

**** Integration of IP telephony and EMR system
IMS in chronic health care management of
SLE patients in remote areas of Jamaica”***

Prof Winston G Mendes Davidson

Head School of Public Health & Health Technology; University of
Technology Jamaica.

In collaboration with: Dr Michel J.F. Walravens (Belgium); Mr Sanjeev
Rangaiah (USA)

* Historical development of remote Telemedicine System in Jamaica

- * 1995-2000 Research explored questions related to the application of Information Technology to Medicine, using Jamaica as the research location.
- * The research questions included:
 - * What is Information?
 - * What is Knowledge?
 - * What is the expected outcome of the practical application of Information Technology to health and medical care?
 - * How can the application of Information technology to Public health and medical care advance the harmonious development of man within the environment?

* Answers to exploratory and basic research questions (1995-2000)

* The answers to the questions were as follows:

* What is Information?

* Was found to be as profoundly a philosophical question as:

* What is “thought”?

* or What is “matter”?

* What is knowledge?

* Was defined simply as: “A state of awareness of information”.

* What is the expected outcome of the practical application of Information Technology to medicine?

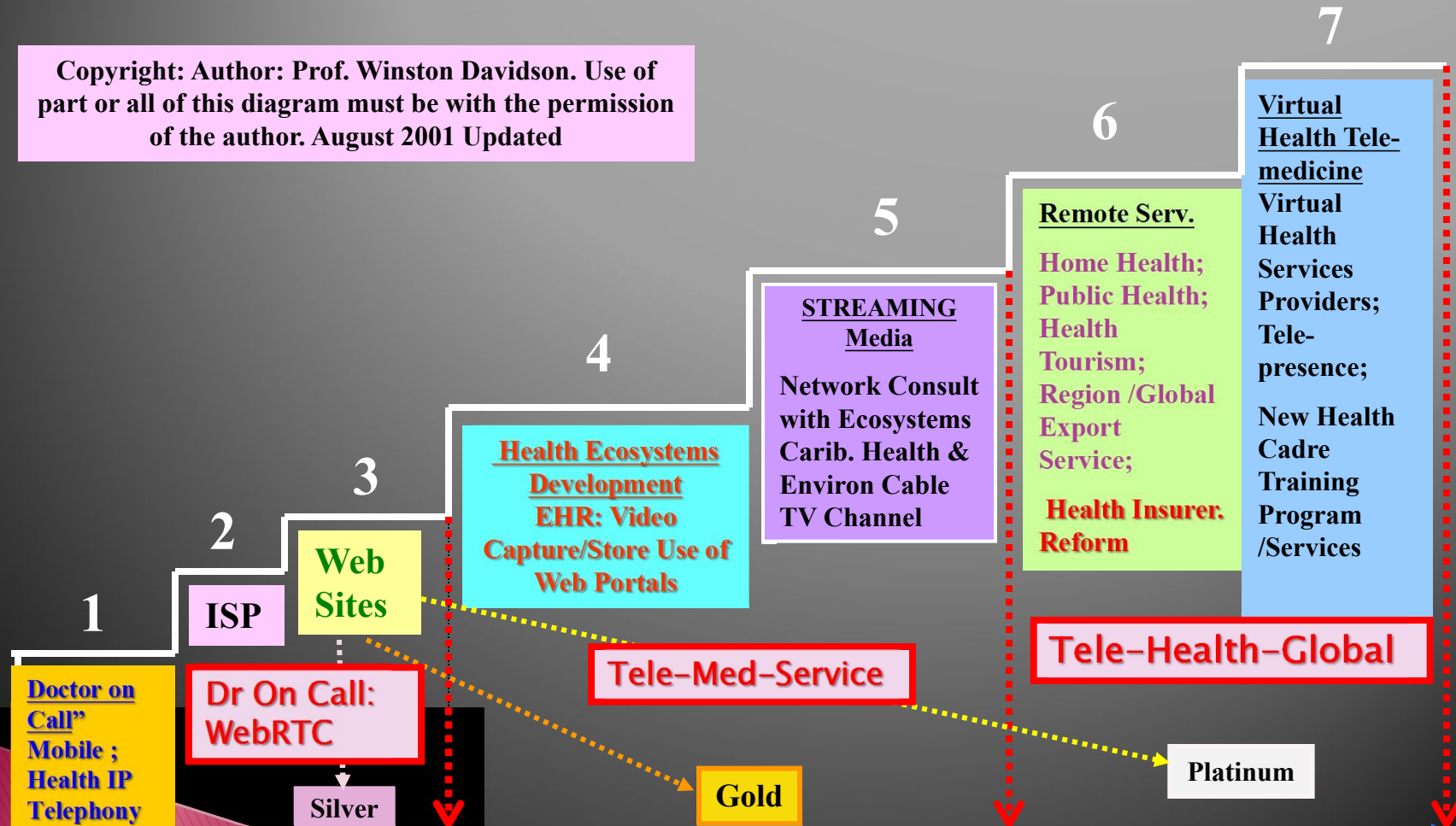
* The answer is explained and expressed in the embodiment of *an integrated four part conceptual framework system model* referred to as: The “MD” MODEL

* What is the MD model?

Telemedicine “The Mendes–Davidson (*“MD”*) Model”

Seven Step Integrated, ICT Converged: Telemedicine/Health Info Management Systems

