSR functioning. These CEMD processes were managed
48
49 24 through quality assurance structures (e.g. adverse event committees) and were
50
51 25 associated with a particular language of sanction – such as 'consequence
52
53 26 management'.

54
55 27 *'So the meetings that we usually have with the quality assurance and the*
56
57 28 *maternity doctors and the sisters in charge [...] those [meetings] push us to be*
58
59 29 *more accountable [...] it's not like the perinatal meeting, [where] we don't*
60
30 *mention the doctors who did what, we just present the case. With those ones*
31
32 *[quality assurance], it pushes you to be more accountable because the file is*
33 *there, we all discuss what's in the file. So, whoever was the attending doctor is*
more accountable, feels more accountable' [Medical officer].

1 **Table 3a: Summary of the functioning of DSR Mechanism in practice**

	Death Surveillance and Response Mechanisms					
	24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/Clinical Governance
Functioning in practice (What/How?)	Reporting and Auditing	Naming; Obligation to inform and explain actions and decision taken;	'No naming, no blaming'	'No naming, no blaming'	'No naming, no blaming', Auditing and Quality Assurance	'No naming, no blaming', Auditing and Quality Assurance
Actors involved (Who?)	National, Province, District, Hospital	Facility (PHC, Hospital)	Clinical (District, Hospital, PHC)	Managers, clinical and non-clinical (District, Hospital, PHC)	Clinical (Hospital)	Clinical (District, Hospital, PHC)
Actions (Pro-active & Reactive)		Reactive; Possibility of imposing sanction; Targeting individual; institutional training	Proactive; Taking collective responsibility; Capacity building; system improvement	Proactive; Taking collective responsibility, In-service training; system improvement and community education	Proactive; In-service training	Proactive, In-service training

1 **Table 3b: Functioning of DSR Mechanism compared to elements from the literature**

		Death Surveillance and Response Mechanisms					
		24-hour Reporting, 48-hour Review	Confidential Enquiry into Maternal Death (CEMD)	Perinatal/Child under-5 Problem Identification Programme (PIIP/CHIP)	Monitoring & Response Unit (MRU)	Morbidity & Mortality	Clinical Audit/ Clinical Governance
Matching to the elements for the functioning of DSR mechanisms	I. Surveillance process (What and How?)						
	1. Continuous surveillance (Death auditing, review, communication, and feedback)	✓	✓	✓	✓	✓	✓
	2. Using cost-effective and evidence-based practices	✓		✓	✓	✓	✓
	3. No naming, No-blaming (Confidentiality, non-punitive tone of the process)	✓		✓	✓	✓	✓
	4. Integrating learning and response, quality improvement, health system strengthening, and community education			✓	✓		
	5. Institutional support culture at all levels of the health system	✓	✓	✓	✓	✓	✓
	Actors (Who?)						
	6. Multidisciplinary teams			✓	✓		
	7. Integration across levels of care			✓	✓		✓
	8. Involvement and commitment of the managers to act on the findings			✓	✓		
9. Community participation in review and response							

II. Following a holistic approach to identifying modifiable causes						
	✓		✓	✓		
III. Actions (Pro-active & Reactive)						
▪ <i>Provider level</i>	✓	✓	✓	✓	✓	✓
▪ <i>System level</i>		✓	✓	✓		
▪ <i>Community level</i>				✓		

Note: The tick (✓) implies that the element of the functioning was observed for the selected mechanism

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4 1 ▪ *Integrating learning and institutional support from higher-level management*

5
6 2 The DCST played a key role in providing clinical guidance, mentorship and in-service
7 3 training related to modifiable factors identified in the DSR. The involvement of a
8 4 facilitator from the National Department of Health was also observed as one of the
9 5 enabling factors in mobilizing higher level management support, a factor unique to the
10 6 study setting. By bringing together district and sub-district actors, DSR meetings acted
11 7 as a lever for more transparency between levels, in sharing frustrations and most
12 8 especially the sharing of good practices.

13
14 9 *'I can say that [DSR meeting] is strengthening the communication between*
15 10 *the sub-districts and the district and because of that I don't see any problem*
16 11 *that might hinder us to progress, because that is where we are sharing our*
17 12 *frustrations and sharing our best practices'* [District programme manager].

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28 14 Also important was the presence and commitment of key champions amongst middle
29 15 managers and medical and nursing clinicians who created and nurtured a community
30 16 of practice for sharing knowledge and learning.

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32
33 17 In one sub-district, participants expressed excitement at attending meetings, and the
34 18 venues were sometimes overflowing with participants.

35
36
37 19 *[I]: So why do you think that meeting is taken seriously?*

38
39 20 *[R]: It's the commitment of the medical managers, the commitment of the*
40 21 *managers and also the operational managers in maternity wards and the*
41 22 *doctors* [Manager, DO].

42
43
44
45 23 At these meetings, each step taken in the care pathway (from PHC to the referral
46 24 hospital) was carefully scrutinized and improvement plans with timelines,
47 25 monitoring and a responsible person were developed, facilitated by the involvement
48 26 and commitment of the managers in the meeting:

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50
51
52 27 *'Because when you put those quality [measures] you start from your ward,*
53 28 *...you put as well the responsible people because when you put some measures*
54 29 *you need to monitor, to come and see if it's working. And you need to give the*
55 30 *timeline... you monitor if it's going well, you sustain, if there is something you*
56 31 *need to review or if it's not going well'* [Clinical manager].

