

# HL7 mFHASt Standard

mobile Frameworks for Healthcare Adoption  
of Short-Message Technologies



Project of the HL7 Mobile Health Workgroup

Presented By: mHealth Co-Chair, Matthew Graham  
Project Lead: mHealth Co-Chair Nathan Botts

# mFHASt Goal

- To provide standards for communicating health services through short message technologies (SMTs) (e.g. SMS, Twitter, etc.)
- Increase opportunities for patient engagement and communication

# mFHASt Status

- Evolved out of mHealth LMIC sub-workgroup activities
- New HL7 project/product (normative standard) in development
- Approved by HL7 SD April 2015
- Awaiting approval by TSC
- Meeting Thursdays @ 2pm EST

# Short-message Tech in Healthcare

Multiple global short-message studies have reported success in improving health outcomes and activities related to:

- Smoking cessation
- Diabetes
- Weight management
- HIV
- Medication adherence
- Appointment attendance
- Activity/Fitness Monitors
- Telehealth/eConsultation
- Pandemic Tracking (e.g. Ebola)
- Immunization/Vaccination

# mFHASt Domain Examples

- Clinical reminders (e.g., appointments, treatments)
- Health Education
- Vital Records
- Disaster Reporting
- Adverse Event Reporting
- Telehealth
- eConsultation
- Community health mobilization
- Public Health and Emergency Response
- Surveillance and Tracking
- Maternal & Child Health

# Short-message Basics

- “Short-Message” encompasses the realm of technologies related to SMS, text messages, instant messages, Twitter, Unstructured Supplementary Service Data (USSD),etc
- Messages composed of approximately 140-160 characters
- Estimated that upwards of 200,000 SMS messages are sent every second
- Low-cost, low infrastructure, low learning-curve
- Currently predicted that instant messaging (MIM) carries upwards of twice the volume (50 billion per day) of messages than SMS (Deloitte 2014)

# How does 140 characters feel?

This is an example of 140 characters:

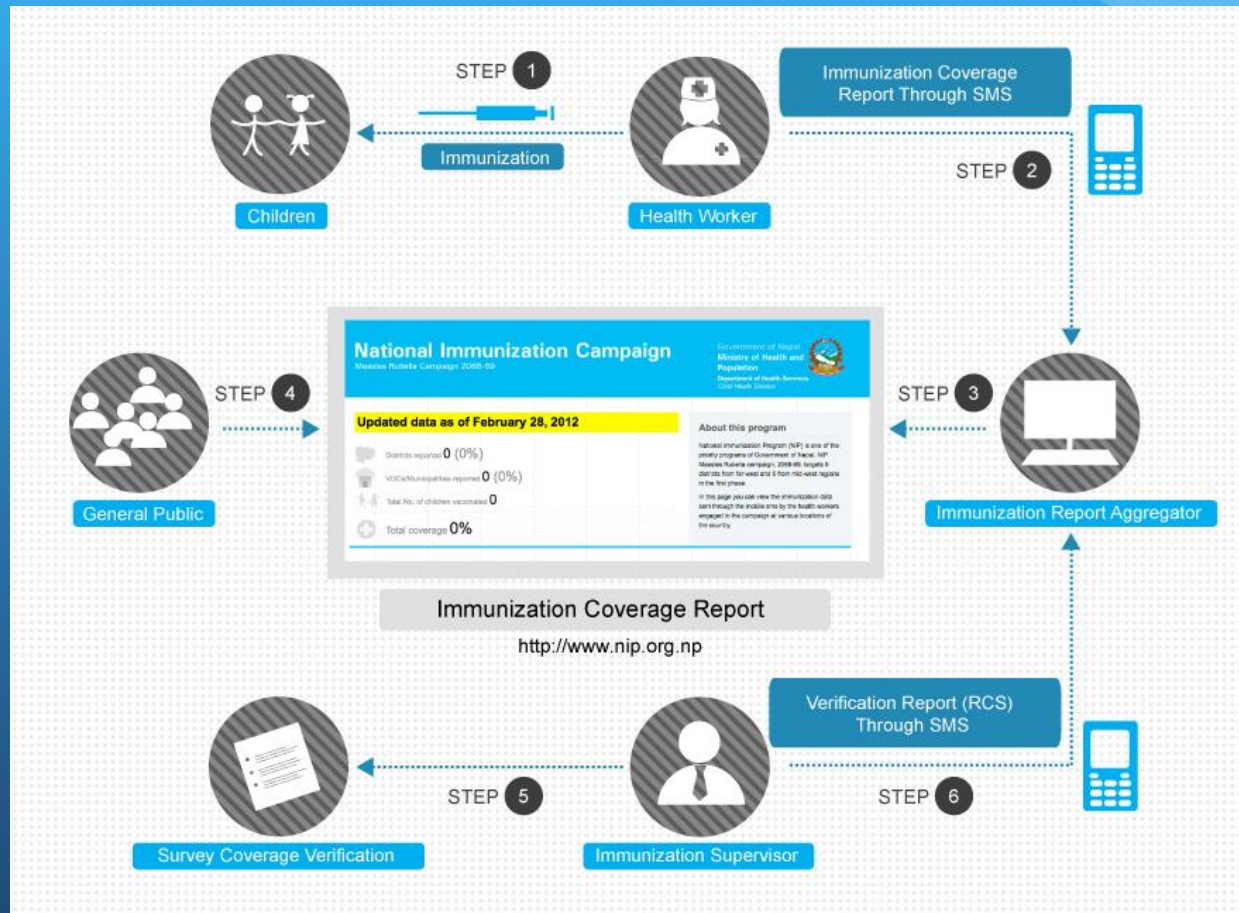
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nunc eu fermentum urna. Vestibulum rhoncus non nisl eu malesuada. Duis turpis dui.

