



SMS alert system for smart patient communication – A retrospective analysis



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Background



- **India:** 2nd Highest populated country
 - 1.23 billion in 2015, 1.28% growth rate, 1 out of 6 an Indian
- **High level of mobile phone penetration**
- 77.58 users of cell phone / 100 population
 - 960 million subscribers
 - Monthly growth rate 0.86%
- Effective mode of communication
 - Excellent reach in this vast country
 - Smart phone – urban centric, rural catching up
- Hospital decided to **use this technology for efficient patient communication**



Background



- Hospital has developed in-house developed Hospital Information system (**HIS**).
 - DB2 database on AS400 server
 - Front end on classical VB migrating to Web base
- Focus on **IT enabled system** and reduction of paper usage
- Reports & clinical information predominantly on **EMR** (Electronic Medical record)
- Patient is given access to EMR through TMC Website & Kiosks
- **Smart card** & Smart card account
 - EMR access & Financial transaction application



Scope of SMS alerts



- Registration alerts
- **Smart card account usage & balance**
- Appointments
- **Diagnostic reports**
 - Lab reports
 - Select parameters
 - Radiology/ PET CT reports
 - Repeats/ Redo's
 - **Critical alerts**
- **Consent** for **SMS alerts**
 - Option to Opt out



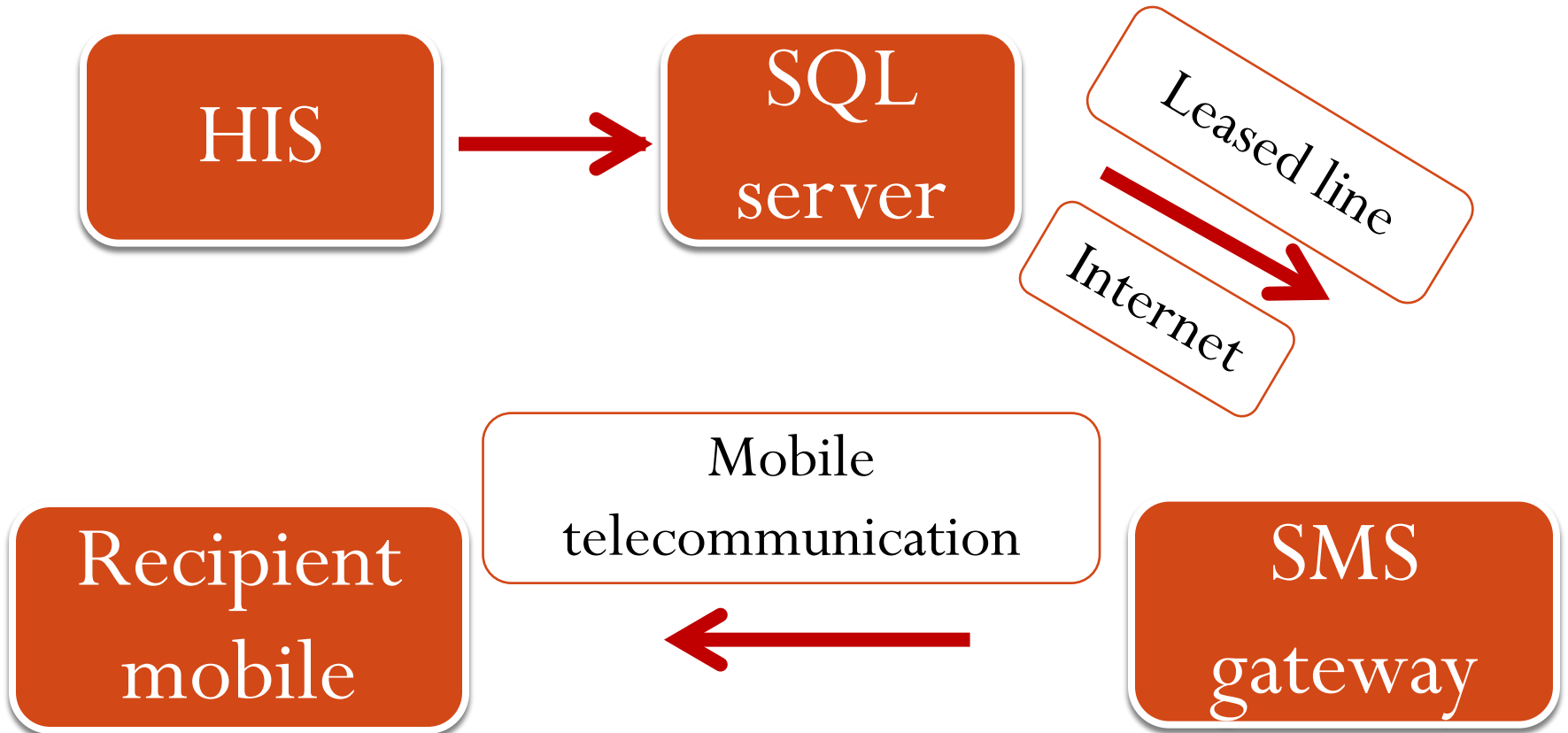
Technological Challenges



- To design and develop **SMS alert** system
- To develop text content masters with patient/transaction specific variables (@) for easy understanding
- **To integrate** with **HIS**
- To integrate with off site sister concern (TMH) whom we share patients and also rely on specific services.



