



**USQ**  
AUSTRALIA


## The practical issues in using existing digital stethoscopes for telehealth

USQ Health Informatics Research Group

Tiana Gurney  
Abdul Hafeez-Baig  
Raj Gururajan  
Aaron Bond

UNIVERSITY OF SOUTHERN QUEENSLAND  
[www.usq.edu.au](http://www.usq.edu.au)

fulfilling lives



**USQ**  
AUSTRALIA

## Acknowledgments

- Special thanks to:
  - Australian Research Council - funding
  - Queensland Telehealth - funding
  - USQ Office of External Relations – IP support
  - USQ FOB – health informatics research laboratory
  - ACRREBP – support in strategic decisions

---



## Research Team

- Prof. Raj Gururajan – Team Leader
  - Tiana Gurney – Research Fellow
  - Abdul Hafeez-Baig – Technology Expert
  - Assoc. Prof. John Leis – Telecommunication Expert
  - Prof. Chandrasekaran – Product Development Expert
  - Layla Soroush – Benchmark Framework
  - Jacqueline Blake – Sleep Study Measurement
  - Clint Moloney – Evidence Based Business Model
  - Merrin Sathya Das – Mechanical Engineer
  - Liz Raymer – Knowledge Management
  - Christopher Shaw – IP Transfer
- 



## Introduction

- Aim of this paper
    - Highlight the inability of many existing digital stethoscopes
  - Assessing the existing models, p2p video conferencing
    - A number of practical issues encountered
  - Focus groups conducted with QH physicians found:
    - Sound quality in existing DSs is not acceptable
-

## Introduction

- RQ
    - What are the issues using DSs in remote assessment?
- 

## Field test

- Laboratory simulation approach was used to test the DSs
  - Wireless network using WiFi capability
  - Video conferencing is held by free software
  - Three market brand DSs were employed to assess performance on simulated telehealth network
-

## Findings

- Five crucial problems are found by the test
  - Sound quality
    - quality reduces by signal transmission
  - Real time connectivity
    - different model of connectivity, infrared, bluetooth
    - ‘store and transmit’ is not real-time
- 

## Findings

- Echo
    - the wireless system cause closed loop in sound signal
  - Body friction noises
    - contact with fabric and skin introduced friction
  - Signal processing
    - software and hardware issues
-

## Conclusion

- Problems are identified from LR and Focus Group
  - Five issues found in local laboratory
  - In this paper, issues from long distance transmission is not measured
  - A intelligent computer algorithm may increase the sound quality that are influenced by these problems
-