

# Instrumentation and Mobile Technology for Monitoring Sexual Behavior and Product Use in Clinical Trials

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# Outline

- MTN 017 + SMS
- What is Instrumentation?
- Process Variable(s) 1 & 2
- SMS System Instrumentation
- Process Variable(s) 3
- Biomedical Informatics
- Process Variable(s) 4
- SMS Survey Item Instrumentation
- Improving the Process of Survey Item Instrumentation

# MTN 017 - SMS

- South Africa, Peru, Thailand, US
  - Four Languages & Eight Sites Total
- Three study arms
  - Daily pill, Daily gel, Intercourse dependent gel use
- Questions sent and answers collected via SMS text message
  - Automated SMS reminders sent to participants to remind them to report behavior
  - Keyword recognition automates system response
  - Site-to-Participant communication capability

# Instrumentation

- Art and science of measurement and control of process variables\*
- Instrumentation in MTN 017's SMS system
  - Short message service (SMS) data collection system
  - Survey instrument items

# Instrumentation

- Art and science of measurement and control of process variables\*
- Instrumentation in MTN 017's SMS system
  - **Short message service (SMS) data collection system**
  - Survey instrument items

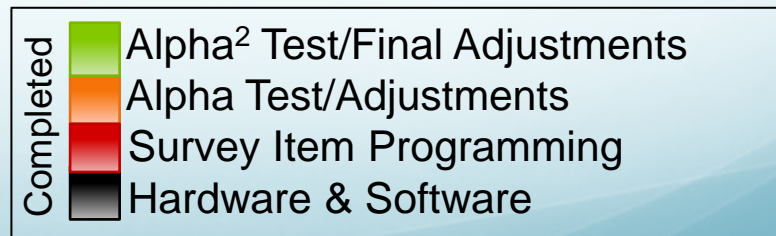
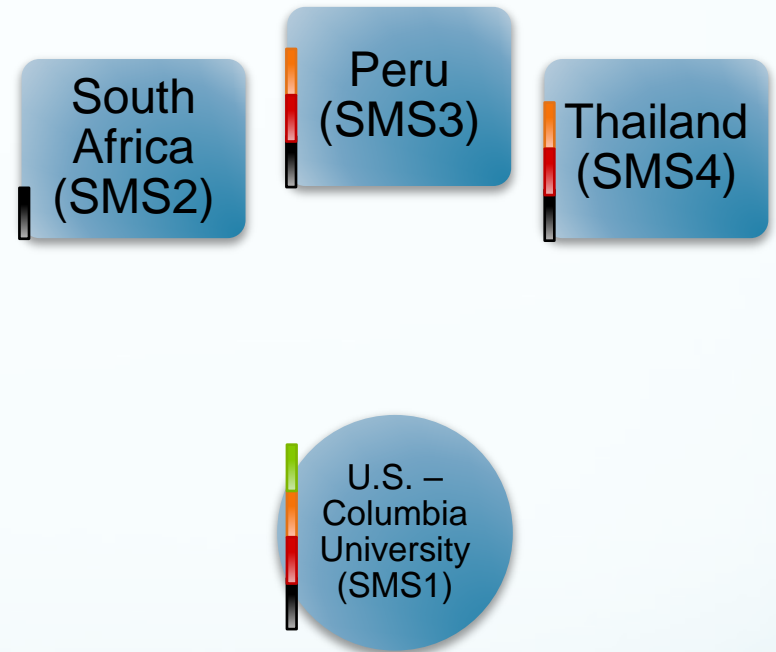
# Process Variable(s) 1 & 2

- 1. International SMS Costs**
- 2. Multiple Languages**

# SMS System

## Instrumentation in MTN 017

- Each Country has its own SMS system
  - Eliminates international SMS fees
  - System in site's active language
- All sites using same system
  - FrontlineSMS
- Capacity remains with the site post MTN 017



# Site Feedback After SMS System Tests

- “The explanation to participant not difficult. At the early, may be error or forgot the step but after day 3, I feel easy to response the system.”
- “The average time between SMS was about 1 minute...We have tried all possibilities: sending wrong password/answer and delaying the response for several hours. They all worked fine.”



