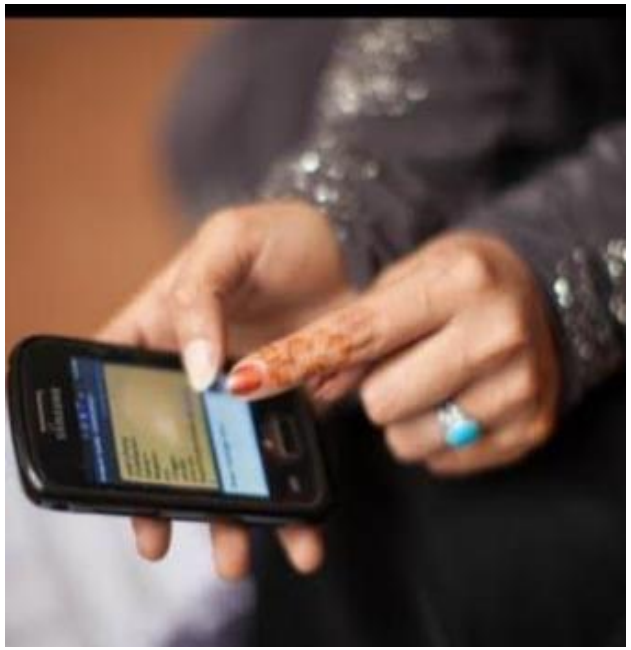
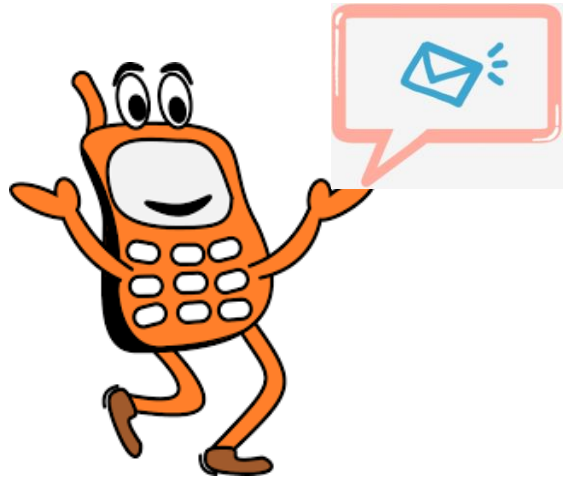
آغا خان یونیورسٹی
THE AGA KHAN UNIVERSITY

Text Messages Interventions And Beyond





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Text messages the Magic Pill

The New York Times

Opinion

We're Ignoring the Biggest Cause of the Measles Crisis

It's not anti-vaxxers. It's parents who create their own vaccine schedules.

INTERNATIONAL

THE NEWS

'Automated text, voice messages increase vaccine coverage in Sindh's underserved areas by 26pc'

News Desk

Customized e-health messages communicated to underserved areas of Sindh through Interactive Voice Response (IVR) system led to a 26 percent increase in vaccine uptake, revealed a study conducted by researchers of Aga Khan University.

According to the details issued by the AKU communication department, the exercise with the theme "Paigham-e-Sehat" comprised a randomised con-

The Paigham-e-Sehat study saw researchers from the AKU and the University of British Columbia partner with digital health and telecommunications specialists to develop a variety of mobile campaigns containing targeted

These messages were then delivered through four different mediums to generate evidence on the most effective means to boost demand for routine immunisation.

Participants in the study were also consequently divided into four different groups, one of which received a one-way series of SMS messages providing information on the benefits of immunisation.

The second group got an interactive sequence of SMS

minders and educational messages," Dr Momin Kazi, an assistant professor in paediatrics at child health at the AKU was quoted to have said.

