VOICES Project: m-health pilot for epidemiological surveillance in Senegal

Michel Seiler, Orange Healthcare
“e-tools and social networks for epidemiology”, 21 May 2013
Orange = our key assets are our strong customer base and ability to cover all communication fields

226 million customers worldwide (+8% in one year)

- **mobile**
  - 167 million customers worldwide (+17 million in one year)
  - over 74 million customers in Africa and the Middle East (+15.6 million in one year)

- **internet and fixed**
  - 59 million customers worldwide including 14.4 million fixed broadband customers (+691,000 in one year)

- **business services**
  - presence on 5 continents
  - 3,700 multinational business customers
  - 3,600 cloud computing customers

- **Orange customers**
  - 147 million customers under the Orange brand
Orange in healthcare

- Orange helps modernize the **healthcare infrastructure** as well as healthcare systems as a whole, and equip healthcare facilities with communications solutions.

- we are convinced that the medicine of tomorrow is a **connected** medicine in which the **management of healthcare data** and medical information play an essential role.

joining up healthcare
Objectives of the m-Health pilot: EC project 2010-2013

- Explore the potential of mobile and speech technologies to improve healthcare systems in developing countries
  - Explore how disease surveillance and medical public laboratory technicians training in Senegal could benefit from mobile and speech technologies

- Deploy and test mobile and speech based m-health services in Senegal to demonstrate that it is possible
  - to enhance the transmission of epidemiologic data from peripheral laboratories to the national health authorities
  - to support medical laboratory technicians training

- 6 Partners involved: Orange, TNO, CSIR, ESMT, the Senegalese National Network of Laboratories (RNL) and Fondation Mérieux.
Methodology

- Understand stakeholders’ and end users’ needs, expectations, issues and activities
- Several meetings and workshops with stakeholders and end-users in Senegal
  - laboratory technicians, RNL staff, medical doctors in health centers, the head of the disease surveillance department
- Field work
  - visits to three laboratories (two district laboratories and one regional laboratory)
  - interviews with laboratory technicians and head doctors of health centers
- Co-elaboration with the RNL of four use cases
Major Results

- **Use case # 1:** Disease surveillance (Cholera, Shigellosis, Meningitis)

Department of epidemiological surveillance

Network of Laboratories

Regional Laboratories

District Laboratories

Nine watched diseases: Cholera, Shigellooses, Meningitis, Tuberculosis, Malaria, Syphilis, HIV, Measles, Poliomyelitis.
Major Results

- **Use case #1: disease surveillance** (Cholera, Shigellosis, Meningitis)

  Laboratory technicians enter and send data by mobile phone (voice user interface or a graphical one)

  Head doctors of health centers receive information by SMS

  **Illustration of the graphical interface**

  **Illustration of a voice interaction pattern**

  - User dials a number
  - System welcomes the user
  - Selects Disease
  - Enters patient name
  - Enters pathogen agent
  - Enters date of swab
  - Enters date of reception of swab

  **Voice recording**

  **DTMF**

  **DTMF**
Use case # 2: To enhance technicians’ medical knowledge related to their work activities (about diseases, technical procedures, etc.) through Quizzes

- The RNL creates and broadcasts quizzes
- Laboratory technicians receive a notification and take the quiz by dialing a phone number
- The RNL tracks the usage of quizzes
Major Results

- **Use case # 3 : Information of the Month.** To enhance technicians’ medical knowledge through the delivery of educational content.

The RNL creates and broadcasts quizzes

Laboratory technicians receive a notification and take the quiz by dialling a phone number

1. Internet
2. GSM
3. Internet

The RNL tracks the usage of quizzes
Major Results

- **Use case # 4: Expert support.** To enable technicians to post questions to the RNL via a voice service.

1. Laboratory technician submits a question in the form of a voice message.
2. RNL treats the question.
3. RNL provides an answer in the form of a voice message.
4. Laboratory technician listens to the answer.

Emerginov

GSM

Internet
Major Results

- Web interface for the RNL
Conclusion and perspectives

- **Usability tests of the applications**
  - the RNL and all technicians found the applications useful for their activities
  - for scenarios 2 & 3: Human voice was preferred to speech synthesis
  - scenario 4 well perceived because allows semi-direct access to reference sources of information

- **Next steps**
  - Analyse feedback of revised version of the applications
  - Manage to install the service on a fully reliable exploitation environment
  - Agree with Health Ministry a commercial offer covering extension to all labs within the RNL
  - Work with Health Ministry on the extension to other data collection services
Thank you