



**TRIPLE RING**  
technologies

# Global and Regional Aspects of mHealth

Geetha Rao  
October 30, 2011

[www.tripleringtech.com](http://www.tripleringtech.com)

# Overview

- Defining mHealth
- Why mobile?
- mHealth Applications
- Regional Focus
  - China, India, Japan
  - US & Europe
  - Africa, Latin America, Russia
- Success Stories
- Opportunities and Challenges
- Looking ahead ...

# Terminology

eHealth?

Telehealth?

mHealth?

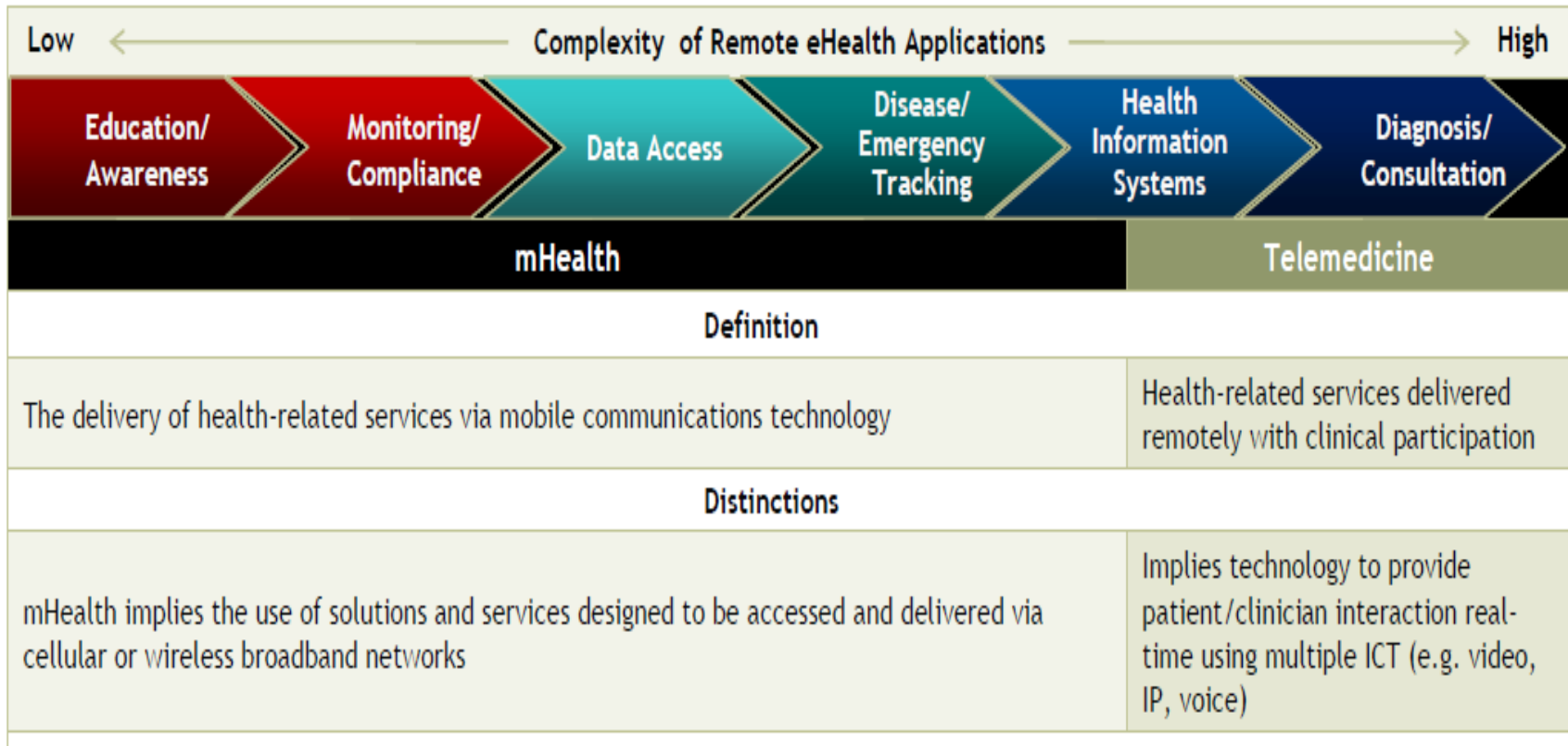
Digital Health?

Connected Health?

# No single definition of mHealth

- mHealth is Part of eHealth
  - WHO Global Observatory on eHealth: *“medical or public health practices supported by mobile devices”* (e.g., mobile phones, patient monitoring devices, PDAs and wireless devices)
- mHealth Includes Telehealth (eHealth)
  - University of Cambridge/China Mobile: *“Service or application that involves voice or data communication for health purposes between a central point and remote locations. ... use [devices] ... for local health-related purposes as long as there is some use of a network.”*
- eHealth can be divided into mHealth & Telemedicine
  - UN Foundation/Vodafone Foundation: *“a subset of eHealth referring to the delivery of health-related services via mobile communications technology”*

# United Nations Foundation Perspective



Source: [www.mHealthAlliance.org](http://www.mHealthAlliance.org)

# Mobile capabilities leveraged in delivering healthcare

- Voice
- Short text message (SMS)
- General Packet Radio Service (GPRS)
- 3G and 4G systems
- Global Positioning System (GPS)
- Bluetooth technology

