The Experience of the Telehealth Network of Minas Gerais, Brazil

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Presenter: Milena Marcolino
<table>
<thead>
<tr>
<th>Brazil</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Population (2010)</td>
<td>190,732,694</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>8,514,876 Km²</td>
<td></td>
</tr>
<tr>
<td># cities</td>
<td>5,565</td>
<td></td>
</tr>
<tr>
<td>HDI (2010)</td>
<td>0.699</td>
<td></td>
</tr>
<tr>
<td>Life expectancy (2010)</td>
<td>73 years</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minas Gerais</th>
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</thead>
<tbody>
<tr>
<td>Population (2010)</td>
<td>19,595,309</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>586,528 Km²</td>
<td></td>
</tr>
<tr>
<td># cities</td>
<td>853</td>
<td></td>
</tr>
<tr>
<td>HDI (2010)</td>
<td>0.800</td>
<td></td>
</tr>
<tr>
<td>Life expectancy (2010)</td>
<td>75 years</td>
<td></td>
</tr>
</tbody>
</table>
Introduction

• Great economic, cultural and geographical contrasts
• Great disparities regarding the access to specialized health services and resources
• High rotation of practitioners
Brazilian Public Health System

- Brazilian public health system (SUS) created in 1988 by the Federal Constitution
- Family Health Program (FHP) created in 1994 to improve the access of all citizens to healthcare
  - 2015: 47,827 teams in 98% of the cities
- Telehealth in Brazil was implemented to support the FHP

(http://dab.saude.gov.br/)
Objective

To report a successful and sustainable experience of a large scale telehealth service in support of primary care practitioners, the Telehealth Network of Minas Gerais (TNMG)
Telehealth Network of Minas Gerais

Partnership of six public universities, implemented by public funds, mainly from the federal and state governments and research agencies
Implementation and expansion

Evolution of the TNMG coverage in primary care

<table>
<thead>
<tr>
<th>Year</th>
<th>Phase</th>
<th># Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005/2006</td>
<td>I</td>
<td>82</td>
</tr>
<tr>
<td>2006/2007</td>
<td>II</td>
<td>100</td>
</tr>
<tr>
<td>2008/2009</td>
<td>III</td>
<td>97</td>
</tr>
<tr>
<td>2009/2010</td>
<td>IV</td>
<td>328</td>
</tr>
<tr>
<td>2011</td>
<td>V</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>VI</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>VII</td>
<td>11</td>
</tr>
<tr>
<td>2014</td>
<td>VIII</td>
<td>50</td>
</tr>
<tr>
<td>2015</td>
<td>IX</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>730</strong></td>
</tr>
</tbody>
</table>
Implementation and expansion

The TNMG currently attends **730** of the **853 cities** of the state:

- **893 primary care units**
- **2 secondary care units**
- **7 emergency care units** in Belo Horizonte, the state’s capital
- **48 ambulances** in the north of the state, as part of a Myocardial Infarction System of Care
Activities

- Telediagnosis: electrocardiography, Holter, ambulatory blood pressure monitoring and retinography analysis
- Off line teleconsultations
- Online teleconsultations in cardiology
- Educational activities
- Research projects

Low cost technology:

<table>
<thead>
<tr>
<th>Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital electrocardiograph</td>
</tr>
<tr>
<td>Printer</td>
</tr>
<tr>
<td>Digital camera</td>
</tr>
</tbody>
</table>
**Off line teleconsultation: how it works**

<table>
<thead>
<tr>
<th>Gatekeeper</th>
<th>Subspecialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Medicine</td>
<td>Angiology</td>
</tr>
<tr>
<td>Family and Community Medicine</td>
<td>Cardiology</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Gastroenterology</td>
</tr>
<tr>
<td>Gynecology/Obstetrics</td>
<td>Infectology</td>
</tr>
<tr>
<td>Dentistry</td>
<td>Pulmonology</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Hematology</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>Geriatrics</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Mastology</td>
</tr>
<tr>
<td>Psychology</td>
<td>Neurology</td>
</tr>
<tr>
<td>Speech-Language Therapy</td>
<td>Orthopedics</td>
</tr>
<tr>
<td></td>
<td>Surgery</td>
</tr>
<tr>
<td></td>
<td>...</td>
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</tbody>
</table>

- **85% of the teleconsultations** Up to 12 hs
- **15% of the teleconsultations** Up to 48 hs
Telecardiology: how it works

• Monday to Friday, from 7:30 am to 8:00 pm
• 3-4 cardiologists on duty/day
• Emergencies in <10 minutes
• Routine exams in the same day (in average, 4 hours)

• Self-made system
• Compatible with different types of equipments
Quality Control

- Audits: ECG reports, teleconsultations
- Satisfaction of healthcare practitioners
- Protocols
- Researches
- Publications
Maintenance methodology
Main results
Main results

2.1 million Electrocadiograms

65,000 TELECONSULTATIONS
Main results

Daily number of activities (2014/15)

- 2,200 ECGs
- 40 teleconsultations
- 30% at night
- 10% on weekends
Main results

Professional categories that request teleconsultations

- Physicians: 42%
- Nurses: 48%
- Other professionals: 11%
Satisfaction survey

80% Did the teleconsultation avoid patient referral to another city?

95% Did your last teleconsultation solve your question?

95% Which is your level of satisfaction with the teleconsultation system?
Economical analysis

Cost per patient referral in Minas Gerais: US$ 22.90
Telehealth activity cost: US$ 3.23
Efficiency: 80%
Number of activities: 2,108,794 (February/2015)

Savings for public health system:

\[
0.8 \times 2,108,794 \times [22.90 - 3.23] = US$ 33.2 \text{ Million}
\]

Investment (2005/2015) = US$ 8.8 Million

ROI = 3.8
Research projects

- Integrated system for telehealth - SIGTEL
- Decision support systems
- Myocardial Infarction System of Care in the north of Minas Gerais (89 cities)
- Evaluation of a low-cost and easy-to-use prognostic model for Chagas primary care setting
- Economic analysis in retinography by telemedicine
Success factors

1. Government-academia partnership
2. Support of public managers
3. Services provided by a collaborative network
4. Systematic monitoring of the services
5. Periodic auditing of ECG analysis and teleconsultations
6. Short response time
7. Ease use of the system
8. Growth and diversification of telehealth activities
9. Research development
10. Economic viability monitoring
Awards

Award Science and Technology National Health System 2010 1st place MsC category

2011 International Health Promotion Awards

Award Science and Technology National Health System 2010 1st place MsC category

Award Health! 2008 1st place in Cardiology

Award Science and Technology National Health System 2011 1st place Paper Published category
Awards

Award Citizenship without Borders 2011
1st place Health category

Certified as Best Practices in Telehealth 2012
Project Regional Protocols in Telehealth for Latin America

17º Inovation in Federal Public Management 2013
1st place
Thank you!

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Coordinator of the Scientific Division of the TNMG