Technology



Technology



Trigger initiated in HIS



Program picks relevant message from master



Program successfully fills variable in the message string



Constructed message gets delivered to SQL server with priority flags



Text message application updates SQL data base with content
& recipient mobile no.

Technology



Memory resident program will push message queued in the SQL into the SMS gateway



SMS gateway sends message to the telecommunication network



Message gets sent to patient mobile



SMS gateway gets status of delivery (delivered/not delivered/ pending)



3 attempts will be made to deliver and if unsuccessful the SQL server will tag it accordingly

Critical alert

- **Biochemistry**

- **Na:** $<120 / >160$ meq/L
- **K:** $<2.8 / >6.0$ meq/L
- **Glucose:** $<50 / >400$ mg/dl
- **Creatinine:** >2 mg%



- **Hematology**

- **Hb:** <6 gm%
- **Platelets:** $10000 / \text{Cu.mm}$
- **Peripheral smear:** Blasts/ Malarial parasite



Alert messages



- *Case no. @1 (Trans No. @2) With reference to your investigation report (@3, ACTREC), Please contact your treating doctor at the earliest.*
- *@1 Report for @3 (Trans. No. @2) is finalised and can be viewed on <https://tmc.gov.in/webemr>*
- *Integrity of sample with Trans. No. @1 compromised. Submit fresh sample @2*



Alert Messages

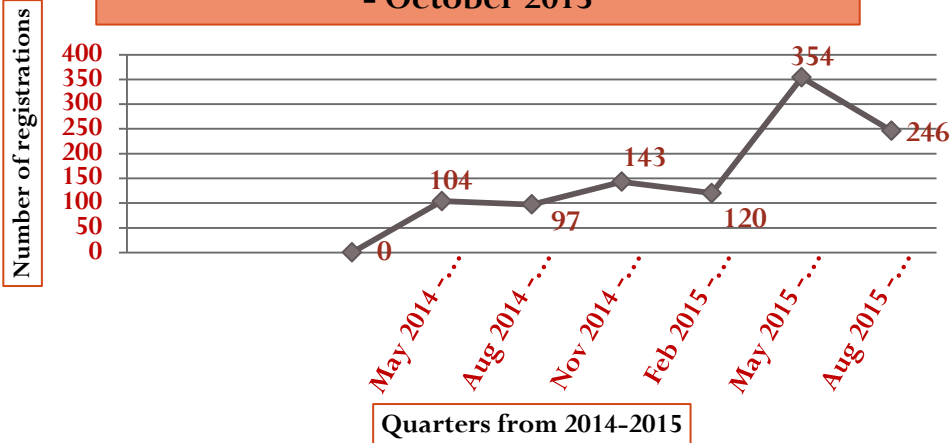


- *Your registration with Tata Memorial Centre has been successful. You have been assigned the Case file No @1. To unsubscribe for this service type STOP<case file no> and send it to 99999*
- *Thank you for using TMH smart card. We acknowledge the credit of amount Rs. @1 into your smart card account. Your balance is Rs. @2*

