

1,000,000 electrocardiograms by distance: an outstanding milestone for telehealth in Minas Gerais, Brazil

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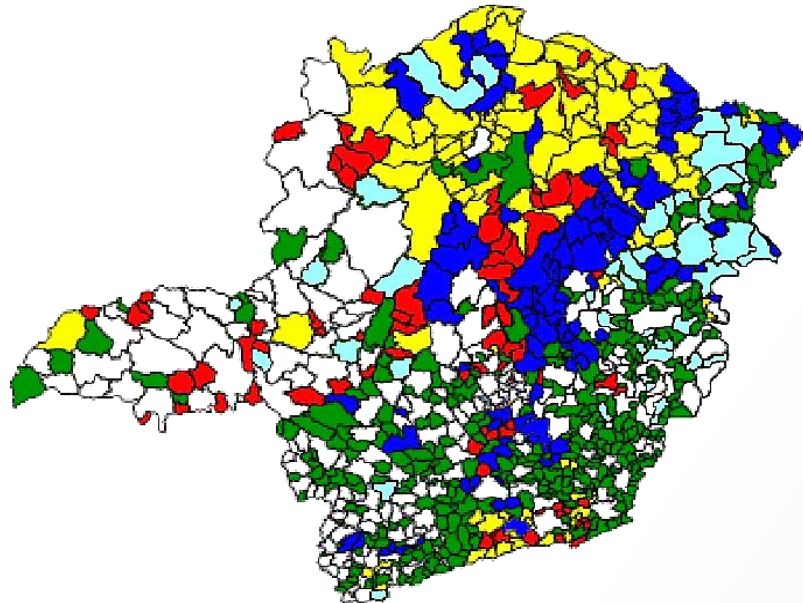
Minas Gerais: Brazilian state with 853 municipalities and 19 M inhabitants.

Important social, cultural, economic, infra-structural and geographical contrasts.



Telehealth has been used with the objective of improving health care for the population who live in distant and poor regions by supporting health professionals in these areas.

Starting in 2006 with 82 municipalities, the **Telehealth Network of Minas Gerais (TNMG)**, a partnership of six public universities, currently **connects 659 municipalities** in the State of Minas Gerais, coordinated by University Hospital of Universidade Federal de Minas Gerais.



Year	Phase	# Municipalities
2005/2006	I	82
2006/2007	II	100
2008/2009	III	98
2009/2010	IV	328
2011	V	51
Total		659

Telehealth services provided

- **Teleconsultation off line**

medicine, nursing, dentistry, physiotherapy,
pharmacy, psychology, speech therapy, nutrition

