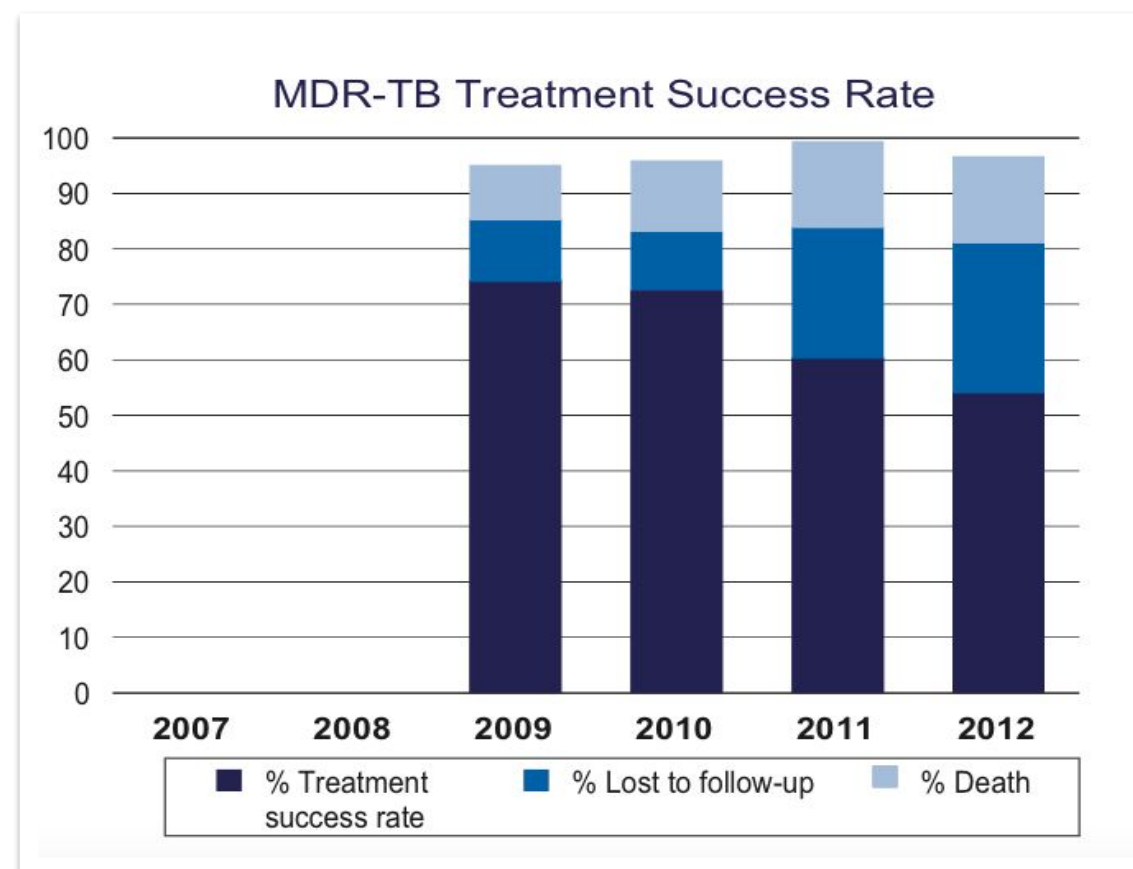# Integrated mobile phone application to support the three pillars of End Tuberculosis Strategy : a new approachment before 2030

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BACKGROUND

Tuberculosis (TB) prevalence in Indonesia showed **no significant declining since 2007** with only 44.4 % TB patients being treated.
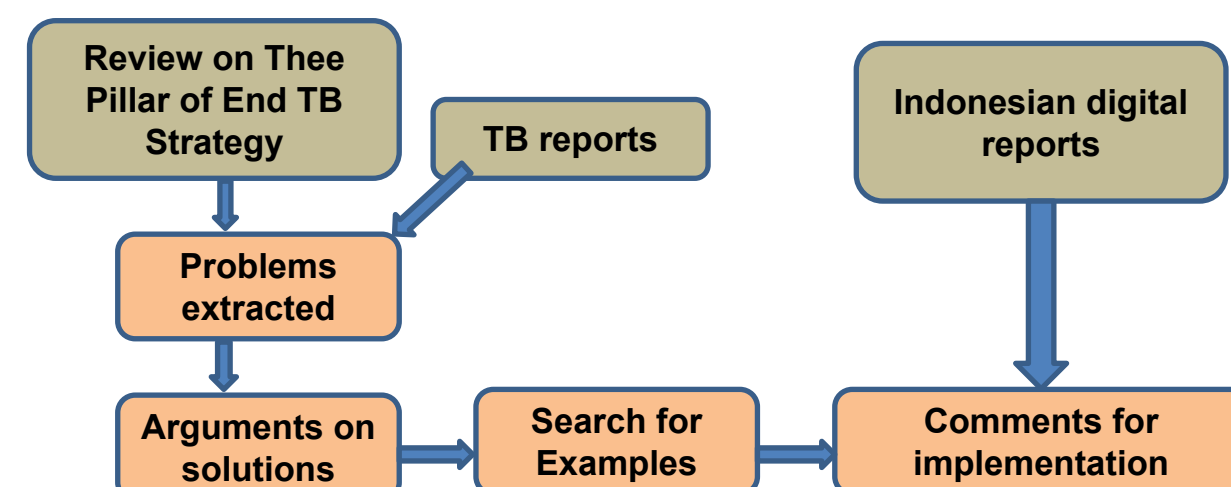

