

HEARING LOSS SCREENING THROUGH CELL PHONES

MIT and UFRN – UERN Collaboration

Cell Phone Hearing Loss Screening

- Brazilian federal law requires a hearing test to be done in the first week of birth

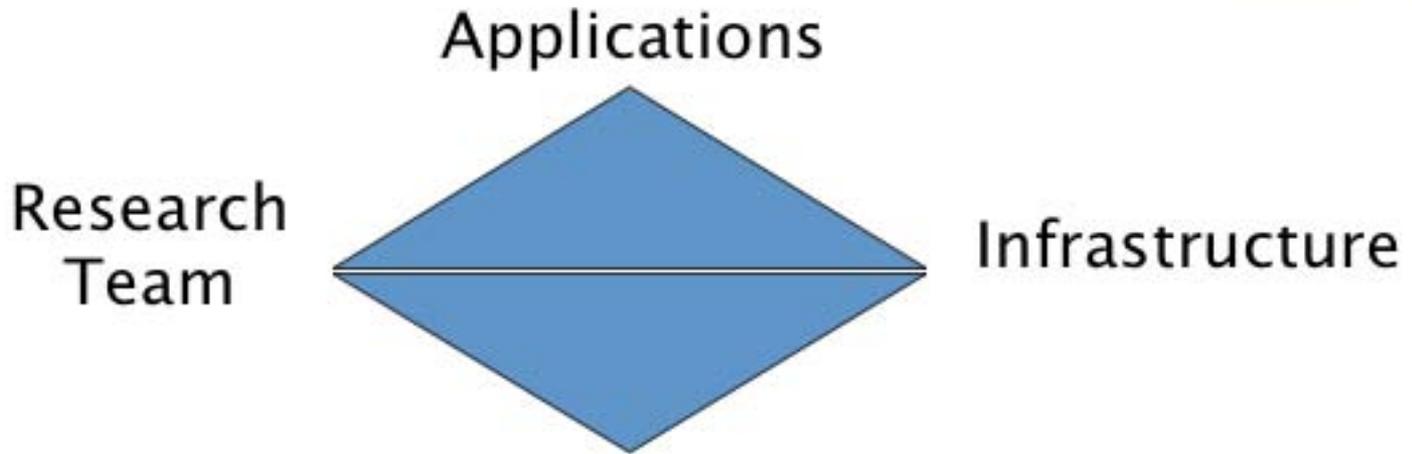
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- ~5.7 million Brazilians have some degree of hearing loss

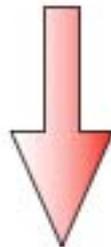
- 6% of children have hearing loss in first three years of life

- Costs in Brazil are high/ equipment always an import

Motivation



Huge Health Care Demand



Development of New Technology to Improve Health Care of Poorly Assisted Communities

Rio Grande do Norte (RN)

RN at a glance

- 1) Area - Total 52,796.791 km²
- 2) Population 2010 - Estimated 3,168,027
- 3) Density - 60 habitants / km²
- 4) Economy - GDP R \$ 25.481 billion
- 5) GDP per capita - U.S. \$ 8,203
- 6) Life expectation 2008 - 70.8 years
- 7) Child mortality 2008 - 3.35%
- 8) Illiteracy Rate - 20.0%
- 9) Birth Rate 2009 - ~47K per year

UFRN – Hospitals

There are four hospitals that belongs to the university:

- Onofre Lopes University Hospital
- Ana Bezerra University Hospital
- Januário Cicco Maternity School
- Children Hospital

Cell Phone Network

Cell Provider	Cities with Coverage	Population with Net
VIVO	3.702	90.7%
CLARO	3.568	90.6%
OI	3.316	87.9%
TIM	3.211	89.6%
CTBC	99	1.9%
AEIOU	5	7.6%
SERCOMTEL	2	0.3%
Brazil	5.564	99.99%

Image by MIT OpenCourseWare.

Growing of Cell Phones

Growing Numbers of the Cell Phones in Brazil

Brazil is a huge market, 242.2 millions of cells phones in 2011, representing 123.9 cel/100 hab.

Graph showing increasing number of cell phone users over time (2010, 2011) in Brazil has been removed due to copyright restrictions.

Hearing Loss Screening Through Cell Phones

(1)

Hearing Assessment
Questionnaire

(2)

Distortion Product Acoustic
Emissions (DPOAE)

Hearing Assessment Questionnaire

GOAL: Obtain Risk Factors:

Family History

Hospital stay > 5 days

utero infections

Ototoxic drugs

Syndromes related to hearing loss

The screenshot shows a mobile application interface for a hearing assessment questionnaire. The top status bar displays various icons (mail, Wi-Fi, cellular signal, battery) and the time 2:52 PM. Below the status bar is a yellow header with the text "Tele dermatology". The main content area is dark gray and contains the question "Is the patient:" followed by five options, each with a checked checkbox: "Pregnant", "Living in poor conditions", "Infected with HIV", "Infected with Hep C", and "Infected with TB". At the bottom of the screen are two buttons labeled "Prev" and "Next".