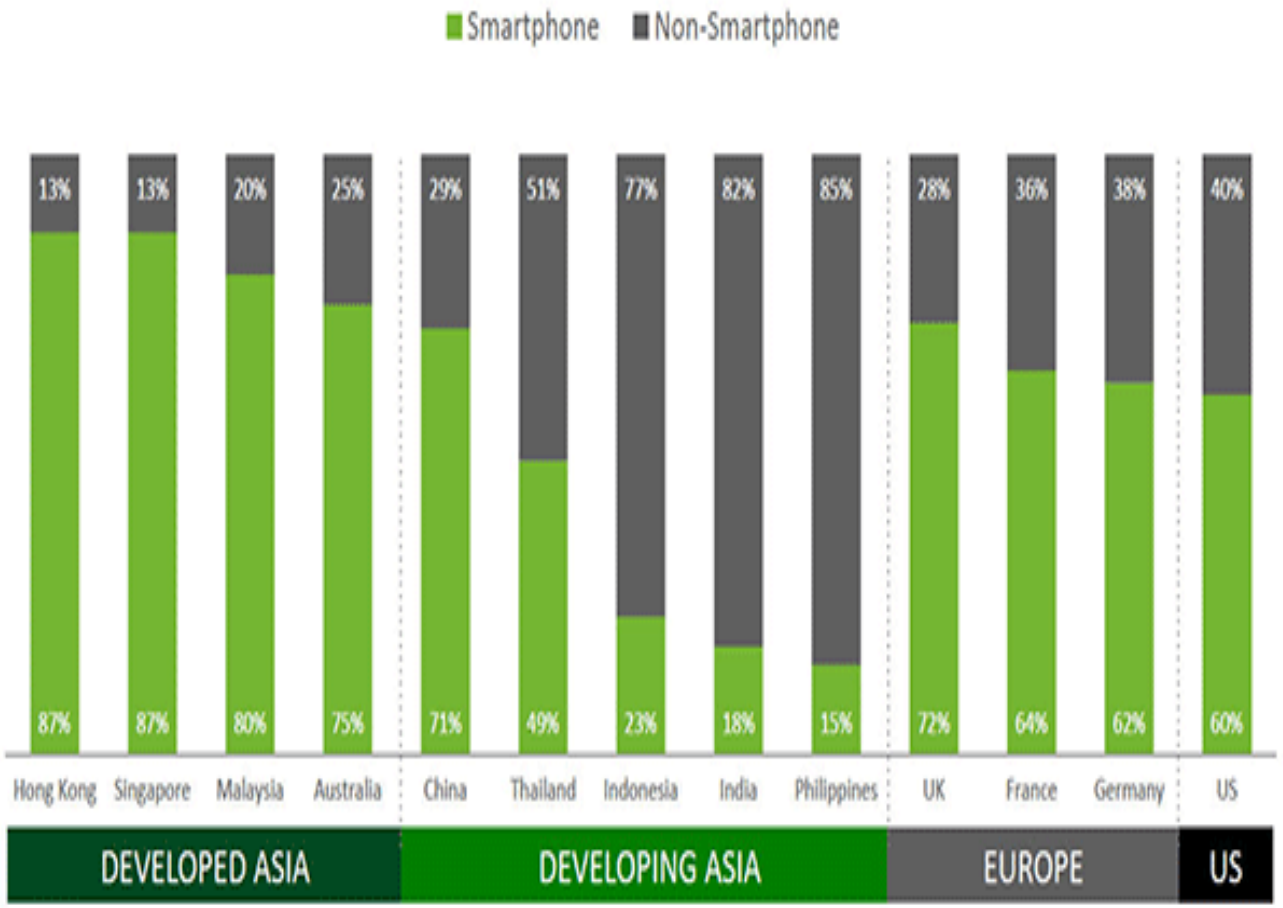
According to Dr Kazi, the study has generated novel insights into the value of voice messages, which is an innovative medium for health awareness.

The study's findings, he said, were particularly useful in contexts where literacy is a challenge, where a variety of local languages and di-

Mobile phone usage across the world

SMARTPHONE PENETRATION

https://www.nielsen.com/bd/en/insights/article/2013/the-asian-mobile-consumer-decoded0/



https://www.brookings.edu/wp-content/uploads/2019/04/20190410_futuredevelopment_Mobile_ownership_2018.jpg

7.7 billion Mobile phone subscribers globally

8.5 billion daily person to person SMS in 2018 globally

Average 32 SMS per mobile phone on a daily basis

However less than 1/3 of the population use Smart phone and hence Interventions that can be used in simple function phone is recommended for generalizability

Textrequest reports USA,2018

Kazi et al JMIR 2018

SMS

Text

Automated calls

Text Message Categories

- **Reminder/Recall**
- **Educational**
- **Interactive**

"Your child [name] is due on [date] at [clinic] for vaccines."

Immunization protects your child against killer diseases such as polio, whooping cough, diphtheria, measles, pneumonia and tuberculosis.

[first name] is due for [vaccine or checkup or vaccine and checkup]. Reply 1 for us to call you to schedule , 2 if you will call us or STOP to end messages [practice name and phone number].

BARRIERS TO IMMUNIZATION

- Vaccine Hesitancy
- Lack of knowledge
- Forgetting due date
- Lack of trust
- Adverse effects
- Religious and social barriers

9 USA and 3 LMIC (12 studies)

Mobile phone based messages - Global data on

14 USA and 7 LMIC (21 studies)

Type of Intervention	Details	Type of messages	Vaccines covered
SMS based	10	3 reminder messages only and 8 both reminder and educational messages	All childhood vaccinations, MMR, HPV, Influenza and MCV4 or TDAP
Emails	2	Both reminder and educational messages	Pneumococcal vaccine and HPV series

Increase in vaccine uptake and series completion – **1.18 (1.11-.125)**

For parents of children aged 18 and younger – **1.22 (1.15- 1.30)**

This study provided evidence that digital push technologies have a modest, positive impact on vaccine uptake and series

