

# Equipment Service: Total Cost of Ownership

Service could be the last frontier where imaging managers can reduce costs

By Sheila M. Sferrella, MAS, RT(R), CRA, FAHRA

Imaging managers are being called upon to reduce costs significantly in their departments, so understanding the total cost of ownership is critical. All payors have targeted imaging as a high-cost, high-utilization service, over the past seven years, and now health-care reform will change the way that imaging does business forever—making it a cost center on the inpatient side.

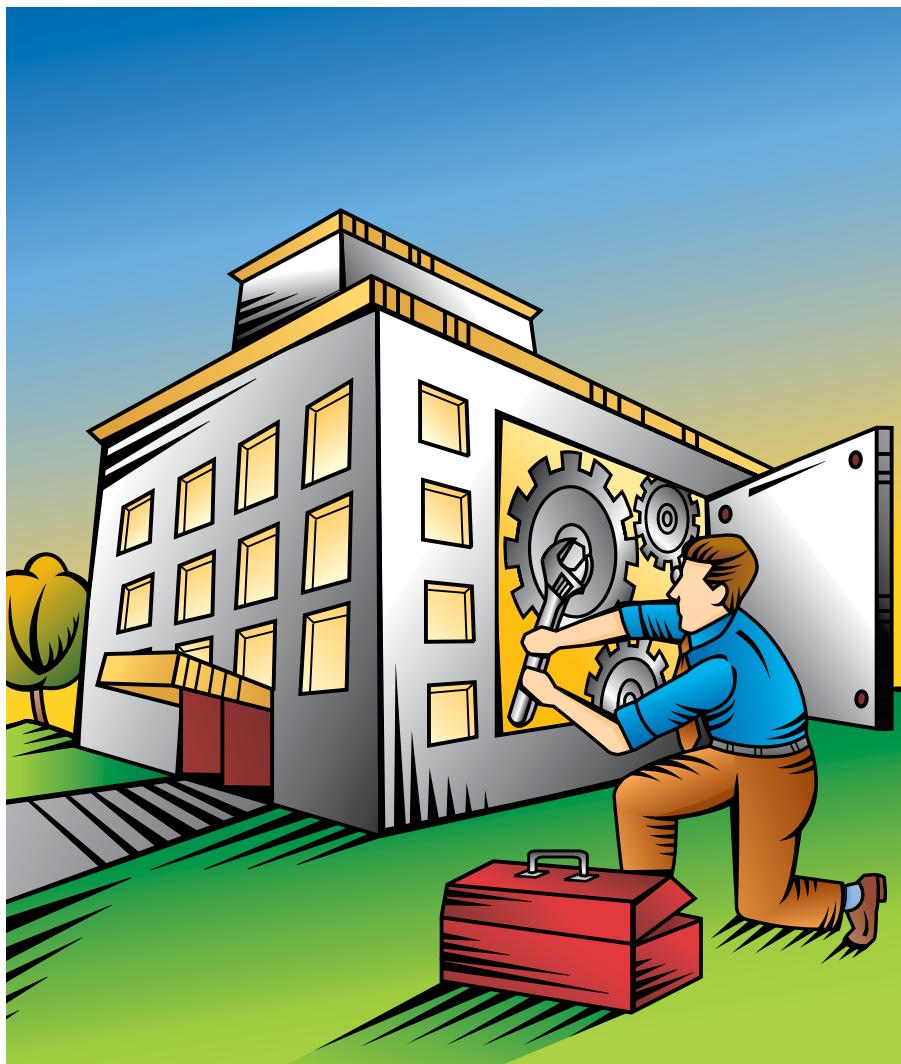
In the future, we could see radiologists' fees bundled with hospital inpatient payments. This leaves outpatient studies as the only source of revenue produced by imaging—yet in Arizona and California, today, a patient can access a website ([www.bidonhealth.com](http://www.bidonhealth.com)) and bid for a study. The cost of an MRI exam ranges from \$320 to \$3,200.

Because the total cost of owning and maintaining radiology equipment can vary tremendously (and can have a serious impact on bottom-line results), imaging managers should select the most cost-effective options for their organization. This calls for the consideration of several variables when acquiring new equipment, in addition to the ongoing review of costs that imaging managers can control.

A number of factors affect the total cost of ownership. They include major equipment, minor equipment, construction, annual service, upgrades, peripherals, supplies, staffing, certificates of need, and leases. When the organization is considering a replacement (or additional) piece of equipment, these costs should be included in the analysis so that life-cycle costs can be compared. For example, the purchase price of a radiography room from one vendor might be a little higher than the price from another vendor, but over the lifetime of the equipment, service might cost \$50,000 less for the (initially) more expensive equipment.