1
2
3 1 One of the key moments of the review meetings was to identify the modifiable causes
4 of death and translating them into training and learning opportunities for frontline
5 2 managers and providers, as well as system improvement and community education.
6 3
7 4 The regular presence of DCST and programme managers in the review meetings
8 5 created a sense of trust and space for empowering providers with knowledge and tools
9 6 for better performance. Nurses were able to present cases and engage in discussions
10 7 with doctors. In one instance, where a doctor was trying to dismiss a nurse's opinion
11 8 and impose his view during discussions, the DCST intervened and emphasized that
12 9 everyone's opinion counted..

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18
19 10 *'The meeting is to highlight things, training, educational issues and to bring*
20 11 *the people, the team together [DCST].*

21
22
23 12 Another perceived core value of the DSR process was learning from the death events
24 13 to come up with quality improvement strategies to prevent similar events in the future.

25
26
27 14 *'After we discuss we all come up with ... if I can say, opinions of what actually*
28 15 *transpired or what could have happened for this baby to demise and what we*
29 16 *could have done differently to help the baby. Maybe for the other babies who*
30 17 *are coming in the near future who present the same way, what can we change*
31 18 *to be able to help them' [Medical Officer].*

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36 19 The learning and training were extended to primary health care facilities; minutes of
37 20 the meetings and reminders of the guidelines were circulated; and regular visits to
38 21 facilities were conducted by the district team, reinforcing what was shared in the
39 22 meetings and allowing those who were absent from the meeting to be capacitated with
40 23 needed skills.

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45 24 **▪ DSR process institutionalized**

46
47 25 DSR processes in this district were anchored into routines in all facilities, with
48 26 standardised agendas and supportive supervision from the DCST and the MNCH
49 27 district programme coordinators. The DSR processes were perceived not only to
50 28 contribute to improving the quality of care and outcomes in facilities...

51
52
53
54 29 *'I think the perinatal meetings are there and they are there forever. It's like an*
55 30 *auditing process, it's impossible to run maternity service without this*
56 31 *[perinatal meeting]' [DCST].*

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60 32 ...but also to facilitate the integration of people and services

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2
3 1 *'When we started MRU [...] we were blaming each other, but the more we*
4 *discussed and saw how it fits, we feel now the problem is not within us, [but]*
5 2 *with our resources [...] Now we feel we are part of the institution; before*
6 3 *[MRU] we felt that EMS was not part of the hospital [EMS].*
7 4
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9

10 5 The perceived benefit and value of DSR processes, particularly the review and
11 6 response meetings, were repeatedly emphasized by the respondents as a motivation to
12 7 continue with and integrate them into the core activities of maternal and child in the
13 8 district.

14 9 However, institutionalising appropriate DSR processes across all levels of the District
15 10 was not an easy or completed task. DSR processes faced challenges at an individual
16 11 level (blaming, sanctioning), institutional or service level (shortage of skilled
17 12 personnel), or system levels (ineffective referral system). We also observed variations
18 13 in the level of support and involvement of local leadership and primary healthcare
19 14 facilities in DSR processes.

20 15

- *Actors: Bringing together a multidisciplinary team of actors across levels*

21 16 As indicated, DSR mechanisms were intended to be driven by a multidisciplinary team
22 17 of actors including medical, nursing and other professionals, and across levels
23 18 (community, PHC and hospital). Indeed, a wide variety of actors participated in DSR
24 19 processes, most prominently in the case of the CEMD, where in addition to the
25 20 provincial assessors, the following actors from district and facility levels were
26 21 involved: the district manager (or a representative), quality assurance manager,
27 22 primary health care and hospital services manager, labour relations and corporate
28 23 services, a member of the DCST, the hospital chief executive officer, (CEO), the
29 24 nursing service and clinical managers, as well as the specific health providers directly
30 25 involved in the maternal death.

31 26 Participants in the PPIP/CHIP review meetings tended to be hospital based clinicians
32 27 with the support of district clinicians and, at times, primary health care managers;
33 28 while the MRU meeting sought to expand participation to other stakeholders such as
34 29 academic partners, non-governmental organisations, other government departments
35 30 (notably the South African Social Security Agency) and community representatives.

