<u>CSEP 590B, Assignment 6, Due Wednesday, February 18, 6:30 pm</u>

SMS Cold Chain Reporting syntax: Laos is in the process of deploying an SMS reporting system for cold chain status and vaccine stock reporting. The idea is that every month the health center sends an SMS message to a central server with information about the status of the refrigerators and the stock levels at the health facility. The project is described in the paper "Supporting Immunization Programs with Improved Vaccine Cold Chain Information Systems," which was published at last years GHTC conference.

This assignment is to design a message structure and syntax for reporting of monthly data from the health facilities. The messages are sent to a server, which processes the messages and stores results in a database. The message structure that you design must:

1. Support reporting of monthly refrigerator alarm reports and stock levels of a subset of vaccines from the Routine Schedule.

2. Must provide a mechanism for associating the messages with health facilities.

3. Must be unambiguously parseable.

4. Use Latin characters (letters, digits, and possibly punctuation) on a standard mobile phone.

In addition, the message structure should be easy to use by a population that has limited familiarity with English (and possibly are not comfortable with the Latin script.) You should try to make your message structure easy to learn, and you may wish to make the common messages short.

The final design consideration is to make the message structure extensible (so that you can add additional commands). There is also the possibility that the system will be redeployed in French or Spanish speaking countries.

Gory details.

Facilities: Reporting should be done from all health facilities, and vaccine storage facilities. The types of health facilities are Health Centers (with a single refrigerator), and provincial and district vaccine stores (with multiple refrigerators). Each health facility has a unique numerical code. The format of the numerical codes is PPDDFF, where the first group of two digits give the province, second group of two digits give the district, and the third group of two digits give the facility number. For facilities with multiple refrigerators, the refrigerators

are designated by letter: a, b, c, ... You can assume that a facility never has more than 26 refrigerators.

Temperature monitoring:
The status of each refrigerator should be reported on the first of every month. The status is given by reading a 30DTR temperature recording device which gives the number of days the refrigerator is too hot (above 10 degrees for more than 8 hours), or too cold (below -0.5 degrees for more than 1 hour). The number of days with high alarms, and the number of days with low alarms should be reported. If there are more than five days with a high alarms, only five need to be reported (and similarly for low alarms). (The reason for this, is that if there are a large number of alarms, action needs to be taken, and the exact number doesn't matter.)

Stock levels: The stock levels of vaccines should be reported on a monthly basis. The report should give the number of vials of each vaccine on the routine immunization schedule. (The initial deployment only covers two vaccines, Pneumoccocal Vaccine and Pentavalent Vaccine.)

Other commands:
The system should support emergency reporting of events. These can be reported at any time. These include a stock out of a vaccine, a failure of a refrigerator, the repair of a refrigerator, and the failure of temperature reporting device.

The system should also allow a help message, to get information on different commands (and should be designed so responses are sent as short messages.)

The client has also requested the ability to use the SMS facility to query the backend database on the stock levels at facilities and the status of refrigerators. This should allow queries that will give either individual results from a facility (on a particular vaccine or refrigerator), or for all vaccines/refrigerators associated with a facility. The query mechanism should also allow reports on whether or not data has been reported on time from specific facilities.

Experience with the client indicates that this list is likely to grow - so there should be a mechanism to allow for extension.

Registering phones:
You may assume that there is a mechanism that allows phones to be initially registered at health facilities. However, the system should allow for other phones to be used to report data from a health facility.

Assignment: Your write up should address the following points:

1. A full specification of your message syntax.

2. A description of what should happen on the back on on receipt of messages, and what notifications or responses should be give.

3. A discussion of usability of your approach, especially for populations who are not familiar with technology or the Latin script.

4. A discussion of design trade offs that you made.

Submit all materials by Catalyst by 6:30 pm, Wednesday, February 18. Submit via the dropbox which will be accessible through your Catalyst accounts.