■ Service Report

Maintenance Service Agreements for Imaging Equipment

Context

Advanced imaging equipment is a significant contributor to the growth in health care costs.[1] Maintenance service agreements (MSAs) have a similar financial value to the cost of a new imaging modality over its lifetime,[2] and consequently have come under scrutiny when considering finite health care resources.[3,4] The development of maintenance programs has gained prominence as the number of devices have increased,[5] and because such programs may prolong the lifespan of imaging equipment, enhance performance, and minimize the cost and effort of repairs.[6]

The routine maintenance, inspection, and calibration of imaging equipment is part of health technology management and ensures the optimal use of equipment across its life cycle.[7] Poor servicing may affect the quality of the equipment's performance and consequently the quality of patient care,[5] as well as the amount of time the equipment is available for use over its lifetime.[7] The regular maintenance of imaging equipment can help prevent downtime.[8] The downtime of imaging equipment is costly, not only due to the lost revenue from the reimbursement of the cost of the examination, but also due to less tangible costs that are incurred by patients.[9] For example, patients may be unable to work while they wait for a diagnosis or may have booked time off work for which they may not be reimbursed; as well, if the downtime is unexpected, patients may have travelled long distances and incurred travel-related expenses. There are also intangible costs incurred by the health system, such as those associated with the rescheduling of appointments.[9]

An MSA defines the terms under which the service provider agrees to perform maintenance and/or corrective repairs to the imaging equipment for a specified amount of time and at an agreed-on cost. Services may include onsite repairs, depot repairs, planned maintenance, replacement parts, loaner units, and consumables.[10]

Outsourcing medical imaging equipment maintenance, rather than using in-house expertise (where an imaging department draws upon internal expertise for equipment maintenance), may reduce the financial risk of costly repairs by sharing the risk between the health care facility and the service provider.[11] Using an external maintenance service provider enables health care facilities to focus on providing service to patients by reducing the administrative burden of managing equipment, maintenance, and repair.[11] It also allows hospital administrators to exercise budgetary controls by protecting them from unpredictable costs associated with correcting equipment failure.[2] Instead of incurring unplanned operational costs, hospitals can spread the costs through regular payment cycles over the lifetime of the contract.[7]

At the same time, it has been noted that outsourcing maintenance of medical devices to an external contractor can result in lower performance levels than with in-house services.[12] As well, multi-year maintenance contracts can limit a health care facility's ability to change to a different original equipment manufacturer (OEM), which may increase their dependence on the OEM.[13] In addition, the type of service contract negotiated may also impact service outcomes; recent empirical analyses of service contracts reported that a full service contract can lead to more failures and increased service costs than a basic service contract.[4] It was also noted that hospitals that use full protection contracts reduce the level of their own care of the equipment.[14]

Careful consideration of service offerings of competing MSAs may play a role in providing the best protection for equipment by lengthening lifespans, shortening or eliminating unplanned downtime, strengthening overall facility operational efficiencies, and cutting operating costs.[15] Selecting the optimal MSA may also help to manage wait-lists, and improve the quality of patient care.[3]

Objective

This report summarizes information on the type of service agreements used for CT and MRI across Canada for equipment maintenance and repair.

The key objectives are:

- to outline the distinct types of service contract agreements and their main characteristics
- to identify the types of agreements used across Canada for equipment maintenance.

About This Document

This document summarizes information identified through the 2019–2020 Canadian Medical Imaging Inventory (CMII) survey,[1] and a limited literature search on service contracts.

Results

The CMII collects data on service models used for advanced imaging equipment at the modality level rather than at the unit level. It has been noted that in some centres with more than 1 CT or MRI unit, different types of service agreements may be used. The most common situation where this occurs is at a site with 2 CTs, where 1 is newly installed; the new unit is usually under warranty, while the maintenance of the older unit is under another type of service agreement; however, only 1 type of service agreement could be reported. In these instances, it was assumed that the most commonly used long-term agreement at the facility was most applicable. As well, the type of service model used may be different between modalities. For CT, among the 317 sites with 1 or more CT units, 192 sites provided information on servicing methods. For MRI, among the 213 sites with 1 or more MRI units, 125 sites provided information on servicing methods.

Types of MSAs and Their Use Across Canada

There are numerous service contract options available to hospitals and health care systems for advanced imaging equipment. The most commonly used service contracts include full vendor (OEM), third-party, insurance policy, in house (often shared with OEM), à la carte (service and parts when needed), warranty, and a combination of some options.[1,16] In addition, most MSAs offer a range of service types[17] and there is an increasing trend toward personalized MSAs tailored to specific customer needs, rather than generic contracts.[17]

While the requirements of an MSA may be unique to the circumstances and settings where imaging equipment is placed, most MSAs focus on 3 key themes related to equipment reliability, resources, and cost of ownership.[18] The type of agreement negotiated between a maintenance service provider and a health care facility depends on the imaging modalities that will be covered under the agreement. The age of equipment is an important factor when negotiating an agreement because imaging units may become progressively less reliable when used beyond their recommended lifespan of about 10 years.[2] Other considerations may include the historical performance of equipment, its current state, its service history, whether there have been upgrades to the equipment, frequency of use, need for guaranteed uptime, and the availability of backup equipment.[16,17,19] The extent of in-house expertise will also influence the type of service contract that is required. A strong in-house maintenance program may be less reliant on external expertise.[16]

