What do infusion pumps and taxicabs have in common? There are hundreds in circulation, but you can never find one when you need one.

Unfortunately, it’s no joke. Hospitals today are filled with underused clinical devices. Equipment such as ventilators, infusion pumps, and telemetry units typically make up more than 95 percent of a hospital’s clinical asset inventory, representing thousands of devices and an investment worth tens of millions of dollars. Yet results of a recent study conducted by GE Healthcare disclose that the average utilization of mobile devices is only 42 percent, meaning that more than half of the fleet is idle (but still accruing expenses) at any given time. And despite the seeming oversupply, availability is inconsistent; for example, nurses spend an average of 21 minutes per shift searching for lost equipment.

Now for the bad news: The situation is getting worse.

The costs associated with mobile clinical assets are rising. Although rising costs are not news, many healthcare managers may not realize how sharply the cost per bed has increased over the past decade and how much money is being spent on assets that are adding little or no value to patient care. As a result, they may be paying insufficient attention to examining and improving how these devices are managed and used.

The GE study, which investigated the changes in mobile device inventory and associated costs, analyzed data collected from 45 hospitals across the United States. Several key findings of the study may have implications for healthcare.
organizations. Between 1995 and 2010, hospitals experienced a dramatic shift in their mobile asset profile, with, on average, a 62 percent increase in the number of clinical devices per bed and a 90 percent increase in the service and maintenance costs per bed, even though the cost-of-service provision has exhibited only a small inflationary rise.

Hospitals have the opportunity to save hundreds of thousands of dollars currently being spent on underutilized assets and redirect this money toward critical hospital initiatives that may benefit from a cash infusion, such as staffing, infrastructure improvements, and service expansion.

**Service Costs: Only a Modest Rise**

Service and maintenance costs per mobile clinical device (including labor and parts) rose 19 percent between 1995 and 2010, according to the cost analysis of mobile clinical assets. The average (mean) cost to maintain a mobile device increased by $40, from $210 to $250 per year.

Over 15 years, the cost-to-serve inflation is up only 1.3 percent compounded annually, which is modest compared with increases posted by other indexes during approximately the same time frame. For example, between 1989 and 2009, the average annual rate of increase in the consumer price index (CPI) was 2.8 percent, the Medical Care CPI rose 4.7 percent, and the Medical Care Services CPI increased 5 percent.

Services costs per device continue to be a relative bargain, having remained at or below inflation, as shown in the exhibit below. The primary driver of rising asset maintenance costs is not the cost to service each asset but rather the overall number of devices being managed.

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**About the Study**

The data for the study on which this article is based were collected by the GE Healthcare Asset Management team in 1995-97 (“1995”) and 2008-10 (“2010”), and included number of staffed beds and mobile device inventory count. To evaluate the changes in service costs per device, number of devices per bed, and service costs per bed from 1995 to 2010, regression models were developed to adjust for hospital characteristics, including case mix index, bed size, location, and other variables. Hospitals (n = 45) included in the analysis were mostly urban (87 percent) and had a teaching designation (73 percent). More than half (58 percent) had more than 200 staffed beds. Hospitals were located primarily in the South (76 percent) and West (20 percent) regions of the United States.

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Number of Devices: Skyrocketing
According to the analysis, the average number of mobile devices per staffed bed increased 62 percent on average between 1995 and 2010, as shown in the exhibit on page 72. In the mid to late 1990s, the typical staffed bed had eight devices. Today, there are 13 devices per bed. This finding, coupled with low asset utilization, indicates a serious problem.

Many hospitals believe, in error, that it is less costly to address equipment availability issues by leasing, renting, or buying more units rather than optimizing how existing devices are managed and distributed. This “redundancy” strategy backfires as the additional equipment simply gets swallowed up in the system, further driving up costs.

Cost per Bed: Out of Control
Service and maintenance costs associated with mobile devices have more than doubled in the past 15 years, demonstrating a rise of 90 percent. On average, the cost per bed rose from $1,656 to $3,144 per year, an increase of $1,488. (See the exhibit on page 73.) For a 200-bed hospital, the service and maintenance costs associated with mobile clinical devices have increased from $331,200 to $628,800 per year on average. A 400-bed hospital now expends $1,257,600 each year compared with $662,400.

Considering that the cost-of-service provision has remained essentially flat, this increase relates directly to the large device inventories in many hospitals. In addition, the analysis does not take into account the other significant costs associated with new devices, including the cost of acquisition (lease, rent, purchase), supplies, consumables, software agreements, staging and installation, and user training. With nearly twice the number of devices flowing into hospitals, those costs have significant impact on capital and operating budgets.

Balancing the Asset-to-Patient Ratio
The number of mobile clinical assets is skyrocketing, along with associated service costs, while utilization remains below 50 percent. It appears that the majority of healthcare organizations are not linking device acquisition to usage patterns or clinical need. Although 100 percent utilization is impossible, 70 to 80 percent is a realistic, achievable target.