K.M. Atkinson et al. 2019

Type of Intervention	Details	Type of messages	Vaccines covered
SMS based	18	14 studies one-way SMS reminders 1 on one-way SMS reminder plus monetary incentive , 1 on two-way SMS reminders	All childhood vaccinations, HPV, MMR, Influenza
SMS and Automated calls	3	combination of SMS and phone call reminders	HPV, MCV Tdap and Varicella, Influenza
Automated Call	1	Automated calls reminders	All childhood vaccinations

All types of messages as compared to control showed increase vaccine uptake - **1.23 (1.12-.136)**

Messages involving adolescents vaccine only - **2.05 (0.92 4.52)**

The review shows potential for mobile phone based interventions to improve immunization coverage for children and adolescents

Kazi et al personal communication

Mobile phone based messages – Low and Middle income counteries

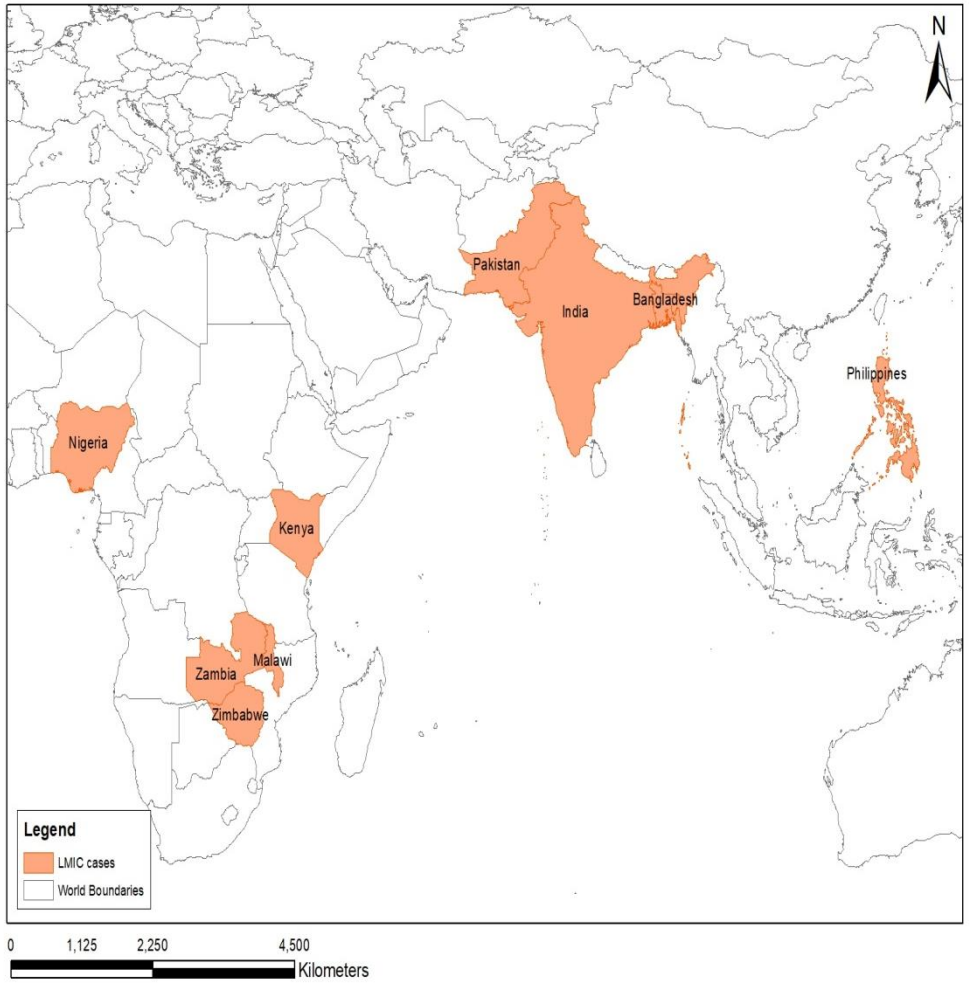
Phone calls or SMS reminders for vaccinations

- Significant improvement in proportions of children fully vaccinated
- Polio, pentavalent, and pneumococcal vaccines (<.001)
- Reduction in delay in receiving immunization (<.001)

Conditional Cash Transfer through SMS

- Significant improvement in immunization in 200KES group (relative risk 1·09, 95% CI 1·02–1·16, p=0·014)