Full Vendor (OEM)

Full vendor contracts are the most common type of MSA used across Canada for all advanced imaging equipment. For CT, 73% of all MSAs are for full vendor support, which is used in all provinces and territories except Nunavut, which did not provide data (refer to Table 1). Similarly, for MRI, 70% of all MSAs are for full vendor support; this service agreement has been implemented, to some extent, in all but 2 jurisdictions (refer to Table 2). It is common for the OEMs of medical imaging equipment to provide service contracts because they have the expertise on the equipment.[9]

Full vendor contracts provide a wide range of services, such as corrective maintenance, operational maintenance, planned maintenance, and extended warranty, along with insurance maintenance programs for a set period of time.[16,20] They usually offer multiple service options that can be tailored for the level of coverage required.[7] Often, coverage for some equipment (e.g., glassware, transducers, and cryogens) involves additional contracts and costs.[16] Typically, full vendor services are the only type of agreement in which response time is guaranteed.[16]

Full vendor contracts usually cover multiple modalities of the vendor's equipment in a single contract.[19] There is a trend toward large vendors acquiring third-party service companies that can provide service for all equipment in a facility, irrespective of the OEM.[16]

Full vendor contracts often offer faster response times and discounts on replacement parts as incentives to take more inclusive contracts.[2] Some full vendor agreements include performance-based incentives whereby they ensure that key performance indicators, such as 100% uptime, are guaranteed, and will compensate the health care facility if equipment fails to provide the promised uptime level.[9]

Managed Equipment Services

A managed equipment service (MES) is a newer type of full vendor contract that has emerged internationally[7] and is gaining acceptance in Canada at the hospital level.[21] In Ontario, Hamilton Health Sciences adopted an MES agreement in 2020,[22] and the William Osler Health System's 3 hospitals established an MES agreement in 2015.[23] With this type of contract, the service provider owns the equipment and provides it to 1 or more health care facilities with all the support to ensure its use.[21] This service package entails ownership, acquisition, installation and commissioning, user training, asset management, maintenance, and ongoing replacement of medical technology and equipment.[21]

CADTH's CMII Service recently published a report, Managed Equipment Services, on the strengths and weaknesses of this type of service delivery method.

Insurance Policy

Insurance policies are a type of MSA most commonly used while an organization is transitioning from one type of service contract to another.[17] It is rarely used in Canada, and does not contribute to MSAs reported in the 2019–2020 CMII survey for CT or MRI units.

Insurance policy service contracts may vary, but most equipment insurance companies specialize in risk management, cost avoidance, or service billing audit functions.[17] An insurance policy typically combines 2 costs: the policy's premium and a fixed equipment-repair fund.[16]

In-House or Shared Service (Usually Split Between the Vendor and a Third Party)

Organizations that have in-house expertise and resources may service their own imaging equipment and may share the service workload with other MSAs to various degrees (i.e., full vendor or third party). This is the second most common type of service agreement used across Canada with 23% of all sites with CT using this method of maintenance support. All but 3 provinces use shared service agreements for CT, to a limited extent, and 1 province uses this type of MSA for 70% of its CT inventory (refer to Table 1). For MRIs, 23% of all MSAs are for shared service agreements, where it is used, to a limited extent, in 5 provinces (refer to Table 2).

In-house maintenance teams often use external service contracts for certain types of equipment.[7] A common partnership is one where in-house programs handle preventive equipment maintenance as well as first-call situations, and service providers handle issues beyond the staff's technical expertise.[17]

In some instances, in-house programs may limit their service contract to providing parts and remote technical support[16] with internal staff installing parts.[17] In-house maintenance programs may be best suited for large departments and/or multiple sites.[16]

Third-Party Agreements

Third-party service contracts often cover all imaging equipment in a health care facility irrespective of the manufacturer. Less than 3% of all MSAs for CT and MRI use this type of maintenance support (refer to Table 1 and Table 2).

Third-party agreements may often be used for hardware support and to provide services offered through a company separate from the OEM. Equipment parts may be less expensive through a third-party supplier than through the OEM, and are generally of the same quality and reliability.[16] An anecdotal comment from a medical imaging decision-maker noted that the cost of a CT replacement tube was quoted at $300,000 from an OEM compared to $70,000 from a third-party supplier. Some third-party providers limit their offering to a technology type or 1 or more manufacturers, although they can cover any and all equipment in an organization or a department.[16]

Under Warranty

Equipment that is under warranty is mostly limited to newly purchased imaging units, for which a warranty period, usually of 1 year, is provided. Often, the largest proportions of problems with imaging equipment, such as design flaws and repetitive failures, occur within the first year after installation during the warranty period.[19]

At the end of the warranty period, health care systems must select their service contract type.[4] Around 2% of all CTs and 4% of MRIs are under warranty in Canada, and all became operational within a year of the last CMII data collection cycle.