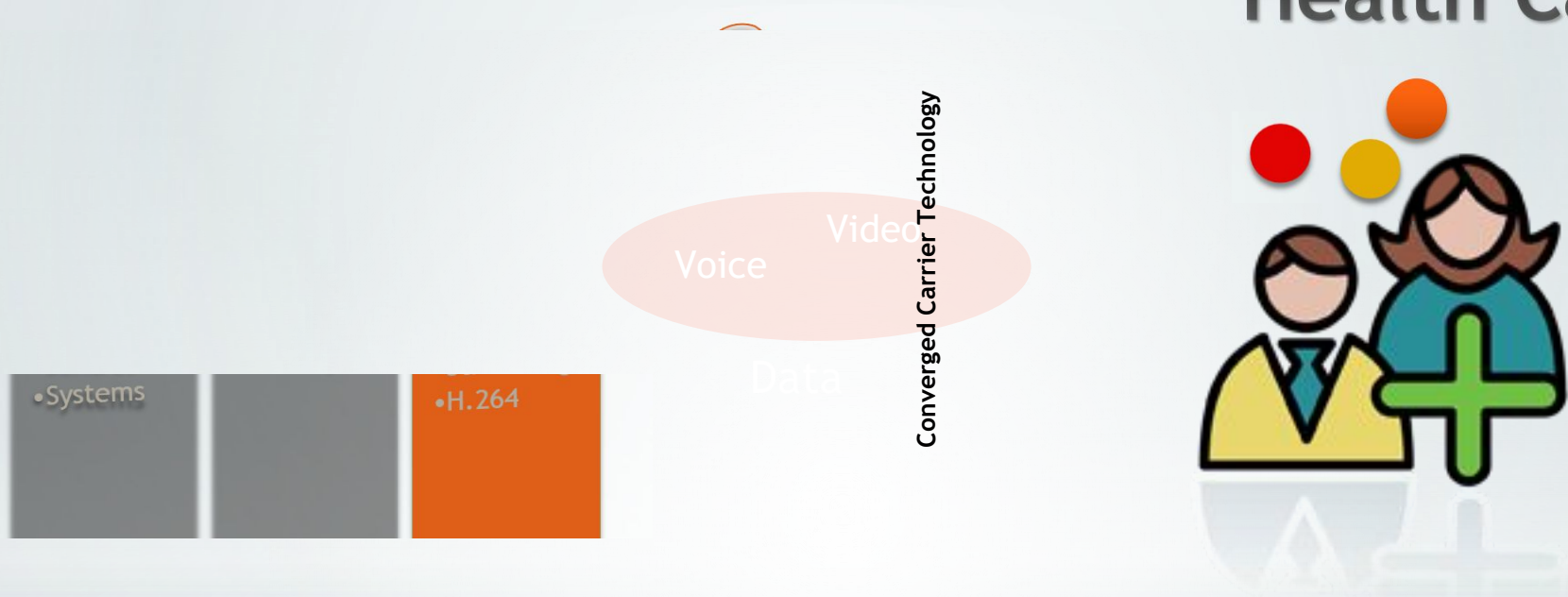
Copyright: Author: Prof. Winston Davidson. Use of part or all of this diagram must be with the permission of the author. August 2001 Updated



EHR (Electronic Health/Medical Record) IMIS / Broad-Band Data Infrastructure

* Why The “Mendes Davidson Model”?

Digital Trends - Convergence affects Health Care



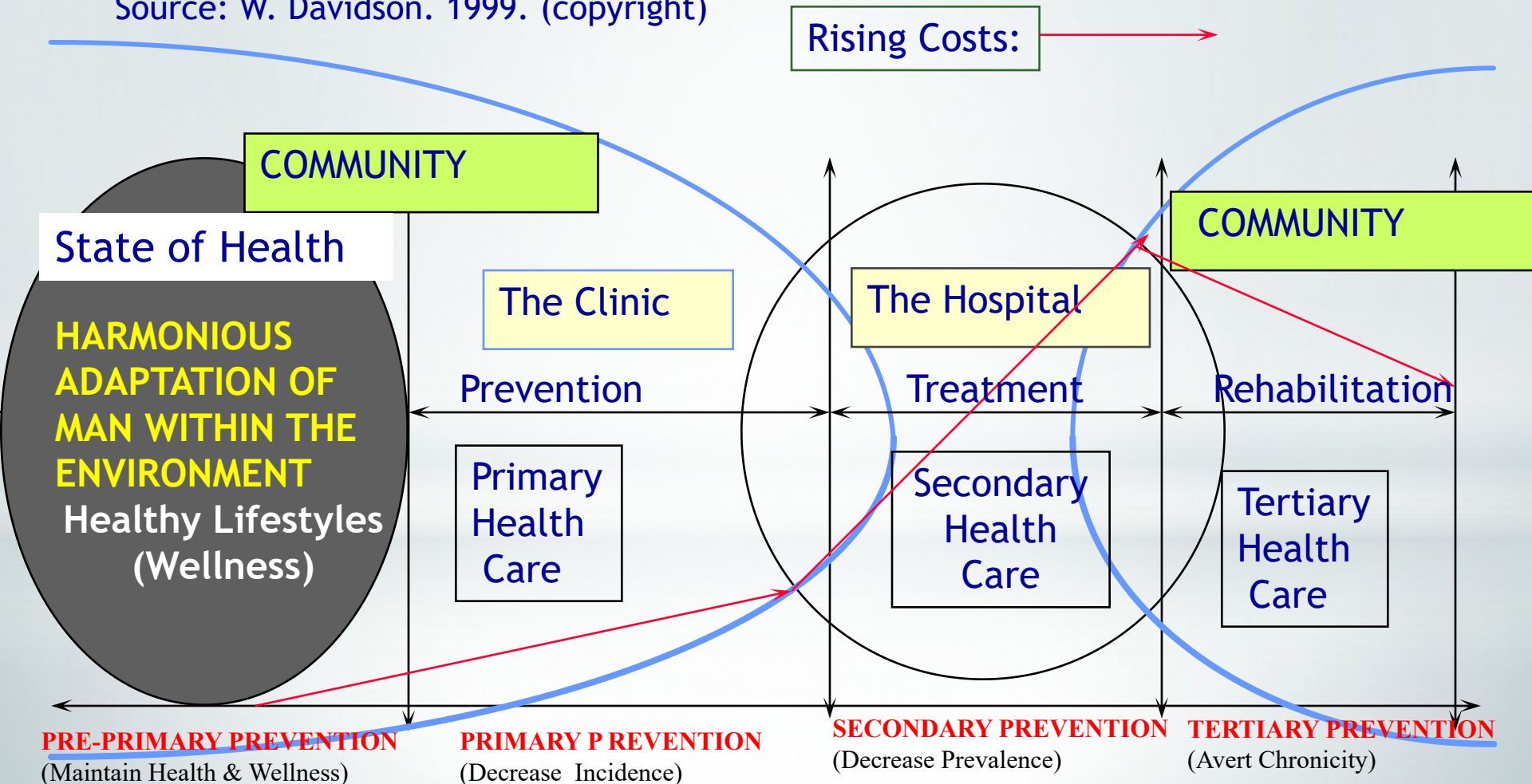
Regional electronic traffic is moving rapidly to an all digital format.

Carrier technology has become ubiquitous and vendor neutral.

End user technology is multifunctional and portable.