# SMT Clinical Use Illustration

Mayo Clinic Health System — Franciscan Healthcare patients can choose to receive text message reminders in place of the automated telephone reminder for upcoming clinic, lab and rehabilitation appointments that are made two or more days in advance.

Patients must provide their cell phone number and elect to participate in the service by texting “MCHS” to 622622. Patients who elect to receive this service can sign up anytime to receive reminder texts for all future appointments.

# SMS Use Case - Immunization



Reference: <http://www.nip.org.np>

# SMS Use Case - Maternal/Child Health

## Set Up Free **Appointment Reminders** with Text4baby

1. Text REMIND (or CITA for Spanish) to 511411.
2. Enter appointment date. Enter 7/7/2014 as 07072014.
3. Enter appointment description with time, place and purpose (ex. 3pm apt w Dr Parker).
4. Reminder text will be sent three days before and the morning of appointment.
5. You can set up as many reminders as you need, at any time.

Reference: <https://www.text4baby.org>

## Findings:

- Increased perception of being prepared to be a mother
- Increased acknowledgment of the dangers of alcohol consumption during pregnancy
- Potential Barrier: Enrollment increases with level of literacy

# SMS Use Case - Ebola Disease Management



Reference: <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/10/gsma-Ebola-Mobile-Response-Blueprint.pdf>

# SMS Use Case - TB

## SMS + Cue Card Interface

### General Strengths

Can be used with any phone  
Ongoing cost is low (SMS)  
Many workers familiar with SMS

### General Weaknesses

- b) Requires basic literacy skills  
Changing survey requires new cue card  
Hard to enter in free-form notes  
No confirmed receipt of data delivery  
Worker can forget or lose cue card  
Quite easy to fake visits (copy old SMS)

### Our Results: Accuracy & Efficiency


We measured 4.5 errors per 100 entries  
The average interaction was 97 seconds

## SMS Cue Card

### 1. Create a new SMS Message

Press Center Button  
Select "Messages"  
Select "Create Message"  
Select "New Short Message"

### 2. Switch to Numeric Input Mode

Press Menu Button   
Select "Entry Mode"  
Select "Numeric"

### 3. Enter the ID of the Current Patient

Aamir Khan	- Press 1
Abhishek Bachchan	- Press 2
Aishwarya Rai	- Press 3
...	

### 4. Enter a Space

Press \*

### 11. Enter the Patient's Cough

No Cough	- Press 1
Rare Cough	- Press 2
Mild Cough	- Press 3
Heavy Cough	- Press 4
Severe Cough (with blood)	- Press 5

### 21. Check Yourself

Your finished message should be  
formatted similarly to the following:  
**10 372 62 68 4 1030007**

