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# Development of a Prospective Payment System for Hospital-Based Outpatient Care

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*The Ambulatory Patient Groups (APGs) are a patient classification system that was developed to be used as the basis of a prospective payment system (PPS) for the facility cost of outpatient care. This article will review the key characteristics of a patient classification system for ambulatory care, describe the APG development process, and describe a payment model based on the APGs. A PPS for outpatient care based on APGs requires numerous policy decisions to be made. The policy issues include the method of computing payment weights, the extent of ancillary packaging, the window of time for ancillary packaging, the extent of multiple procedure discounting and the outlier policy. Financial simulations of an APG based outpatient PPS were performed in order to evaluate the impact of alternative policy decisions. Recommendations are made relative to each policy issue and implementation issues are discussed.*

## Introduction

The OMNIBUS Budget Reconciliation Act (OBRA) of 1990 required the U.S. Health Care Financing Administration (HCFA) to design and evaluate a prospective payment system (PPS) for the facility cost of outpatient care. OBRA called for the evaluation of a PPS for all hospital outpatient services (e.g., same-day surgery units, emergency departments, outpatient clinics, etc.). The facility cost refers to the hospital cost for providing care (e.g., room charges, medical and surgical supplies, etc.) and excludes the physician's professional service.

During the period 1988-1990, HCFA funded the development of Version 1.0 of the Ambulatory Patient Groups (APGs) (Averill, Goldfield et al, 1994). The APGs are a patient classification system that was designed to be used as the basis of an outpatient PPS. Version 1.0 of the APGs was released in the spring of 1991. During the period 1991-1994, a number of payors, including state Medicaid agencies and Blue Cross and Blue Shield plans, began using APGs for outpatient payment (Vertrees, Pollatsek et al., 1994) Individual providers also began using APGs for internal management. The availability of improved data, the expanding use of APGs and the potential use of APGs as the basis of a Medicare outpatient PPS resulted in HCFA funding the development of Version 2.0 of the APGs. One of the objectives of the development of Version 2.0 was to simplify the APG system so that it could be more easily implemented as the

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basis of a Medicare outpatient PPS.

The research project to develop Version 2.0 of the APGs was initiated in 1992. The development of Version 2.0 of the APGs was performed by 3M Health Information Systems in close cooperation with HCFA. Version 2.0 of the APGs was completed and released in August 1995 (Goldfield, Averill, et al., 1997).

In March 1995, HCFA submitted a Report to the U.S. Congress recommending that the APGs or an APG-like patient classification system, be used as the basis of a Medicare Outpatient PPS. In August 1997, the U.S. Congress passed the Balanced Budget Act of 1997 which included the requirement that a Medicare Outpatient PPS be implemented beginning in January 1999.

This article will discuss the development of the APG patient classification system and its use in an outpatient PPS. Financial simulations of an APG-based PPS are presented and various policy alternatives are evaluated.

### **Characteristics of an Outpatient Patient Classification System**

Fundamental to the design of any Prospective Payment System (PPS) for ambulatory care is the selection of the basic unit of payment. The Medicare inpatient PPS uses the hospital admission as the basic unit of payment. The basic unit for ambulatory care is the visit, which represents a contact between the patient and a health care professional. The visit could be for a procedure, a medical evaluation, or an ancillary service such as a chest x-ray. For each type of visit a prospective price could be established that includes all routine services (e.g., blood tests, chest x-rays, etc.). If the cost of the routine services rendered during a visit were included in the payment for the visit, hospitals

would have the financial incentive to control the amount of services rendered.

An ambulatory patient classification system serves the same function as the Diagnosis Related Groups (DRGs) in the Medicare inpatient PPS. The patient classification system provides the basic product definition for the ambulatory setting and will have important secondary effects. For example, DRGs have brought about fundamental changes in management, communications, cost accounting and planning within hospitals. These changes have resulted in improved efficiency in the delivery of inpatient care. The benefits to hospital management that resulted from the adoption of DRGs would also be expected to occur in the ambulatory setting. Thus, the selection of an appropriate patient classification system is critical to the success of an outpatient PPS. An ambulatory patient classification system should have the following characteristics.

