

T-MedRobotics

*Ultrasonography
without Borders*

<http://www.t-medrobotics.com>

Minimum Bandwidth Only 2 MBits



Patient Center

- *No ultrasound or sonography expertise is necessary. A nurse can serve as the healthcare provider on the patient site.*
- *He/She will be in contact with the expert through the video-conferencing system, allowing the patient and the sonographer to maintain dialogue and communication.*



Expert Center

- *The Sonographer is managing & controlling the Robot at the Patient Center thousand miles away.*
- *The expert is conducting an Ultrasonography exam in “real time, exact viewing & manipulator dependent”.*

Expert Center



Patient Center



Medical Areas Benefiting From Melody Robot

Ultrasonography
without Borders:



A Unique
Telemedicine
Cost Saving
Solution

- **Diagnostic & Emergency:**
*Abdominal,
Pelvic,
Urinary,
Obstetric*
- **Obstetric Surveillance, OB/GYN**
- **Cardiology**
- **Second Opinion**
- **Surgical Interventions**
- **Surveillance of Pathologies**
- **Pediatric**

Melody Robotized Telemedicine System addresses the Growing Challenges:

- ***Medical Desertification:***

The shortage of medical care specialties in underserved areas; e.g. rural regions, islands, mountain resorts.

- ***Lack of Radiologists & Sonographers:***

Whether in the United States or around the Globe, there is a lack of Radiologists & Sonographers.

- ***Limited Revenues for Hospitals:***

Revenues for Hospitals are limited to a 4-hour drive geographic area. With Melody robot, there is no geographic limitation.

- ***Cost Savings:***

Radiologists & Sonographers are replaced at the Patient Center by a Nurse.

- ***Managing & Controlling Multiple Patient Sites:***

The Expert Center or Hospital Hub can manage and control multiple Patient sites; e.g. rural medical centers, correctional facilities, mobile units, cruise ships, veteran medical centers, off-shore platforms, medical island centers and boost revenues.

- ***Security & Savings:***

Transportation of inmates by Sheriffs to hospitals is no more necessary. Several cases of inmates killing to flee are public information.

Targeted Medical Facilities

Whether as an Expert Center or a Patient Center, these facilities can benefit from using a Melody Robotized Telemedicine System

Hospitals & Hospital chains	Rural Hospitals
Outpatient Medical Centers	Island Medical Centers
Imaging Medical Chains	Mobile Health Unit Centers
Correctional Facilities	Ships & Cruise Ships
University Hospitals	Off-Shore Platforms
Telemedicine Sites	Retirement Living Resorts
24/7 Emergency Centers	Industrial Sites
Military, Navy, and Air Force Facilities	Veteran Hospitals

Boosting Your Telemedicine Revenues One Expert Center Controlling Multiple Patient Centers



References



<https://www.rwjbh.org/blog/2022/february/rwj-university-hospital-and-rutgers-rwj-medical/>

RWJ University Hospital and Rutgers RWJ Medical School Deploy First FDA-Approved Clinical Robotic Tele-Cardiac Ultrasound Technology in the United States.

(New Brunswick, NJ) - The future of cardiac imaging arrived at Robert Wood Johnson University Hospital (RWJUH), an RWJBarnabas Health facility, and Rutgers Robert Wood Johnson Medical School (RWJMS) last week via special delivery from France. The MELODY™ robotic tele-cardiac ultrasound technology is the first of its kind deployed in the United States for clinical use, and opens the door for providing patients with more access to expert diagnostic imaging in a convenient, telehealth delivery model.

The MELODY™ robotic tele-ultrasound system features a robotic arm, an ultrasound machine and video conferencing technology that connects the patient with an expert at two separate locations. Last week, experts in Naveil, France connected the system to the RWJUH and RWJMS Cardiovascular team, led by Partho Sengupta, MD, FACC, in New Brunswick, NJ. The team tested the limits of the system by performing several hours of trans-Atlantic diagnostic ultrasound imaging in real time over a routine 4G cellular network.