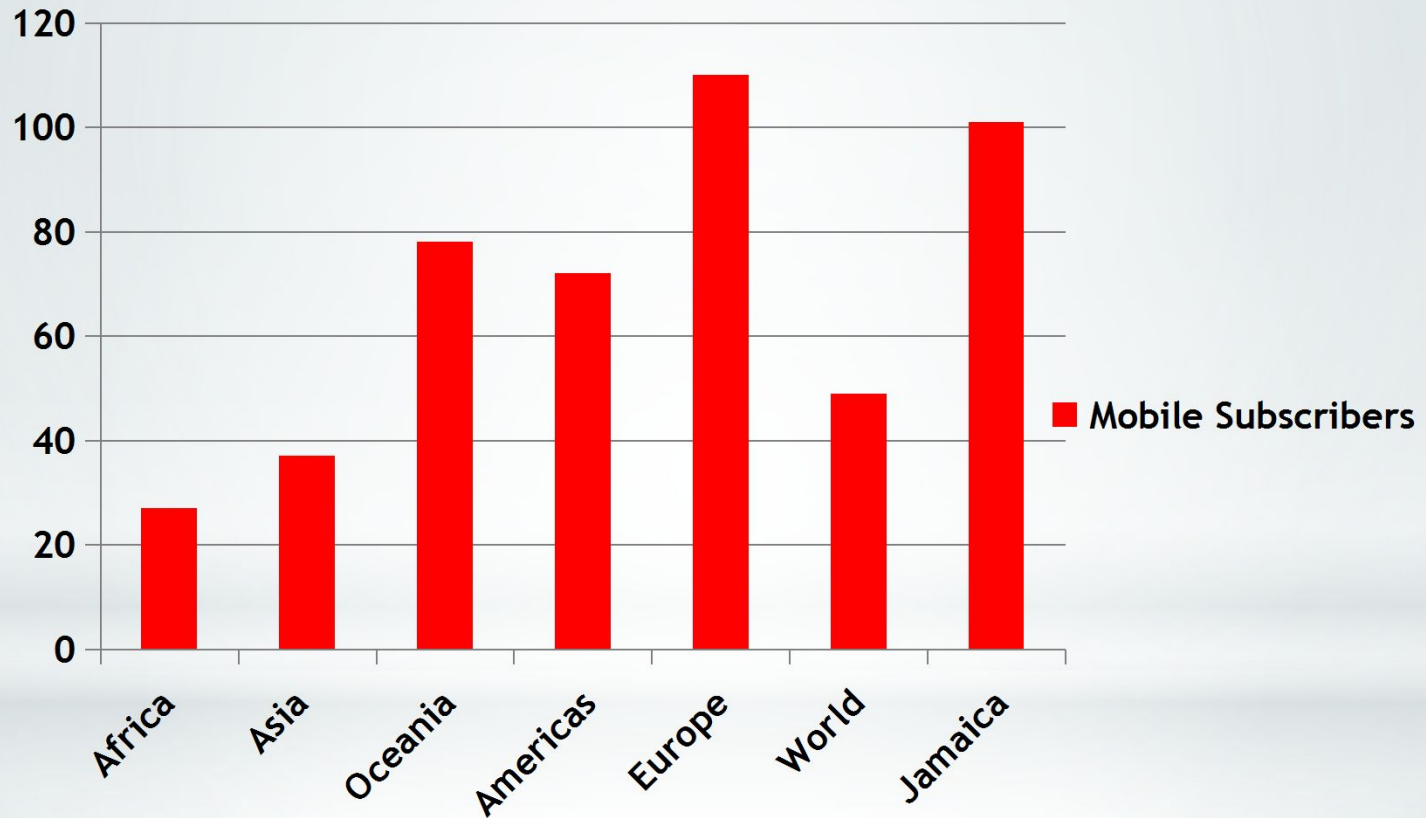
* “The Mendes Davidson” (MD) Model utilizing: **THE FOUR STAGES THEORY OF PREVENTION** for Sustainable Local & Global Health Systems Development

Source: W. Davidson. 1999. (copyright)



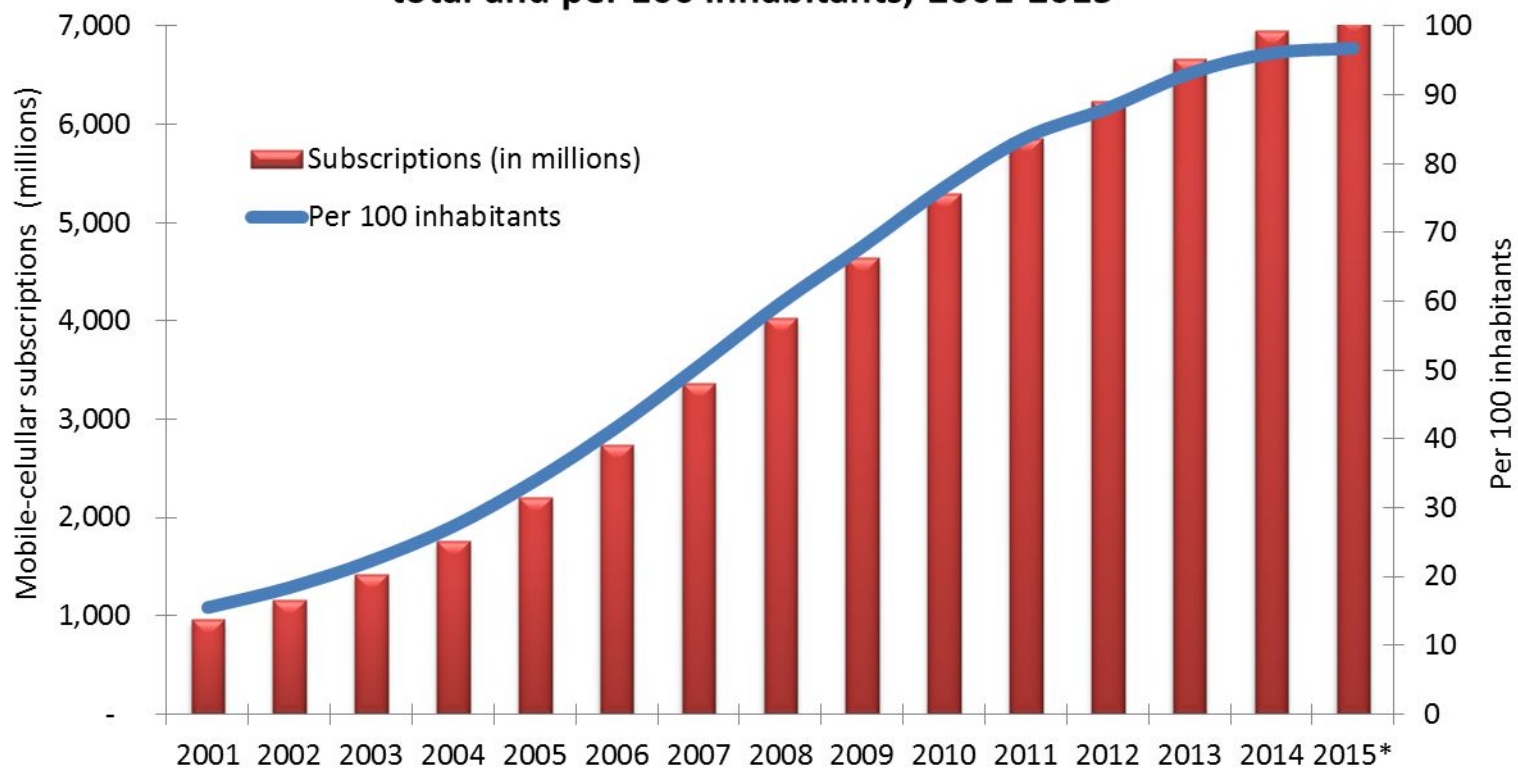
*Cellular phone use is ubiquitous globally