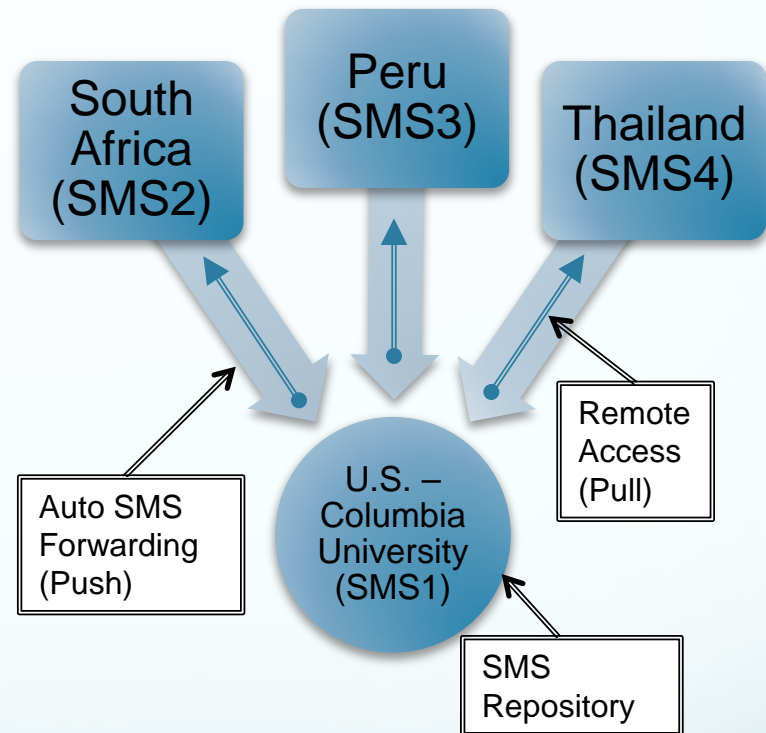
# Process Variable(s) 3

1. International SMS Costs
2. Multiple Languages
3. **Coordination and Centralization of Data from Four International Sites**

# SMS System

## Instrumentation in MTN 017

- Data Push/Pull biomedical informatics techniques
  - Automated SMS forwarding via email to a secure and centralized SMS repository (Data Push)
  - Remote access to all SMS systems and databases by Columbia Univ. BRWG (Data Pull)
  - Automated and Manual data aggregation are secure and reciprocally redundant



# Instrumentation

- Art and science of measurement and control of process variables\*
- Instrumentation in MTN 017
  - Short message service (SMS) data collection system
  - **Survey instrument items**

# Process Variable(s) 4

1. International SMS Costs
2. Multiple Languages
3. Coordination and Centralization of Data from Four International Sites
4. **Survey Item Instrumentation for a multi-site, multi-language, multi-cultural, multi-biomedical protocol study**

# SMS Survey Item Instrumentation

- Iterative process
- Major iterations and adjustments
  - Complex vs. Simple
  - Password / PTID / Error Responses
  - Multiple Choice vs. Single Answer
  - Product Use / Sexual Behavior / Drug Use / Etc.
- Each site's input helped us account for cultural and linguistic differences

# Key Elements

## Inputs

- [Redacted]
  - Multiple Choice [Redacted]
  - [Redacted]
  - [Redacted]
  - [Redacted]
  - Multiple Choice [Redacted]
  - Product Use / [Redacted] / [Redacted] / [Redacted]
- 
- Each site's input helped us account for cultural and linguistic differences
  - Many hours and many adjustments

# Improving the Process of Survey Item Instrumentation

- Development of an HIV Biomedical Survey Ontology to Assist and Improve Survey Item Instrumentation for HIV Clinical and Behavioral Research
- Ontology?
  - In informatics, an ontology formally represents knowledge as a set of concepts and their relationships within a domain.

