Requirements for the Integration of RapidSMS and the Shared Health Record

# About this document

This document is intended to highlight the basic requirements for the RapidSMS system to integrate and share clinical data with the Shared Health Record. This document is not intended to serve as the technical specifications. The Requirements for a Shared Health Record contains a number of requirements that will apply to both the sending and receiving systems (not specifically identified as RapidSMS). Unlike previous requirements documents, this document refers to the requirements for the RHEA pilot ONLY.

Recently, requirements for the registries have also been finalized and accepted by the Ministry of Health of Rwanda and should serve as the authoritative reference documents for registries and the relevant data exchanged.

There are several requirements which appear to explicitly define the data structure of the Shared Health Record- these should be treated as suggestions and illustrations only- the final decisions will be the content of later design documents.

# Background

Phase 1 of the RHEA project focuses on assisting and improving the delivery of maternal healthcare within a defined community. In particular, we will seek to improve the coordination of care by implementing information sharing among the different care sites that interact with pregnant women: community health workers, primary care centers, and district hospitals. Since RapidSMS receives information from community health workers, and provides them with relevant alerts, communication with Rapid SMS is a key aspect of RHEA Phase 1 development

We have looked at the information exchanges involved from two perspectives:

1. That of the functional flows between health workers. You can see the work process underlying these flows in the work flow diagram in Appendix A.
2. That of the structured transactions between systems. We plan to use HL7 Version 2.5. This will simply be the Observation Result Unsolicited (ORU) message.

It is worth noting that the RHEA design is centered around the development of national registries for clients (patients), providers, facilities, and common vocabularies; and around the creation of a Shared Health Record (SHR) which provides a common data store for significant clinical information. In RHEA phase 1, we will be improving the coordination of maternal healthcare by enabling communications between the providers caring for patients and the Shared Health Record. That communication is used to get significant data into the SHR, and to allow relevant alerts to be provided by the SHR.

In general the functional flows are based on the current use cases and the high level workflow documented in Appendix A. In brief, data is provided to the SHR to become part of the patient’s record, and to be available for use at primary health centers and district hospitals. At the same time, data received by the SHR which originated at the primary health center is used to trigger alerts that provide relevant information to the community health worker. The flows are labeled as “notifications” – flows from RapidSMS to the SHR based on current transactions, and as “alerts” – flows from the SHR to RapidSMS.

A list of the individual data flows can be found in Appendix B, and the specific data and triggers are further defined in the following specific requirements section.

In general, we are expecting that current data submissions from community health workers to Rapid SMS will lead to updates sent from RapidSMS to the SHR. (These updates could be immediate or they could be batched if that were technically easier to implement.) At the same time, updated data provided to the SHR from the Primary Health Center – and eventually from the District Hospital – would have the potential of triggering alerts to RapidSMS that would lead to messages sent to the community health worker.

# Specific Requirements

The following high level requirements include the business rules as well as *potential* data structures and specifics for the messages where appropriate.

* All messaging interactions between RapidSMS and Registries or Shared Health Record will be facilitated through the Interoperability layer. RapidSMS must be able to send and receive messages to and from the interoperability layer. The RapidSMS server will continue to send and receive all SMS messages- and the RapidSMS Server will be responsible for all messaging to and from the interoperability layer.
* The integration between Rapid SMS and the SHR for the clinical messages will only happen in the regions where the pilot is deployed. The RAPID SMS will only send messages from the catchment area where the pilot running.
* The PRE (Report Pregnancy) message will always be sent from the RAPID SMS server to the SHR.
* The RAPID SMS server will add the CHW NID number and the HC\_FACILITY\_ID associated to that CWH to the PRE message before sending it to the SHR
* The SHR will store this PRE message (received and processed as a HL7 ORU message containing the data from the RapidSMS PRE message) as a new encounter with the following data structure:
  + ENCOUNTER\_DATE = MSG\_DATE\_ SMS
  + HC\_PROFESSSIONAL\_ID= CWH\_NID\_ SMS
  + LOCATION\_ENCOUNTER= LOCATION \_SMS

