
Using NFC-Enabled Mobile Phones for Public Health in Developing Countries

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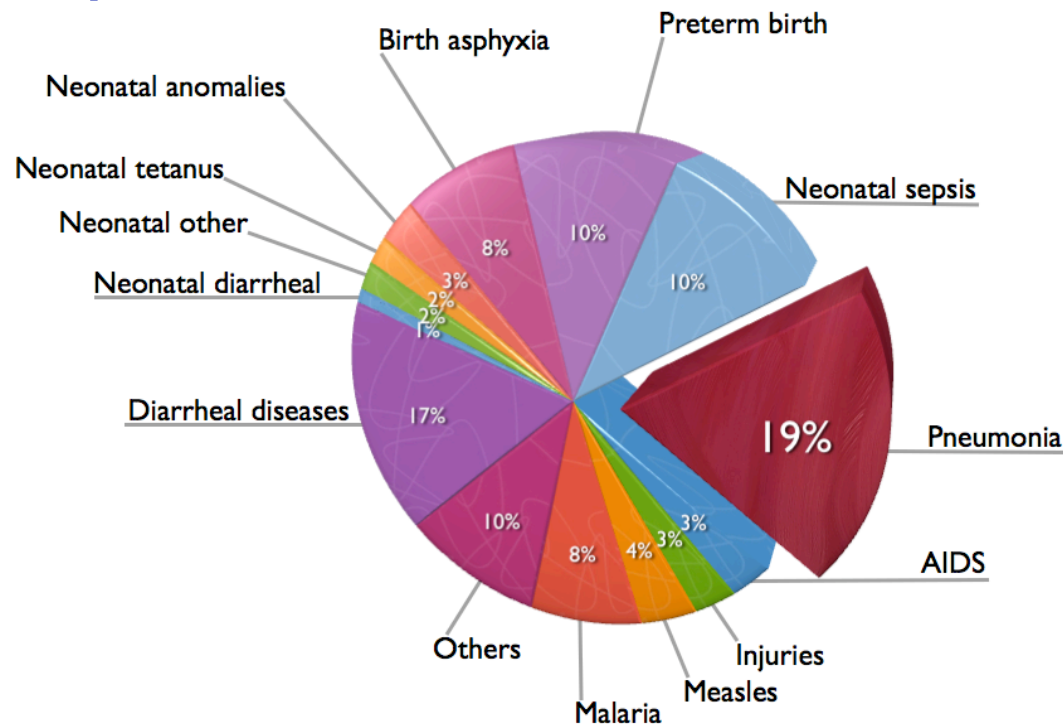
AMIA Spring Conference '09
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IRD NFC Project Overview

- Interactive Research and Development (IRD)
 - A non-profit based in Karachi, Pakistan
 - Sponsors of IRD: Johns Hopkins University and PATH
- Objective: ***Implement real-time electronic disease tracking system in developing nations***
- MIT Students' Role
 - To create a functional prototype for IRD

Background

- Pneumonia kills more children under 5 years than any other disease



UNICEF / WHO: Pneumonia: The forgotten killer of children, 2006

IRD Project Site Karachi

Towns

Korangi, Landhi and Bin Qasim

Population

1.2 million +

Primary care clinics

139

Vaccine centers

32

Major hospitals

9



Existing Conditions and Challenges

- Physicians
- Identification / Records
- At clinics
 - Spotty wired internet
 - Unstable electricity
 - Good wireless data coverage at clinics
- At central server facility
 - Dependable internet
 - Stable electricity



Prior Methods and Challenges

- Paper-based System
 - Slow and inefficient
 - Immediate alerting not supported
 - Costly (>400,000 paper sheets)
 - Highly dependent on quality of printing
 - Scanner burn-outs (4 replacements)
 - Unique ID errors: linking data forms manually