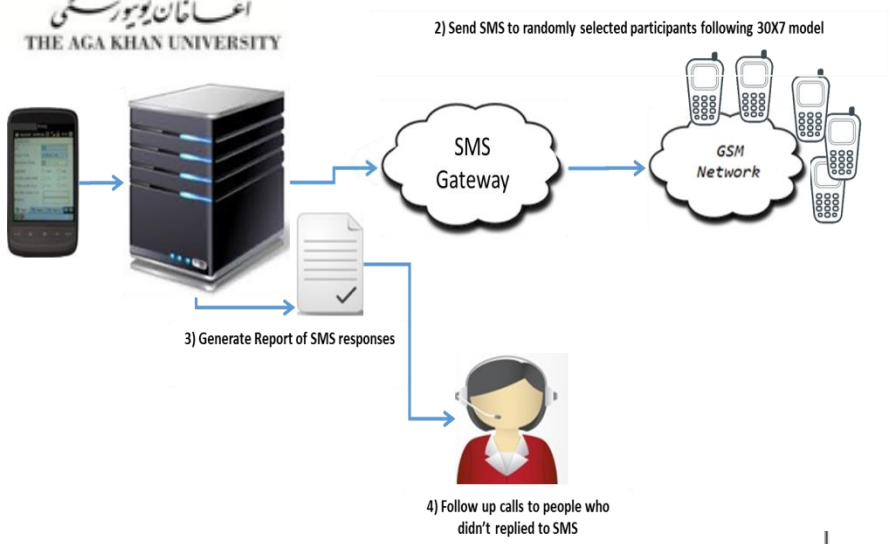
India 9, Pakistan 3, Bangladesh 1, The Philippines 1, Kenya 2, Nigeria 2, Zambia 1, Zimbabwe1, Malawi 1 (n= 21)



