

A P P E N D I X

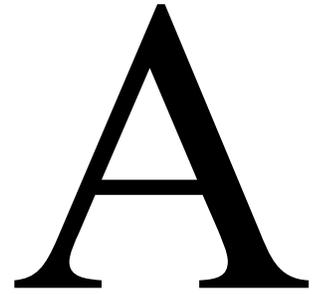
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**Overview of new hospital  
technologies for fiscal  
year 2002**

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# Overview of new hospital technologies for fiscal year 2002

To encourage hospitals to adopt new technologies that enhance quality of care for Medicare beneficiaries but increase costs, MedPAC includes an allowance for scientific and technological advances in its hospital update framework. In determining the magnitude of the allowance, we consider only those new technologies that have progressed beyond the initial experimental stage of development but are not fully diffused in the inpatient hospital setting. Payment for fully diffused technology is subsumed in the base.

## Current approach

The allowance for scientific and technological advances (S&TAs) represents MedPAC's best estimate of the incremental increase in costs for a given fiscal year that will result from hospitals adopting new technologies or new applications of existing technologies beyond that automatically reflected in the payments hospitals receive. To derive the fiscal year 2002 allowance, we are using a qualitative method similar to our approach for fiscal years 2000 and 2001. First, we reviewed the technologies included in fiscal year 2000 and 2001 updates that continue to diffuse and estimated changes

in their overall use and costs predicted for fiscal year 2002 (MedPAC 1999; MedPAC 2000). Next, we attempted to identify new technological advances for this year's update by reviewing select medical literature, trade journals and popular press; approvals of drugs, devices, and biologics by the Food and Drug Administration (FDA); and information from other federal and private organizations. As in prior analyses, we did not attempt to identify all cost-increasing technologies, but focused on the most significant medical and scientific advances from a cost and potential diffusion perspective. Finally, we included only those quality-enhancing technologies that met the following criteria as best as we could determine:

- The technology was approved by the FDA as appropriate.
- At least an estimated 5 percent but no more than 75 percent of relevant Medicare beneficiaries (patients whose medical condition warrants use of the technology) would receive the technology.
- Substantially higher net treatment costs would result from use of the new technology.

We divided new technologies into five broad categories that we believe encompass virtually all of the advances expected to contribute significantly to increased costs:

- information systems;
- drugs and biologics;
- devices and diagnostics;
- imaging technology; and
- surgical/procedural techniques and other technological advances.

These categories are similar to those we used for the 2000 and 2001 allowance except that we have grouped drugs with biologics and devices with diagnostics and have added a category for surgical and procedural techniques. While advances in cardiology continue to increase costs significantly, we have generalized the categories of drugs and biologics and devices and diagnostics to include advances in all specialties.

In some cases, the new technology would replace a less expensive older technology. In addition, the cost of new technologies may be partially offset by productivity increases. For the purpose of determining the S&TA adjustment, we attempt to

estimate the net of the new and old technology costs. In calculating the adjustment, it is also important to keep in mind that the use of these new technologies is limited to a fraction of patients in certain diagnosis related groups. Thus, while the list of S&TAs appears impressive in scope, the S&TA contribution to total hospital costs remains relatively minor.

The following sections contain categorical listings of FDA-approved scientific advances since our last review of this topic in June 2000 as well as recently developed technologies which were identified in our two previous reviews of S&TAs (MedPAC 1999, MedPAC 2000) but which continue to diffuse.

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## Information systems

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Coordination of health care across different providers is critical to ensuring quality of care, and delivery of coordinated health care is dependent on the availability of integrated information systems. In light of the trend for more coordinated care delivery by hospitals, information systems will probably continue to account for a significant proportion of increased costs in fiscal year 2002. This will encompass multisite, integrated information systems that capture, store and tabulate financial, pharmacy, radiology, patient care, and laboratory data. In particular, recent emphasis on reduction and elimination of systematic medical errors will prompt hospitals to invest further in information systems that can detect medication errors and diagnostic inaccuracies (IOM 2000). As hospitals continue to develop clinical and financial data repositories and electronic medical records, technology to standardize, aggregate, integrate, and transfer information through secure channels across multiple providers within a network as well as to parties outside a health care system, including Medicare, becomes a high priority expense.

The Balanced Budget Act of 1997 (BBA) required Medicare to cover interactive

telemedicine consultations in areas designated as health professional shortage areas. Telemedicine—the electronic delivery of health care information and services—continues to diffuse into underserved areas. Rural hospitals continue to expand existing and implement new uses of telemedicine, which will increase access to care for Medicare beneficiaries but will require continued investment in this technology.

Video-conferencing, which uses the internet and web-based diagnostic software, may enable physicians to care more efficiently for patients, especially in the intensive care unit (ICU). Using this technology, nurses will be more effective in communicating with and transmitting data to intensivists and other physicians who are not physically present in the ICU.