1
2
3 1 In one particular sub-district, the organizational culture and the leadership style of
4 senior managers promoted collaboration between primary health care facilities and
5 hospitals in DSR.
6
7

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9 4 ‘...we only receive the mother during the process of giving birth, and when the
10 woman is now complicated with pre-eclampsia of which I think that this
11 would have been prevented at the first place; so we are involving the primary
12 health care level to come to the perinatal meetings so that they can hear
13 exactly about the progress of the woman because, for us, as a hospital, we do
14 not have the liberty of starting the woman on antenatal care, whereas the PHC
15 are the ones who might have been able to pick up on some problems during
16 the antenatal period. So, for them being involved in these perinatal meetings
17 is quite vital [...] not coming is also is a transgression on its own’ [Hospital
18 CEO].
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26 14 In this sub-district, where identified modifiable factors were related to the patient or
27 community, hospital board chairpersons were contacted to facilitate the dialogues
28 within the community and identify key actions together with the community leaders
29 to address the identified problem. However, the community was not usually
30 implicated directly in DSR processes.
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36 19
37 20 It is important to note that this degree of functioning was not universal, and there was
38 variation across facilities and sub-districts in the levels of team involvement,
39 particularly of staff from PHC facilities and hospital actors. In instances where doctors
40 and nurses, managers and providers, or PHC facilities and hospitals were not working
41 as a solidified team, accountability mechanisms were flawed resulting in poor referral
42 systems, ‘blame games’ and the deferring of responsibility in case of death events.
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50 27 ***b. Following a holistic (three delays) approach to identifying and***
51 ***acting on modifiable factors***
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54 29 Review meetings were observed to follow the ‘three delays’ approach to identifying
55 factors (especially modifiable factors – Excerpt 1) associated with the occurrence of
56 death events and to take collective responsibility and proactively set up key actions to
57 prevent further events (Tables 3a and b). This was enabled by the presence of
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1 stakeholders across levels - from primary health care facilities to district clinical
 2 specialist teams and programme managers. Because of the managerial orientation of
 3 MRU, the three delays mostly focused on the system factors for action, while
 4 PPIP/CHIP meetings were clinically oriented towards provider and, to some extent,
 5 patient factors. In both cases, any matters related to community engagement were
 6 discussed with the board chairpersons to liaise with the community leadership.

Excerpt 1 (From DSR meeting and discussion with respondents)*

Case 1: A pregnant patient who had never attended antenatal care presented to the hospital with severe complications and subsequently died. The main modifiable factor identified was the delay in deciding and seeking care.

Case 2: A young primigravida who was followed up since the early stage of the pregnancy, but died because of a failure to treat her high blood pressure. The modifiable factor identified was the delay in receiving adequate care.

Case 3: The patient was referred to a higher level hospital for a complication during labour, but the ambulance was delayed resulting in the death of the patient while still at the first level hospital. The modifiable factors identified were the lack of an effective referral system, adequate equipment and trained human resources.

Case 4: In a 'backstreet abortion', a patient was given misoprostol, used for medical termination of pregnancy. She developed complications and sought care at the hospital but could not be saved. One of the modifiable factors was that safe termination of pregnancy services were not sufficiently accessible.

*The 'three delays' approach was applied in the discussion of death cases to identify the modifiable factors associated with death events including patient or community factors (Case 1), the provider (Case 2) or the system (Cases 3 and 4).

c. Implementation of actions

Following the three delays model, the identified actions targeted the community (community education facilitated by the hospital board chairpersons and community leaders); the system (provision of resources); or the providers (skills building). Actions toward community were limited and only addressed by one DSR mechanism (MRU).

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3 1 We observed evidence of implementation of actions recommended from DSR
4 processes which were perceived to result in improved MNCH outcomes. For instance,
5 2 during the study period outreach training in surgical skills (caesarean section and
6 3 anaesthesia) was organized by a provincial team of specialists; DCST members were
7 4 actively involved in organising training and mentoring programmes; and the district
8 5 paediatrician supported facilities to set up and ensure availability and functioning of
9 6 the Continuous Positive Airway Pressure (CPAP) therapy machines for neonatal care.
10 7
11 8

9 DISCUSSION

10 **While WHO guidelines outline the necessary steps in conducting death**
11 **surveillance and response,⁶ there is little holistic guidance on how this is**
12 **to be achieved in health systems. By collating elements from the literature**
13 **into a conceptual framework it was possible to explore the factors**
14 **enabling or constraining DSR functioning in one district. This framework**
15 **may be of value in other similar settings. It can be used by researchers or**
16 **health service managers to explore the functioning of the DSR system,**
17 **diagnose challenges and promote an inclusive organisational culture of**
18 **holistic scrutiny into the causes of death.**

19 **Maternal, neonatal and child DSR is well established in the South African**
20 **district health system. Across the five forms of DSR directly related to**
21 **maternal and child deaths in the study district, we found a range of**
22 **practices. The surveillance process routinely emphasized on the ‘4R’s’**
23 **(‘Report, Review, Record, Respond’). In most instances, the process**
24 **followed the ‘No name, no blame’ approach as stipulated in the guiding**
25 **documents. There were also holistic approaches to identifying causes of**
26 **death, efforts to integrate training and support from higher levels,**
27 **facilitation of multi-disciplinary teams, and elements of**
28 **institutionalisation of DSR in the district. The latter requires a systemic**
29 **supportive environment and organisational culture at all levels that are**
30 **linked to annual planning and budgeting to support the implementation**
31 **of evidence-based actions.⁴⁵ In these regards, the study District had**