*6 SMS, 1 phone call and one combined study

Oliver-Williams et al, 2017 , Gibson et al, 2017

Monitoring of SIA campaigns- Phase1 and 2



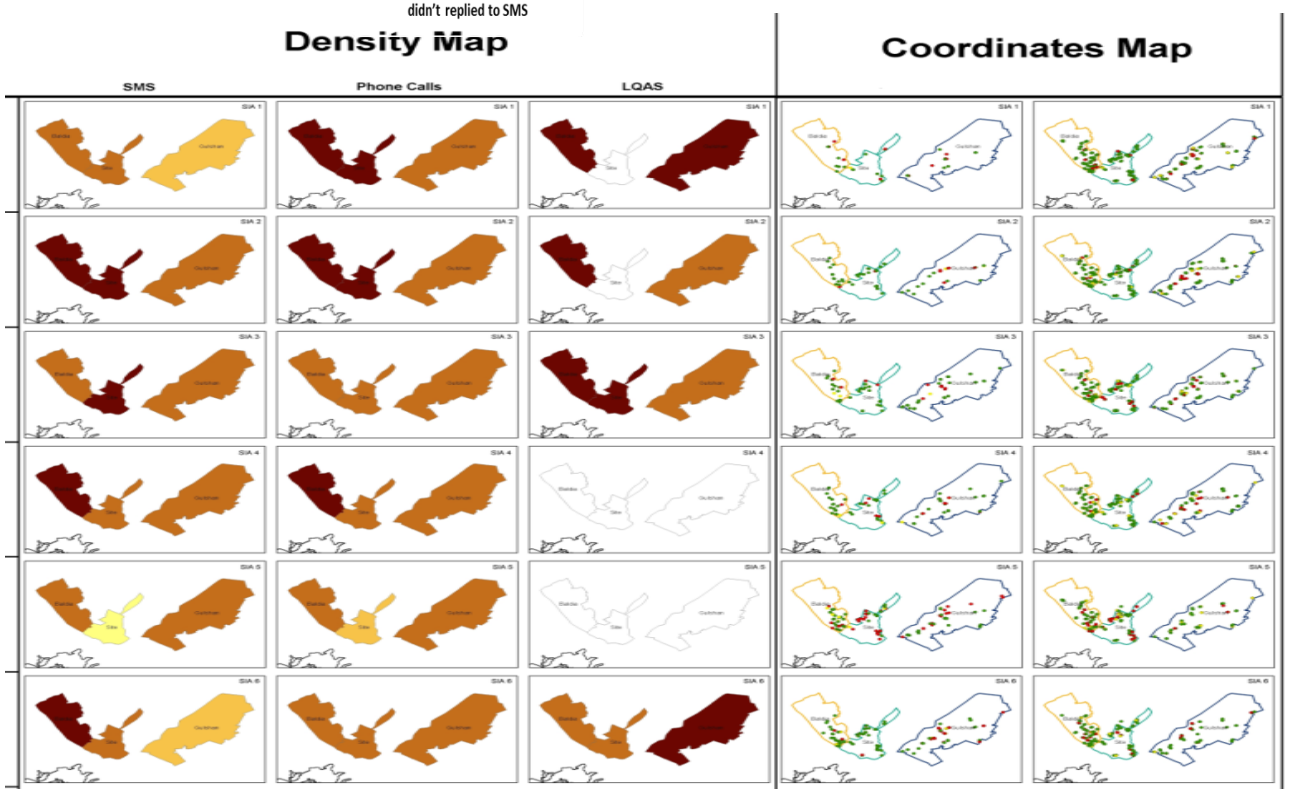
SMS Content - Urdu

Urdu SMS 1

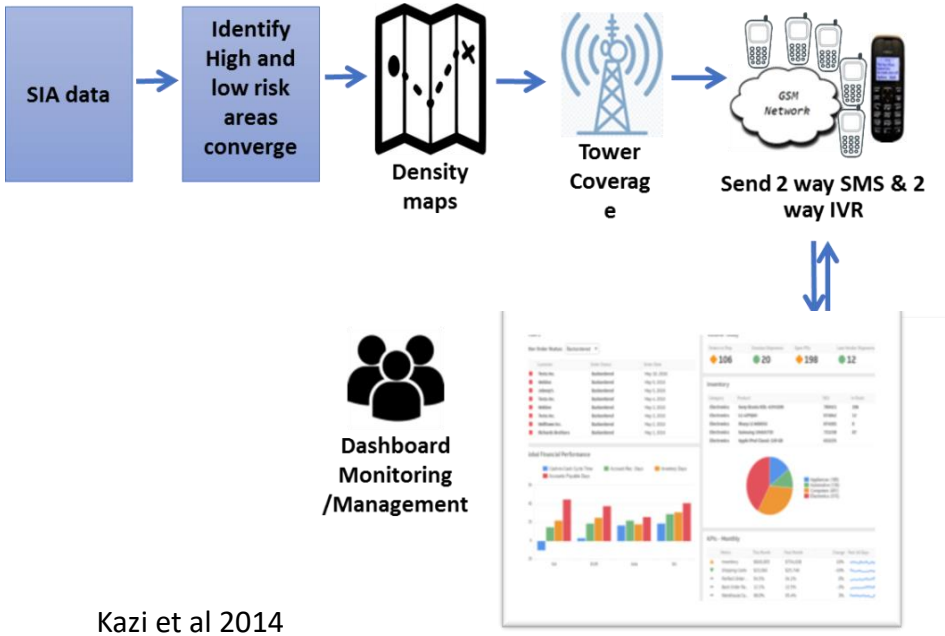
آغا خان یونیورسٹی : کیا پولیو کے قطرے پلانے والے پچھلے ہفتے آپکے گھر آئے تھے؟
ہاں P1 نہیں P2 معلوم نہیں P3 لکھ کر reply کریں

Urdu SMS 2

آغا خان یونیورسٹی: کیا (بچے کا نام) کو پولیو کے قطرے اس ہفتے پلائے گئے تھے؟ ہاں P1 نہیں P2 معلوم نہیں P3 لکھ کر reply کریں

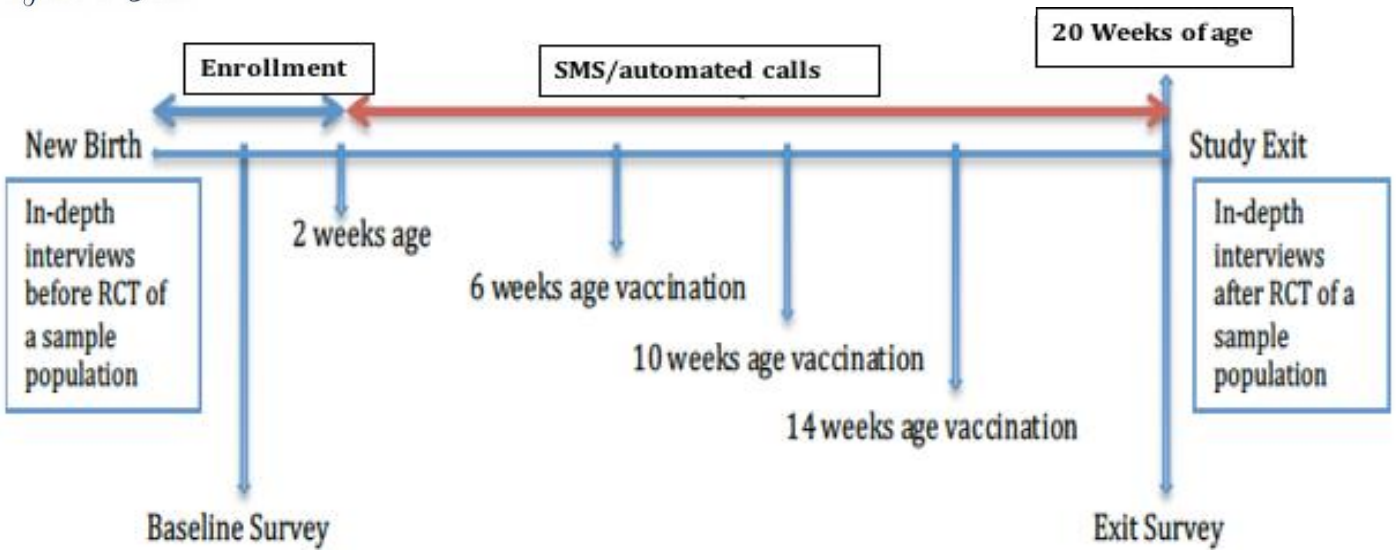


eSurveillance through Tower Coverage- Pilot



Kazi et al 2014

To evaluate the role of mobile phone SMS messages and automated calls in improving vaccine coverage among children in certain districts of Pakistan-Mixed method