Prior Methods and Challenges

Mother Father Aunt Uncle Grand mother Grand father Sister/ Brother Cousin Other

4. Mother's first name? 4- ماں کا پہلا نام کیا ہے؟

5. Mother's last name? 5- ماں کا آخری نام کیا ہے؟

6. Father's first name? 6- باپ کا پہلا نام کیا ہے؟

7. Father's last name? 7- باپ کا آخری نام کیا ہے؟

8. Child's first name? 8- بچے کا پہلا نام کیا ہے؟

Child Not Named Yet (go to 10)

9. Child's last name? 9- بچے کا آخری نام کیا ہے؟

10. Child's sex: Male Female

11. Child's date of birth: 11- بچے کی تاریخ پیدائش کیا ہے؟

12. Today's date: (DD/MM/YYYY)

13. Immunization given: BCG/OPV0 DPT1/OPV1

14. Next visit for: (DPT1/OPV1 if BCG in 13 or DPT2/OPV2 if DPT1/OPV1) DPT1/OPV1 DPT2/OPV2

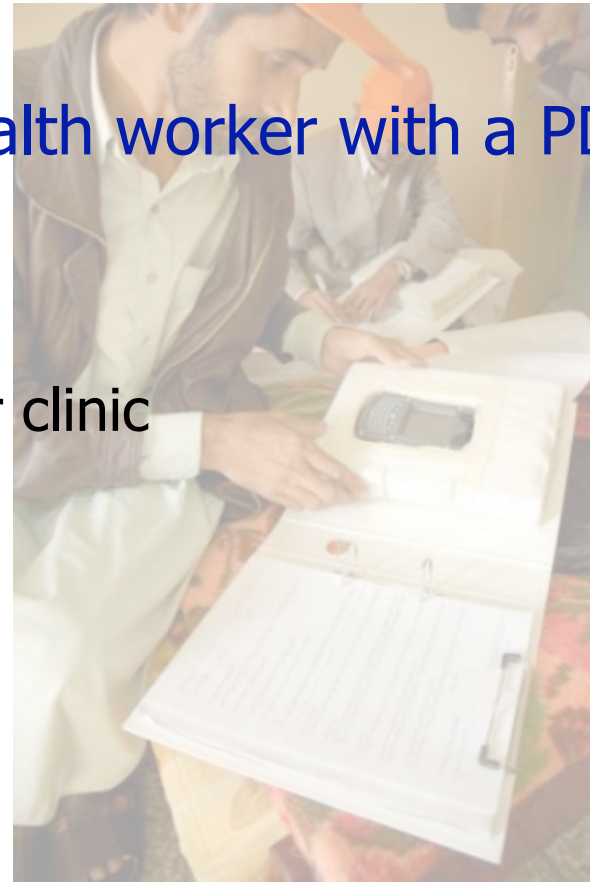
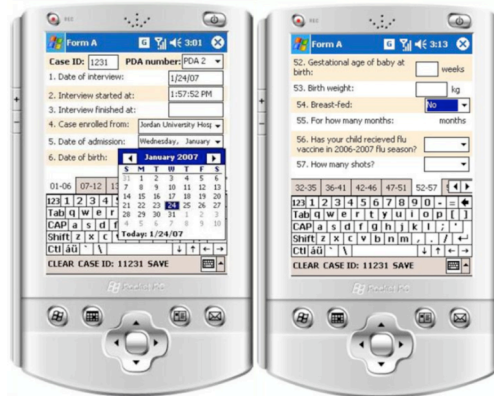
15. Allotted Date of next visit: (6 week from BCG or 4 week from DPT1/OPV1) (DD/MM/YYYY)

16. Which EPI center would you like to visit for next immunization of your child? 16- آپ بچے کے اگلے ویکسینیشن سینٹر کے لئے کون سے مراعاتی سینٹر کو ترجیح دینا پسند کریں گے؟

Table(01)