Mobile subscribers - rates per 100 inhabitants



Source – International Telecommunications Union website. 2004

Global mobile-cellular subscriptions, total and per 100 inhabitants, 2001-2015

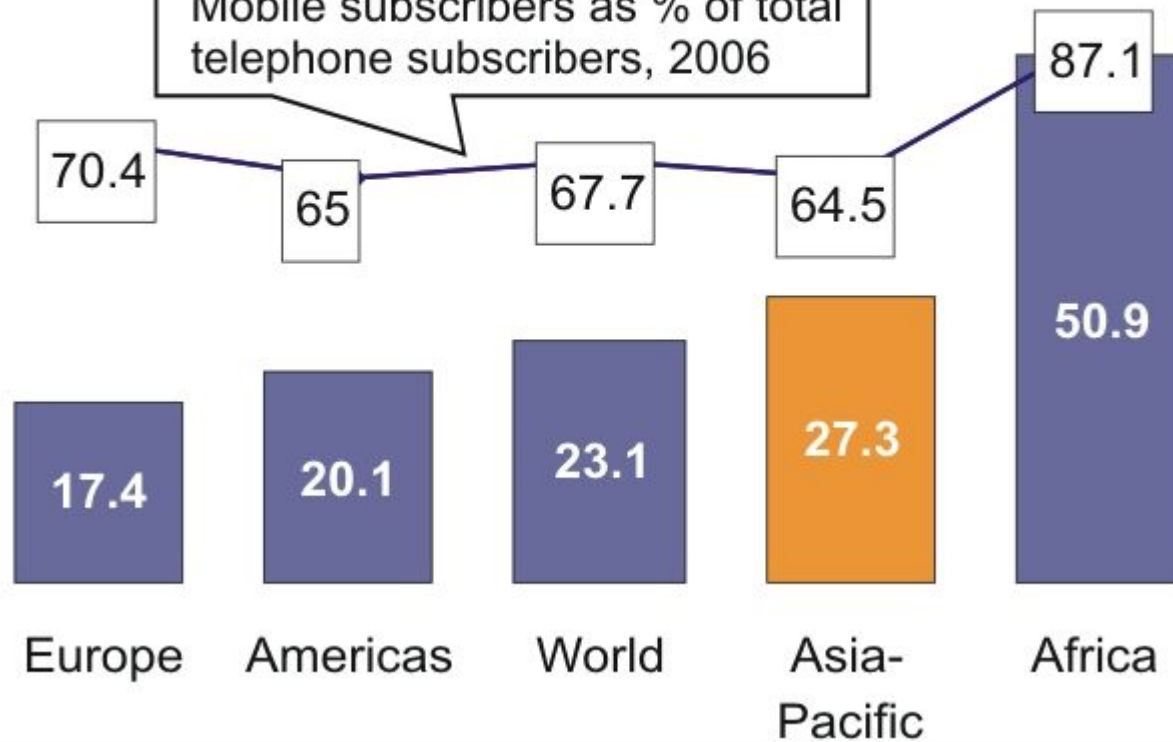


Note: * Estimate

Source: ITU World Telecommunication /ICT Indicators database

Annual average growth rate in mobile subscribers, 2001-2006

Mobile subscribers as % of total telephone subscribers, 2006



Seeking Answers related to the applied research questions (2002-2016)

- * Having settled the problem of the conceptual framework the research proceeded to questions related to applied research?
 - * How can the application of Information technology to Public health and medical care advance the goal of the harmonious development of man within the environment?
- * Research Center was set up in 2002 strictly for this purpose of developing practical solutions to that end.
 - * The practical outcomes were two prototypes for testing: 1. “Dr On Call” (Mobile IP Telephony solution) and 2. UNIMEDICS (EMR solution)

Local Area Network (LAN)

Systems Engineer
Network Administrator etc.

Admin computer

Health TV Chan. Op. Centre

Dir. Program/ Edit/ Schedule

Multi-media /program /edit/ device

City & Town

Cable Modem / DSL

Telemedicine Unit

Home Health Cable TV Telehealth Unit

Network Operating Centre (NOC)

T1 Telephony VOIP server (Front-end)

ISP/ Web hosting Site Settings

domain DNS

Application server

Hub

Cable Modem

PSTN

VPN

RAS

Firewall

Router

siteLink

VPN

Network attached Storage (NAS)
Fault tolerant NOC mirror (FTNOCM); (back-end).

Storage

Generic file server

Band width; from V-sat, via wireless; Cable, Via Cable modems

International collocation
VPNs

Rest of Country

Switch

Telemedicine Unit

Hotel / School Health Cable TV Telehealth Unit

Telemedicine Unit

Wide Area Network (WAN)

Telemedicine / Telehealth units for Drs. Office; Clinic; Hospital; Pharmacy; Schools; Factories ; Enterprises; Homes; Hotels; Prisons ; Sports Medicine; Homes for Elderly; UWI; UTECH; Training Instits.; All online in real time.

Multimedia Streaming and capture diagnostic devices located at patient terminals on LAN and WAN

Internet / Web, E-Health, Telemedicine Services for export to Overseas Jamaicans, Tourists, the Caribbean Community & Ghana.

System designed by: Dr. Winston Mendes-Davidson. This diagram is copyright protected; Use may only be made with the permission of the author. 20th February 2002.