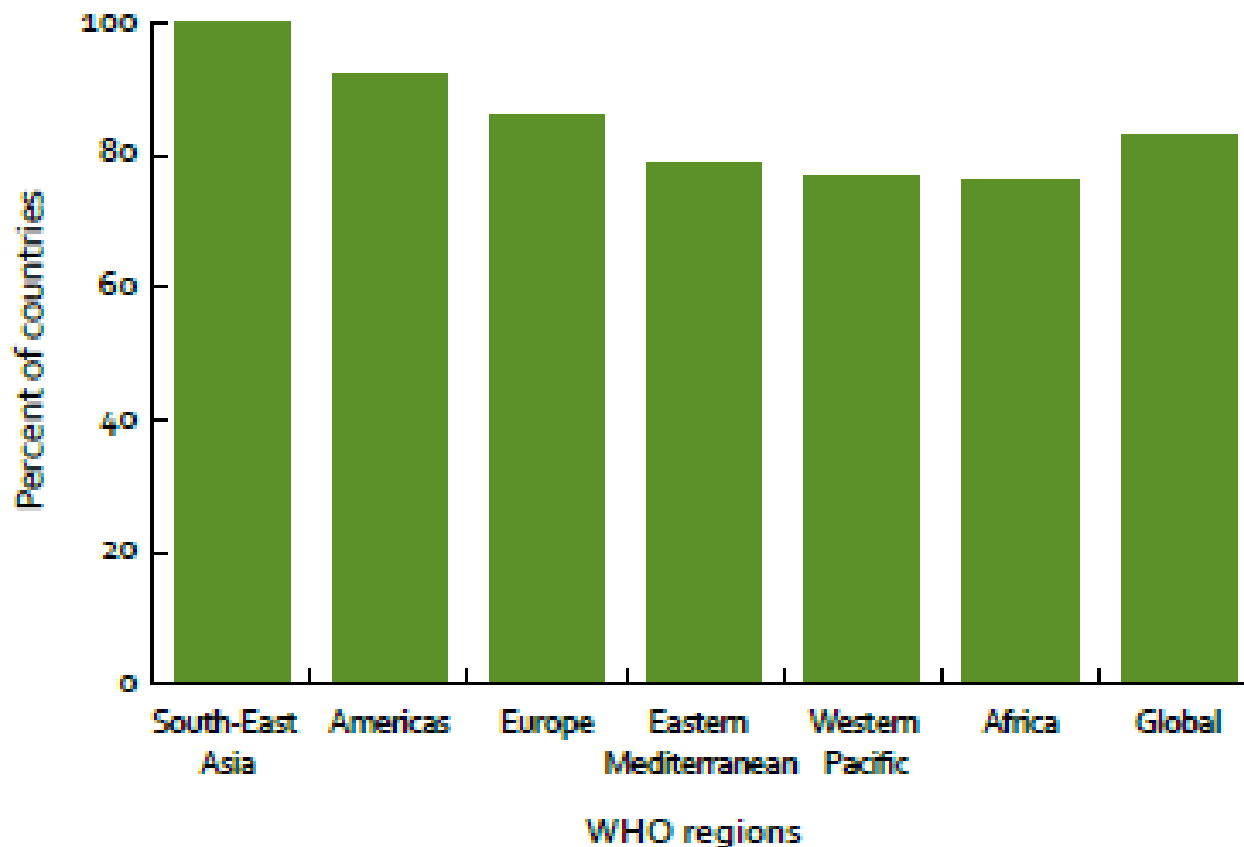
# Worldwide subscriptions (millions)

<b>Mobile cellular</b>	5,282	1,436	3,846	333	282	2,649	364	741	880
<b>Per 100 people</b>	76.20%	116.1%	67.6%	41.4%	79.4%	67.8%	131.5%	120.0%	94.1%
<b>Fixed telephone lines</b>	1,197	506	691	13	33	549	74	249	262
<b>Per 100 people</b>	17.30%	40.9%	12.1%	1.6%	9.4%	14.0%	26.6%	40.3%	28.1%
<b>Mobile broadband</b>	940	631	309	29	34	278	72	286	226
<b>Per 100 people</b>	13.60%	51.1%	5.4%	3.6%	9.7%	7.1%	25.9%	46.3%	24.2%
<b>Fixed broadband</b>	555	304	251	1	8	223	24	148	145
<b>per 100 people</b>	8.00%	24.6%	4.4%	0.2%	2.3%	5.7%	8.7%	23.9%	15.5%

Source: [International Telecommunication Union](http://www.itu.int)

# mHealth is Global

2011 WHO Report: Member states with at least one initiative





# Why mHealth?

- Dramatically extend the reach and touch of health systems - bring healthcare to un-served or underserved populations
- Increase effectiveness and reduce costs of healthcare delivery
- Improve public health
  - Better monitoring and real-time communications
  - Prevention for infectious diseases (e.g., behavior change)
- Manage chronic diseases
  - Individualized lifestyle management Reduce later interventions
- Improved accountability of/to care providers or funders

# Specific Drivers & Opportunities

## Driving Factors

### **Increasing (and ageing) population**

- Increasing cost of care

### **Rising income, dietary and lifestyle changes**

- Increase in heart disease, diabetes, certain cancers, and smoking-related respiratory illness

## Potential Applications

- Automated, remote delivery processes
- Enable ancillary care-providers
- Information provision and self-help
- Intelligent public health systems
- Remote monitoring for treatment of long-term conditions

# Specific Drivers & Opportunities

## Driving Factors

### **Advancement of medical technology and rising personal expectations**

- Growing demand for advanced treatments
- “Industrialization” of health

### **Antibiotic resistance of some bacteria**

- Reduction in effectiveness
- Increasing costs of established treatment

## Potential Applications

- Information provision for health professionals and public
- Applications that match resources to need more effectively
- Information provision for health professionals
- Information gathering for monitoring of treatment effectiveness

# Specific Drivers & Opportunities

## Driving Factors

### **Corruption, fraud, war**

- Risks to drug supply chain effectiveness
- Disruption of health infrastructure

### **Population mobility and globalization**

- Increased risks of epidemics and global pandemics
- Migration to cities putting pressure on centralized health systems

## Potential Applications

- Tracking applications
- Point-of-sale security
- Information systems
- Applications that support distributed and local healthcare
- Applications supporting *local* healthcare
- Increasing efficiency of healthcare systems, in hospitals, in the wide area and across the country
- Data collection for epidemiological research

