2005 will likely be the first year that hospital purchases of spinal implants and related accessories will exceed those for hip and knee implants. Many products sold today for treating spinal disorders did not exist as few as 6 years ago, and their proliferation has made containing their costs a major headache for hospitals.

According to the Millennium Research Group of Toronto, Ontario, sales of spine-related devices and products to US hospitals exceeded $3.4 billion in 2004, up 19% from 2003. The spine segment of the orthopedic market is growing at a faster rate than the market for hip and knee implants, estimated to be at $3.3 billion in 2003.

Since 1994, sales of spinal devices have increased 15-fold, while sales of joints have approximately doubled.

If you assume an annual growth of 11% in the hip and knee implant market and a 21% growth in the spine market, the 2 markets intersect in 2005 (graph). This means that in 2005, hospitals will spend more for spinal devices than for joints.

With the Food and Drug Administration’s approval of the artificial spinal disc in October and wider application of spinal monitoring, it is likely that this disparity will grow even further.

### Spinal devices proliferate

Spinal supplies include the hooks, rods, plates, screws, bone, and bone substitutes used for spinal surgeries, such as fusions and disc excisions (pie chart, p. 22). Other categories of spinal devices that didn’t exist a couple of years ago include vertebral compression fracture surgical supplies (mainly products manufactured by Kyphon), thermal therapy (including the IDET procedures), bone morphogenic protein (BMP) (Medtronic Sofamor Danek’s InFUSE and Stryker Orthobiologics OP-1, which recently received a humanitarian device exemption for spinal fusions). Interbody fusion devices, which barely existed in 1997, in 2004 represented a market of over $675 million, roughly split in half between machined bone and nonbone cages and other devices.

### Overlapping technologies

Although spinal fusions account for just over one-third of spinal surgeries in the US, almost 90% of implants sold to hospitals are used to enhance spinal fusions. These devices have been developed to improve the fusion rate, the assumption being that well-fused vertebrae will result in a more successful outcome. This has resulted in a proliferation of overlapping and potentially redundant technologies, including bone grafts and bone substitutes, spinal growth stimulators, anterior and posterior fixation of the spine, and bone morphogenic proteins.

### Hard-to-manage costs

Several problems face hospitals that are trying to manage spinal implant costs:
- the anatomy of the spine itself

### Materials management

**Spine costs: A bigger problem than joints**

A column on cost and quality issues in orthopedics.

<table>
<thead>
<tr>
<th>Year</th>
<th>US sales (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$225 million</td>
</tr>
<tr>
<td>1997</td>
<td>Added interbody fusion, bone allograft</td>
</tr>
<tr>
<td>2002</td>
<td>Added vertebral compression fracture, BMP, thermal therapy</td>
</tr>
<tr>
<td>2005</td>
<td>Estimated 2005 spine market $4.03 billion</td>
</tr>
</tbody>
</table>

**Sales of hip & knee implants and spinal devices to US hospitals, 1994-2004**

the payer mix of patients having surgery
the proliferation of new technologies treating spinal conditions.

Osteoarthritis accounts for a large percentage of patients receiving hip and knee replacements. But there are a number of unrelated reasons that patients receive back surgery, including trauma, congenital deformities, arthritis, degenerative disc disease, spondylolisthesis, tumors, compression or pathological fractures, generalized back pain, and other pathologies. Patients suffering back pain may be completely debilitated and desperate for solutions, including surgery. In contrast, joint pain is more chronic, and surgery is often less urgent.

Many patients with spinal implants are younger (40-somethings) with relatively good insurance. Because hospitals often can pass on additional costs to insurers, there generally is less incentive to decrease prices of spinal devices than there is for joint replacements, which are primarily performed in the Medicare-aged population with a fixed DRG payment. The fixed DRG payment for a joint replacement becomes a lever and a target in negotiations to reduce the cost of the implants. Because insurers for spinal procedures don’t generally have these restrictions, there is less consensus and focus on that problem.

The proliferation of technologies used for spinal fusions can be seen in a sample patient from 1997 and 2003 (sidebar, p 22).

**Track record lacking**

The proliferation of these new technologies means that there is not much of a track record for comparing surgical outcomes with the different devices. While outcomes of hip and knee surgery have been reported for periods of up to 30 years, a typical trial reporting outcomes of spine surgery is around 2 years. There are a number of reasons for this disparity in outcomes reporting including that the technology changes quickly, many events may affect patients’ subsequent back pain, and it has been difficult to develop consensus on what a successful outcome is.

Nevertheless, patients with pedicle screws and other hardware will likely be living with these devices for the rest of their lives, which, compared to the age of a typical joint patient, will be several decades longer.

**Ideas for managing costs**

Hospitals trying to manage their spinal implant costs should attempt the following:

- Review with your surgeons potentially redundant technologies. Many of the devices used to promote fusion are additive. Specific guidelines should be developed for BMP, demineralized bone matrix, bone growth stimulators, and anterior / posterior fusions, among others.
- Contracting may have limited benefit. Many hospitals ask vendors to bid on single-level constructs, 2-level constructs, anterior constructs, etc. This makes sense only if you have a handle on how many procedures fall into these categories. And recognize that the source of demineralized bone, spacers, and BMP often are excluded from negotiated contracts. These add-ons may exceed the costs of fusion plates and screws.
- Encourage creativity on the part of surgeons. I have seen situations in which BMP was replaced with demineralized bone matrix products, which then were
replaced with autologous bone marrow aspirate mixed with autologous bone from the patients’ fusion site. Is one any better than the other? Unfortunately, nobody really knows.

- Review ICD-9-CM coding. The ICD-9-CM procedures are constantly changing, and it requires a significant effort to ensure procedures are coded appropriately. Among the most frequently missed codes are the ICD-9 codes for interbody fusion devices.

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How costs compare

Here’s how costs might compare for a patient having a single-level L5-S1 fusion in 1997 and in 2003. Many products used today were not available in 1997.

1997
L5-S1 posterior lumbar fusion
- 39-year-old male, smoker
- Sofamor Danek TSRH rod/screw system
**Total $3,207**

2003
L5-S1 posterior lumbar fusion
- 51-year-old male, smoker
- Sofamor Danek TSRH 3D rod/screw: $4,682
- RTI Precision bone dowel: $2,800
- Synthes DBX bone paste: $630
- Sofamor Danek bone-void filler: $458
- Sofamor Danek BMP (large) $4,900
**Total: $13,470**

Source: Orthopedic Network News.