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2
3 1 clearly benefitted from the DSR system strengthening interventions
4 implemented over a number of years.
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8 3 In certain instances, however, the “no name, no blame” approach was
9 contradicted by an organisational culture of blame and punishment,
10 particularly following maternal deaths. Here the emphasis was on
11 identifying and sanctioning the persons responsible for death incidents
12 and on curbing the institutional ramifications of the incident, instead of
13 using it as an organisational learning event to prevent further incidents.⁴⁶
14 However, this level of scrutiny was not observed in instances of perinatal
15 deaths, showing the difference between maternal and perinatal DSR
16 processes. Such blame cultures in a healthcare organisation can be a
17 source of an increased number of medical errors.⁴⁷
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26 13 Death events, particularly maternal deaths, are considered to be a
27 barometer of a health system’s performance. In this regard, DSR
28 processes can be constrained by the fear of revealing malpractice and poor
29 health system performance, and DSR processes can become politicized
30 and maternal deaths under-reported by bureaucrats unwilling to disclose
31 system failures.⁴⁸ In our study setting, DSR processes were facilitated by
32 a high-level political commitment from the national government to
33 compulsory and transparent reporting and reviewing of all cases of
34 maternal or child deaths and implementation of measures to avoid future
35 deaths from identified modifiable factors.
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44 23 In this study, ‘no name, no blame’ approaches were observed to facilitate
45 the active participation of various actors, especially those directly linked
46 to death incidents and the possibility of embracing responsibility for the
47 incident.⁴⁹ Thus, DSR processes can create a sense of interpersonal trust
48 and trust in the health care organization, key for generating learning and
49 improvement. In contrast, as noted in Kenya, the lack of trust, the fear of
50 blame or individualised disciplinary action conditioned frontline
51 professionals to be reluctant in disclosing data on maternal death.¹⁷
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3 1 **As proposed by Deis *et al.*⁵⁰ DSR meetings can be transformed into**
4 **instruments of system improvement using a systematic approach that**
5 **incorporates the ‘three delays’ model for action including the providers,**
6 **the health system and the communities in identifying and addressing**
7 **modifiable factors related to death events. This means that DSR processes**
8 **should not only seek to identify and correct frontline providers’ and**
9 **managers’ practices but also health system and structural factors at the**
10 **community level,²⁰ A holistic approach was made possible through the use**
11 **of standardised protocols and guidelines for DSR that integrated**
12 **reporting and feedback mechanisms.⁴⁶**

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11 **Another important element of successful DSR observed was the inclusion**
12 **and engagement of a multidisciplinary team of actors from various**
13 **professional backgrounds and managers. This created a space to address**
14 **not only health system-related problems⁵⁰ but also problems related to**
15 **social structural factors (e.g. social exclusion, poverty). Where these**
16 **functioned effectively, DSR platforms intersected individual and**
17 **collective competency and responsibility for MNCH, enabling a**
18 **community of practice that recognised the contribution and value of all**
19 **levels, from PHC facilities to district hospitals actors. Furthermore, the**
20 **inclusion of various stakeholders into DSR processes can also facilitate**
21 **social autopsies given that some maternal and child deaths occur outside**
22 **of health facilities. Similarly, a study in four Sub-Saharan African**
23 **countries reported interdisciplinary teamwork with good communication amongst**
24 **staff and active participation of staff as enablers of the DSR process.⁵¹ In contrast,**
25 **where actors from PHC facilities and hospitals, or when doctors and**
26 **nurses, managers and providers were disconnected, it resulted in a poor**
27 **referral process, blame games and deferring of responsibility or**
28 **avoidance of accountability. Melberg *et al.*⁴⁸ referred to a ‘defensive**
29 **referral’ as a result of fear of being blamed for maternal death incident.**

30 **When encouraged by leadership support, DSR processes can become a**
31 **platform for common learning, knowledge sharing and quality**
32 **improvement.⁴⁵ Effective DSR system, according to Kerber *et al.* ⁵² needs**

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3 **1 engaged leadership and use of guidelines and protocols that ensure the**
4
5 **2 complete cycle of the audit system.⁵³**
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7

8 **3 Finally, DSR processes were able to systematically and proactively identify**
9 **4 and plan actions based on the framework. Though tracking**
10 **5 implementation of these actions can be limited in scope, this study**
11 **6 nevertheless presented evidence of responsive action implemented as**
12 **7 part of DSR.**
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17 **8 Limitations**

19 **9 The statements of lived experiences of DSR processes by the respondents**
20 **10 could have been what they thought to be the right answer reflecting a**
21 **11 social desirability bias in their responses. Being observed, respondents**
22 **12 could have behaved differently ('Hawthorne effect'). We did indeed**
23 **13 observe instances of where the absence of the national facilitator led to a**
24 **14 slackening of meeting processes. Furthermore, respondents' self-reports and**
25 **15 accounts could have led to an overstatement of phenomena. We sought to**
26 **16 minimise these biases by prolonged immersion in the field and**
27 **17 supplementing formal interviews with observations and informal**
28 **18 conversations.^{30,54}**
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39 **19 This study was conducted in one district at a particular moment in time.**
40 **20 While the forms of DSR are likely to be repeated elsewhere, the study**
41 **21 findings related to the functioning of DSR are not generalisable given the**
42 **22 management investments made. However, the findings have analytical**
43 **23 relevance in illuminating DSR in best-case scenarios and the triangulated**
44 **24 nature of the data provide confidence in the data collected.**
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50 **25 CONCLUSION**

51
52 **26 The success of DSR processes resides in the intersection of many contextual factors**
53 **27 such as the commitment of a multidisciplinary team of actors and support from district**
54 **28 managers, the integration of primary healthcare and district hospitals, and the**
55 **29 establishment of a space for mutual trust and learning anchored within the**
56 **30 organisational culture of health facilities. A holistic approach is essential to address**
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1 the modifiable factors identified, translate them into long-term organisational
2 learning opportunities, and set up evidence-based, 'real-time' responses.