#### *Comprehensiveness*

The patient classification system must be able to describe every type of patient seen in an ambulatory setting. This includes medical patients, patients undergoing a procedure and patients who receive ancillary services only.

#### *Administrative Simplicity*

The patient classification system should be administratively straightforward to implement. The number of patient classes should be kept to a reasonable number. A patient classification system containing relatively few patient classes (e.g., fewer than the number of DRGs) will be more easily understood by providers and will ease the administrative burden on both facilities and payors. In addition, the data used to define the patient classes should be compatible with existing billing, data collection, coding, storage and processing

practices. Such compatibility will decrease implementation costs, data errors and other administrative problems.

### *Homogeneous Resource Use*

The amount and type of resources (e.g., operating room time, medical surgical supplies, etc.) used to treat patients in each patient class should be homogeneous. If resources used vary widely within a patient class, it would be difficult to develop equitable payment rates. If a facility treated a disproportionate share of either the expensive or inexpensive cases within a patient class, then the aggregate payments to that facility might not be appropriate. Further, the facility might be encouraged to treat only the less costly patients within the patient class causing a potential access problem for the complex cases. Thus, a homogeneous pattern of resource use is a critical characteristic of any patient classification system used in a PPS.

### *Clinical Meaningfulness*

The definition of each patient class should be clinically meaningful. For example, a patient class involving a procedure should, in general, contain only procedures on the same body system, which are of the same degree of extensiveness and which utilize the same method (e.g., surgical, endoscopic, percutaneous, etc.). The underlying assumption in a PPS is that hospitals will respond to the financial incentives in the system and become more efficient. Clinical meaningfulness is critical because in order to respond effectively, hospitals must communicate the incentives to their medical staffs. A clinically meaningful patient classification system will be more readily accepted by providers and will be more useful as a communication and management tool.

### *Minimal Upcoding and Code Fragmentation*

In the patient classification system, there should be minimal opportunities for providers to assign a patient to a higher paying class through upcoding. A patient classification system with many classes that are based on subtle distinctions is susceptible to upcoding. In general, the patient classes should be as broad and inclusive as possible without sacrificing resource homogeneity or clinical meaningfulness. In addition, there should be minimal opportunities for increasing payment by separately reporting the constituent parts of a procedure.

### *Flexibility*

In a visit based payment system, there is a wide array of options in terms of which ancillary services should be included in the visit payment. The extent to which ancillary services are included in the visit payment is a policy decision. The patient classification system must be flexible enough to accommodate a full range of options for incorporating ancillary services into the visit payment. In addition, the patient classification system should be structured to allow changes in technology and practice patterns to be easily incorporated. This system should provide a flexible framework that can adapt to such change without requiring a major restructuring of the classification system.

Because of the fundamental role that the patient classification system plays in a PPS, it is essential that the patient classification system possess substantially all of the above characteristics.

### **Overview of APGs**

APGs are designed to explain the amount and type of resources used in an ambulatory visit. Ambulatory resources

include pharmaceuticals, supplies, ancillary tests, type of equipment needed, type of room needed, treatment time, etc. Patients in each APG have similar clinical characteristics, resource use, and costs. Similar resource use means that the resources used are relatively constant across all patients within each APG. However, some variation in resource use will remain among the patients in each APG. In other words, the definition of the APG is not so specific that every patient included in the same APG is identical, but rather the level of variation in patient resource use is known and predictable. Thus, although the precise resource use of a particular patient cannot be predicted by knowing the APG of the patient, the average pattern of resource use of a group of patients in an APG can be accurately predicted.