# HIV Biomedical Survey Ontology

Knowledge Base

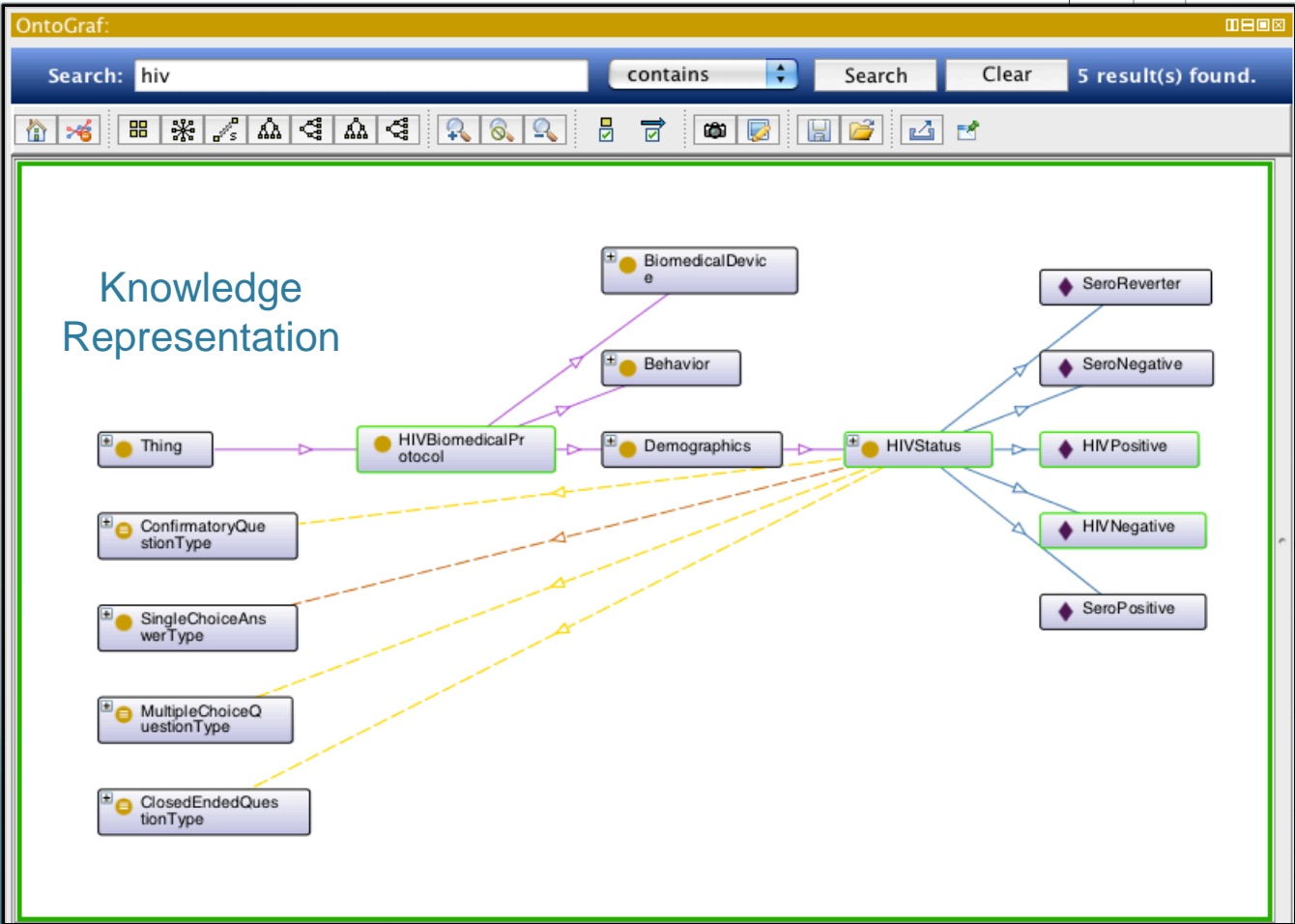


Table with 5 columns and multiple rows, likely representing a data table or a detailed ontology view. The first column contains IDs like 'I.1', 'I.2', 'I.3', etc. The second column contains terms like 'SeroReverter', 'SeroNegative', etc. The third column contains terms like 'HIVPositive', 'HIVNegative', etc. The fourth and fifth columns contain complex logical expressions involving terms like 'SeroReverter', 'SeroNegative', 'HIVPositive', 'HIVNegative', and 'SeroPositive'. The table appears to be a complex logical representation of the ontology's relationships and constraints.



# HIV Biomedical Survey Ontology

- Evidence based instrumentation
- Representative of “Benchmark Standards”
- Adjustable culturally and linguistically
- Acts as an “Expert System”
- Provides Decision Support (DS)
- Helps to train new/young investigators

Questions?

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