HC\_FACILITY\_ID= CLINIC\_ID\_SMS

* + PATIENT\_ID= MOTHER\_NID\_RAPID\_SMS
  + DATE\_LAST\_PERIOD=DATE\_LAST\_PERIOD\_SMS
  + MOTHER\_WEIGHT= WEIGHT\_SMS
  + GESTATIONAL\_AGE= should be calculated by the TODAYS DATE - DATE\_LAST\_PERIOD in weeks
  + PDD\_ESTIMATED\_CWH= DATE\_LAST\_PERIOD+9 MONTHS + 7 DAYS
* Upon receiving a birth message (LA- mother in labor)- RapidSMS server will send that message to the SHR which will search the MOTHER\_OBSTETRICAL\_RISK for any previous C sections and/or any previous stillbirth (have to translate to the proper templates) for all pregnancies 36 weeks or more of gestational age. This will generate a specific alert to remind/inform the CHW that the woman will need to deliver in a hospital. This is a new alert/reminder in addition to what is currently generated from RapidSMS. (see appendix D)
* The RISK (Report Maternal Risk /Death) message will always be sent from RAPID SMS to the SHR.
* The RAPID SMS server will add the CHW NID number and the HC\_FACILITY\_ID associated to that CWH to the RISK message before sending it to the SHR
* The SHR will store this RISK message as a new encounter with the following data structure:
  + ENCOUNTER\_DATE = MSG\_DATE\_ SMS
  + HC\_PROFESSSIONAL\_ID= CWH\_NID\_ SMS
  + LOCATION\_ENCOUNTER= LOCATION \_SMS

HC\_FACILITY\_ID= CLINIC\_ID\_SMS

* + PATIENT\_ID= MOTHER\_NID\_RAPID\_SMS
  + RISK\_CODE=RISK\_CODE\_SMS (can occur 1 to n times)
  + MOTHER\_WEIGTH= WEIGTH\_SMS
  + GESTATIONAL AGE= calculate by the SHR
* If the RISK MESSAGE is from a pregnancy more than 36 weeks and there is the assessment that DELIVERY\_RECOMMENDATION on the obstetrical risk template is = “HOSP” then the SHR should send an “advice message to RAPID SMS informing that this woman must deliver at the hospital. Message data structure:
  + DATE\_MSG\_SENT
  + CWH\_PROFESSSIONAL\_ID= CWH
  + MOTHER\_NID
  + ADVICE = DELIVER AT THE HOSPITAL ( to be checked)

See Appendix D for all (current and proposed) reminder and advice messages

* The BIR (Report Birth) message will always be sent from RAPID SMS (server) to the SHR.
* The RAPID SMS server will add the CHW NID number and the HC\_FACILITY\_ID associated to that CWH to the BIR message before sending it to the SHR
* The SHR will store this BIR message as a new encounter with the following suggested data structure:
  + ENCOUNTER\_DATE = MSG\_DATE\_ SMS
  + HC\_PROFESSSIONAL\_ID= CWH\_NID\_ SMS
  + LOCATION\_ENCOUNTER= LOCATION\_MOTHER \_SMS

HC\_FACILITY\_ID= CLINIC\_ID\_SMS

* + PATIENT\_ID= MOTHER\_NID\_RAPID\_SMS
  + CHILD\_NUMBER= CHILD\_NUMBER\_SMS
  + BIRTH\_CODE=BIRTH\_CODE\_SMS (can occur 1 to n times)
  + RISK\_CODE= RISK\_CODE\_SMS (can occur 1 to n times
  + BABY\_WEIGTH= WEIGTH\_SMS
  + GESTATIONAL AGE= calculate by the system
* The Rapid SMS server will not send any CHI (Report Child Health /Death) message to inform of a maternal death (as it does currently), rather we are proposing a new message MAT to report maternal death, be sent to the SHR, as below. See Appendix C for all messages including MAT.

Registering a new CHW- upon receiving a new REG SMS message for a community health worker- the message will be sent from the RapidSMS server to the interoperability layer and on to the provider registry to be validated. If the CHW is not already in the provider register the message will be rejected and be sent to an error log to be manually processed.

# Appendix A



# Appendix B

* **Community health worker registration**: A new community worker is registered within the context of a village. The existing RapidSMS communication is expected to trigger a transaction to the RHEA Central System. This should lead to an updated assignment within the Provider Registry.
* **Expected Pregnancy**: The community worker provides Rapid SMS with information regarding an expected pregnancy. The existing RapidSMS communication is expected to trigger a transaction to the RHEA Central System. The transaction updates the SHR.
* **Suspected Complications or Death**: The community worker provides Rapid SMS with information regarding a patient complication or a death. The existing RapidSMS communication is expected to trigger a transaction to the RHEA Central System. The transaction updates the SHR.
* **Child Born at Home**: The community worker provides Rapid SMS with information regarding a child’s birth at home. The existing RapidSMS communication is expected to trigger a transaction to the RHEA Central System. The transaction updates the SHR.
* **Child Complication or Death**: The community worker provides Rapid SMS with information regarding a child’s complication or a death. The existing RapidSMS communication is expected to trigger a transaction to the RHEA Central System. The transaction updates the SHR.
* **Pregnancy Confirmed**: The confirmation of a pregnancy at the Primary Health Center triggers a transaction to the RHEA Central System that updates the SHR. This is expected to also trigger an alert sent to RapidSMS.
* **Potential Complication**: Once the SHR is updated with confirmation of a pregnancy, there is the potential of reviewing the SHR content to indicate previous information of conditions considered to be a complication of pregnancy. This can lead to an alert sent to Rapid SMS. [Should this information be included within the Pregnancy Confirmed alert? Should it be triggered by the Expected Pregnancy transaction which the SHR receives from RapdSMS?]
* **Confirmation of Complication**: The confirmation of a complication of pregnancy at the Primary Health Center triggers a transaction to the RHEA Central System that updates the SHR. This is expected to also trigger an alert sent to RapidSMS.
* **AnteNatal Visit Due**: The fact that a mother is due for an antenatal visit can be calculated at the SHR based on a) the mother’s expected delivery date, and b) whether the mother has arrived for the visit based on information received from the Primary Health Center. This functionality is already available in RapidSMS and will be leveraged in the pilot.