INTERVENTION ARM	WEEKLY AUTOMATED SMS TEXT AND AUTOMATED CALLS FROM ENROLMENT TILL 20 WEEKS OF LIFE
ARM 1 (INTERVENTION)	Parents/caregivers will receive one way educational/ reminder/ proactive SMS messages related to routine immunization once a week till 20 weeks of age.
ARM 2 (INTERVENTION)	Parents/caregivers will receive two way (interactive) educational/ reminder/ proactive SMS messages related to routine immunization once a week till 20 weeks of age- parents will have the option to reply and receive more information related to immunization through text messages.
ARM 3 (INTERVENTION)	Parents/caregivers will receive one way educational/ reminder/ proactive automated phone call related to routine immunization once a week till 20 weeks of age.
ARM 4 (INTERVENTION)	Parents/caregivers will receive two way (interactive) educational/ reminder/ proactive automated phone call related to routine immunization once a week till 20 weeks of age- parents will have the option to reply and receive more information related to immunization through phone call.
CONTROL GROUP	NO INTERVENTION

1.Literature Search

2.Content Categorization

3(a).Literature Translation

3(b).Back Translation

4.Validation of content through In Depth Interviews(IDIs)

5.Discussion regarding content with stakeholders

6.Focused Group Discussion (FGFD)

General Education | Education Adverse | Education Religious | Reminders | Combo

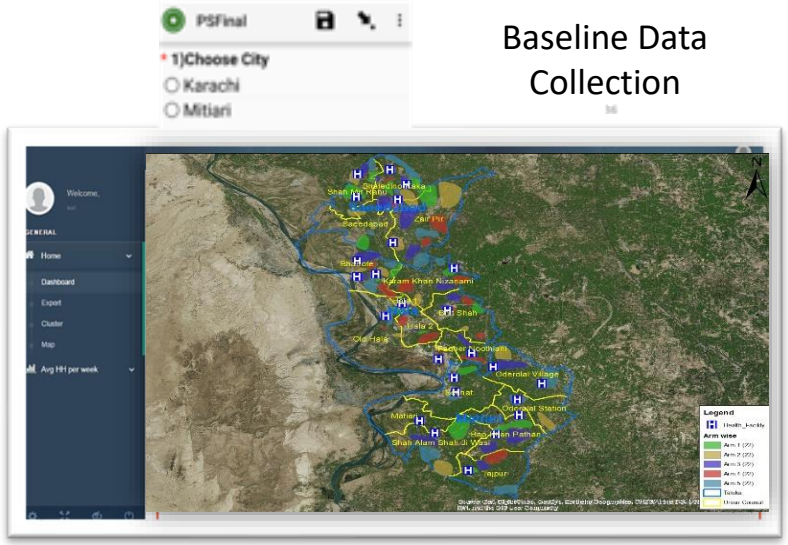
English	Roman Urdu	Urdu	Roman Sindhi	Sindhi

Pigham-e-Sehat Cloud

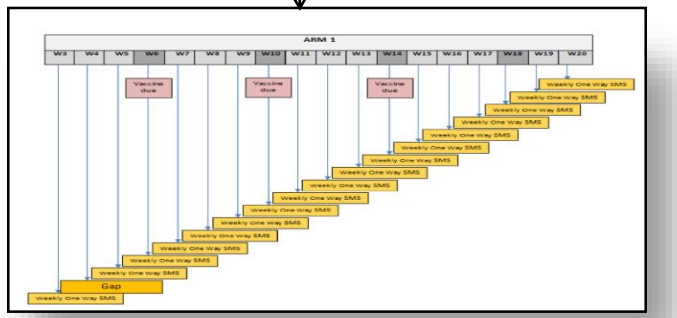
Personalize Messages according to Arm and barriers