Patients in each APG also have similar clinical characteristics. Similar clinical characteristics mean that the patient characteristics included in the definition of the APG should relate to a common organ system or etiology and that a specific medical specialty should typically provide care to the patients in the APG. In addition, all available patient characteristics that consistently affect resource use should be included in the definition of the APGs. For example, patients with diabetes may or may not have ketoacidosis. Although these patients are the same from organ system, etiology and medical specialist perspectives, the APGs will assign these patients to different patient classes, because the presence of ketoacidosis consistently increases the resource use of diabetic patients. On the other hand, sets of unrelated surgical procedures should not be used to define an APG because there is no medical rationale to substantiate that resource use would be expected to be similar.

The definition of similar clinical characteristics is, of course, dependent on the goal of the classification system. For APGs, the definition of clinical similarity relates to the medical rationale for differences in resource use. If, on the other hand, the classification goal was related to patient prognosis, then the definition of patient characteristics that were clinically similar might be different. The requirement that APGs be clinically homogeneous caused more patient classes to be formed than is necessary for explaining resource use alone. For example, patients with a dilation and curettage or a simple hemorrhoid procedure are quite similar in terms of most measures of resource use. However, different organ systems and different medical specialties are involved. Thus, the requirement that APGs have similar clinical characteristics precludes the possibility of these types of patients being in the same APG.

APGs were developed to encompass the full range of ambulatory settings including same day surgery units, hospital emergency rooms, and outpatient clinics. APGs, however, do not address phone contacts, home visits, nursing home services or inpatient services. Data from several sources, including hospital outpatient departments and ambulatory surgical centers, were used in developing the APGs. However, better cost data from nonhospital sites are needed in order to determine if there are any problems with applying APGs to nonhospital sites.

Although the anticipated initial application of APGs focuses on Medicare patients, APGs were developed to represent ambulatory patients across the entire patient population. For example, APGs relating to pregnancy were developed even though pregnancy is not often encountered in the Medicare population.

APGs were developed to differentiate facility costs and not professional costs. However, professional costs relate primarily to professional time and, therefore, directly relate to facility time. Professional time can serve as a proxy for the amount of time a patient used the resources of the facility. During the development of APGs, facility costs such as supplies and equipment as well as professional time were taken into consideration.

The data elements used to define APGs were limited to the information routinely collected on the Medicare claim form and consisted of the diagnoses coded in International Classification of Diagnoses 9th Revision Clinical Modifications (ICD-9-CM) and procedures coded in Current Procedural Terminology Fourth Edition (CPT-4). The patient characteristics used in the definition of the APGs were restricted to those readily available in order to insure that the APGs could be readily implemented.

### **Selection of the Initial Classification Variable**

The first step in developing a patient classification system is to choose the initial classification variable. In the DRGs, the principal diagnosis is used to classify patients into a set of mutually exclusive Major Diagnostic Categories (MDCs). Within each MDC, procedure, age and complication and comorbidities are used to complete the DRG classification system. APGs use procedure instead of diagnosis as the initial classification variable. The decision to do so was based on the following considerations:

- When a significant procedure is performed in an ambulatory setting, it is normally the reason for the visit. The procedure will normally be scheduled in advance and will consume the vast

majority of resources associated with the visit.

- With procedure as the initial classification variable, each procedure will be assigned to only one APG. With principal diagnosis as the initial classification variable, the same procedure could be assigned to many different APGs depending on the principal diagnosis. Having each procedure in only one APG also reduces the number of APGs and simplifies the establishment of prospective prices.

Once the decision to use procedure as the initial classification variable was made, it was then necessary to partition all procedures into a set of mutually exclusive and exhaustive procedure groups. The first step in the process was to identify all procedures that could be done only on an inpatient basis. An inpatient procedure was defined as a procedure that requires at least 24 hours of post operative recovery time or monitoring before a patient can be safely discharged. Some procedures, such as craniotomies, are clearly inpatient procedures. However, there are other procedures such as the treatment of an open fracture that are normally done on an inpatient basis but can sometimes be done on an ambulatory basis. Further, patients with the same CPT-4 procedure code can have a great deal of variation in the complexity of the procedure performed. For example, the treatment of an open humeral fracture can vary considerably in complexity.