In our work, we find that hospitals generally have about 25 percent more mobile devices than they can actually use based on patient volume and case mix. By understanding how this equipment is managed and deployed in patient care and then developing more effective policies and processes to govern its utilization, healthcare organizations can:
> Reduce inventory significantly
> Reduce capital and operating expenditures
Help to improve care efficiency and patient safety
Increase staff productivity and satisfaction

Steps You Can Take Now

Inventory reduction alone will not improve utilization or drive down costs. A hospital with 350 beds and 700 infusion pumps will not achieve efficient utilization simply by cutting inventory in half. Achieving a more cost-effective asset-to-patient ratio is a multistep process that includes the following steps.

Select an initial asset group to target. No healthcare institution has the time or resources to address every device group at once. Pick one that offers the greatest potential for improvement (in terms of volume of devices and associated costs), and begin there. Some of the best candidates include infusion pumps, PCA pumps, syringe pumps, telemetry monitors, portable vital signs monitors, ventilators, CPAP/BiPAP equipment, and pulse oximeters.

Conduct a physical inventory. You can only manage what you know. Even though nine out of 10 devices in a hospital fall into the mobile clinical equipment class and represent an investment in the tens of millions of dollars, many hospitals lack an accurate accounting of these assets.

Evaluate the organization’s asset “ecosystem.” Because every hospital has its own way of making assets available for patient care, it is worth the time to consult with and observe clinical and biomedical staff to understand these utilization patterns. A recommended practice is to walk the halls to see where devices are located and how they are being used, stored, and managed. Look in closets and empty rooms. Talk with staff members in nursing, central sterile supply, housekeeping, and biomedicine. The impressions from such first-hand observation can be eye-opening.

Optimize workflow processes. Armed with a basic understanding of the current state of asset management gained from inventory and observation, financial managers can begin developing a better approach. Key decision makers—chosen from management and front-line staff—should meet to map the key processes and identify wasted steps and roadblocks. The goal is to redesign asset workflow processes to reduce inefficiencies while aligning with the organization’s culture and workflow preferences.

Phase in new processes, phase out inventory. A phased implementation of new asset workflows is advisable to control the changes and allow for process adjustments. Conducting trial runs on a few units will disclose whether the new processes are successful in optimizing asset management and distribution to meet patient care needs and staff workflow realities. Then, and only then, should organizations begin adjusting stocking levels to be

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DISTRIBUTION OF COST PER BED

<table>
<thead>
<tr>
<th></th>
<th>1995-97</th>
<th>2008-10</th>
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<tr>
<td>Mean</td>
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<td>3,144</td>
</tr>
<tr>
<td>Median</td>
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</tr>
<tr>
<td>75th Percentile</td>
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<td>3,474</td>
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consistent with the new workflow. A practical approach is to remove excess devices from circulation, making them available only in the event of an emergency—similar to an in-house rental. As the staff becomes accustomed to the new workflows, inventory levels can be permanently reduced.

Devote time to change management. Even if the new processes require only minimal adjustments and deliver positive outcomes, employees are still likely to resist change. Healthcare organizations should engage employees, helping them understand the changes and mobilizing their support. Nurses, for example, may need reassurance that devices will be available as promised, allowing them to give up the work-arounds they have relied on to provide patient care. Using a methodology that combines communication tools, engagement strategies, and measurement-reward systems can help organizations develop the structure and accountability that drives lasting change.

Develop a replacement strategy. One reason for the burgeoning inventories of mobile clinical assets is that subjective input often drives acquisition decisions. For example, a nurse manager reports difficulty locating telemetry monitors on her unit, so the hospital leases 10 more rather than investigate why the ones that should be available are missing. These requests are made in good faith and with the best of intentions for patient care. The trouble is, they often obscure a systematic workflow problem. What is needed is an objective counterbalance to ad hoc decision making that enables the hospital to weigh individual requests against an overall strategic plan for equipment replacement. With such a plan in place, leaders will be better able to prioritize competing demands for limited capital and ensure that the organization has the proper type and number of mobile assets on hand to meet patient needs in all care areas.

**Action Delayed, Opportunity Lost**

Healthcare organizations can no longer delay addressing the issue of clinical asset utilization. In this era of belt-tightening and to-the-bone reductions in staffing and services, the money saved by right-sizing a hospital’s clinical asset inventory and optimizing its asset management processes can be redirected to other critical areas in the organization.

According to our calculations, the average 200-bed hospital could avoid $1.3 million in capital expenditures and reduce annual service costs by $160,000 simply by reducing its inventory of mobile devices by 25 percent—a reasonable and achievable goal. If hospital was able to realize those savings, how could that money be applied toward achieving its organizational goals? 

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