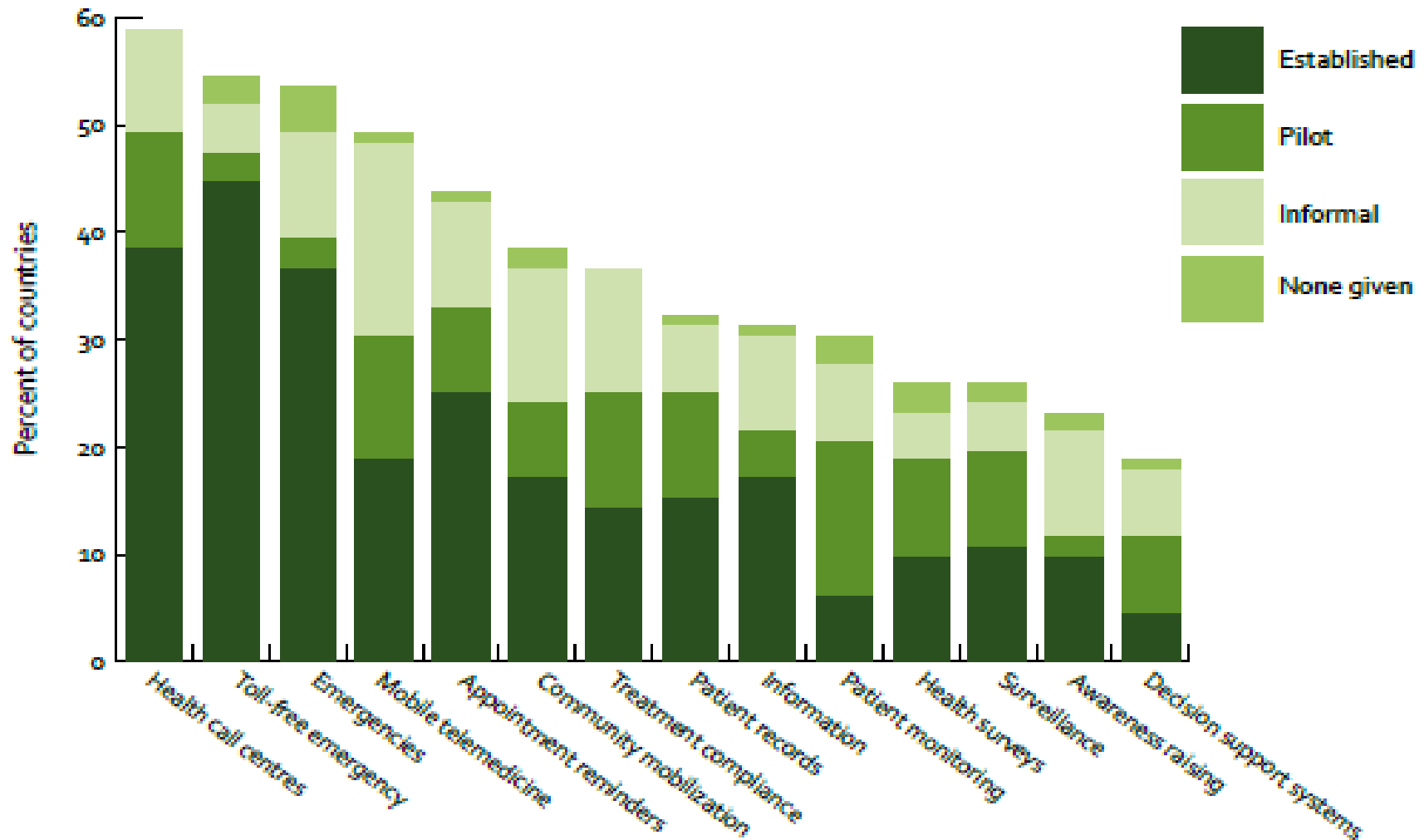
# Where are we today

- Not yet mainstream
- Relatively minimally funded
  - In developed world (especially US) still mainly “building firehouses”
  - In developing world ~\$50M of \$27M total healthcare disbursements (less than 0.1%)
- Highly fragmented
- No game changers yet
- A handful of success stories

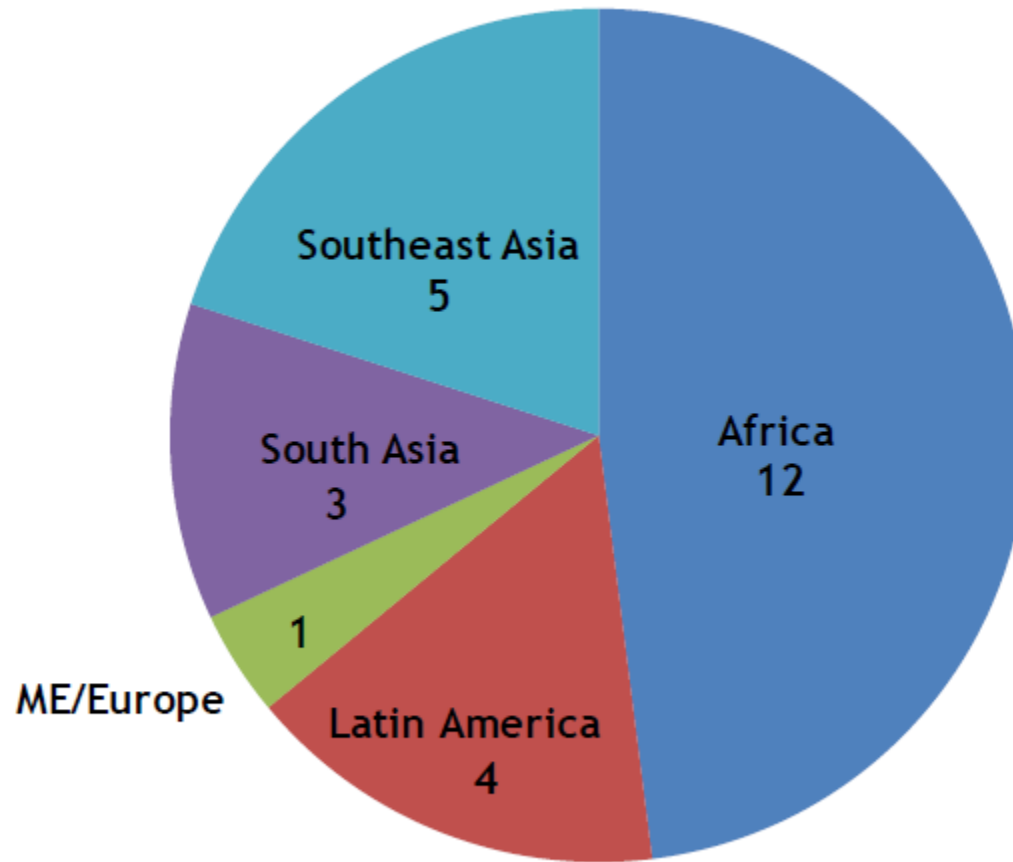
# "... more pilots in mHealth than in the US Air Force"

- Majority of deployments are still small-scale
- Insufficient evidence-base
- Not aligned with priorities – “technology in search of a problem”
- Uncoordinated funding – even in same area (e.g., multiple phones for different apps)
- No standards, especially in health data maintenance (EMR's, intake data, etc.)