TELEMEDICINE & TREATMENT CENTRE

HEALTH FOR ALL JAMAICA

First operational prototype network diagram:
“DR ON CALL” using Altigen / Alti-Serv System

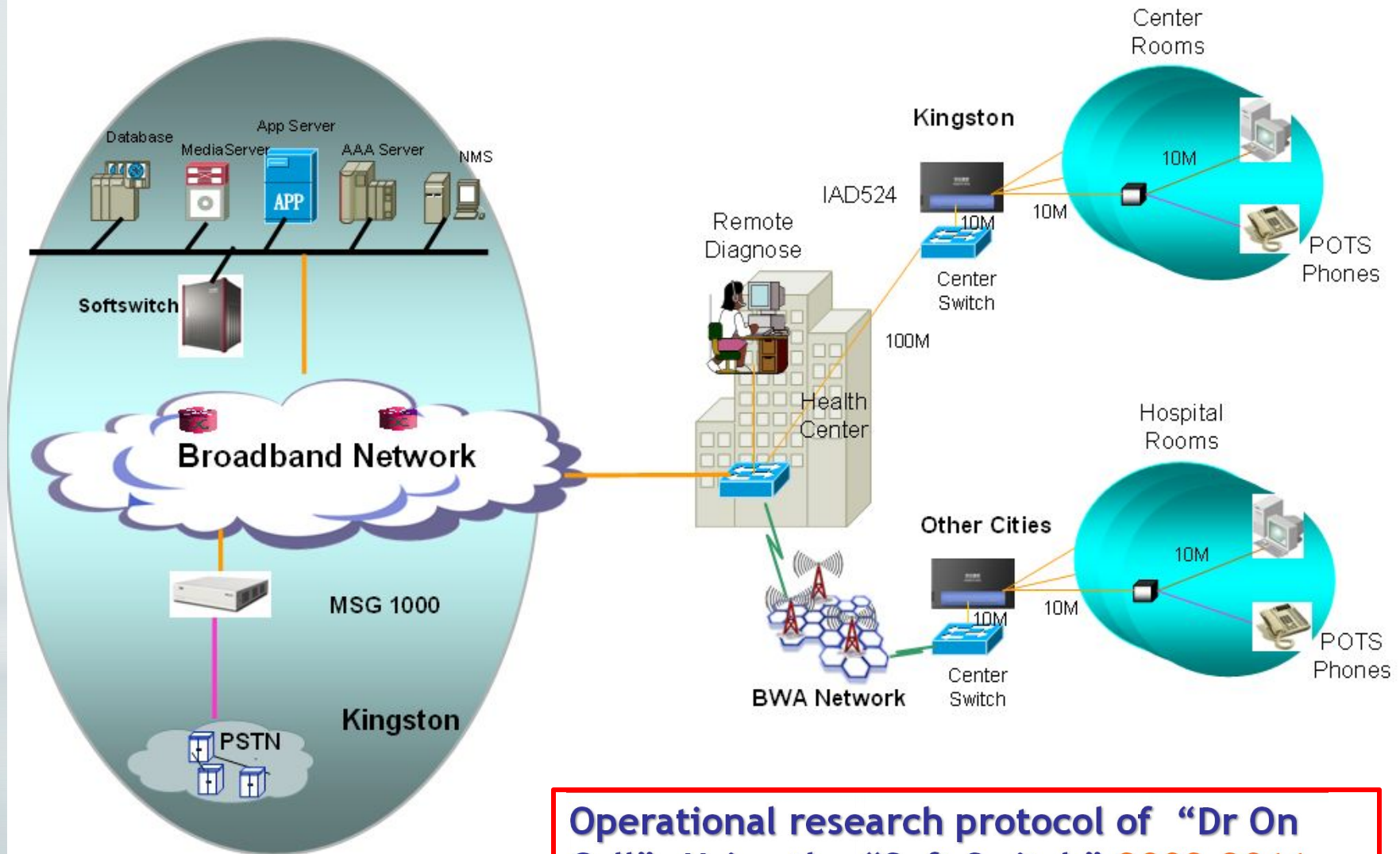
* Web Based EHR for All Drs, Health Institutions / Health & Allied Personnel Developed For Global use

Version 1

1. Office Schedule Module
2. Hospital / Institutional module
3. Institutional/Field database integration
4. Interface c 3rd party Scheduling
5. Billing Module
6. Interface c 3rd party Billing
7. Lab / HL7 interface
8. Soap notes
9. Medical/Surgical procedures
10. Online consultations
11. Prescriptions
12. Drug interactions
13. Connect Multiple Locations
14. Wireless access to the service
15. Voice recognition
16. PDA compatible
17. Cell phone compatible
18. Capture and Store images (Using Lead Tool Components)
19. Multimedia patient file storage (Using Lead Tool Components)
20. Digital imaging (Using Lead Tool Components)
21. Reminders
22. Bilingual / Multilingual
23. Unlimited # of Active Users
24. Web Site interface
25. E-mail contact

NEW UNIMEDICS EHR:
At What Cost ?

Telemedicine Remote Medical System ---Network Topology



Operational research protocol of “Dr On Call”: Using the “Soft Switch” 2009-2011

*Use of the soft-switch and the need to be telecom agnostic

- * Limitations in the use of the soft-switch arise from the Complex configurations necessary to make IP telephony for telephone medicine work seamlessly in harmony with the Telecom interconnections and electronic health record systems
- * Complex configurations with interconnections to different systems invariably create challenges with scalability, network stability and security which are crucial for health networks
- * The remote access to health care systems invariably represents the last mile of the network which must be user friendly, simply configurable, network agnostic, rigorously secure and open to innovative changes necessary for system harmonious adaptation to technological advances

**Doctor On Call*



Doctor on Call

Medical Care... A Call Away

When you need it... where you need it... at a cost you can afford!

How you will benefit:

- No need to make an appointment to visit the Doctor
- Available medical consultation 24 hours a day, 7 days a week
- Prevents unnecessary hospital emergency visits
- Refill medications
- Receive test results
- Receive assistance in providing CPR to loved ones
- Have prescriptions sent to the nearest participating pharmacy
- Help with health care decisions at home
- Reduced cost of medical consultation

*WebRTC: Web Real Time Communication

*Web-Real-Time-Communication

- * allows enterprises and developers to embed real-time communications, like voice and video, into web browsers without the need for end users to install a client or plug-in.

*IP Telephony-”Doctor on Call” Utilising WebRTC Technology?

