SMS Tube : A Novel Way of Giving Specimen Collectors 24/7 Mobile Access to Our Specimen Requirements Database

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Objectives :

Pathology Laboratories typically receive many repetitive telephone calls from Doctors, Nurses and Phlebotomists enquiring about what tube they need to use to collect a blood sample for various tests. In our practice these clients do have access to an online web database but many claim that they do not have convenient access to a PC to use that.

This project involved the development of a mobile phone SMS based system which we anticipate will reduce the amount of time 'wasted' on handling these calls.

Method :

Our existing specimen requirements database, currently viewable at

www.centrepath.dhhs.tas.gov.au

has been ported to an SMS database query server for this project.

Typically our clients interact with the SMS system as follows

● Specimen collection staff cannot recall what tube to use when they are just about to collect a blood sample for cholesterol testing so they create a quick SMS query message on their mobile phone eg '**cholesterol**'

● They then send this SMS message to our SMS database server at **+61409454701**

● Our system uses a unique program to query the database which responds with the SMS message

'Cholesterol : 4ml blood, red top tube, patient should be fasting for 12 hours. Results same day.'

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If the SMS text from the caller is not immediately recognisable eg Creat then the system responds with a few options

'Did you mean
  1. Serum Creatinine
  2. Urine Creatinine
  3. Creatinine clearance
  4. None of the above
  Respond by SMSing us the closest
  number from this list'

If the SMS text query is totally unrecognisable then it places that call onto a web page that is monitored by our Specimen Reception staff who will then phone back the caller to assist them.

SMSTube
Management Interface

Unresolved Queries

Handle	Complete	Admin Handler	Time of Request	Phone Number	User Query	Comment
Handle	Complete	user	14/10/2009 10:25:33 AM	+61410747204	Flow	Phoned back at 10:26

The Unresolved Queries Interface

The USB GSM Modem That Is Connected to the Database Server

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Results :

- The software has been shown to be capable of handling SMS query messages via a GSM modem. It has been able to analyse the content of the message to find key acronyms and has used these to search the database. Once the acronym has been matched then the relevant information has been compiled and formatted to the size of a standard SMS text message (160 characters) and this has been sent back to the mobile number from which the request originated.

- Basic session management has been implemented. The system has opened new sessions for each new SMS query that it has received.

- If a query has been matched exactly by the database then the system has responded with the name of the matching test and the relevant tube information. The session has then been closed.

- If there have been multiple matches for the query, the system has responded with a simple "Did you mean?" and provided a list of the possible alternatives, with the final one being "None of the above". When the user has chosen one of the options, then the corresponding database entry has been sent. The session has been kept open until the user replies with an option. If the user has chosen the last option, "None of the above", then the query and the user details have been logged and displayed on the 'Unresolved Queries' Management Interface web pages.

- Any open sessions have been terminated after 10 minutes if the user has not responded.

- Unresolved queries have been notified via an SMS from the system to the user.

- A web interface has been developed that facilitates remote setup of the server and users and also provides a full suite of reports.

SMSTube
Management Interface

Reporting

Reporting

Modify SMS
User Details

Modify Default
Responses

Create Web
User

Unresolved
Queries

Service
Control

Logout

Please select one of the following reports:

- **Traffic Report by Day of the Week and Time of Day**
- **Traffic Report by Date and Time of Day**
- **Traffic Report by Mobile Number**
- **Caller Query vs Our Response Report**
- **Single Session Report**
- **Temporarily Barred Users Report**
- **Permanently Barred Users Report**
- **Client with General Service Problem Report**
- **Client with Response Time Complaint**
- **Nominated Caller Reimbursement Report**
- **All Registered Callers Reimbursement Report**

Caller Query Vs. Our Response

Sort By: Date | Mobile Number | Ascending
Start Date: 01 | September | 2009
End Date: 14 | October | 2009

[Run Query]

Session ID	Query	Date	Time	Reply	Reply Number	Mobile Number
158	Troponin	01/10/2009	16:11:29	Troponin: Plain 5mL (White Top with gel)	1	0439366524
159	Troponin	01/10/2009	16:11:35	Troponin: Plain 5mL (White Top with gel)	1	0439366524
160	Jack jumper	01/10/2009	16:16:55	Jack Jumper IgE RAST: SST 4mL (Red top with gel) OR Plain 5mL (White Top with gel) **This test does NOT include IgE and/or RAST, it ONLY means	1	0439366524
161	Muramidase	01/10/2009	16:32:22	Lysozyme (Muramidase): SST 4mL (Red top with gel)	1	0439366524
163	Gliadin	05/10/2009	09:17:42	Did you mean: 1. anti Gliadin antibody 2. Coeliac Serology 3. None of the above	1	0439366524
164	Gliadin	05/10/2009	09:17:48	Did you mean: 1. anti Gliadin antibody 2. Coeliac Serology 3. None of the above	1	0439366524
165	Thallium	05/10/2009	09:18:35	Thallium (TI): Urine 24hour ACID WASHED (plastic 2 litre Bottle)	1	0439366524
166	Thallium	05/10/2009	09:38:32	Thallium (TI): Urine 24hour ACID WASHED (plastic 2 litre Bottle)	1	0439366524
162	Call "101" 3 Messages	05/10/2009	09:17:35	Your query did not match any results. Pathology will contact you.	1	101
167	2	07/10/2009	12:39:05	Viscosity - whole blood: Lithium Heparin 4mL (Green Top)	2	0439366524
167	Viscosity	07/10/2009	12:38:31	Did you mean: 1. Viscosity - plasma 2. Viscosity - whole blood 3. None of the above	1	0439366524
				Your query did not match any		

Done

Discussion and Conclusions :

The project has reached an advanced stage in the 'proof of concept' cycle. A panel of clinical and laboratory users have tested the system. As a result of their feedback further work needs to carried out on the underlying database. Essentially the database that was ported from the Internet system has some Comments Field that contain so many characters that the 160 character limit on the SMS reply was insufficient. This will be resolved by the laboratory editing down the information in that comment field to the minimum required by the Phlebotomist.

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