# Adoption of mHealth Initiatives

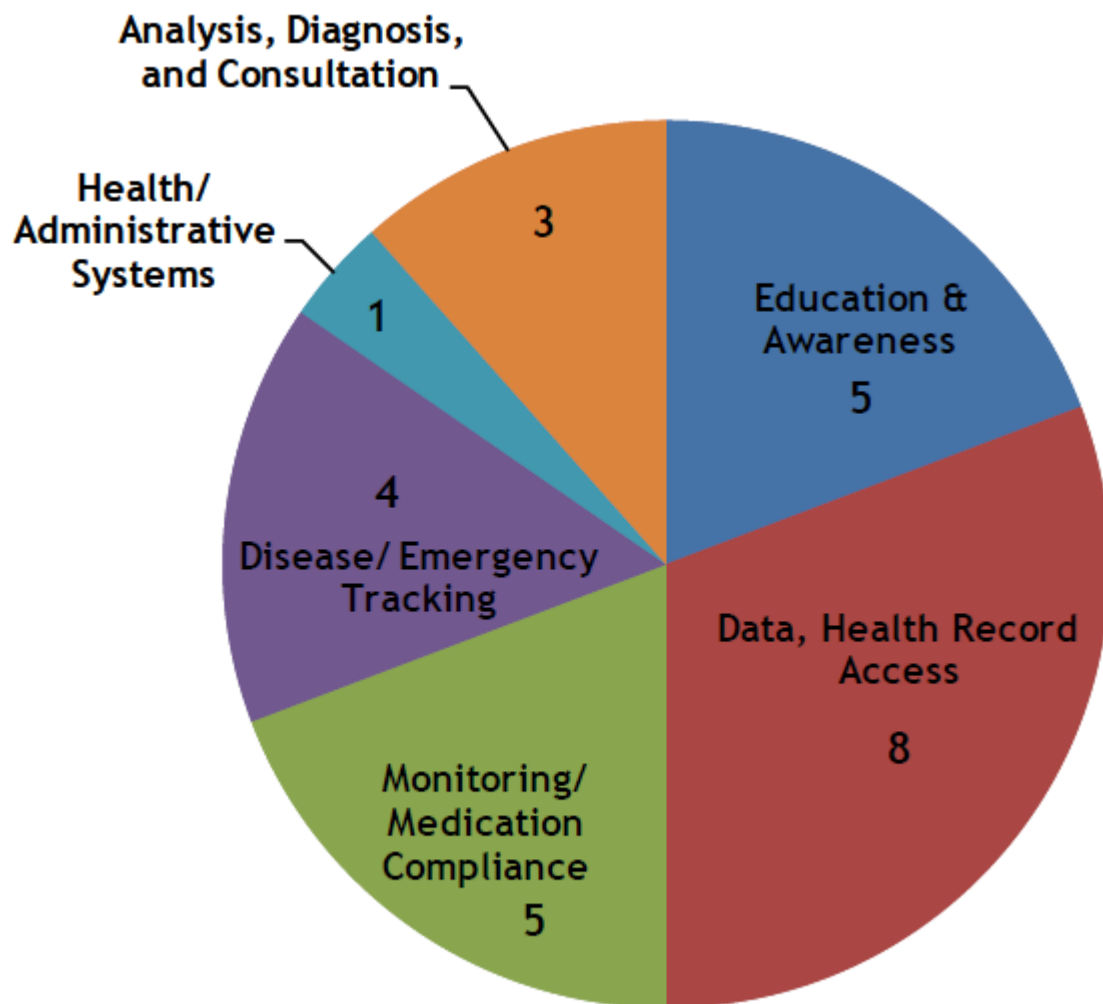


# mHealth Activity by Region





# mHealth Activity by Application



# Current mHealth applications

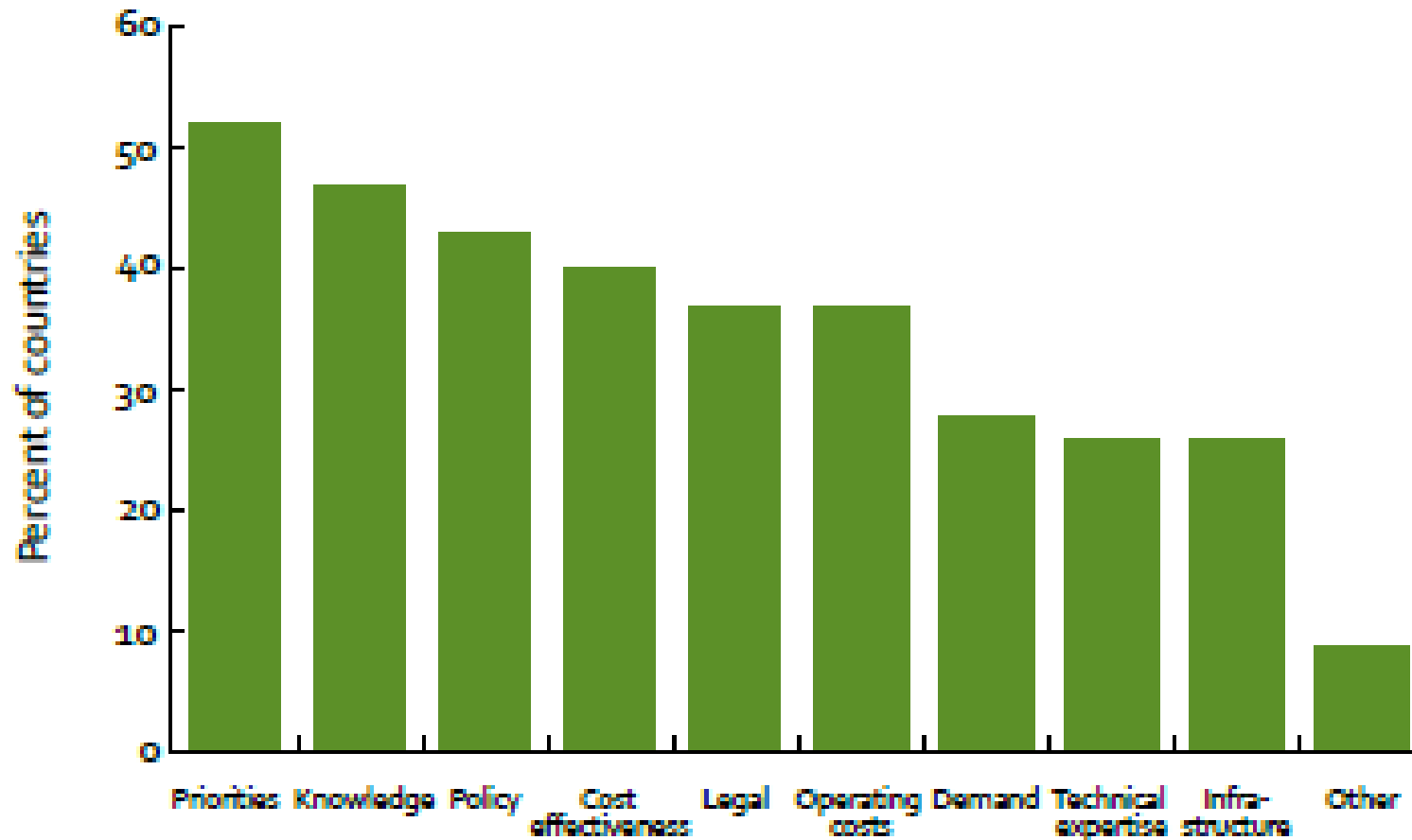
## Global Top 4

1. Mobile-Enhanced Appointment Booking Systems
2. Drug Authentication and Tracking
3. Remote Diagnosis
4. Wellness/Self-Tracking

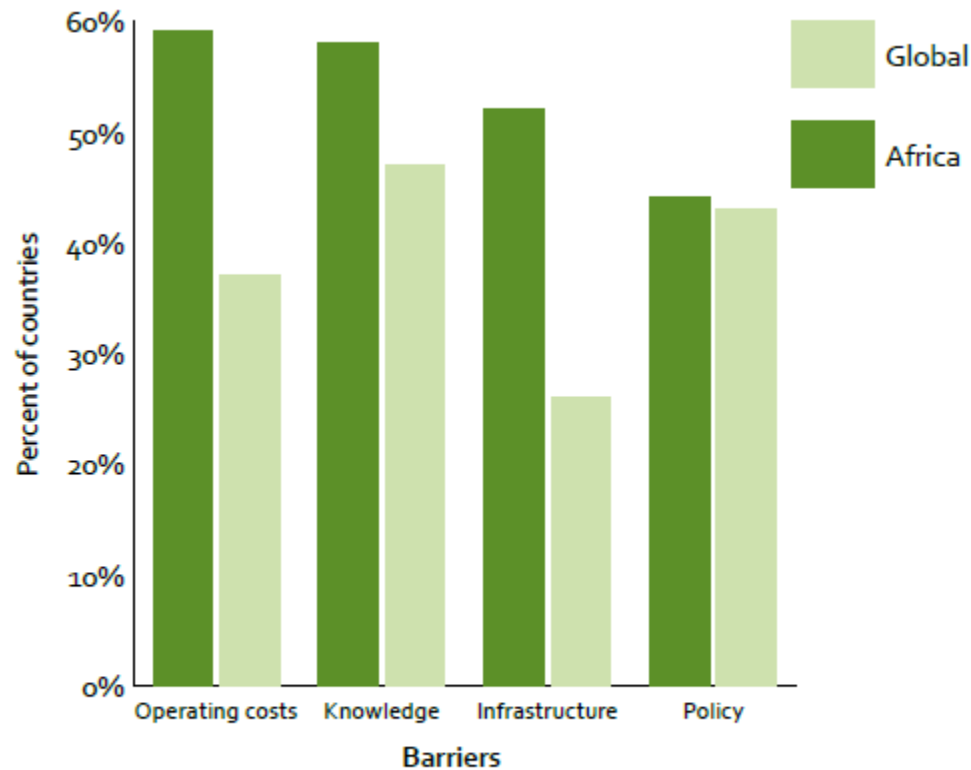