IP TELEPHONY AT WORK

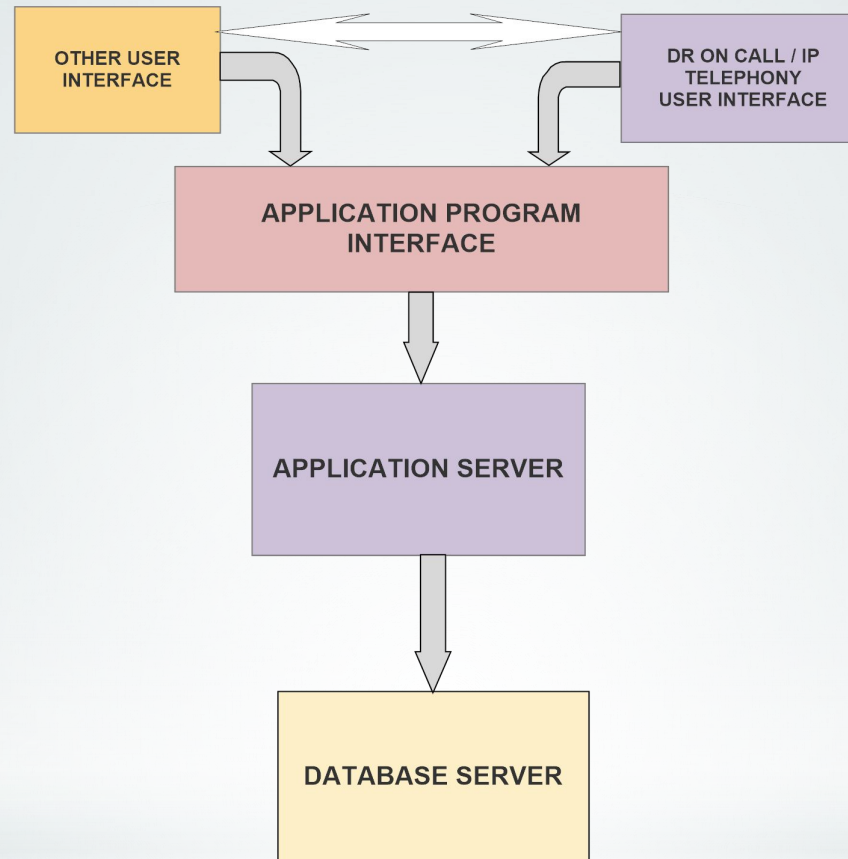
- *Telephone Access to Medical Care for Everyone, Everywhere, Anywhere, Any-time at a Cost They Can Afford
- *Doctor on Call is the Practice of Medicine using the Smart Phone (Cel Phone), where Medical Care is just a Telephone call away
- *“Dr On Call” Provides for 21st century “ANYWHERE CARE”

*WebRTC: Telecom agnostic for remote health user interface

WebRTC -- an emerging standard claiming the ability to conduct real-time, peer-to-peer voice and video communication through a browser, no plug-ins necessary

- * Because of the dynamic and rigorous encryption capabilities associated with the protocol, its telecom agnosticism, its low cost and its user friendliness, “Dr On Call” IP Telephony adopted WebRTC as the technology platform for best practice of remote IP Telephony in the practice of telephone “**any-where-care**” medicine.

FEDERATED EMR SYSTEM CONFIGURATION

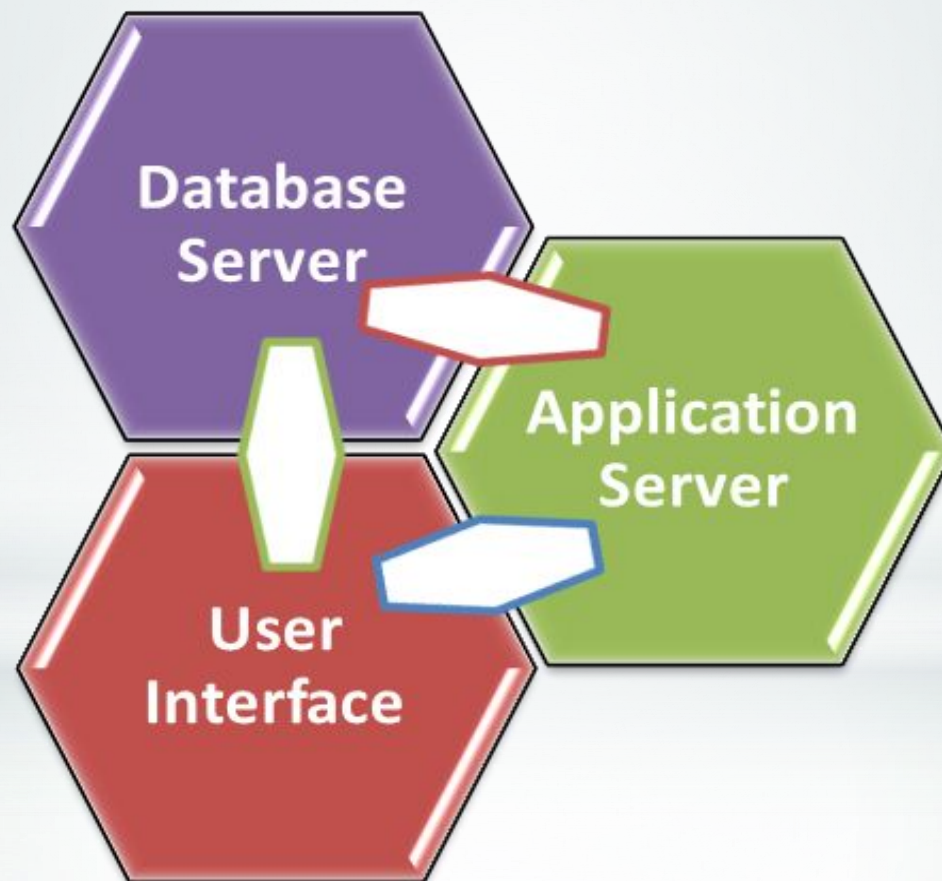


FUTURE: EMR BEST PRACTICE

*

MONOLITHIC EMR SERVER SYSTEMS CONFIGURATION

FUTURE: NON-VIABLE SYSTEM



Experimental design for remote management of
Chronic disease (Systemic Lupus Erythematosus)

Using IP Telephony (Dr On Call)

LUPUS IN JAMAICA RESEARCH PROJECT

SLE Patients + Physician/IMIS

SLE Patients/IP Telephony
(Remote) + Physician/IMIS

SLE Patients/IP Telephony
(Remote)+ Physicians

* **I**ntegrated **M**edical **I**nformation **S**ystem **R**emote (**IMIS**-Remote)

An Internet based
Structured Patient-Doctor Interaction
to Improve Efficiency
of Care for Chronic Diseases
in Poor Populations

Michel J.F. Walravens M.D.