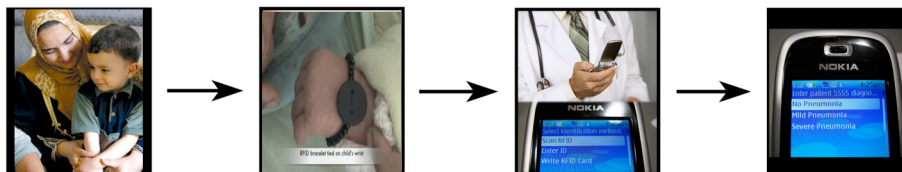
Prior Methods and Challenges

- First Electronic Approach: Health worker with a PDA
 - More accurate data gathering
 - But no accurate ID
 - Needs extra health worker per clinic



- Still needs system that does not require additional man power while remaining accurate, scalable, affordable

Our Solution



No Pneumonia



Pneumonia



Severe Pneumonia




Massachusetts
Institute of
Technology



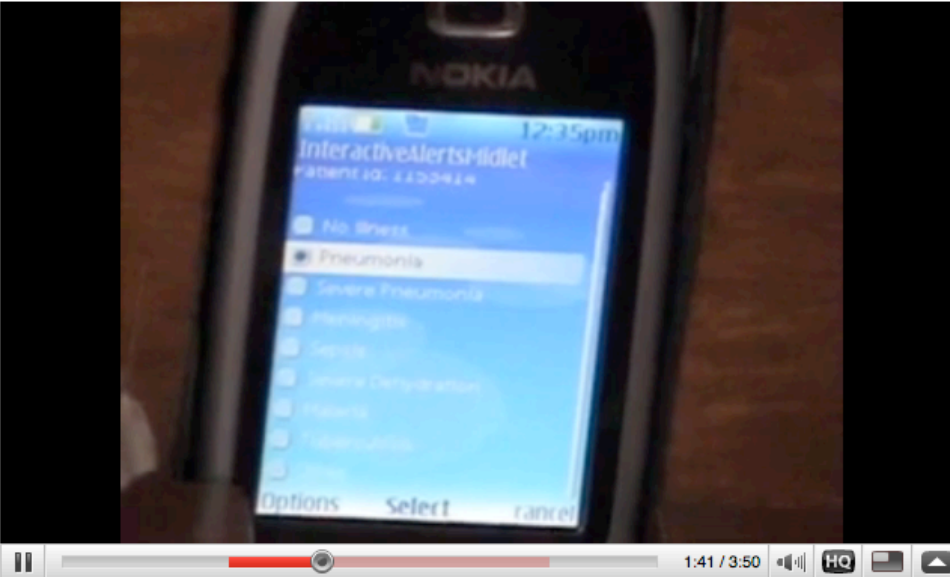
nextlab

Video

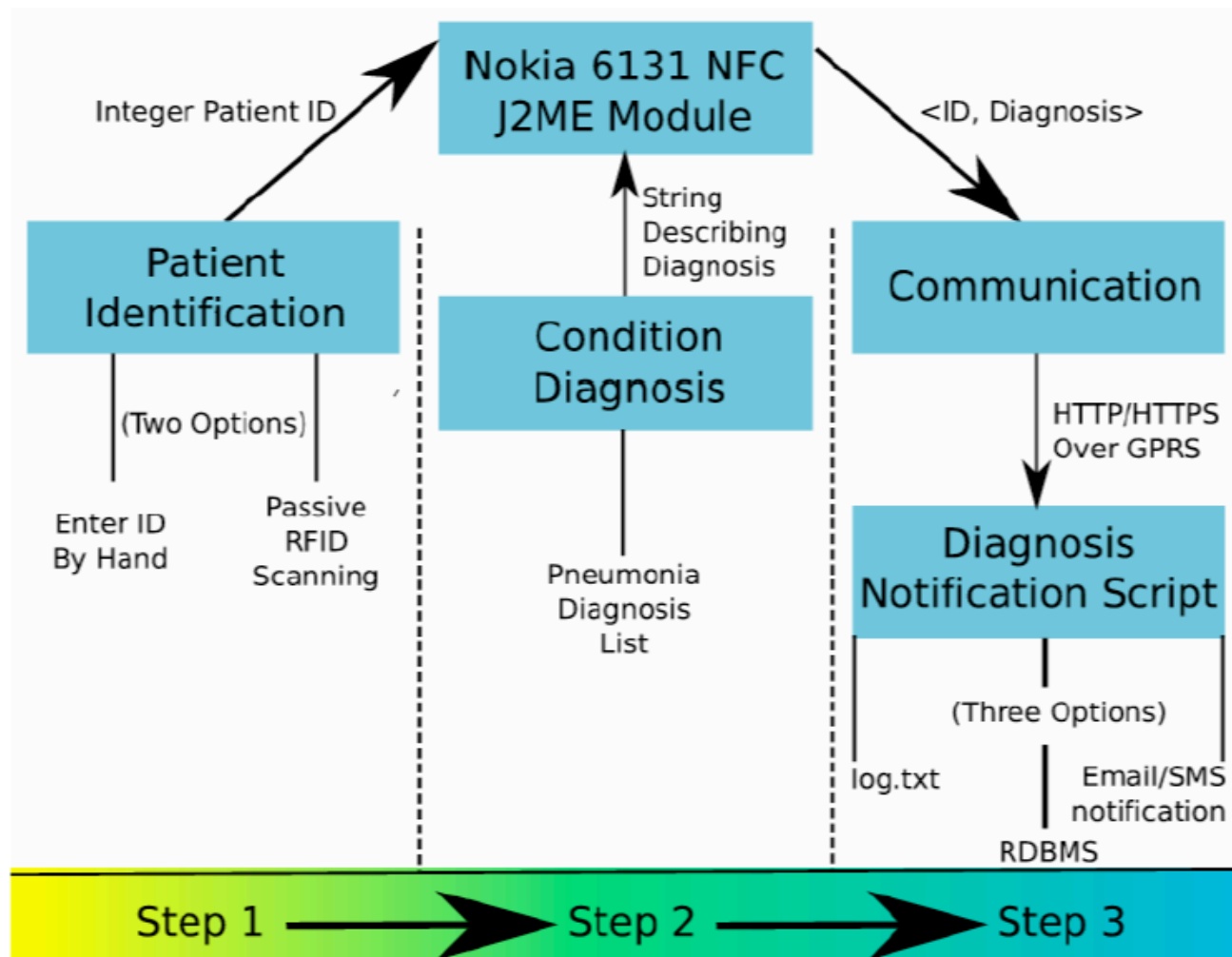
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Interactive Alerts Pakistan



Architecture



Advantages

- Quick and accurate ID
- Automatic logging to longitudinal health record of patient
- Enables immediate alerts and notification of support team
 - Enables team to immediately pick up patient, collect samples, and administer treatment
- Affordable
 - Approx. USD 200 / phone
 - < USD 2 / bracelet
- Easy to maintain
 - Phone batteries avoid electrical problems
 - Phones are relatively easy to replace

Real-World Use

- MIT students completed the end-to-end prototype
- IRD software developers integrated and extended technology
- Nokia sponsored NFC phones for deployment
- Now in use, since Dec 2008
 - 20 PCP clinics already deployed, more soon
 - Over 1000 children already enrolled
 - Potential for more children



Future Work

- Continue and extend application in IRD's operations
- Public health data collection and surveillance, outbreak prediction.
- Use same phone for pharmaceutical inventory control
- Use to populate medical records
 - Increase the scope of illnesses and treatments

Acknowledgments

- Omar Allawala and Julia Irani at IRD are extending and continuing the work at IRD
- Nokia for the phones given to IRD
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- Jhonatan Rotberg director of Next Billion Network

Thank You

Questions