## PRELOAD: PREVIEW

- ❖ Many factors affect the total cost of equipment ownership, and service is one of them.
- ❖ Providers have six primary service options: OEM, third-party, insurance, in-house, time-and-materials, and hybrid solutions.
- ❖ To evaluate service costs and options, managers must calculate two benchmarks: mean time between failures and cost-of-service percentages.
- ❖ A good decision necessitates a complete census of equipment and the capabilities (and cost of training) of in-house biomedical-equipment specialists.



Space for the equipment can be owned or rented; in a hospital environment, the space is usually owned, but in an imaging center, the space is often leased. Whether the space is owned or leased, the costs of buildout will need to be calculated (and funded) as part of the project's cost. If the space is leased, negotiations with the landlord will often allow you to include buildout costs in the lease terms.

**Service Options**

For major radiology equipment, many organizations will purchase the equipment, while many outpatient centers might lease the equipment (to improve cash flow for the center). Leases can be obtained from vendors and banks, regardless of funding. In addition to the purchase price, the operating budget must include expenses for equipment maintenance.

There usually are multiple payment options available to avoid an up-front outlay of cash. If the equipment is leased, however, the only choice for service is a full-service maintenance contract from the vendor (similar to the service arrangements required to lease a car). To keep the lease's cost down, your organization might opt to pay for a maintenance plan separately for each year of the lease and to fund it from the operating budget.

For purchases, there are six primary service options for an organization to compare, in terms of efficiency and cost effectiveness. First, OEMs offer a maintenance plan for a set period of time. There are usually multiple options, and obtaining coverage for glassware, transducers, and cryogenics involves an additional contract and expense.

Second, a third-party service organization can cover any and all equipment in the organization. Third, an insurance company will write a policy to cover the department or center and to combine two costs: the policy's premium and a fixed equipment-repair fund. This company will provide data on the best prices for parts and service in your area. At the end of the year, if actual costs are less than the repair fund's pool of money, the organization will retain the saving. If the year ends with actual costs exceeding

the pool of money, there are no additional out-of-pocket costs, since the risk has been capped.

Fourth, hiring a dedicated in-house maintenance team is another option. An in-house solution might be best if you are managing a large department and/or multiple sites. Fifth, an organization can take the risk and pay for service and parts as needed. Usually, the organization will create a risk pool that is based on the past two years' failure rates for equipment. With this method, costs are paid from the pool as they are incurred.

Sixth, the organization can use a mix of the other five service options. For example, you can buy a full-service contract on one machine (because it has high failure rates) and buy an insurance product for everything else.

**Benchmarking Costs**

There are two major benchmarks to use in order to evaluate service costs and impact for a department. The mean time between failures of your equipment will be based on actual failure events over the past fiscal year. Mean time between failures is the mean number of days between downtime events for a given machine. There are national benchmarks available for each vendor and each equipment model.

It is also critical to determine a cost-of-service percentage by dividing the acquisition value of the equipment by the actual service cost for the past fiscal year. If the acquisition cost was \$100,000 and the service cost for the past year was \$10,000, for example, then the cost-of-service percentage is 10%. This information is particularly important in determining what a service contract should cost—whether service comes from the OEM or from another party.

In my experience, relying mainly on OEM support produced an annual cost-of-service percentage of 10% to 14% of the equipment's cost. Third-party service contracts averaged 8.3%, insurance coverage averaged 7.4%, and a combination that relied mainly on in-house service ranged from 4% to 6%—but that percentage could vary tremendously from organization to organization. The actual second-year cost of a program using in-house service is shown as a percentage of equipment cost (see table).

Traditionally, equipment-purchase and maintenance costs were segregated into different budgets, so the total cost was difficult to track. The equipment purchase might be allocated to the capital budget, but the space buildout would be treated as an expense in the budget of the facilities-management department. The costs of supplies, aprons, wedges, and other items would be expenses in the operating budget.

The materials-management department might negotiate the service contract, which was treated as an expense in a separate subaccount of the operating budget. In OEM organizations, sales and service are still separate companies, so a manager has to negotiate with different representatives for the purchase of the equipment and for the service contract.