MDR-TB Treatment Success Rate

Legend: % Treatment success rate | % Lost to follow-up | % Death

Using **m-Health** to enhance the success of TB treatments and programs might be promising

AIM

To review the benefit and applicability of mobile phone application to support the three pillars end TB trategy, especially in Indonesia

METHODS

Narrative literature review

Review on Thee Pillar of End TB Strategy → TB reports → Indonesian digital reports

Problems extracted → Arguments on solutions → Search for Examples → Comments for implementation

RESULTS

A. First Pillar of End TB Strategy : Integrated Patient Centered Care and Prevention

Problems	Solutions	Examples
1. Patient engagement to meet drug supervisor 2. Forget to take the drug	- Video Directed Observatory Therapy, Digital Adherence Technology - Reminder, Drug Package Sensor	- Voalte One, VDOT in Kenya and New York - MedLink
3. Late to be diagnosed	- Online cadre report system - Online surveillance - GPS-contact detection	- Cell-PREVEN in Peru - Outbreak Near Me
4. MDR-TB late detection and treatment	- Improving empiric therapy data based on epidemiological study and live mapping	- Mobilite - DOTsync in Myanmar
5. Lack of information about health care facilities and supportive diagnosing test, especially in rural areas	- Facilities mapping - AI based suggestion and comparison	- Waze, Agoda, Skyscanner
6. Poor patient feedback system	- Integrated online feedback to various health care facilities and provider	- NHS England multilevel feedback responses

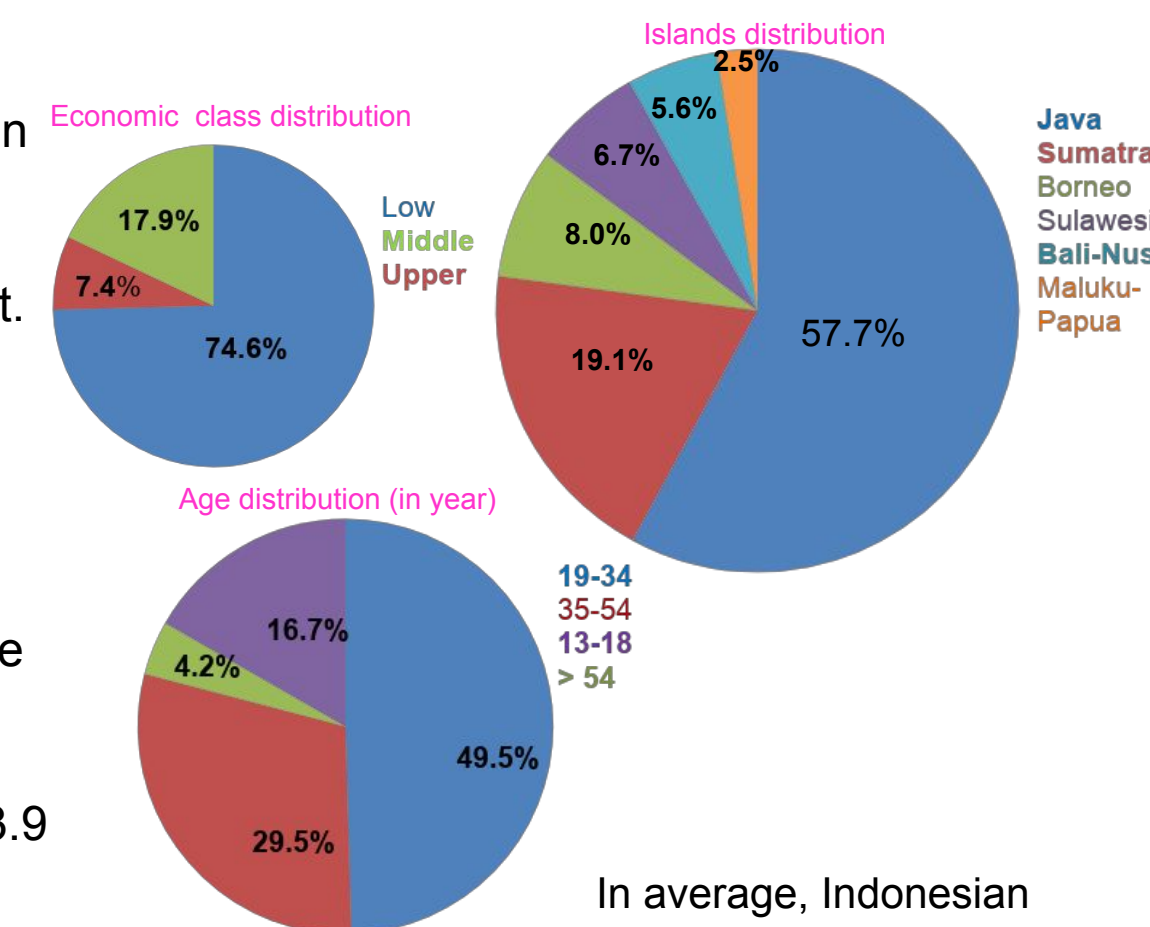### B. Second Pillar of End TB Strategy : Bold Policy and Supportive System