Reference: <http://www.cs.cmu.edu/~ebrun/patnaik-ictd09.pdf>

# Short-Message Standards Development

<p><b>1</b></p> <p><b>IN DETERMINING WHETHER AN SMS PLATFORM IS APPROPRIATE FOR DISASTER RESPONSE ACTIVITIES,</b></p> <p>• • •</p> <p>ORGANISATIONS SHOULD CONSIDER THE BROADER LOCAL MEDIA ENVIRONMENT AND CONTEXT, MOBILE PHONE OWNERSHIP AND DISTRIBUTION (ESPECIALLY IN REGARDS TO ACCESS BASED ON GENDER AND AGE), LITERACY LEVELS AND THE COVERAGE AND RELIABILITY OF THE NETWORK.</p>	<p><b>2</b></p> <p><b>SMS PLATFORMS SHOULD IDEALLY BE SET UP PRIOR TO MAJOR DISASTERS.</b></p> <p>THESE SYSTEMS SHOULD BE HIGHLY ROBUST AND RELIABLE. BACKUP SYSTEMS SHOULD ALWAYS BE AVAILABLE SHOULD THE PRIMARY SYSTEM CRASH, MAKING IT OPTIMAL THAT PROFESSIONAL ORGANIZATIONS HOST THE SERVERS AND CRITICAL NETWORK CONNECTIONS (PREFERABLY IN SITES LOCATED OUTSIDE OF THE DISASTER ZONE).</p>	<p><b>3</b></p> <p><b>EXISTING NATIONAL SMS SYSTEMS SHOULD NOT BE DUPLICATED</b></p> <p>[UNLESS THERE ARE COMPELLING REASONS TO DO SO].</p> <p>INSTEAD, ORGANIZATIONS SHOULD WORK WITH LOCAL GOVERNMENT AS MUCH AS POSSIBLE. THIS MEANS SUPPORTING NATIONAL INSTITUTIONS AND PROCESSES WHEREVER POSSIBLE.</p>	<p><b>4</b></p> <p>ORGANIZATIONS SHOULD PLAN REGULAR CONTACT WITH MOBILE NETWORK OPERATORS TO AVOID SWAPPING THEM WITH AD-HOC REQUESTS.</p> <p>• • •</p> <p>MNOs SHOULD APPOINT A SINGLE POINT OF CONTACT FOR HANDLING SHORT CODE AND CONNECTIVITY REQUESTS IN A DISASTER/CRISIS EVENT WHEREVER POSSIBLE.</p> <p>• • •</p> <p>RESPONDERS SHOULD ALSO APPOINT A SINGLE POC TO COORDINATE COMMUNICATION WITH MNOs, ESPECIALLY IN CLUSTER-BASED RESPONSES.</p> <p>• • •</p> <p>POCS FOR BOTH PARTIES SHOULD BE TRAINED IN ADVANCE ON CONNECTIVITY AND SERVICE ROLL-OUT NEEDS, TO MINIMIZE COORDINATION CHALLENGES DURING DISASTERS.</p>
<p><b>5</b></p> <p><b>A STREAMLINED PROCESS FOR SHORT CODE PROVISIONING SHOULD BE ADOPTED TO AVOID CONFUSION AND DUPLICATION</b></p> <p>• • •</p> <p>SHORT CODE SHARING BY MULTIPLE ORGANISATIONS SHOULD BE CONSIDERED WHERE POSSIBLE, AND ACHIEVING THIS REQUIRES THAT THESE ORGANISATIONS PARTNER WITH EACH OTHER, PREFERABLY THROUGH A COORDINATING BODY (FOR SMS BROADCAST PURPOSES) AT A SYSTEMIC LEVEL.</p> <p>THE LATTER WOULD ENSURE THAT TEXT MESSAGES ARE NOT DUPLICATIVE OR CONTRADICTORY, AND THAT ANY PARALLEL SERVICES DO NOT INTERRUPT THE OPERATIONS OF THE OTHER. IT WOULD ALSO ENSURE THAT THE CAPACITY AND PROCESSES FOR RESPONSE</p>	<p><b>6</b></p>  <p>ALTHOUGH POTENTIALLY CHALLENGING TO ACHIEVE, MANY ACTORS AGREE THAT A CENTRALISED COORDINATING BODY SHOULD BE IDENTIFIED TO STREAMLINE SMS SERVICES IN AN EMERGENCY.</p> <p>STRONG PARTNERSHIPS, PREPAREDNESS AND</p>	<p><b>7</b></p> <p>FOR MNOs</p> <p>WHERE PRICING IS CONCERNED, MAKE EVERY EFFORT TO OFFER TEXT SERVICES AT ZERO COST TO LOCAL USERS – OR AT LOCAL SMS RATES. DO NOT CHARGE PREMIUM SMS RATES FOR VITAL INFORMATION UNLESS ALL OTHER PRICING OPTIONS ARE IMPOSSIBLE. AT TIMES, MNO INFRASTRUCTURE MAY BE AFFECTED BY A DISASTER, IMPACTING SERVICE PROVISION AND STRAINING THEIR OPERATIONS.</p>	<p><b>8</b></p> <p>FOR RESPONDERS</p> <p>(IF DIRECT CONNECTIVITY WITH MNO GATEWAYS IS NOT POSSIBLE) UTILISE NETWORK CONNECTIVITY PROVIDERS WHICH HAVE BEEN AUTHORIZED TO PROVIDE SERVICES BY THE MNOs IN THE COUNTRY. COUNTRIES OF SERVICE DELIVERY JUST AS TOWNSHIPS HOST THEIR OWN SERVERS TODAY FOR REASONS OF SCALABILITY AND MONITORING, IT IS NO LONGER AN OPTIMAL ARCHITECTURE FOR AN NGO TO HOST LOW-LEVEL NETWORK CONNECTIONS.</p>
		<p><b>9</b></p> <p>FOR RESPONDERS</p> <p>CONSIDER THAT MOBILE NETWORK OPERATORS ARE BOUND BY LICENSING, LEGAL AND REGULATORY REALITIES THAT WILL VARY BY COUNTRY AND INFORM THE WAYS IN WHICH INFORMATION CAN BE SENT OVER THE MOBILE NETWORK WHICH MAY IMPACT SERVICE DESIGN. PREPARING FOR THIS TO LIMIT NEGATIVE IMPACT OR DELAY IN SERVICE ROLL-OUT MAY BE ACHIEVED BY CONSIDERING LOCAL INFORMATION ECOSYSTEMS, CULTURAL CONTEXT AND THE TELECOMMUNICATIONS AND MEDIA LANDSCAPE TO ENSURE THAT THE SERVICE IS RELEVANT TO THE INTENDED AUDIENCE AND COMPLIANT WITH RELEVANT PRIVACY AND POLICY REGULATIONS AS MUCH AS POSSIBLE. (FOR EXAMPLE, SEE TOOLS SUCH AS INFOGASAP'S MEDIA AND TELECOMS GUIDES).</p>	<p><b>10</b></p> <p>THE ABILITY TO MONITOR AND EVALUATE THE IMPACT AND APPROPRIATENESS OF THE SERVICE SHOULD BE CONSIDERED AND OUTLINED IN THIS STAGE.</p>