In the traditional model, about 60% of service contracts are OEM full-service contracts. Typically, those are the only contracts in which response time is guaranteed. Generally, contracts are priced based on a set number of hours, but many customers might use less than half of the maintenance purchased in an OEM contract. Vendors calculate uptime percentages based on 24-hour days, no

**Table.** Annual Cost of Service As a Percentage of Equipment Cost

Device Type	Service Cost
C-arm, port	< 1%
Chest room	< 1%
Portable radiography	< 1%
Radiography	2.1%
Mammography	2.3%
Angiography	2.7%
Ultrasound	4.5%
Radiography/fluoroscopy	5.2%
Gamma camera	6.4%
MRI	7.7%
CT	8.4%



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matter how many hours of service are contracted for in the agreement.

In the traditional model, revenue in a hospital is based on contribution margin or contribution to overhead. It's very difficult to get actual costs out of hospital systems because of the hierarchy of charges. Ordinarily, expenses for nonrevenue departments are allocated to revenue-producing departments, as part of overhead.

### Cost-reduction Opportunities

At the start of each new fiscal year, gross charges might be raised between 8% and 10% for the purpose of balancing budgets, but charges are not always based on a cost structure. The cost of delivering care in a hospital environment can be as much as five times greater than the cost of delivering the same service in a freestanding outpatient center.

Competition among third-party service companies and insurance brokers has driven down response times and the cost of service. In addition, large vendors have acquired many third-party service companies, so they are now able to provide service for all equipment in an enterprise, not just their own equipment.

There are several opportunities to reduce the cost of equipment ownership and maintenance, grouped under three headings that managers can control: service costs, capacity, and equipment costs. To examine how service costs can be reduced, it is important to compare the advantages and disadvantages of various equipment-maintenance options. Some of the common reasons for selecting a full OEM contract are that:

- the vendor offers the best/most reliable service, as well as immediate discounts at the time of equipment purchase;

- uptime is guaranteed;
- upgrades are free;
- the maintenance agreement is thought to be less expensive than paying on a time-and-materials basis;
- the health-care organization lacks the capacity to develop an in-house program;
- arranging the full-service contract is easy; and
- the manager no longer has to worry about equipment coverage.

On the other hand, an OEM contract can have its pitfalls. Some of these are suboptimal pricing on parts and services, the risk of paying more than necessary to meet service needs, and unnecessary downtime while waiting for service (compared with an in-house program with on-site staff).

### Assessing Costs

It's usually most effective to examine equipment piece by piece and determine which devices should be maintained via OEM contract, on a time-and-materials basis (or some other method), or using combined methods. To perform an analysis, collect several types of information, including the current state of equipment, its service history, and whether there have been upgrades to the equipment.

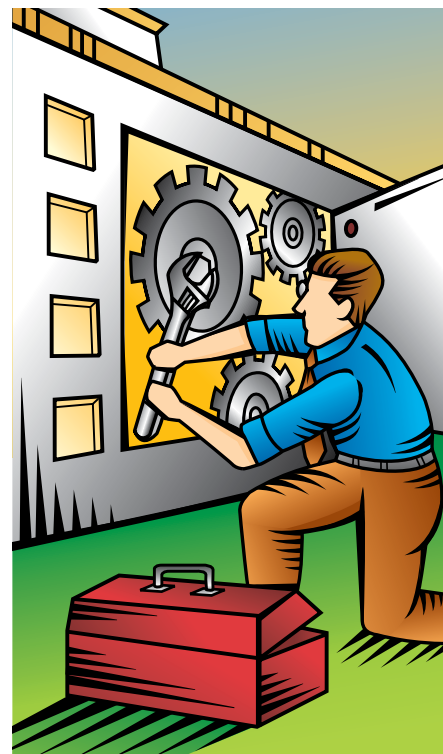
To begin, develop a spreadsheet with all of the equipment listed. If there are on-site biomedical-equipment specialists, they might already have such a list. Group data according to modality and machine type and model. For each device, list the cost of service under an OEM maintenance contract, the duration of that contract, its date of purchase, and the length of the equipment's warranty. Much of this information will be extracted from the general-ledger accounts in the budget.

Next, document dates of repair, costs of labor and parts, problems identified and parts replaced, initial reasons for service, the service method, and the amount of downtime associated with the repair. Note the number and nature of upgrades, their cost, and the software level/version. If the organization doesn't have these specific details, call vendors and ask them to provide the data.

Findings will vary, depending on the equipment. For instance, with nuclear medicine, you might find that repairs are infrequent and costs are relatively low; thus, you'll probably save considerably by canceling the OEM contract and having the equipment serviced on a time-and-materials basis by the OEM or a reputable third-party service vendor.