- Educational
- Religious
- Adverse Effect
- Reminder
- Combo

Baseline Monitoring Portal



Baseline Data Collection



Schedule Messages on weekly basis

Message Sending and Content Management Portal

Community

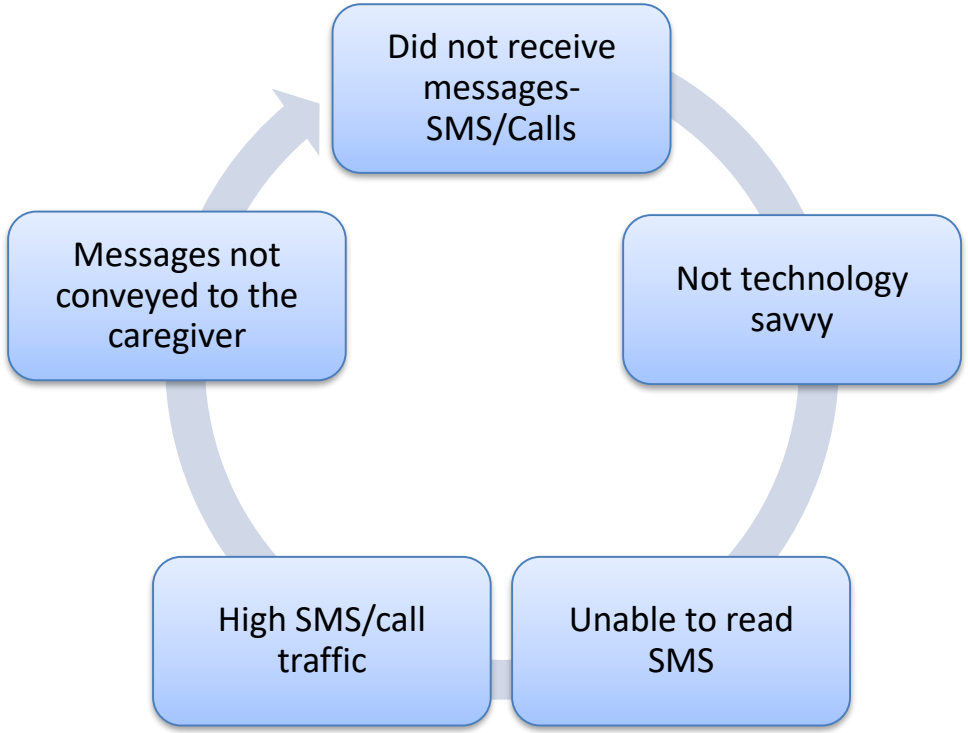
Telecom network

Message Gateway

Key Findings (n=3383)

- 98% of the study participants had access to mobile phone
- 79.1% of the respondents used a simple function phone
- Around 50% and 38.4% of the mothers and fathers respectively had no formal education
- 54.5% and 13.8% fathers and mothers respectively owned a mobile phone

- **In the final PP model IVR risk ratio was 1.26 (p-Value 0.037) with Confidence Interval 1.01-1.52**



Barriers to RI Coverage

- Forget RI due date
- Lack of awareness for immunization
- Not permitted by family members
- Low level of trust for government EPI
- Religious beliefs
- Adverse effects

Messages

- Preferred language for SMS
  - Roman Urdu and plain Urdu for urban site
  - Sindhi written in Sindhi script for rural site
- Preferred language for automated calls
  - Urdu for urban site and
  - Sindhi for rural site

- Information regarding families' perceptions of vaccination and the daily life challenges helped to develop personalized mobile phone messages
- IVR based intervention personalized according to barriers for immunization should be scaled up
- The **Intervention is useful** but too many families did not get the message

Conclusion

- Personalized mobile phone messages (barrier based) interventions should be scale up at the program level

- Connected with electronic immunization registries for engagement in care with caregivers of children for routine immunization