Only the simplest cases of procedures normally done on an inpatient basis are done on an ambulatory basis. Thus, an open humeral fracture treated on an ambulatory basis will have minimal bone displacement and tissue damage. Such procedures are included in the APG procedure classification. When grouping procedures together to form homogeneous

subclasses, it is important to recognize the variations of severity within a CPT-4 code and that only the simplest cases of complex procedures are treated in an ambulatory setting.

The procedures which could be performed on an ambulatory basis were then assigned to one of the following two classes:

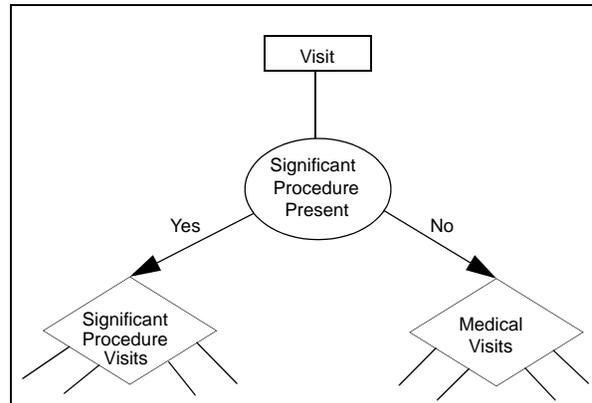
### *Significant Procedure*

This is a procedure that is normally scheduled, constitutes the reason for the visit and dominates the time and resources expended during the visit. (e.g., the excision of a skin lesion). Significant procedures range in scope from debridement of nails to pacemaker replacements as well as significant tests, such as a stress test.

### *Ancillary Services*

The term ancillary services is used to refer to both ancillary tests and ancillary procedures. An ancillary test is one that is ordered by the primary physician to assist in patient diagnosis or treatment. Radiology, laboratory and pathology constitute ancillary tests. An ancillary procedure is a procedure that increases but does not dominate the time and resources expended during a visit, Examples of ancillary procedures are immunizations, or the insertion of an intrauterine device (IUD).

Only patients with a significant procedure were assigned to significant procedure APGs. All medical services provided to the patient were assumed to be an integral part of the procedure. Patients who received medical treatment but who had no significant procedures performed were assigned to Medical APGs. Examples of medical treatments which do not involve a significant procedure include treatment for poisoning, neonatal care, and well care.



**Figure 1** Initial APG Partition Based on the Presence of a Significant Procedure

Figure 1 illustrates the APG partition based on services rendered or procedures performed. Patients who undergo a significant procedure are assigned to a significant procedure APG. For example, a patient who had a simple skin excision performed to remove a skin lesion would be placed in a significant procedure APG based on the CPT-4 code which describes the precise procedure. Patients receiving medical treatment which does not involve a significant procedure, were assigned to medical APGs. A patient who visited a physician to have a skin lesion evaluated and had no significant procedures performed would be assigned to a medical APG based on the ICD-9-CM diagnosis code. A patient who neither received medical treatment nor underwent a significant procedure, but had an ancillary service performed would be assigned to only an ancillary service APG.

### **Development of Significant Procedure APGs**

Significant ambulatory procedures are subdivided into groups of CPT-4 codes based on the body system associated with the procedure:

- Integumentary System
- Musculoskeletal System

- Respiratory System
- Cardiovascular System
- Hematologic, Lymphatic and Endocrine
- Digestive
- Urinary System
- Male Genital System
- Female Genital System
- Nervous System
- Eye and Ocular Adnexa
- Facial, Ear, Nose, Mouth and Throat
- Therapeutic and Other Significant Radiological Procedures
- Physical Medicine and Rehabilitation
- Mental Illness and Substance Abuse Therapies