# Current Challenges for mHealth

- Cultural misalignment between information technology and medicine
- Lack of technology standardization
- Network availability (including frequencies, coverage, etc.)
- Cost of service and devices for lower income communities
- Handset churn
- Literacy levels
- Regulation
- Security and privacy concerns

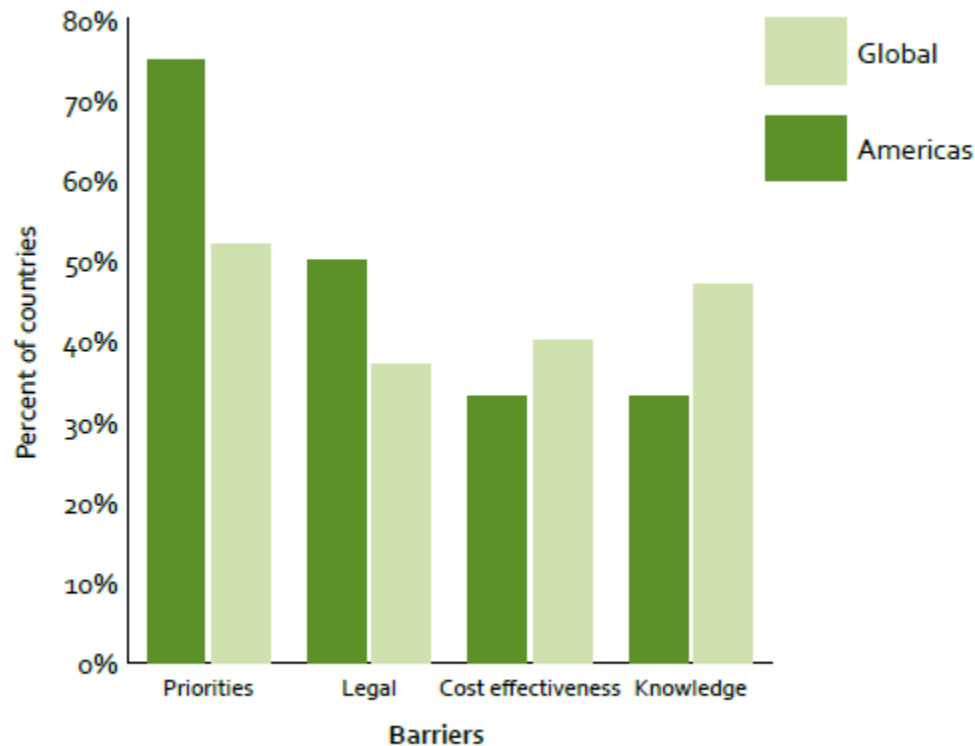
# Barriers to mHealth implementation globally