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11 **Contributors:** FKM designed the study, collected, analysed the data, and wrote the
12 first draft with input from AG, HS and SVB. All authors edited the manuscript and
13 approved the final version.

14
15
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35
36
37
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49
50 **ORCID iDs:**

51
52 Fidele Kanyimbu Mukinda: <https://orcid.org/0000-0002-0764-6213>

53
54 Sara Van Belle: <https://orcid.org/0000-0003-2074-0359>

55
56 Asha George: <https://orcid.org/0000-0002-5968-1424>

57
58 Helen Schneider: <https://orcid.org/0000-0002-0418-1828>

REFERENCES

1. United Nations Commission on information accountability for Women's Children's and Health. *Keeping promises, measuring results*. New York: United Nations;2013.
2. De Kok B, Imamura M, Kanguru L, Owolabi O, Okonofua F, Hussein J. Achieving accountability through maternal death reviews in Nigeria: a process analysis. *Health Policy and Planning*. 2017;32:1083–1091.
3. Mills S. *Maternal Death Audit as a Tool Reducing Maternal Mortality*. Washington DC: World Bank;2011. 77799.
4. Smith H, Ameh C, Roos N, Mathai M, Broek NVD. Implementing maternal death surveillance and response: a review of lessons from country case studies. *BMC Pregnancy Childbirth*. 2017;17(233):1-11.
5. World Health Organization. *Beyond the numbers: Reviewing maternal deaths and complications to make pregnancy safer*. Geneva: WHO;2004.
6. World Health Organization (WHO). Maternal Death Surveillance and Response. In. Geneva, Switzerland: World Health Organization 2013:1-118.
7. Bandali S, Thomas C, Hukin E, et al. Maternal Death Surveillance and Response Systems in driving accountability and influencing change. *Int J Gynaecol Obstet*. 2016;135(3):365-371.
8. Kongnyuy EJ, Mlava G, van den Broek N. Facility-based maternal death review in three districts in the central region of Malawi: an analysis of causes and characteristics of maternal deaths. *Women's Health Issues*. 2009;19(1):14-20.
9. Ochejele S, Musa J, Abdullahi MJ, Odusolu P, Attah DI, Aloba G. Maternal death surveillance and response system in Northern Nigeria. *Tropical Journal of Obstetrics and Gynaecology*. 2019;36(2).
10. Pearson L, deBernis L, Shoo R. Maternal death review in Africa. *Int J Gynaecol Obstet*. 2009;106(1):89-94.
11. Ayele B, Gebretnsae H, Hadgu T, et al. Maternal and perinatal death surveillance and response in Ethiopia: Achievements, challenges and prospects. *PLoS One*. 2019;14(10):1-24.

- 1
2
3 12. Bandali S, Thomas C, Wamalwa P, et al. Strengthening the "P" in Maternal and
4 Perinatal Death Surveillance and Response in Bungoma county, Kenya:
5 implications for scale-up. *BMC Health Serv Res.* 2019;19(1):611.
6
- 7
8 13. Halim A, Dewez JE, Biswas A, Rahman F, White S, van den Broek N. When,
9 Where, and Why Are Babies Dying? : Neonatal Death Surveillance and Review
10 in Bangladesh. *PLoS ONE.* 2016;11(8).
11
- 12
13 14. Krug A, Pattinson R. *Saving Children 2004: A survey of child healthcare in*
14 *South Africa.* South Africa: National Department of Health;2004.
15
- 16
17 15. Patrick ME, Stephen CR. Child PIP: Making mortality meaningful by using a
18 structured mortality review process to improve the quality of care that children
19 receive in the South African health system. *SAJCH.* 2008;2(2):38-42.
20
- 21
22 16. South Africa Every Death Counts Writing Group. Every death counts: use of
23 mortality audit data for decision making to save the lives of mothers, babies,
24 and children in South Africa. *The Lancet.* 2008;371(9620):1294-1304.
25
- 26
27 17. D'Ambruso L, van der Merwe M, Wariri O, et al. Rethinking collaboration:
28 developing a learning platform to address under-five mortality in Mpumalanga
29 province, South Africa. *Health Policy and Planning.* 2019;34(6):418-429.
30
- 31
32 18. Mahato PK, Waithaka E, van Teijlingen E, Pant PR, Biswas A. Social autopsy: a
33 potential health-promotion tool for preventing maternal mortality in low-
34 income countries. *WHO South-East Asia Journal of Public Health.* 2018;7(1).
35
- 36
37 19. Biswas A, Halim MA, Dalal K, Rahman F. Exploration of social factors
38 associated to maternal deaths due to haemorrhage and convulsions : Analysis
39 of 28 social autopsies in rural Bangladesh. *BMC Health Services Research.*
40
41 2016;16(1).
42
- 43
44 20. Smith H, Ameh C, Godia P, et al. Implementing Maternal Death Surveillance
45 and Response in Kenya: Incremental Progress and Lessons Learned. *Global*
46 *Health: Science and Practice.* 2017;5(3):345-354.
47
- 48
49 21. De Brouwere V, Delvaux T, Leke RJ. Achievements and lessons learnt from
50 facility-based maternal death reviews in Cameroon. *BJOG.* 2014;121 71-74.
51
- 52
53 22. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci*
54 *Med.* 1994;38(8):1091-1110.
55
- 56
57 23. Barnes-Josiah D. The "Three delays" as a framework for examining maternal
58 mortality in Haiti. *Soc Sci Med.* 1998;46(8):981-993.
59
60