# Appendix C

# RAPID SMS Messages

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Message Type/ Data Element** | **REG** | **PRE** | **RISK** | **BIR** | **MAT**  **(proposed)** |  |
| **Clinicalworker NID** | X |  |  |  |  |  |
| **CLINIC ID** | X |  |  |  |  |  |
| **LANGUAGE (RW FR EN)** | X |  |  |  |  |  |
| **VILLAGE NAME** | X |  |  |  |  |  |
| **MOTHER NID** |  | x | x | X | X |  |
| **DATE LAST PERIOD DD.MM.YYYY** |  | x |  |  |  |  |
| **RISK CODE** |  | x | x | X |  |  |
| **LOCATION CODE** |  | x | x |  |  |  |
| **LOCATION\_MOTHER** |  |  |  | X | X |  |
| **MOTHER’s WEIGHT IN KG** |  |  | x |  |  |  |
| **CHILD NUMBER** |  |  |  | X |  |  |
| **BIRTH DATE** |  |  |  | X |  |  |
| **BIRTH CODE** |  |  |  | X |  |  |
| **BABY WEIGHT** |  |  |  | X |  |  |
| **DEATH DATE** |  |  |  |  | X |  |
| **MATERNAL DEATH CODE** |  |  |  |  | X |  |

MAT – is a new message only to report maternal death instead of sending this in the CHI message. The proposed structure for the MAT message is:

NID mother – NID of the mother,

DEATH DATE – date the mother died

MATERNAL DEATH CODE

BL – before labor

DL – during labor

AB – after birth

XX - unknown

# Appendix D

# Alerts/Advice and Reminders

Rapid SMS generates both reminder sms messages as well as alerts. The following are the reminders generated, on what schedule, and who is the recipient.

**Reminders**

|  |  |  |
| --- | --- | --- |
| ***Type(s)*** | ***Description*** | ***Recipient(s)*** |
| 2nd ANC visit | 150 days before EDD | CHW |
| 3rd ANC visit | 60 days before EDD | CHW |
| 4th ANC visit | 14 days before EDD | CHW |
| SUP expected delivery date | 14 days before EDD | SUP |
| Expected delivery date | 7 days before EDD | CHW |
| Due date | EDD | CHW |
| Week after due date | 7 days after EDD | CHW |
| Expired reporter  \*Deliver in hospital | Reminder to Supervisor about inactive reporters (15 days without reporting)  28 days before EDD | CHW  CHW |

\*new reminder proposed

Here are the messages that, when received in a CHW generated SMS, will cause an automated message to be sent (and to whom). Other messages can be added as needed.

**Trigger(s)/Alert(s)**

|  |  |
| --- | --- |
| ***Risk/Action Code(s) received from CHW– Description*** | ***Recipient(s) of alert/advice message*** |
| MC-Miscarriage | SUP,CHW,AMB |
| HE-Bleeding | SUP,CHW,AMB |
| CD-Child Death | SUP,CHW,AMB |
| SC-Serious Condition | SUP,CHW,AMB |
| LA & HO - in Labour & at Home | SUP,CHW,AMB |
| MD-Maternal Death | SUP,CHW,AMB |
| CO-Convulsion  \*\*Any risk message received on a pregnant woman who is >36 weeks AND according to the SHR risk assessment the woman needs to deliver in a hospital | SUP,CHW,AMB  SUP,CHW |
| \*\*new/proposed |  |

***CHW*** : Community Health Worker

***SUP*** : Supervisor

***AMB*** : Ambulance

***EDD*** : Expected Delivery Date

***ANC*** : Antenatal Care Visit