While software upgrades are usually included in full OEM service contracts, they rarely cause a dramatic change in a device's function. On the other hand, hardware upgrades are rarely included in an OEM contract, but are usually more critically related to improving the patient experience, reducing scan time or radiation exposure, improving image quality, or improving the machine's performance.

You can usually negotiate a maintenance contract, either with an



OEM or with a third party, depending on your own resources. For example, do you have a strong in-house maintenance program? In that case, your contract might only cover parts needed for repairs. At a minimum, it is wise to contract for remote technical support.

### Managing Costs

In many cases (and depending on your in-house resources), you will want to negotiate for some type of support agreement that gives you the software key, error-code information, and telephone support from the vendor. At one facility, we only had full-service agreements for first-generation equipment and for devices with very high failure rates.

PET systems require relatively infrequent repairs, most of which we could handle in-house, and we had a third-party parts supplier. An agreement for remote diagnostic support was negotiated.

Ultrasound requires infrequent repair/replacement of probes. Initially, we negotiated with the vendor to cover probes, at a set cost, for five years. Our biomedical-equipment manager found a source for probes online at half the cost of buying probes from the vendor. We did not experience any difference in failure rates with those probes.

CT tubes are expensive, but they wear out predictably. Thus, we might shop around for competitive tube costs. In most cases, we saved 30% or more by buying from a parts distributor, not the OEM.

For MRI systems, we used our biomedical-equipment specialists to handle repairs, but we needed remote technical support and parts, so we negotiated a contract that covered both. This option saved a considerable sum over a full-service contract.

Parts are almost always less expensive through a parts source than through the OEM. Those parts are generally of the same quality and reliability as those obtained through the OEM.

To make good decisions concerning an equipment-maintenance plan, ask some questions. First, how many pieces of equipment are in your department? The fewer machines you have in service, the more the cost effectiveness of trained in-

house personnel diminishes. There are a number of other options between a full-service contract and an in-house program.

Second, how quickly do you expect the technology to change? Be sure to negotiate the inclusion of any training needed by your biomedical-equipment specialists as part of the purchase of new equipment. If you're considering taking your maintenance in-house, include timing costs. At one health system, we had a number of contracts that were still in effect when we began our program. Some could not be canceled, so we notified all the vendors that we would terminate any contracts that we could and terminate the remainder at the end of the contract. That also allowed us to ramp up our in-house program.

Third, if you're going in-house, be sure to include all the costs of the operation, including the costs of adding personnel and/or training them. Before we implemented our in-house program, our cost-of-service percentage was close to 12%. After our first year of the program (with a mix of options), our cost-of-service percentage dropped to 6%. By the second year, it was down to 4%.

In an outpatient center, we were able to come up with a program that resulted in the saving of more than 18% over an OEM or third-party service contract (through an insurance program). This program covered corrective maintenance; preventive maintenance; parts, travel, and shipping; an equipment repair-or-replacement feature; and 24/7 service.

With the program, there is simplified management and control: freedom to use any vendor; a common program anniversary date for all equipment; management reports; full control of administrative matters (such as accounts payable, budgeting, and vendor management); multivendor maintenance-management support systems; and full access to alternative providers of parts and service.

When using an insurance product, you will be able to secure experience-rated renewals, reimbursement for in-house repairs, and access to shared savings. The contract that we negotiated could be canceled by the customer at any time, and we were able to add and remove equipment at any time.

An insurance proposal for some equipment in one imaging center, for example, had a total program cost of \$673,692. This was based on an aggregate deductible (underwritten proposed repair cost) of \$519,724 and an insurance premium cost of \$153,968. The result was a saving of \$153,630 (or 18.6%) from the projected OEM cost of \$827,322. In addition, we had a cap (maximum exposure) of \$673,692 that we could budget.

You might find opportunities to save on the purchase of equipment. In hospital environments, we nearly always purchased new equipment. When I began working with a radiology group, however, we almost always purchased used equipment. An OEM will offer used equipment that has been certified by that vendor.

This equipment has been refurbished, which includes painting the equipment to make it look new. In my experience, the cost of new equipment comes down much more quickly than that of certified used equipment. If you work with a reputable used-equipment broker, however, it is possible to get equipment for a fraction of the original cost.

Throughout the fiscal year, maintain access to data on costs, efficiency, and quality of service. The amount saved at the end of the year might surprise you. As reimbursement continues to decline and imaging utilization comes under continued scrutiny, it is imperative to examine the total cost of equipment ownership for your organization. **REI**

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