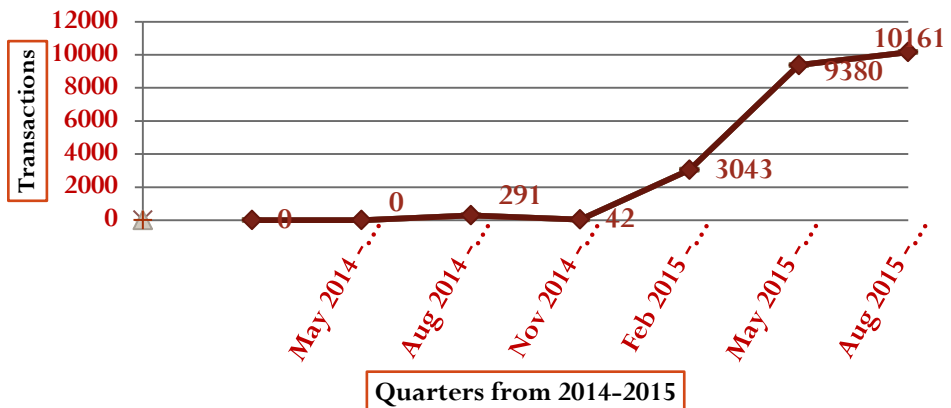


Retrospective analysis

Trends of Registrations Alerts SMS'es May 2014 - October 2015

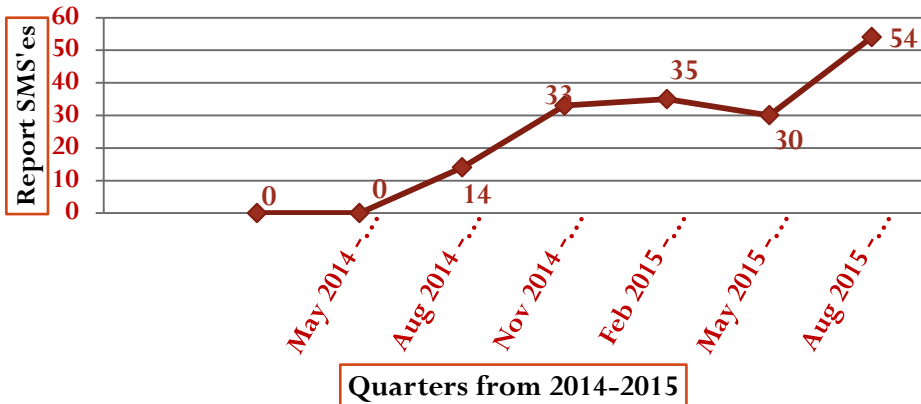


Trends of Smart Card Transaction Alerts May 2014 - October 2015

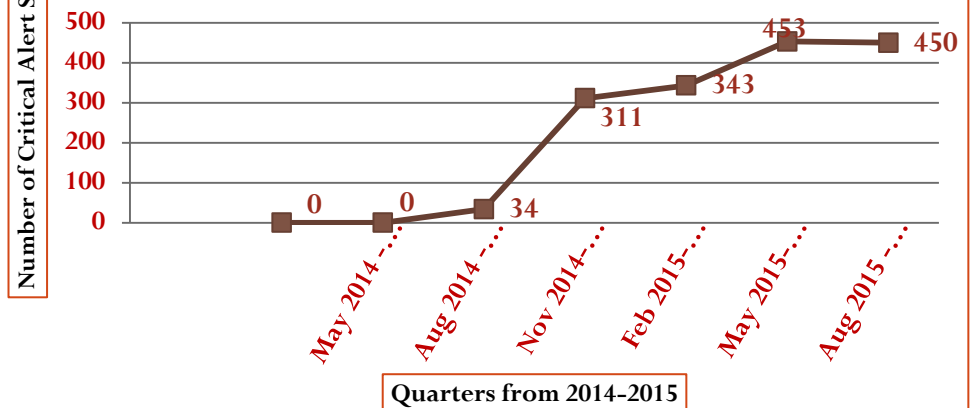


Retrospective analysis

Trends of Diagnostic Report SMS'es May 2014 - October 2015



Trends of Critical Alert report SMS'es May 2014 - October 2015



Limitations & Conclusion



- Registry into the SMS service with right Mobile no. for the patient
- Unsuccessful delivery - Network issues, Phone switched off
- Delayed delivery / Delayed reading
- Language barrier – as message text is currently available only in English

CONCLUSION

- SMS Alert system has improved Patient communication in the Simplest, Quickest & Cost effective way



Future Plans



- **Alerts for services**
 - Follow up reminders – Consultation/ Investigation/ Medication
- **Interactive SMS**
 - Warning sign alerts to the providers from patients
- Transaction alerts for Credit patients (non Smart card)
- **Out station Diagnostic samples**
 - Tracking
- Notification of financial donation received
- General Health advise, Diet advise
- **Alerts to Staff** – Salary/ Reimbursements / Submissions
- **Alerts to Vendors** –Tenders/ Purchase orders/ Material receipt/
Payment release



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THANK YOU