- 1
2
3 1 24. Pattinson R, Kerber K, Waiswa P, et al. Perinatal mortality audit: counting,
4
5 2 accountability, and overcoming challenges in scaling up in low- and middle-
6
7 3 income countries. *Int J Gynaecol Obstet.* 2009;107:S113- S122.
- 8
9 4 25. Rhoda N, Velaphi S, Gebhardt G, Kauchali S, Barron P. Reducing neonatal
10
11 5 deaths in South Africa: Progress and challenges. *S Afr Med J.* 2011;108:S9-S16.
- 12
13 6 26. Mayne J. Addressing attribution through contribution analysis. Using
14
15 7 performance measures sensibly. *The Canadian Journal of Program*
16
17 8 *Evaluation.* 2001;16(1):1-24.
- 18
19 9 27. National Department of Health. Second Interim Report on Confidential
20
21 10 Enquiries into Maternal Deaths in South Africa: Maternal Deaths for 1999. In.
22
23 11 Pretoria, South Africa: NDOH; 1999.
- 24
25 12 28. National Department of Health. National Perinatal Morbidity and Mortality
26
27 13 Committee Report 2008-2010 (NaPeMMCo). In. South Africa: NDOH; 2010.
- 28
29 14 29. National Department of Health. 1st Triennial Report of the Committee on
30
31 15 Morbidity and Mortality in Children Under 5 Years (CoMMiC). In. Pretoria,
32
33 16 South Africa: NDOH; 2011.
- 34
35 17 30. Mukinda FK, Van Belle S, George A, Schneider H. The crowded space of local
36
37 18 accountability for maternal, newborn and child health: A case study of the
38
39 19 South African health system. *Health Policy and Planning.* 2020;35(3):279–
40
41 20 290.
- 42
43 21 31. Shung-King M, Lake L, Sanders D, Hendricks M. *South African ChildGauge*
44
45 22 *2019: Child and adolescent health.* Cape Town: Children’s Institute, University
46
47 23 of Cape Town;2019.
- 48
49 24 32. Allanson ER, Pattinson RC. Quality-of-care audits and perinatal mortality in
50
51 25 South Africa. *Bull World Health Organ.* 2015;93(6):424-428.
- 52
53 26 33. Schneider H, George A, Mukinda F, Tabana H. District Governance and
54
55 27 Improved Maternal, Neonatal and Child Health in South Africa: Pathways of
56
57 28 Change. *Health Systems & Reform.* 2020;6(1):e1669943-1669941-e1669943-
58
59 29 1669912.
- 60
30 34. World Health Organization. *Improving the quality of Paediatric care:*
31
32 *Operational guide for facility-based audit and review of paediatric mortality.*
Geneva: World Health Organization;2018.