This system is being successfully used in Europe and Canada and has been approved for clinical use in the US by the Food and Drug Administration (FDA).

Robotic Ultrasound Imaging

Improving Access to Care for Rural and Remote Populations



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What is the current situation for Canadians living in remote communities who need an ultrasound scan? Are there any mobile services, or are they expected to travel?

Approximately 20 percent of the Canadian population live in rural and remote communities with limited access to imaging, due to lack of radiologists, technologists and infrastructure in these communities. Sonography is unique in that it is an operator- and user-dependent imaging modality and the skill and experience of the operator is paramount to accurate diagnosis. Since a sonographer is required to be on-site, ultrasound imaging is simply not available in many hospitals and communities in Canada, and patients—both inpatients and outpatients—must travel or be transferred to secondary or tertiary care centres or imaging clinics. In some cases, this delays diagnosis and subsequent treatment, burdens patients and their families, and increases healthcare costs.

What is the potential for telerobotic sonography technique based on your initial experiences and current clinical trial?

Our group has trialled a telerobotic ultrasound system for abdominal and second-trimester prenatal imaging, directly comparing telerobotic examinations and conventional examinations.

Using a telerobotic ultrasound system, sonographers could remotely control all fine movements of the ultrasound transducer—including rotating, rocking and tilting—by manipulating a mock transducer at a central site. Sonographers communicated with the patient and an assistant at the patient's site through a videoconferencing system, and the assistant grossly positioned the frame for the robotic arm based on instructions from the sonographer. We found that organs could be reliably visualised using the telerobotic ultrasound system and measurements of common structures were comparable using the two systems (taking into account the user-dependency of sonography). Importantly, all patients agreed that they would be willing to have a telerobotic scan in the future if conventional sonography was not available in their community.

Telerobotic sonography opens up the possibility of establishing remote ultrasound clinics within smaller communities, enabling patients to access sonography in their home community and improving access to

care. Telerobotic sonography may facilitate routine imaging studies or after-hours sonography for emergent cases, possibly avoiding transport to a larger centre for imaging or calling in a sonographer for a single study. In small to medium-sized centres, telerobotic sonography also may enable patients to access subspecialty imaging consultations that would otherwise not be available.

How did previous studies on telerobotic sonography inform the set up of your current clinical trial?

Telerobotic technology has advanced significantly since previous reports; for example, early telerobotic ultrasound systems did not allow users to remotely control settings such as gain or depth, and other telerobotic ultrasound systems required operators to use a computer mouse for movement of the transducer rather than a transducer similar in appearance to that used conventionally. We are now at the point where commercial-grade telerobotic ultrasound systems have been developed, and a key prerequisite for widespread adoption into clinical use is assessment of diagnostic capability. Directly comparing telerobotic and conventional sonography—with sonographers and radiologists blinded to findings of the corresponding examination—is a key part of our assessment.

The initial experiences showed some differences in diagnostic performance between telerobotic vs conventional ultrasound, which could not be attributed solely to the method - how has this been factored in to the current clinical trial? Please comment on the important differences between conventional sonography and robotic telesonography.

In our initial study, there was no significant difference between telerobotic and conventional measurements of liver span and diameters of the proximal aorta and spleen; however, telerobotic assessments overestimated distal aorta and common bile duct diameters and underestimated kidney lengths compared with the conventional scan. Some of the differences in measurements may be related to different sonographers performing the conventional and telerobotic scans (sonography is a user-dependent modality, and variations in measurements may occur between two sonographers using the same ultrasound system with



A remote clinic is equipped with an ultrasound unit and robotic arm (MELODY Patient System, to which an ultrasound transducer is attached). An assistant with no prior ultrasound experience guides gross placement of the frame for the robotic arm based on instructions from the sonographer or radiologist.



At the central site, a transducer enables the sonographer or radiologist to remotely control all settings and fine movements of the Transducer.

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<https://www.youtube.com/watch?v=OcDXmH3a3O8&feature=youtu.be>