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## Drugs and biologics

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MedPAC believes that continued diffusion of new drugs and biologics will have at least a modest impact on total costs for hospitals in fiscal year 2002. Stunning advances in molecular and genetic medicine have yielded innovative yet costly approaches to treating certain diseases. For example, drugs and biologics recently approved by the FDA include:

- platelet aggregation inhibitors to treat acute coronary syndrome (GP IIb/IIIa inhibitors);
- new antiarrhythmics;
- protease inhibitors to reduce perioperative blood loss in patients undergoing cardiopulmonary bypass;
- a quinolone derivative to treat intermittent claudication;
- an agent to treat acute deep-vein thrombosis;
- fibrin sealants that prevent or reduce bleeding from small blood vessels during and after surgery;

- an injectable sustained-release formulation to treat lymphomatous meningitis;
- a retinoid and a fusion protein to treat certain lymphomas;
- a genetically engineered protein that reduces symptoms of rheumatoid arthritis;
- a recombinant thrombin inhibitor to reverse anticoagulation associated with heparin-induced thrombocytopenia;
- a synthetic plasma expander to treat hypovolemia;
- a skin construct to treat venous leg ulcers;
- anti-infectives to treat certain bacterial infections, including those caused by gram-negative organisms and resistant strains;
- new cyclooxygenase-2 (cox-2) inhibitors for osteoarthritis and rheumatoid arthritis;
- an anticoagulant to prevent clot formation after surgery;
- antineoplastics for certain cancers;
- agents to reduce the side effects of some cancer therapies;
- new agents for surgical anesthesia and sedation;
- mitoxantrone, an approved cancer drug, for treatment of advanced or chronic multiple sclerosis; and
- verteporfin (injection) followed by laser treatment for age-related macular degeneration.

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## Devices and diagnostics

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New devices and diagnostics are a perpetual source of increased costs for hospitals. MedPAC believes that continued diffusion of advances in this

category will have a small impact on total hospital costs for fiscal year 2002. Some recent advancements include:

- biventricular pacing devices with implantable defibrillators for congestive heart failure;
- catheter-based devices that remove blood clots from occluded coronary arteries or bypass grafts;
- stents (liver, biliary, and lung);
- endovascular devices that reinforce aortic aneurysms;
- intravascular brachytherapy systems that administer radiation energy for treatment of in-stent restenosis;
- an electronic device to treat post-operative nausea;
- abdominal implant for treatment of chronic, intractable (drug-refractory) nausea and vomiting secondary to gastroparesis;
- biological sensors (continuous glucose monitoring system);
- drug delivery implants with and without biosensors that monitor drug or chemical concentrations in body fluids;
- a brain stem implant device for patients who experience total hearing loss when the removal of a tumor damages their cranial hearing nerves;
- robotics for minimally invasive surgery (robotic-enhanced endoscopic systems for arterial revascularization, three-dimensional video and robot-assisted port-access mitral valve operation, and robotic-enhanced laparoscopic surgery for gall bladder and reflux disease);
- microchip devices for various indications; for example, for restoring vision in patients with diseases of the retina;
- a fully automated blood testing system;

- immunoblot assay for hepatitis C virus;
- an ultrasonic scalpel or ultrasonically activated shears;
- handheld radioguided probes or detection devices to assist in certain surgeries; and
- a laser to treat pain caused by herniated or ruptured spinal discs.

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## Imaging technology

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Over the past several decades, tremendous quality-of-care enhancements have been achieved in the fields of radiology, imaging and nuclear medicine. In the next year, new imaging technology and additional applications of existing technologies including magnetic resonance imaging, positron emission tomography, ultrasound and computed tomography, will continue to increase costs for hospitals. MedPAC believes that diffusion of advances in these areas will have a small impact on total hospital costs in fiscal year 2002. Some recent advancements include:

- digital mammography and breast imaging devices (T-scan) to clarify ambiguous mammograms;
- mini-magnetic resonance devices to view internal body structures;
- handheld ultrasound devices;
- expanded uses for endoscopic ultrasonography;
- electron-beam computed tomography to detect blockages in arteries;
- functional anatomic mapping systems;
- positron emission tomography to diagnose certain cancers;

- radiosurgery devices that direct radiation to treat certain solid tumors; and
- new imaging agents to detect certain lung tumors and certain brain and spinal lesions.

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## Surgical/procedural techniques and other technological advances

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MedPAC anticipates that new surgical or procedural techniques will collectively result in a small increase in total hospital costs for fiscal year 2002. Some examples include:

- transmyocardial revascularization, a laser treatment that opens tiny channels in the heart muscle, increasing cardiac blood flow in patients with severe angina;
- laser angioplasty;
- minimally invasive and off-pump coronary artery bypass surgery;
- new and expanded transplantation procedures and techniques;
- intraclot recombinant tissue plasminogen activator for deep venous thrombosis of the extremities;
- photodynamic therapy for treatment of various tumors;
- hand-assisted laparoscopic surgery;
- radiofrequency ablation of unresectable hepatic malignancies;
- extracorporeal life support for cardiac and pulmonary failure;
- extracorporeal perfusion for the treatment of acute liver failure; and
- permanent sacral nerve stimulation for fecal incontinence.

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