- 1
2
3 1 35. Bac M, Pattinson RC, Bergh AM. Changing priorities in maternal and perinatal
4 health in Gert Sibande District, South Africa. *South African Medical Journal*.
5 2019;109(11):838-840.
6
7 3 36. Schneider H, McKenzie A, Tabana H, Mukinda F, George A. *Evaluation of*
8 *health system strengthening initiatives for improving the quality and*
9 *outcomes of maternal, neonatal and child health care in four South African*
10 *districts*. South Africa: School of Public Health, SAMRC Health Services to
11 Systems Research Unit, University of the Western Cape;2017.
12
13 37. Cupido J. *Reducing Maternal, Neonatal and Under 5 Child Deaths by linking*
14 *the Ideal Clinic and the MRU model*. Gert Sibande: DOH;2018.
15
16 38. Moodley J, Pattinson RC, Fawcus S, et al. The Confidential Enquiry into
17 Maternal Deaths in South Africa: a case study. *BJOG*. 2014;121 (Suppl 4):53-
18 60.
19
20 39. National Department of Health. *Saving Mothers 2008-2010: Fifth*
21 *Comprehensive Report on Confidential Enquiries into Maternal Deaths in*
22 *South Africa*. Pretoria2011.
23
24 40. National Department of Health. *Saving Mothers 2011-2013: Sixth report on*
25 *confidential enquiries into maternal deaths in South Africa*. Pretoria2014.
26
27 41. Green J, Thorogood N. *Qualitative Methods for Health Research*. 4th ed.
28 London: Sages Publications; 2018.
29
30 42. Azungah T. Qualitative research: deductive and inductive approaches to data
31 analysis. *Qualitative Research Journal*. 2018;18(4):383-400.
32
33 43. Mukinda FK, Van Belle S, Schneider H. Perceptions and experiences of
34 frontline health managers and providers on accountability in a South African
35 health district. *International Journal for Equity in Health*. 2020;19(1):1-11.
36
37 44. Li J. Ethical Challenges in Participant Observation. *The Qualitative Report*.
38 2008 13(1):100-115.
39
40 45. plementationLewis G. The cultural environment behind successful maternal
41 death and morbidity reviews. *BJOG: an international journal of obstetrics and*
42 *gynaecology*. 2014;121:24-31.
43
44 46. Hussein J, Okonofua F. Time for Action: Audit, Accountability and Confidential
45 Enquiries into Maternal Deaths in Nigeria. *Afr J Reprod Health*. 2012;16(1):9-
46 14.
47
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 1 47. Khatri N, Brown GD, Hicks LL. From a blame culture to a just culture in health
4 care. *Health Care Management Review*. 2009;34(4):312-322.
5 2
6 3 48. Melberg A, Mirkuzie AH, Sisay TA, Sisay MM, Moland KM. 'Maternal deaths
7 should simply be 0': politicization of maternal death reporting and review
8 processes in Ethiopia. *Health Policy and Planning*. 2019;34(7):492-498.
9 4
10 5
11 6 49. Kuipers S, Hart P. Accounting for Crises. In: Bovens M, Goodin RE, Schillemans
12 T, eds. *The Oxford Handbook of Public Accountability*. USA: Oxford University
13 Press; 2014:589-602.
14 7
15 8
16 9 50. Deis JN, Smith KM, Warren MD, et al. Transforming the Morbidity and
17 Mortality Conference into an Instrument for Systemwide Improvement. In:
18 Henriksen K, Battles JB, Keyes MA, Grady ML, eds. *Advances in Patient*
19 *Safety: New Directions and Alternative Approaches*. Vol 2. Rockville (MD):
20 Agency for Healthcare Research and Quality; 2008.
21 11
22 12
23 13
24 14 51. Maternal and Child Survival Program. A Regional Assessment of Facility-Level
25 Maternal and Perinatal Death Surveillance and Response Systems in Four Sub-
26 Saharan African Countries. USAID; 2018. Available at:
27 [https://www.mcsprogram.org/resource/regional-assessment-facility-level-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
28 [maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/)
29 [african-countries/](https://www.mcsprogram.org/resource/regional-assessment-facility-level-maternal-perinatal-death-surveillance-response-systems-four-sub-saharan-african-countries/) (Accessed: 16 August 2020).
30 17
31 18
32 19
33 20 52. Kerber KJ, Mathai M, Lewis G, et al. Counting every stillbirth and neonatal
34 death through mortality audit to improve quality of care for every pregnant
35 woman and her baby. *BMC Pregnancy Childbirth*. 2015;15 Suppl 2:S9.
36 21
37 22
38 23 53. Bergh A-M, Pattinson R, Belizán M, et al. Completing the audit cycle for quality
39 care in perinatal, newborn and child health. In. University of Pretoria: MRC
40 Research Unit for Maternal and Infant Health Care Strategies; 2010:1-45.
41 24
42 25
43 26 54. Baxter K, Courage C, Caine K. Chapter 13 - Field Studies. In: Baxter K, Courage
44 C, Caine K, eds. *Understanding your Users (Second Edition)*. Boston: Morgan
45 Kaufmann; 2015:378-428.
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Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

Interview Guide – Accountability – Review meetings	
A. ACCOUNTABILITY	
Introduction	<ul style="list-style-type: none"> ▪ Can you tell me about your current position/role in the (district) health system? <p><i>Probes: For how long have you been in that position?</i></p>
Accountability definition	<ul style="list-style-type: none"> ▪ Could you describe to me what accountability means to you? <p><i>Probes: What does it make you think of accountability? What does it mean 'being accountable to'?</i></p> <p><i>How would you relate your definition of accountability to MNCH?</i></p>
Challenges	<p>Can you share some of the challenges that you face while performing your tasks as a health professional (or mid-level manager) within your district?</p> <p><i>Probes: Health Systems challenges/Challenges related to clients & Community/Personal challenges</i></p>
<ul style="list-style-type: none"> - Line/forms, - Guidelines - Enablers - Barriers - Complaints 	<ul style="list-style-type: none"> ▪ In your working area, to whom do you think you are accountable and why? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Tell me about the reporting structure with regard to your role in the health systems?</i> - <i>To/from whom do you report/receive order/provide information/provide technical support/training/supervision</i> <ul style="list-style-type: none"> ▪ Are there any accountability guidelines/framework from the DOH that you are using? <i>[If yes, please describe]</i> ▪ What are the enabling and limitation factors of the current accountability processes? ▪ Does the District/Sub-district/Hospital/PHC Management Team have a mechanism in place to handle clients' complaints? How does it work? ▪ Can you describe how voice of the vulnerable (and of the community) is being represented within the Health System/clinic committee/ Hospital Board?
Team	<ul style="list-style-type: none"> ▪ What's your experience/perception regarding teamwork and accountability for MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you tell me about the team members/actors involved in the accountability processes for MNCH (Probe: Level)</i> - <i>How will you characterise the attitude and commitment of teamwork regarding MNCH</i> - <i>What's your beliefs regarding MNCH and the value of accountability</i>

Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

	<ul style="list-style-type: none"> ▪ How do you perceive the performance of the team with regard to MNCH? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Do you share the same goals? How do you set up these goals [decision making process]</i> - <i>Can you comment on the level of participation and collaboration work environment?</i> - <i>How do you monitor group accountability for MNCH</i>
Adverse events	<ul style="list-style-type: none"> ▪ How do you perceive a case of adverse event (e.g. maternal or child death) as a team and/or individual? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Please elaborate</i> - <i>How is the climate within your team when it comes to adverse event?</i> <ul style="list-style-type: none"> ▪ When you have to justify/explain/answer on an adverse event, how do you perceive the role of team members (peers)?
Improvement	<ul style="list-style-type: none"> ▪ How would you characterise the role of the investigation team regarding an adverse event? [Team: DCST, Province, or other] <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Does the investigation result in sanctions and/or learning? [Please elaborate]</i> - <i>If learning, how often does the training happen? By Whom?</i> - <i>How do you identify areas for improvement [beside when an adverse event occurs]?</i>
B. DEATH REVIEW MEETINGS	
Actors/Who?	<ul style="list-style-type: none"> ▪ Can you please describe who attends the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who are the actors from district office, hospital, PHC? Doctors vs Nurses and/or others?</i>
Meeting	<ul style="list-style-type: none"> ▪ How would you describe the structure of the meeting? <p><i>Probe:</i></p> <ul style="list-style-type: none"> - <i>Who chairs, the agenda, how long, frequency, participation/engagement?</i> - <i>What are the drivers/facilitators/barriers to this [name] meeting and related processes?</i>

Title: Forms and functioning of local accountability mechanisms for maternal, newborn and child health: A case study of Gert Sibande District, South Africa

	<ul style="list-style-type: none"> - <i>What, from your perspective, is the difference between MRU, PPIP/CHIP and other review meetings [name]?</i>
Decision process	<ul style="list-style-type: none"> ▪ How would you describe the decision process during the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>What happens? What do you discuss? How do the discussions of the meetings lead to decision or [positive] results (for actions)?</i>
Dealing with adverse events (deaths)	<ul style="list-style-type: none"> ▪ How do you deal with adverse events e.g. maternal or child death? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Can you describe the situation of maternal, neonatal and child death (mortality) in this area since you started in your position?</i> - <i>Can you share from your experience an example of an adverse event (maternal or child death) and how was the process of enquiry?</i> - <i>How do you see the problem of death in terms of accountability?</i> - <i>Do you have/know any policy/guideline for dealing with death event?</i>
	<ul style="list-style-type: none"> ▪ How do you see the role of the [name] meeting as a structure that is facilitating/supporting accountability processes for MNCH? <p><i>Probes:</i></p>
	<ul style="list-style-type: none"> ▪ How would you describe the role of communities in addressing MNCH problems? ▪ How would you describe the role and level of engagement of PHC facilities? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>Referral processes</i> - <i>Role of Provincial and National department of Health</i>
Actions/Outcomes	<ul style="list-style-type: none"> ▪ What from your perspective are some of the key actions and outcomes on MNCH as a result of the [name] meeting? <p><i>Probes:</i></p> <ul style="list-style-type: none"> - <i>How sustainable are these actions? [Please elaborate]</i>
Conclusion	<ul style="list-style-type: none"> - Remind Ethics and right to withdraw from the study at any time - Thanking the informant

Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

Title and abstract

<p>Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended</p>	Pg 1, L1-3
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	Pg 2, L1-28

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	Pg 4, L1 - Pg6, L2
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	Pg 6, L3-13

Methods

<p>Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**</p>	Pg 8, L1-pg9 L5
<p>Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	Pg12, L4-15
<p>Context - Setting/site and salient contextual factors; rationale**</p>	Pg 9, L6-pg10 L11
<p>Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	Pg10, L12-pg11, L7
<p>Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	Pg12, L17-22; Pg31, L11-15
<p>Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**</p>	Pg10, L14-pg11 L21

1 2 3 4 5	Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg10, L28-30 Pg11 L12-13
6 7 8	Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	
9 10 11 12	Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Pg11, L25-pg12, L3
13 14 15 16	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Pg11, L25-pg12, L3
17 18 19 20	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Pg12, L6-15

Results/findings

23 24 25 26	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12, L24-pg27, L18
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Pg12, L24-pg27, L18

Discussion

32 33 34 35 36 37	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg27, L19-pg29, L30
38 39	Limitations - Trustworthiness and limitations of findings	Pg30, L1-16

Other

42 43 44	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg30, L29
45 46	Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg31, L1-6

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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