



## **DEVELOPING AN IN-HOUSE MRI MAINTENANCE PROGRAM: THE CHILDREN'S HOSPITAL OF EASTERN ONTARIO EXPERIENCE**

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### **INTRODUCTION**

Over the last seventeen years, the Clinical Engineering (CE) department at the Children's Hospital of Eastern Ontario (CHEO) has developed an imaging servicing group, starting first with the less complex modalities such as ultrasound and portable x-ray units and then gradually expanding to more complex modalities. By 2007, the only major equipment remaining on full service contract by the original equipment manufacturer (OEM) was the Hospital's two magnetic resonance imaging (MRI) units.

The remaining imaging service hurdle was delivering an in-house MRI service. To date, only a few of in-house Clinical Engineering departments in Canada have developed equipment maintenance programs for medical imaging equipment. Even fewer of these departments eventually cover the full range of medical imaging modalities typically found in a medium to large acute healthcare facility.

### **PROJECT INITIATION**

To start its own in-house MRI service, first, Clinical Engineering overcame concerns, and worked with Medical Imaging staff to develop a list of performance standards that would meet their expectations (See Table 1). Next, CHEO leveraged an existing relationship with an

experienced imaging independent service organization (ISO) for assistance on support such as: remote-monitoring tools, parts supply, and technologist support training.

Table 1: Performance Standards for MRI Maintenance Program

<b>Parameters to measure</b>	<b>OEM Service Contract</b>	<b>In-house MRI Maintenance Program</b>
Service uptime: Calculation is based on regular business hours – 8hrs/day, 5days/week. (calculated over 26 week blocks/intervals)	98% stated commitment	99.7 %
Savings	Extra cost to sustain	\$ 234,000
Customer Satisfaction	Not provided	96%
COSR	7.77 %	4.01 %

The implementation plan identified the need for an extra full time staff position. This resource can provide additional hours to bring the technical service of the OEM MRI in-house at CHEO, pursue additional regional service revenue, and give the imaging service group staffing redundancy. The project was scheduled to start April 1, 2015, but was deferred for a

few months to hire the right personnel. It was imperative that the new imaging technologist to have previous MRI service experiences. Fiscally, the start date remained at April 1, 2015 whereas the program officially started on August 2015. A considerable amount of pre-planning work and training was conducted prior to the August handover. The project delay reduced Year 1 savings potential, but did not have any other operational impact.

## **SUMMARY AND CONCLUSIONS**

This initiative to move MRI Service in-house has realized more benefits than anticipated. To date this project has achieved or surpassed all of the planned objectives of initiative. Highlights from this initiative are outlined in no particular order below:

- **Operational Savings** – Year 1 actual saving was \$59,000 where the planned forecast was \$42,000. The 4-month delay start detailed above required the hospital to take on the additional cost of a 4-month contract with OEM, an unplanned expense. Based on our data, it is expected that this project produce over \$230,000 in operational savings over 3 years.

- **Improved Uptime and Response Time** – Since assuming the service of the OEM MRI unit, the CHEO Clinical Engineering team has achieved an operational uptime of 99.7 %. The previous OEM contract commitment for the system was 98 %.

- **High Customer Satisfaction** –Our customer centered approach has achieved an outstanding 96% satisfaction score on our recent customer satisfaction survey in August 2016. We will follow up with another survey in 2018.

- **Round-the-clock On-Call Service** - With the implementation of the MRI service, Clinical Engineering initiated an 24x7 on-call service that covers all imaging modalities at CHEO. Prior to the start of this service, if emergency weekend service was required, it was necessary to pay for service from the OEM at their premium weekend rates because our service contracts only covered Monday to Friday service during business hours.

- **Flexible Maintenance Time Bookings** – the Clinical Engineering team has worked around the MRI bookings schedule. With the exception of preventative maintenance (PM) bookings, most repairs have been completed during off-hour times (before 7 am).

- **Increased Revenue Generation Capability** –The addition of the second imaging service technologist position has provided staffing redundancy, and gives CE department the ability to pursue addition external revenue from other regional healthcare facilities. In this fiscal year Clinical Engineering expects to generate \$35,000 to \$40,000 dollars in external imaging service revenue.

- **Expanded Service** – The imaging service team has recently been trained on a 3.0 Tesla MRI from another OEM and is now providing service for this system.

By careful planning, an experienced in-house imaging service group can be successful in providing in-house MRI service, and meet customer expectations by exceeding OEM performance thresholds. Through this article, CHEO Clinical Engineering Department has shown that this is achievable.

## **REFERENCES**

- [1] M.R. Asbil, B. Boland, M. Dussault, W. Rabbie, M-A. Janvier, Y.R. Zhang and K. Greenwood, "Developing an in-house MRI maintenance program: The Children's Hospital of Eastern Ontario Experience," accepted to BI&T, AAMI, 2018.