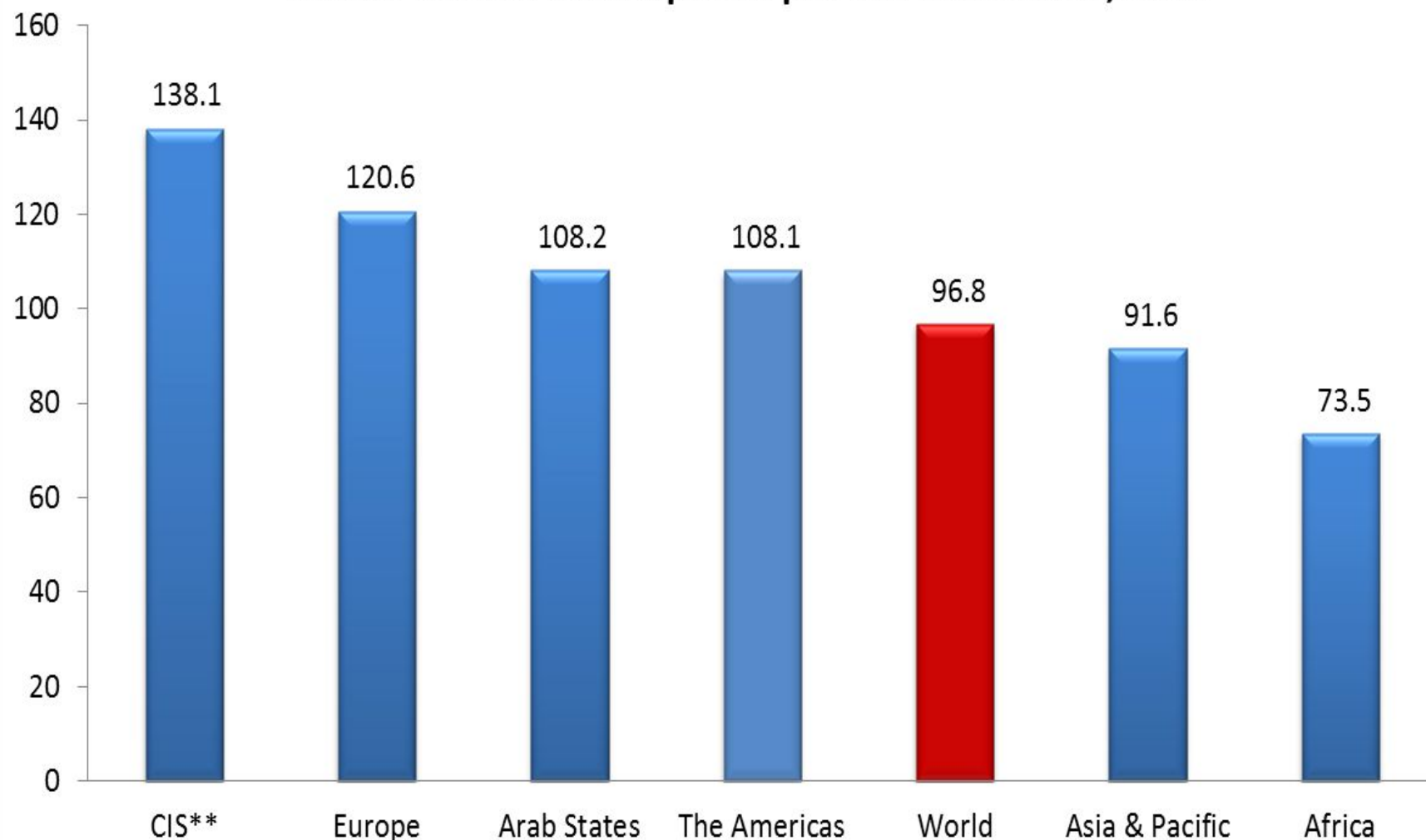
* Improving Efficiency of Health Care for Chronic Diseases in Poor Populations with Internet Based Structured Patient-Caregiver Interaction

Target:

- 1/ poor EU countries
- 2/ 4th world in rich EU countries
- 3/ developing countries (3th world)

Michel J.F. Walravens M.D.

Mobile-cellular subscriptions per 100 inhabitants, 2015*

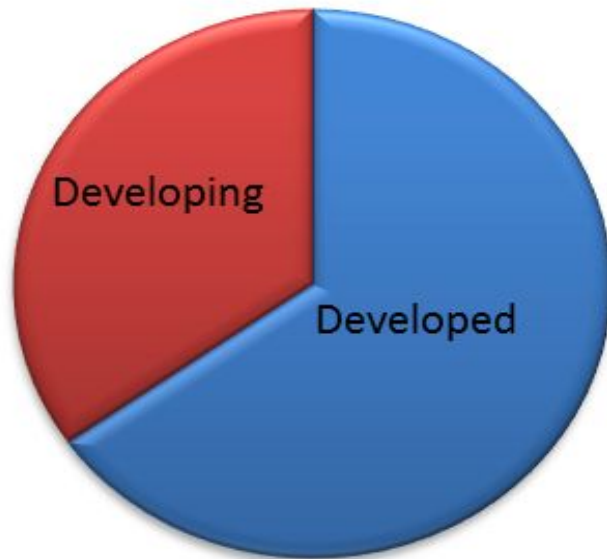


Regions are based on the ITU BDT Regions, see: <http://www.itu.int/ITU-D/ict/definitions/regions/index.html>

Note: * Estimate ** Commonwealth of Independent States

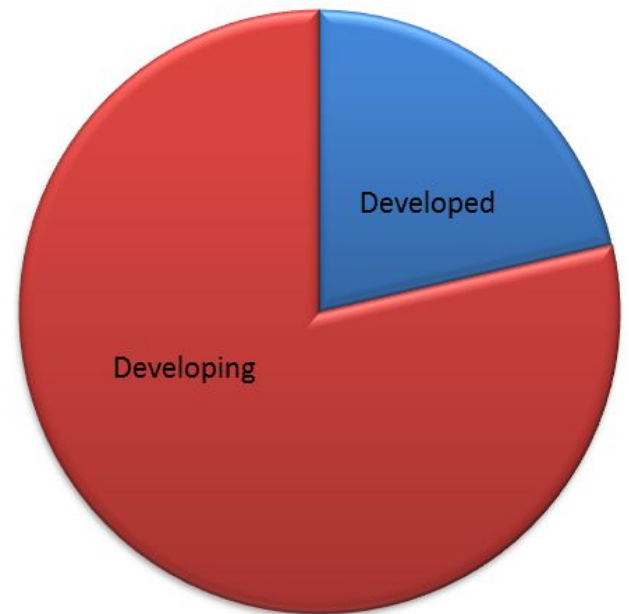
Source: ITU World Telecommunication /ICT Indicators database