Problems	Solutions	Examples
1. Unsustainable training and supervision of the cadre 2. Lack of community sharing responsibility	- Trainings to society adjusted by education and age to support online cadre system - Massive online campaign	- Wahanavisi in Indonesia - MeToo, Ice Bucket Challenge, BellLetsTalk,, etc - Mobile games and HIV Quiz in african countries
3. Vulnerability of the patients, especially related to mental health, undernutrition, and economic collapses	- Experts teleconsultation - AI to help deciding the necessity of cash transfer	- Riliv, PijarPsikologi, Betterhelp ; Nutrimedi, Pasific Nutrition - Opportunity NYC , Grow360
4. Unclear policy related to universal health coverage	- Mobile financial transaction and investment with AI decision support	Mostly among e-commerce and forex trading
5. Limited support for patients and families due to the stigma and discrimination	- Online peer support - Increasing awareness	- Pasienia - Healtheir.id, Alodokter

C. Research Opportunities to Support Third Pillar of End TB Strategy

Field of Study	Example
Epidemiology	Epidemiological Alert System in Mali
Case Report	ESP system in USA
Health economic	- Review the economic data provided by the app - To review the cost-effective and efficiency of the app
Clinical trial, hospital administration, family medicine, health informatics, HR management, health promotion, etc	

DISCUSSION

143 million population (**54.5%**) in Indonesia had internet access, mostly mobile internet. This number is increasing 56 million people from 2015

Mobile broadbad price is USD 3.4 / 500 megabyte, with average connection 3.9 mbps

Economic class distribution: Low / Middle / Upper — 74.6%, 17.9%, 7.4%

Islands distribution: Java 57.7%, Sumatra 19.1%, Borneo 8.0%, Sulawesi 6.7%, Bali-Nusa 5.6%, Maluku-Papua 2.5%

Age distribution (in year): 19-34 49.5%, 35-54 29.5%, 13-18 4.2%, > 54 16.7%

In average, Indonesian spend **3.5 hours/day** to surf using mobile devices

75% of online purchase are using mobile devices

6x rising data traffic in 2020 compare to 2015

Digitalization improvement in Indonesia year 2014-2015

	2014	2015
Cloud Technology ($ million)	269	364
IoT (million units)	32	37
Big data % advance analytics (million gigabyte)	277	448

Important Notes

- Who should be able to use it?
  - **ALL** segments of societies
  - Different function for each **profession** groups

- Separated or **integrated**
  - Lesson from Snapchat and BBM
  - **Engagement** and retention rate

- Society disparities
  - Geography → can emergency signal system being used?
  - Age related users → children?
  - Poverty → guardian?

- Government's roles
  - what kind of **leadership** style suitable for this program?
  - Private sector **collaboration** to increase connectivity and technology development
  - Becoming Independent developer or creating **platforms for startups** to join the initiation?
- **Ethical** consideration to use the big data provided for the **researches**

CONCLUSIONS

Mobile phone application should be applied as **integrated "one stop"** concept and it is needed to **attract** gross participation from society to **maximizing** it benefit to fight TB

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