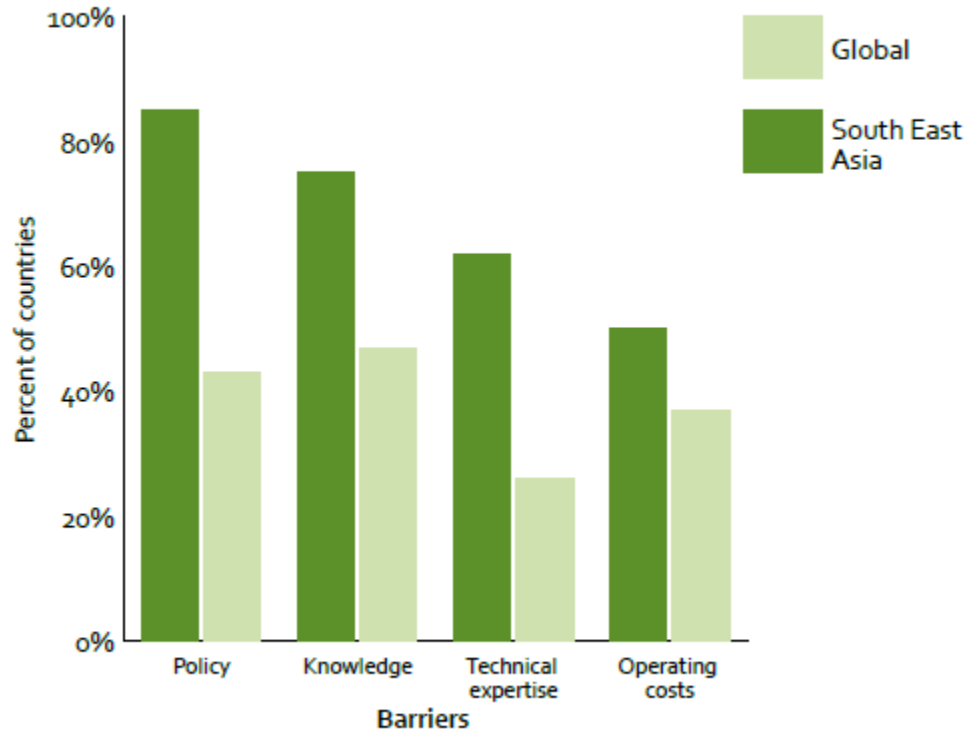
# Regional differences in mHealth issues



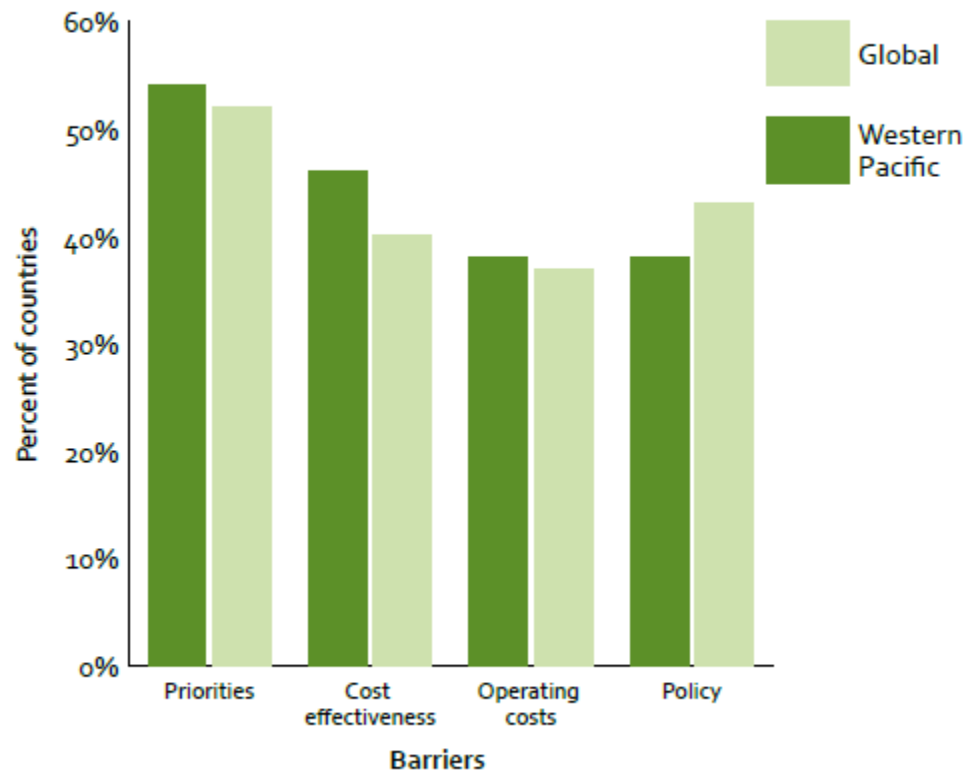
# Regional differences in mHealth issues



# Regional differences in mHealth issues



# Regional differences in mHealth issues





# Success Stories

- Mobile Alliance for Maternal Action (MAMA)
  - Partnership with J&J, United Nations Foundation, the mHealth Alliance, and BabyCenter LLC
  - Collaborative approach
  - Global knowledge base
  - Share best practices
- WelTel (text messaging application)
  - Increase adherence to antiretroviral therapy (ART) for HIV/AIDS,
  - Shown to significantly suppress viral loads.
- Episurveyor (quality metrics)
  - Mobile software for collecting medical data
  - Scalable and replicable models
- Clinton Health Access Initiative
  - SMS printers for diagnostic data
  - Currently being rolled out across Nigeria
- mUbuzima program
  - Improving efficiency of community health workers
  - Deployed in Rwanda

# Focus on China

- Single most active country
- Massive scale projects
- Several major regional public initiatives
- Single greatest focus is on care delivery to more people
- Early adopter for many large-scale networked applications
- Leading the way in standardization

# Focus on India

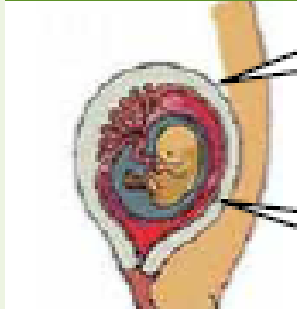
- Public-private partnerships
- Very active in extension of care delivery
- Major focus on chronic diseases
  - Heart disease
  - Diabetes
- Rural public health initiatives
  - Maternal and child health