- Mobile phone based interventions should be adapted to AI and ML models

Thank you

Study team and staff

THE AGA KHAN UNIVERSITY

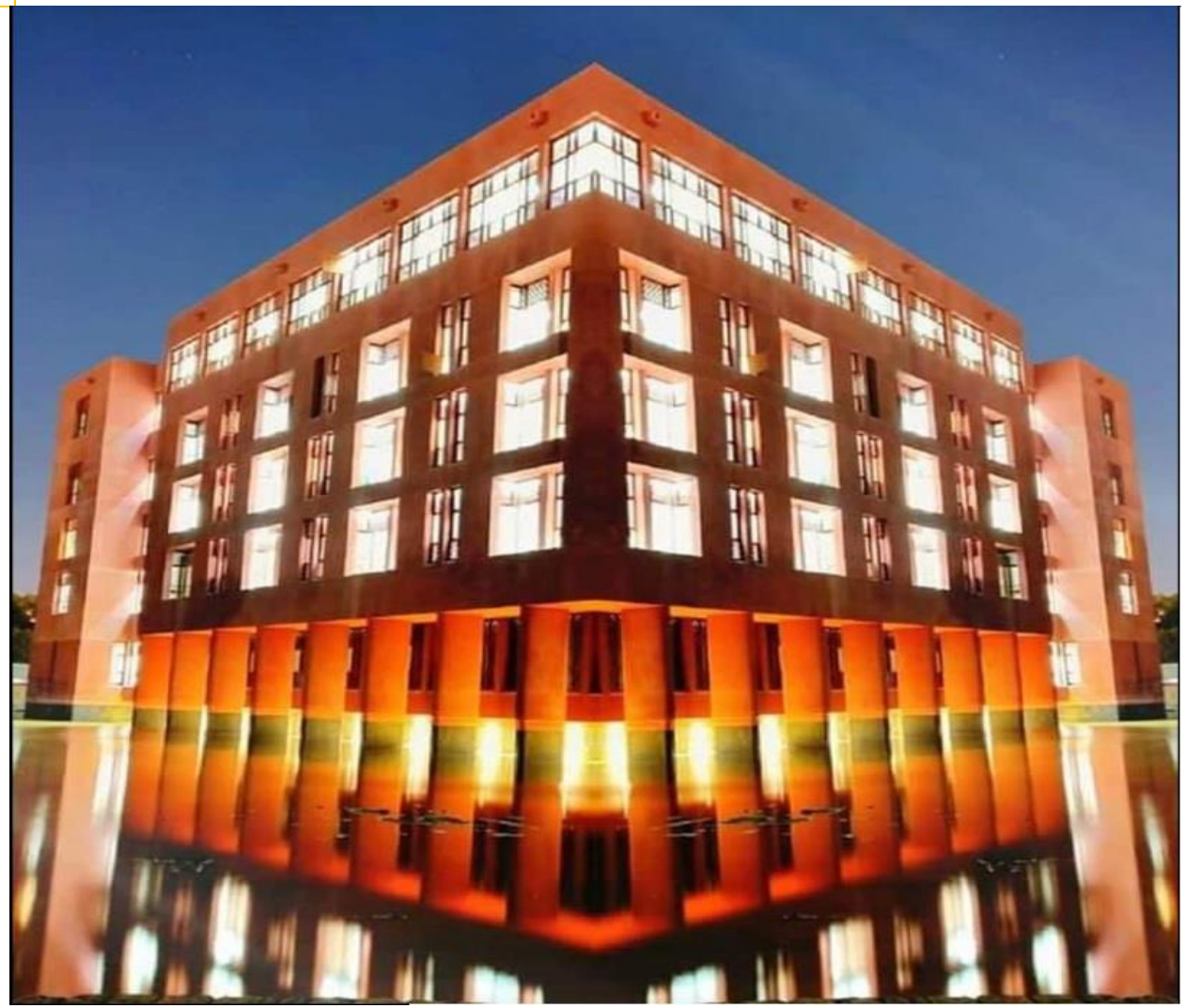
AKDN eHRC
AGA KHAN DEVELOPMENT NETWORK
eHEALTH RESOURCE CENTRE

UBC University Of British Columbia

Grand Challenges Canada®
Grands Défis Canada

NIH Fogarty

World Health Organization



REFERENCES

1. Atkinson KM, Wilson K, Murphy MSQ, El-Halabi S, Kahale LA, Laflamme LL, et al. Effectiveness of digital technologies at improving vaccine uptake and series completion – A systematic review and meta-analysis of randomized controlled trials. Vaccine [Internet]. 2019;37(23):3050–60. Available from: https://doi.org/10.1016/j.vaccine.2019.03.063
2. Oliver-Williams C, Brown E, Devereux S, Fairhead C, Holeman I. Using Mobile Phones to Improve Vaccination Uptake in 21 Low- and Middle-Income Countries: Systematic Review. JMIR mHealth uHealth. 2017;5(10):e148.
3. Jaca A, Mathebula L, Iweze A, Pienaar E, Wiysonge CS. A systematic review of strategies for reducing missed opportunities for vaccination. Vaccine [Internet]. 2018;36(21):2921–7. Available from: https://doi.org/10.1016/j.vaccine.2018.04.028
4. Posadzki P, Mastellos N, Ryan R, Lh G, Lm F, Pappas Y, et al. Automated telephone communication systems for preventive healthcare and management of long-term conditions (Review) SUMMARY OF FINDINGS FOR THE MAIN COMPARISON. 2016;(12).
5. Google images

Effect of Mobile Phone Text Message Reminders on Uptake of Routine Immunization in Pakistan: A Randomized Controlled Clinical Trial (n=300)

- Automated one way reminder messages were sent in the week child was due - 6,10, 14 weeks schedule
- The coverage was consistently higher at each visit
  - Both the ITT and PP analyses
  - Only the RI coverage scheduled at 6 weeks, according to PP analysis, was statistically significant

Key Findings

- Automated simple one-way SMS reminders in local languages might be feasible for improving routine vaccination coverage
- Whether SMS reminders alone alter parental attitudes and behavior needs to be further explored

Kazi et al JMIR 2018

Assessing Mobile Phone Access and Perceptions for Texting-Based mHealth interventions among Expectant Mothers and Caregivers in Remote North Kenya:

Study Finding

- Majority of participants had access to mobile phone
- Agreed to receive weekly text messages from their healthcare provider
- mHealth may be an innovative way for engaging women in care for improved maternal and newborn child health outcomes