2000



Total 719 million

2015*



Total 7.09 billion

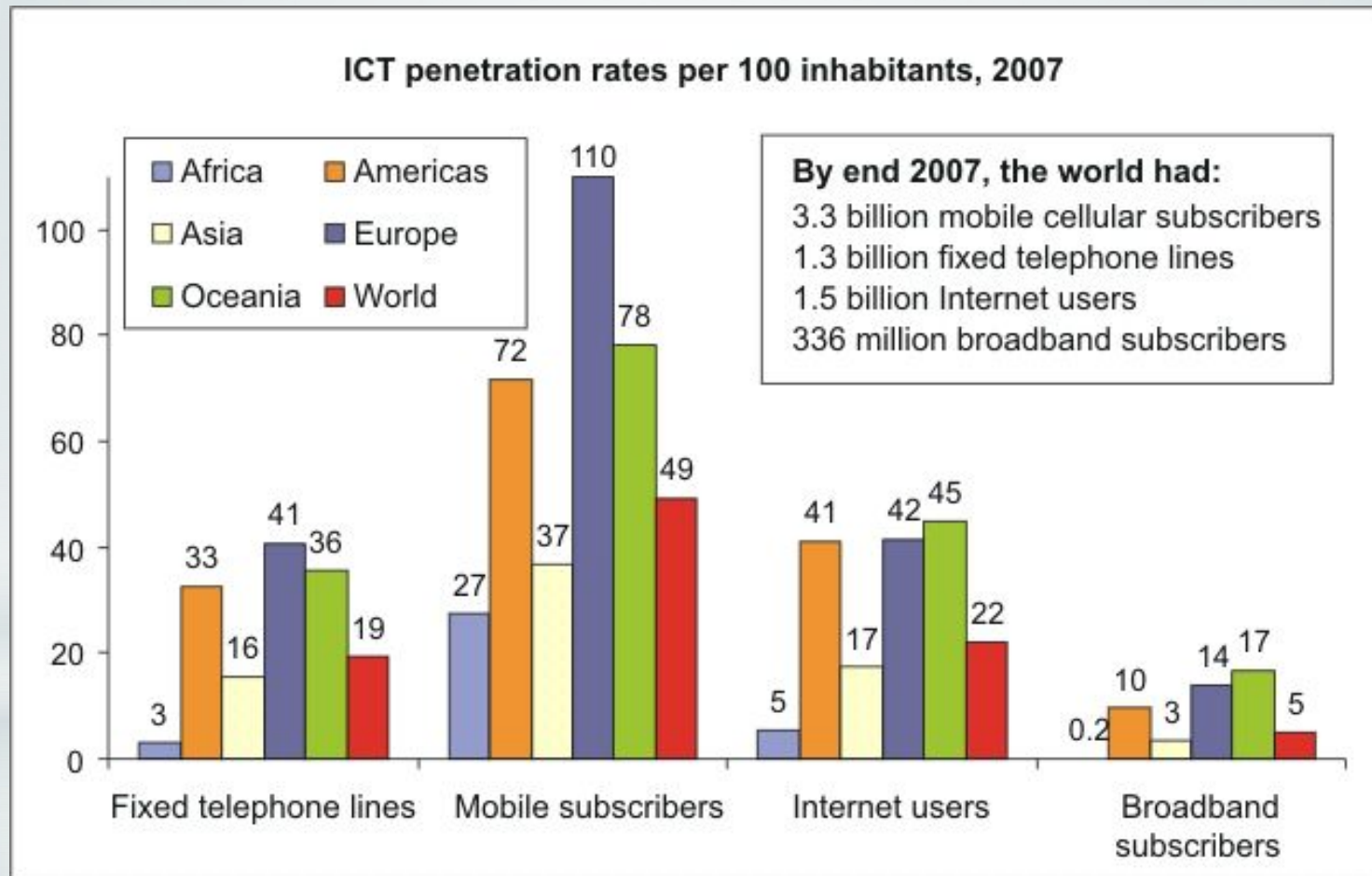
The developed/developing country classifications are based on the UN M49, see:

<http://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx.html>

Note: *Estimate

Source: ITU World Telecommunication/ICT Indicators database

* Technology Map



Source – International Telecommunications Union website.

7/14/2016

Improving Efficiency of Health Care...
...for Chronic Diseases....in Poor Populations...
with Internet Based....Structured Patient-Caregiver Interaction

Health Care issues for Chronic Diseases

- Distance to specialised health care
- No money to afford transportation
- No money nor insurance for good health care
- Low education level

Lupus Foundation of Jamaica

Lupus in Jamaica

A patient oriented e-health project

Participating centers

TEJALUPA Study Group

What is the "Lupus in Jamaica" project?

"Lupus in Jamaica" is an internet based self-assessment system for Lupus patients. Self-assessment means that you yourself analyze and report how you are feeling, what your physical limitations are and how your disease symptoms are doing. So you help your doctor to focus on the most important problems or disease complications. Out of these data the doctor can deduce the activity and course of your disease and the points to give special or urgent attention to. For you, self-assessment is a learning process in better insight in your disease and better understanding the doctor. It is known that better informed patients have a better disease prognosis.

Why should you participate in the "Lupus in Jamaica" project?

By filling in the questionnaires you give your doctor important information about how you are doing, about possible complications of your disease or medication, as well as information about your any other complaints. So your doctor is prepared when you see him or her at your visit. He/she can immediately focus on the existing problems and has much more time to listen to your complaints and to explain to you what to do about them. The system also gives you the possibility to follow the course of your disease and of your complaints.

How can you participate in the "Lupus in Jamaica" project?

Depending on your disease or the course of it, your doctor, nurse or social worker can make you an active member of the project. You will be given a username and password. When you get your username and password, you can log in (see below on this page). Write your username and password down in a safe and private place so that nobody can log in and see your data. If you are not enrolled in the project and you think you should, speak to your doctor about it. If the Lupus project is something for you, we really do hope it will be helpful to you.

If you have got a username and password - please log in:

Username

Password

Let me in

Doctor on Call

&

IMIS

**The perfect match for
Chronic disease remote
management**



Doctor on Call

Medical Care... A Call Away

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How you will benefit:

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- Receive test results
- Receive assistance in providing CPR to loved ones
- Have prescriptions sent to the nearest participating pharmacy
- Help with health care decisions at home
- Reduced cost of medical consultation



Telemedicine

Doctor on Call



IMIS



Interactive data system for

PATIENTS / DOCTORS / NURSES / PARAMEDICS / SOCIAL WORKERS

Doctor On Call (Virtual Office WebRTC) Practice /Demo by Mr. Vijay Sachet (Software Engineer: DOC) and Prof W.G. Mendes Davidson (Health Technology Specialist)

Please click this link below to play the Dr/patient video encounter demo:

<https://drive.google.com/open?id=0B7GAhBbr79aXNDFXLUZqY1pxc2c>

Thank you very much: The end



Doctor^{on} Call
Medical Care... A Call Away

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- Reduced cost of medical consultation