À La Carte (Time and Materials)

Some imaging facilities pay for services and parts on an as-needed basis,[16] with the service provider charging for parts, labour, and travel.[24] This type of MSA is not used for either CT or MRI in Canada. This is likely because expenditures for parts are the biggest cost in equipment management,[18] and as such bring unpredictability to health care facility budgets.

Other

The Canadian Medical Equipment Protection Plan (CMEPP) is an organization that coordinates equipment service contracts. The CMEPP is Canada's only not-for-profit organization that is owned by participant hospital members.[25] The CMEPP does not maintain or repair equipment or employ a service technician, but rather provides advice on equipment maintenance services on behalf of its members. CMEPP members decide who will repair their respective equipment and this is then coordinated and managed through the CMEPP.[26]

Table 1: CT Servicing Methods at Sites by Province and Territory, 2019 to 2020

Provinces and territories	À la carte[a]	Full vendor	Insurance	Shared service[b]	Third party	Under warranty	Other
			Numbers of sites (%)				
Alberta	0 (0)	36 (92.3)	0 (0)	1 (2.6)	0 (0%)	2 (5.1)	0 (0)
British Columbia	0 (0)	8 (21.1)	0 (0)	27 (71.1)	1 (2.6%)	1 (2.6)	1 (2.6)
Manitoba	0 (0)	15 (100)	0 (0)	0 (0)	0 (0%)	0 (0)	0 (0)
New Brunswick	0 (0)	5 (71.4)	0 (0)	2 (28.6)	0 (0%)	0 (0)	0 (0)
Newfoundland and Labrador	0 (0)	10 (76.9)	0 (0)	2 (15.4)	0 (0%)	1 (7.7)	0 (0)
Northwest Territories	0 (0)	1 (100)	0 (0)	0 (0)	0 (0%)	0 (0)	0 (0)
Nova Scotia	0 (0)	14 (100)	0 (0)	0 (0)	0 (0%)	0 (0)	0 (0)
Nunavut	NR	NR	NR	NR	NR	NR	NR
Ontario	0 (0)	24 (72.7)	0 (0)	7 (21.2)	1 (3%)	0 (0)	1 (3)
Prince Edward Island	0 (0)	2 (100)	0 (0)	0 (0)	0 (0%)	0 (0)	0 (0)
Quebec	0 (0)	19 (82.6)	0 (0)	4 (17.4)	0 (0%)	0 (0)	0 (0)
Saskatchewan	0 (0)	7 (70)	0 (0)	3 (30)	0 (0)	0 (0)	0 (0)
Yukon	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Canada	0 (0)	142 (72.8)	0 (0)	45 (23.2)	2 (1)	4 (2)	2 (1)

NR = not reported.
Note: Data derived from the survey question "How is imaging equipment serviced?"
[a] Time and parts by external service provider.
[b] Between vendor and in house or a third party.

Table 2: MRI Servicing Methods by Province and Territory, 2019 to 2020

Provinces and territories	À la carte[a]	Full vendor	Insurance	Shared service[b]	Third party	Under warranty	Other
			Number of sites (%)				
Alberta	0 (0)	21 (91.3)	0 (0)	0 (0)	0 (0)	2 (8.7)	0 (0)
British Columbia	0 (0)	11 (44)	0 (0)	10 (40)	2 (8)	1 (4)	1 (4)
Manitoba	0 (0)	0 (0)	0 (0)	7(50)	0 (0)	1 (8)	6 (42)
New Brunswick	0 (0)	7 (100)	0 (0)	0 (0%)	0 (0)	0 (0)	0 (0%)
Newfoundland and Labrador	0 (0)	4 (80)	0 (0)	0 (0%)	0 (0)	1 (20)	0 (0%)
Northwest Territories	NR	NR	NR	NR	NR	NR	NR
Nova Scotia	0 (0)	9 (100)	0 (0)	0 (0%)	0 (0)	0 (0)	0 (0)
Nunavut	NR	NR	NR	NR	NR	NR	NR
Ontario	0 (0)	14 (63.6)	0 (0)	7 (31.8)	1 (4.5)	0 (0)	0 (0)
Prince Edward Island	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Quebec	0 (0)	15 (88.2)	0 (0)	2 (11.8)	0 (0)	0 (0)	0 (0)
Saskatchewan	0 (0)	5 (71.4)	0 (0)	2 (28.6)	0 (0)	0 (0)	0 (0)
Yukon	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Canada	0 (0)	88 (65.6)	0 (0)	31(23.1)	3 (2.4)	5 (4)	7 (5.2)

NR = not reported.
Note: Data derived from the survey question "How is imaging equipment serviced?"
[a] Time and parts by external service provider.
[b] Between vendor and in house.

Conclusion

Full vendor service agreements are the most common type of maintenance agreement used in Canada for CT and MRI units. With demand for maintenance agreements continuing to grow at a time when spending is increasing at a pace that challenges the sustainability of a publicly delivered health care system, the current landscape of MSAs may come under greater scrutiny. Careful consideration of the service offerings of different maintenance providers may help to maximize cost efficiencies and improve the quality of patient care. This may result in a more competitive MSA environment and a wider array of customized service offerings.

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