2:52 PM

Tele dermatology

Is the patient:

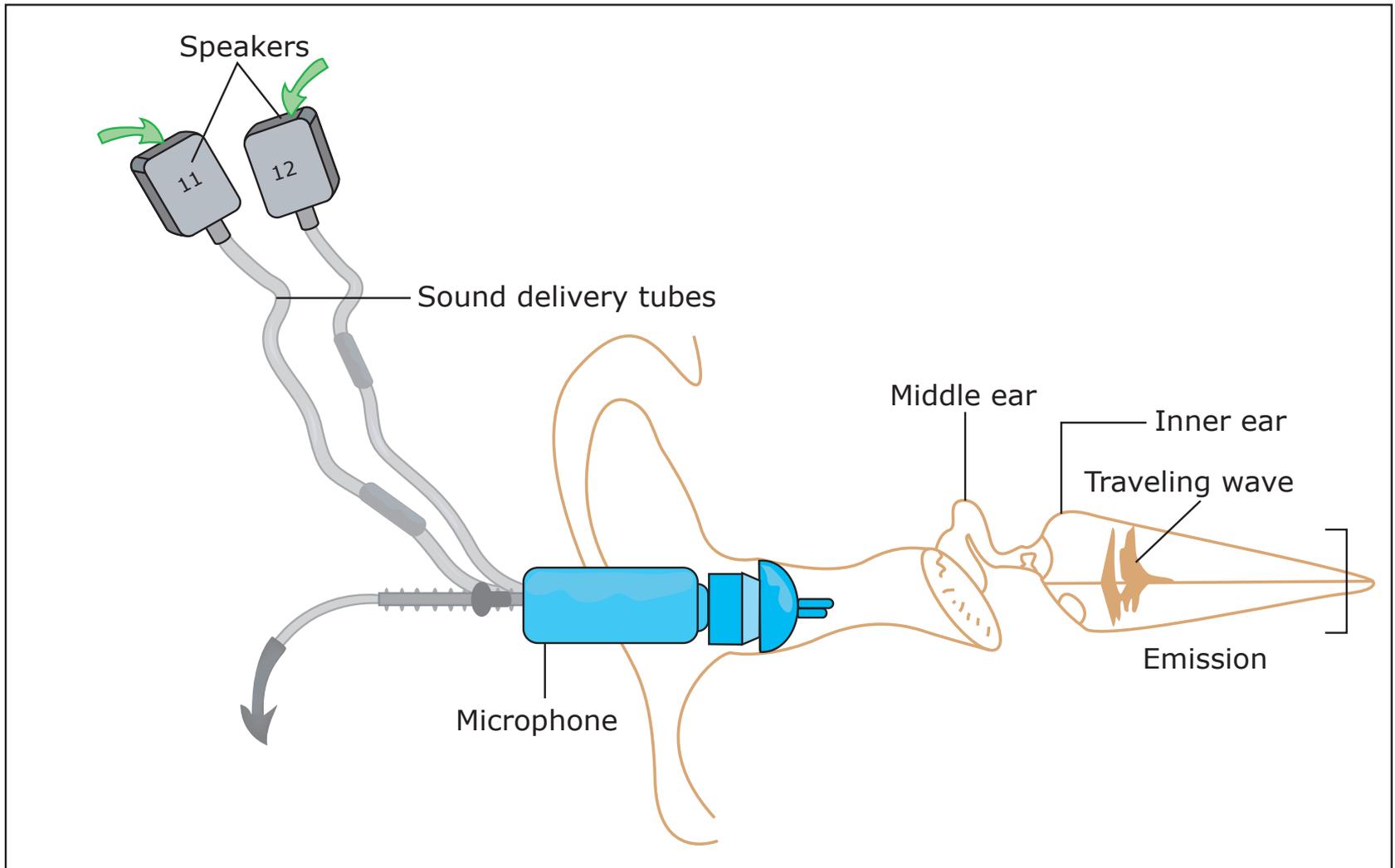
- Pregnant
- Living in poor conditions
- Infected with HIV
- Infected with Hep C
- Infected with TB

Prev Next

DPOAE Test



DPOAE Test



Goal

Teledermatology

Enter Patient's Medical Record ID Number:

123456

Scan ID

Found patient record for ID 123456
First Name: Jane
Last Name: Smith
Gender: Female
Is this the correct patient?

Yes No

7 PQRS 8 TUV 9 WXYZ DEL X

* # (0 +

Teledermatology

Is the patient:

- Pregnant
- Living in poor conditions
- Infected with HIV
- Infected with Hep C
- Infected with TB

Prev Next

Teledermatology

Take picture of skin condition.

Add Picture



Prev Done

Closed 1	Eggshead, Karl	26 M	Radiology Examination	05/26/2010 07:06	05/26/2010 07:07	5588888888	
Closed 100-8	Fahnest, John	35 M	Surgery Follow Up	05/24/2010 04:28	05/25/2010 01:44	15555218135	
Closed 2	Neechal, Nadeburg	27 F	Prenatal Screening	05/19/2010 02:34	05/21/2010 11:21	16502817948	
Closed 2	Neechal, Nadeburg	27 F	Radiology Examination	05/19/2010 09:46	05/19/2010 09:49	16502817948	
Closed 1	Eggshead, Karl	26 M	Radiology Examination	05/19/2010 02:38	05/19/2010 09:28	16502817948	

Possible Project Goals

1) Propose a plan with metrics for evaluating and quantifying the cost-effectiveness of the project based on the current practices in Brazil.

2) Propose sustainable business plan for a global market place

3) Developing the APP₁₃

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