# Mobile phone use in Bangladesh



# Pregnancy care advice by SMS

## First trimester



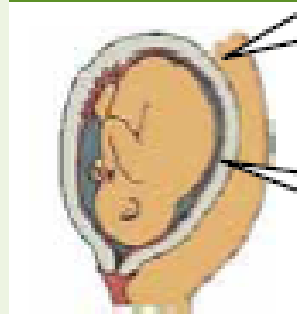
**Send** <LMP:ddmmyyyy><Mobile No.><Name> to 14242

**Instant:** Mrs. <name>, thank u for registration. Your probable date of delivery is dd/mm/yy. U will receive periodic advice for safe pregnancy. Type "No" & send to <xxxx> to cancel registration. - By Ministry of H&FM

**260 to 290 days:** Mrs. <name>, every pregnant mother should consult a health worker or doctor at least 1 time in 1<sup>st</sup> 3 months. If you did not consult yet, do it now & follow advice. Take rest. Avoid heavy work. Start saving money for child delivery. -By Ministry of H&FM

**180 days:** Mrs. <name>, Consult health worker or doctor. Do it if u have not done yet. Take TT vaccine, iron-folate tablet & additional food. Maintain personal hygiene. -By Ministry of H&FM

## Third trimester

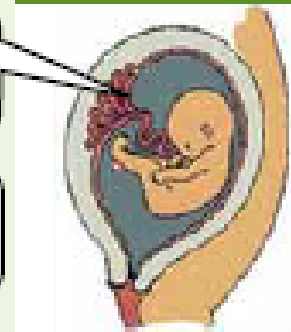


**240 days:** Mrs. <name>, go to health worker or doctor to check condition of pregnancy. Test urine for protein/glucose. Make a good plan for safe delivery, good in a health center. -By Ministry of H&FM

**255 days:** Mrs. <name>, your tentative delivery: dd-mm-yy. Consult health worker or doctor. Take preparation for safe delivery. Make sure a trained person attends your delivery, good in health center. After delivery, check your & newborn's health from health worker or doctor within 48hrs. May Almighty help you. -By Ministry of H&FM



## Second trimester



# Focus on Japan

- Entrenched healthcare system culture
- Conservative and slow to change
- Innovations coming from outside the industry
  - Telecom
  - Information technology
- Greater opportunity for patient engagement
  - Gaming
  - Real-time communications

# Focus on US and Europe

- US is similar to Japan
  - But, stronger innovation infrastructure
- Major issue with misaligned financial incentives
- Europe is similar to US
  - But, with better aligned incentives in some countries
  - Significant regional variations

# Focus on Africa

- Currently 51% penetration of mobile phones – expect over 100% within 8 years
- Numerous philanthropic and development projects
  - Infectious disease management (HIV/AIDS)
  - Maternal health
- Key challenges in accountability and lack of coordination
- Mostly outside solutions with limited local adaptation



# Medic Mobile: Kuvela

## First SIM Healthcare Application



- Menu based application and reporting for maternal health services
- Advantages of SIM over Smartphone
  - Runs on 80% of world's mobile phones
  - Easy to use, low cost, broadest reach
  - Menu-based interface
  - Automatic OTA (over the air) updating
  - Proven scalability (mobile banking)
- Future applications for patients
  - Schedule appointments
  - Access remote consultations
  - Alert nearest clinic in medical emergency

<http://medicmobile.org/2011/06/06/medic-mobile-announces-the-first-mobile-sim-app-for-healthcare/>

# Focus on Latin America

- Over 90% penetration of mobile phones
- Increasing focus of health authorities
  - Education and medical literacy
  - Chronic disease management
  - Infectious disease management
  - Data collection and health surveillance
- Leveraging mobile in research
  - Informatics
  - Outcomes research
- Customized local solutions

[http://www.mhealthinfo.org/projects\\_table?order=field\\_geo\\_value&sort=asc](http://www.mhealthinfo.org/projects_table?order=field_geo_value&sort=asc)

# Focus on Russia

- Notable lack of activity
- Neither public health nor provider systems seem to be driving
- Isolated global private enterprise players are attempting to drive:
  - Telecom operators
  - Pharmaceutical companies
- Slow follower in selected projects, after proven worldwide success
  - MAMA, Text4Baby
  - Cardiac monitoring

# Top New 2011 mHealth Areas

- Public health
  - Disease surveillance: e.g., Brazil - health workers gather data on outbreak of Dengue Fever
- Primary care
  - Extend the reach of physicians: e.g., Tasmania - use of mobile imaging to provide breast cancer screening.
- Emergency care
  - Response to natural disasters: e.g., Haiti
  - Personal emergency response capability: e.g., wireless fall-prevention
  - Ability to distribute off-hour calls to groups of qualified specialists
- Drug verification/counterfeit detection in developing countries
- Online patient management
  - Scheduling
  - Patient verification