Body systems were formed as the first step toward ensuring that the procedures in each APG were clinically similar. The significant procedures in each body system generally correspond to a single organ system and are associated with a particular medical specialty. The body systems used in the procedure APGs are similar to the Major Diagnostic Categories (MDCs) for the DRGs. However, there are some significant differences. For example, the body system for skin and subcutaneous tissue includes muscle, whereas muscle is in the musculoskeletal MDC. Muscle was included in the skin and subcutaneous tissue body system because most procedures involving the fascia (connective tissue) are clinically similar to dermal procedures and have similar patterns of resource use. If fascia or muscle procedures were included within the bone and joint body system then it would have been necessary to form separate APGs for muscle procedures. Thus, the inclusion of muscle in the skin and subcutaneous tissue body system reduced the overall number of APGs. Further, there are MDCs for etiologies such as infectious diseases, for which there are no corresponding body system in the significant procedure APGs.

Some body systems had few procedures performed on an ambulatory basis. For example, except for biopsies or excisions of the thyroid, there are no endocrine procedures performed on an ambulatory basis. Thyroid procedures were included with lymph node biopsies and excisions because they are clinically quite similar.

Once each significant procedure was assigned to a body system, the procedures in each body system were subdivided into clinically similar classes. The classification variables considered in the formation of the procedure classes are shown in Table 1. In general, method was used as the primary classification variable. Different methods such as surgery, endoscopy, manipulation, dilation, catheterization, laser and needle often require different types of rooms, equipment and supplies as well as different amounts of time. For example, procedures in the respiratory body system were initially divided by method into endoscopic, needle or catheter and noninvasive test subgroups. On the other hand, most male reproductive procedures are surgical; therefore, the male reproductive body system was initially subdivided on site and not method. Surgical procedures were usually subdivided based on type (i.e., incision, excision, or repair). The time required to perform a procedure depends on the type of procedure, with repairs generally taking the most time. Thus, surgical skin procedures were divided into separate incision, excision and repair groups. Endoscopic procedures were often divided into separate classes depending on purpose (i.e., diagnostic or therapeutic). Therapeutic endoscopic procedures generally require more time. The extent of a procedure was often taken into consideration. Thus, skin excisions of 2 cm and 20 cm are assigned to different APGs.

Variable	Example
Site	Face, Hand, etc.
Extent	Excision Size: 2 cm Versus 20 cm
Purpose	Diagnostic or Therapeutic
Type	Incision, Excision or Repair
Method	Surgical, Endoscopic, etc.
Device	Insertion or Removal
Medical Specialty	Urology, Gynecology, etc.
Complexity	Time Needed to Perform Procedure

**Table 1:** Classification Variables Considered in the Development of the Significant Procedure APGs

Another aspect of extent is the complexity of the procedure. Complexity basically refers to the amount of time normally required to perform a procedure. For example, the excision of a pressure ulcer will generally require more time than the excision of a skin lesion. Thus, the excision of the pressure ulcer was viewed as more complex, and therefore, assigned to a different APG. Anatomical site (e.g., face, hand, etc.) within a body system was used in order to ensure clinical similarity (e.g., procedures of the external ear versus the internal ear), and was also used to implicitly reflect complexity (e.g., treatment of a closed fracture of a finger is usually less complex than treatment of a closed fracture of other sites).

If a procedure involved the insertion of a device (e.g., neurostimulator), then a separate APG was formed in order to recognize the cost of the device. Medical specialty was never explicitly used in the significant procedure APG formation, but procedures normally done by different medical specialties were usually put in different APGs.

### Development of Medical APGs

Medical APGs describe patients who receive medical treatment but do not have a significant procedure performed during the visit. The fact that a patient had a specific significant procedure performed pro-

vides a great deal of precise information regarding the amount and type of resources typically used during the visit. Patients without a significant procedure (i.e., medical patients) can use a wide range of resources depending on the condition of the patient at the time of the visit. Medical patients can be described using the diagnoses of the patient coded in ICD-9-CM which allows both specific diseases (e.g., pneumonia) as well as signs, symptoms and findings (SSFs) (e.g., chest pain, melena, elevated sedimentation rate, etc.) to be coded. The term “diagnosis” will be used to refer generically to SSFs and diseases. The standard Medicare claims form and the ICD-9-CM ambulatory coding guidelines require that the diagnosis that was the primary reason for the visit be indicated. Further, any additional diagnoses that are present may be listed on the claim as secondary diagnoses. The primary variable used to form the medical APGs is the diagnosis coded as the reason for the visit. The reason for the visit is the primary determinant of the resources used (e.g., time, tests ordered, etc.) during the visit. Thus, the medical APGs are based on the type of patient being treated.