Reference: <http://www.souktel.org/sites/default/files/resources-files/Towards-a-Code-of-Conduct-SMS-Guidelines.pdf>

# mFHASt Whitepaper Development

- Purpose: Scoping and Education of mFHASt Domain
- Outline:
  - SMT Background
    - SMT Workflow
    - SMT Structures
  - Methods
    - Lit review
    - Environmental scan
  - Results & Discussion
    - Current domain of SMT interventions
    - Standards development implications

# mFHASt Preliminary Findings: Domain



# mFHASt Preliminary Implications

- SMT Intervention findings suggest:
  - Ability of targeted text messages to improve lifestyle decisions toward cardiovascular health
  - Effectiveness of SMS mobile health methods for improving frontline health worker adherence to treatment guidelines
  - Opportunity for text-message based reinforcement to increase effectiveness of a behavioral intervention (encouraging increased walking habits)
  - Effectiveness of short messages for increasing adherence to malaria therapies
  - Standards for insulin titration through SMS methods within underserved populations.

# Short-message Barriers

- Ad-hoc implementations
- Lack of interoperability
- Security/Privacy/Consent
- Message size
- Stateless (at its most basic implementation)
- Cost of message
- Governmental and organizational policy and barriers

# mFHASt Pathway of Inquiry

- What is the issue?
- What are the critical variables? (e.g., prioritization, response)
- What are the privacy/security/consent variables required?
- Who initiates/consumes/stores the message?
- What format/architectures are required?
- What are the temporal considerations?
- What are the limitations?

# Short-Message Actors

- Healthcare Providers (at all levels)
- Business
- Organizations (e.g., Non-profit, NGOs)
- Governments
- People (Families, Peers, Public)
- Systems

# mFHASt Communication Structures

- Coded Response
- Short codes (reference sets)
- Free Text
- Structured Response
- API Interactions & Transformations

# mFHASt Future and Beyond

- Space exploration health needs...
- Extreme remote and boundary cases
  - Low density population areas
  - High Altitude populations
  - Oceanic exploration
- Extremely low-bandwidth environments
- Transmission speeds
  - Requirements when high throughput is paramount

# mFHASt Project Timeline 2015

- Q1 2015 - PSS submission, Documentation, education, use case development and requirements gathering
- Q2 2015 - Project approval at HL7 Paris Meeting, Use Case development
- Q3 2015 - Environmental Scan, White paper development
- Q4 2015 - Comment only draft developed
- Q1 2016: (1<sup>st</sup>) Ballot

# Related and Associated Organizations & Projects

## SDO/Organizations

- HL7 EHR/PHR/FHIR/Medical Devices/PHR
- WHO eHealth Standardization and Interoperability Recommendations
- ISO/AHIMA/OASIS/IEEE/HIMSS

## Initiatives

- Mobile Alliance for Maternal Action (MAMA) in Bangladesh and South Africa
- Millennium Development Goals
- mPowering Frontline Health Workers
- Saving One Million Lives initiative
- Asia e-Health Information Network

## Organizations

- US Centers for Disease Control
- U.S. Office of the National Coordinator for Health Information Technology
- World Health Organization
- United Nations Foundation
- USAID / UNICEF
- mHealth Alliance
- Johnson & Johnson
- Gates Foundation

# Appendix

# Short-Message Communication Methods

- Reminders
- Broadcasts (e.g., Alerts, Alarms)
- Education/Decision Support
- Structured Data Collection
- Interactive Health Communication