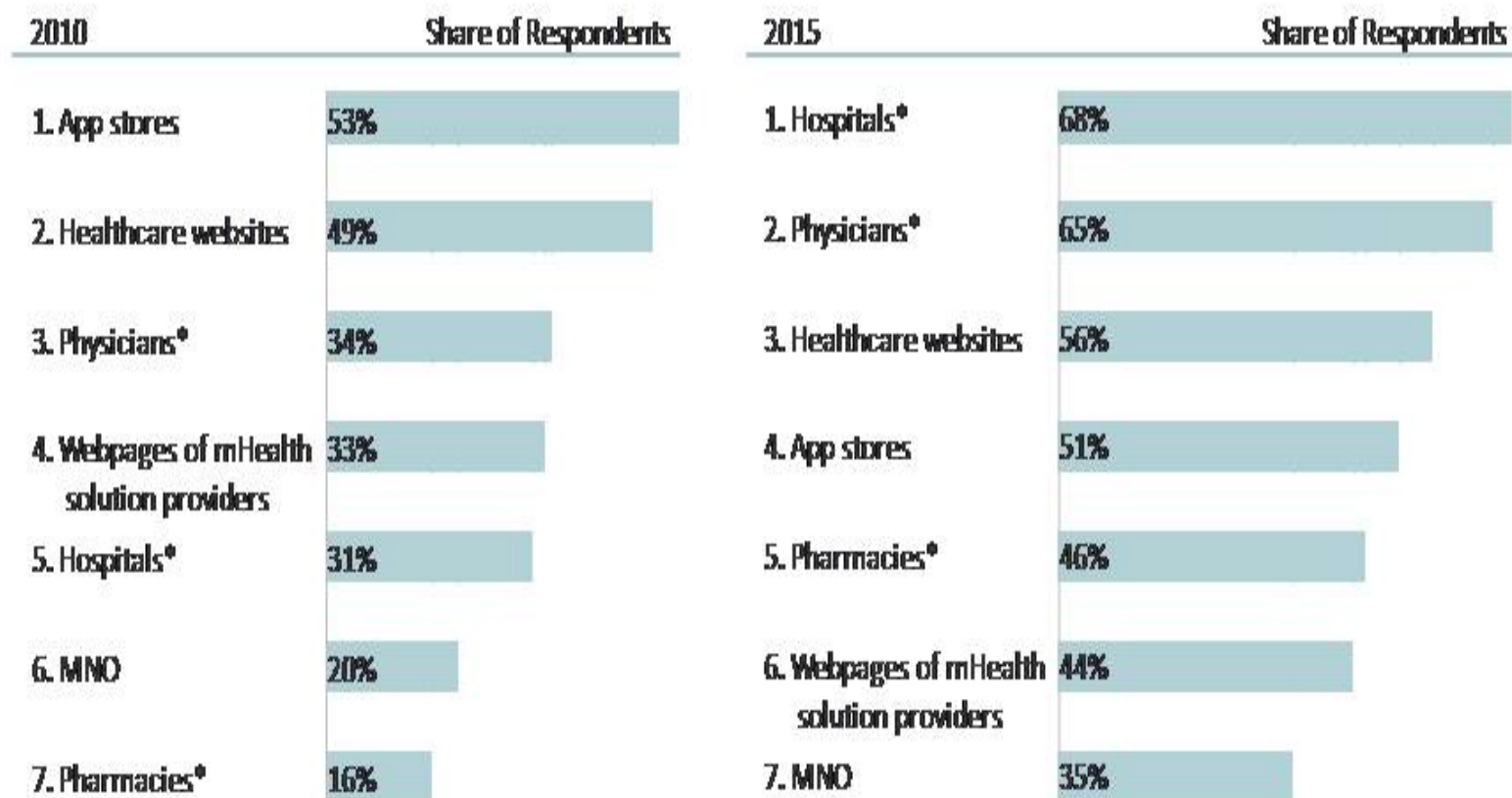
Source: Mobile Communications for Medical Care

a study of current and future healthcare and health promotion applications and use in China and elsewhere

Final Report: April 2011



# mHealth Distribution Channels in 5 Yrs (based on survey)



# Looking ahead ...

- Continued downward cost pressures on providers will drive mHealth
- Shift in financial incentives towards outcomes & disease prevention
- Integration of monitoring and evaluation in mHealth programs
- Medical devices will get connected
- More complexity in data ownership
  - Role of “inferred” data
  - Privacy
- Stratification of value chain
  - Shifting role of mobile operators
  - Networks as platforms for healthcare innovation
- More integrated telecommunications providers
  - Information exchange
  - Healthcare delivery
  - Payments
- Business opportunity for managed mHealth services
- Potential regulatory gridlock
  - Blurring of jurisdiction
  - Shift toward risk/benefit based oversight
- Fundamental shifts in medicine
  - Disease understanding
  - Healthcare delivery

# Immediate future mHealth applications Top 4 globally

1. Sensor-Based Applications
2. Mobile-Enabled Telecare
3. Intelligent Public Health Messaging
4. Aggregated Private Data for Public Health Benefit



# mHealth guidance for investors and funders

- Invest in the evidence base.
- Align on standards and systems
- Ground mobile and information and communications technology (ICT) strategies in country-level realities, needs and opportunities
- Share learnings and best practices.
- Build a coalition of global health funders to improve coordination

**The Elusive Power of mHealth**, October 4, 2011

By Amanda Glassman with Vicky Hausman, in Health Product Innovation and Access, Health Systems



# Long-Term Vision for mHealth

Ubiquitous, point-of-care  
smartphone-based  
applications connected to local  
peripherals and data systems  
that provide real-time  
networked healthcare delivery

# Long-Term Future mHealth Low-income regions

- Robust administrative systems for healthcare delivery
- Better population health monitoring and planning
- Mobile services coupled with mobile banking
- Increasingly powerful mobile phones in the hands of health workers
  - On-board applications
  - Low-cost peripheral devices
  - Personalized diagnosis and health condition management
- Mobile phone based training
- Remote decision support
  - Automated clinical decision algorithms
  - Real-time (or near-real-time) contact with specialist doctors

# Long-Term Future mHealth Developed economies

- Unobtrusive and passive data collection
  - vital signs (heart rate, body temperature, etc.)
  - location, motion, ambient air temperature and pollution levels
  - conversational patterns, interaction with other people
  - Medication adherence
- Conscious and active patient engagement in real-time guidance and adaptive therapy
  - sleep apnea monitoring
  - pollution warnings for asthma
  - drug dosing controllers
- Clinical studies using very large populations
- Anytime, anywhere access to personal health records
- Truly personalized treatments
- Real-time infectious disease monitoring
- Gamification for behavior-modification and mental health

# Regions where mHealth will progress most rapidly

- Healthcare delivery system is in transition
- Population has rising expectations
- Healthcare industry is willing and able to experiment with new model
- Most likely in major emerging economies:
  - India
  - China
  - Brazil
  - South Africa

# References

Statistics and survey data in this presentation were derived from the following sources:

- *World Health Organization: mHealth - New horizons for health through mobile technologies*, 2011 Report, Global Observatory for eHealth series - Volume 3
- VitalWave Consulting: *Landscape Analysis of mHealth in the Global South*, 2008 Report
- VitalWave Consulting: *mHealth for Development, The Opportunity of Mobile Technology for Healthcare in the Developing World*, 2009 Report
- VitalWave Consulting: *Sizing the Business Potential of mHealth in the Global South - A Practical Approach*, 2009 mHealth Alliance
- Mishra, Ganapathy, & Bedi: *The Current Status of eHealth Initiatives in India*, Making the eHealth Connection, 2008
- Leslie et al: *Mobile Communications for Medical Care - a study of current and future healthcare and health promotion applications, and their use in China and elsewhere*, 2011 Report, University of Cambridge