- **Teleconsultation on line**

Cardiology

- **Telediagnostic**

Electrocardiogram, Holter, ambulatory blood pressure monitoring,
spirometry



Technology

Low cost equipment and simple technology

Web services, mobile

Standards, interoperability



Financial support

Federal, state and municipal government

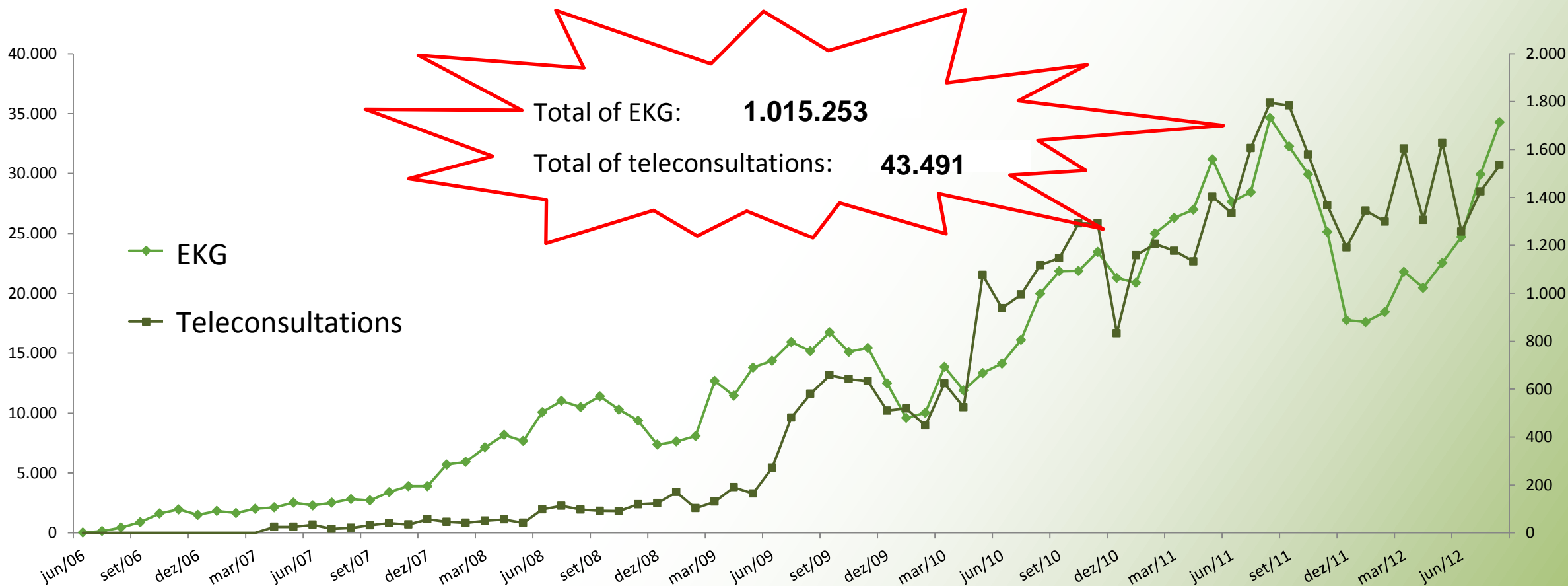
Agencies for research

Implementation process

Large scale telehealth service monitoring

- strategies to overcome barriers to telehealth use

Results and Discussion



Daily average (Sep/2012)
ECG: 1,700 Teleconsultation: 80

Teleconsultation off line

Specialties most demanded

- Family medicine
- Dermatology
- Nursing
- Gynecology/Obstetrics
- Pediatrics
- Dentistry

Questions most demanded

- Pharmacological treatment (39%)
- etiology (24%)
- examinations (19%)
- No pharmacological treatment (16%)

Results and Discussion

Evaluation of the System by Users

Q1. Did the teleconsultation avoid the patient referral to another level?	% of Satisfaction
Yes	79%
No, because the referral to no another level was inevitable.	16%
No, because the questions were not answered properly.	5%
Q2. Did your last teleconsultation solve your doubt?	% of Satisfaction
Yes, completely.	83%
Yes, partially	14%
No.	3%
Q3. Which is your level of satisfaction with the Teleconsultation System?	% of Satisfaction
Very satisfied.	72%
Satisfied.	24%
Little satisfied.	4%

Results and Discussion

Economic Indicators

- **Cost of each teleactivity: 5,17 US\$**
- **Referral cost: 35,55 US\$**
- **Implementation cost/village: 2,635,98 US\$**
- **Operational cost/village: 245,38 US\$**
- **Return on investment (ROI): 2,00 \longrightarrow 1,00**

Results and Discussion

Main Success Factors

- Collaborative network,
- Partnership government and academia,
- To meet real needs of users,
- To use simple and low-cost technology,
- Adequate combination between virtual and personal process and
- Economic sustainability.

Conclusion

The telehealth model developed to support primary health care in Minas Gerais has produced good clinical and economical results. As a consequence, it is now a regular health service in the State, covering 70% of the municipalities and integrated to the health care system. It has also been expanded to secondary and emergency care. The model and technology characteristics permit the replication in other parts of the world.

1,000,000 EKG

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