The treatment of a medical patient is often highly influenced by the SSFs present at the time of the visit. In general, the coding of a disease simply indicates that the disease was present but gives no indication of how extensive or severe the disease was at the time of the visit. The coding of SSFs in addition to the underlying disease provides some indication of the extensiveness of the disease. The use of SSFs in the definition of the medical APGs was difficult because of the following limitations in the ICD-9-CM codes for SSFs:

- Many of the ICD-9-CM codes for SSFs are not precise. For example, abdominal

rigidity (code 7894) has no precise clinical definition.

- There are a large number of SSF codes that refer to abnormal laboratory results that are imprecise. For example, a diagnosis of hypokalemia does not convey useful information because the range of potassium levels associated with hypokalemia can vary significantly in terms of clinical significance.

In addition to the imprecision of many of the SSF codes, the use of SSFs as a primary variable in the medical APGs could create opportunities for upcoding. If the APGs for SSFs had a high payment weight then there would be a financial motivation to code the SSFs instead of the underlying disease. The fact that the ICD-9-CM coding rules allow only nonroutine SSFs to be coded also limited the applicability of SSFs in the definition of the medical APGs. As a result of the problems associated with SSFs, the SSFs used in the definition of the medical APGs were restricted to SSFs with the following characteristics:

- SSFs with a relatively precise clinical meaning
- SSFs that were significant enough not to be a routine part of most diseases
- SSFs that were significant enough to tend to dominate the resources used during the visit. Thus, upcoding is not an issue because assignment to the SSF APG is appropriate irrespective of the underlying disease.

A single major SSF APG for medical patients was formed. Examples of SSFs included in the major SSF APG are meningismus and gangrene. In addition to the SSF codes, there were also ICD-9-CM codes included in the major SSF APG that specify both the underlying disease and the SSF (e.g., diabetic ketoacidosis). A patient is assigned to the major SSF APG

whether the major SSF is coded as the reason for the visit or as a secondary diagnosis. The major SSF APG identifies the medical patients with extensive diseases who are usually treated in emergency rooms and who require significant amounts of resources. Patients who have non-major SSFs coded as the reason for the visit, are assigned to the medical APG that is usually associated with the SSF (e.g., cough is assigned to the upper respiratory infection APG).

After patients who had a major SSF were assigned to a separate APG, the medical APGs were formed on the basis of the ICD-9-CM diagnosis code that was the reason for the visit. Thus, all possible ICD-9-CM diagnoses were divided into a set of mutually exclusive and clinically similar classes. The classification variables considered in the formation of the medical classes are shown in Table 2.

Variable	Example
Etiology	Trauma, Malignancy, etc.
Body System	Respiratory, Digestive, etc.
Type of Disease	Acute or Chronic
Medical Specialty	Ophthalmology, Gynecology, etc.
Patient Age	Pediatric, Adult, etc.
Patient Type	New or Old
Complexity	Time Needed to Treat the Patient

**Table 2:** Classification Variables Considered in the Development of the Medical APGs

The initial variable used to form the medical APGs was the etiology of the diagnosis that was the reason for the visit:

- Well Care & Administrative
- Trauma
- Infections
- Pregnancy
- Malignancy
- Poisoning
- Neonate
- Other

As a first step in the formulation of the medical APGs, each ICD-9-CM diagnosis code was assigned to one of the etiology subgroups. Malignancies and trauma were assigned to separate subgroups because

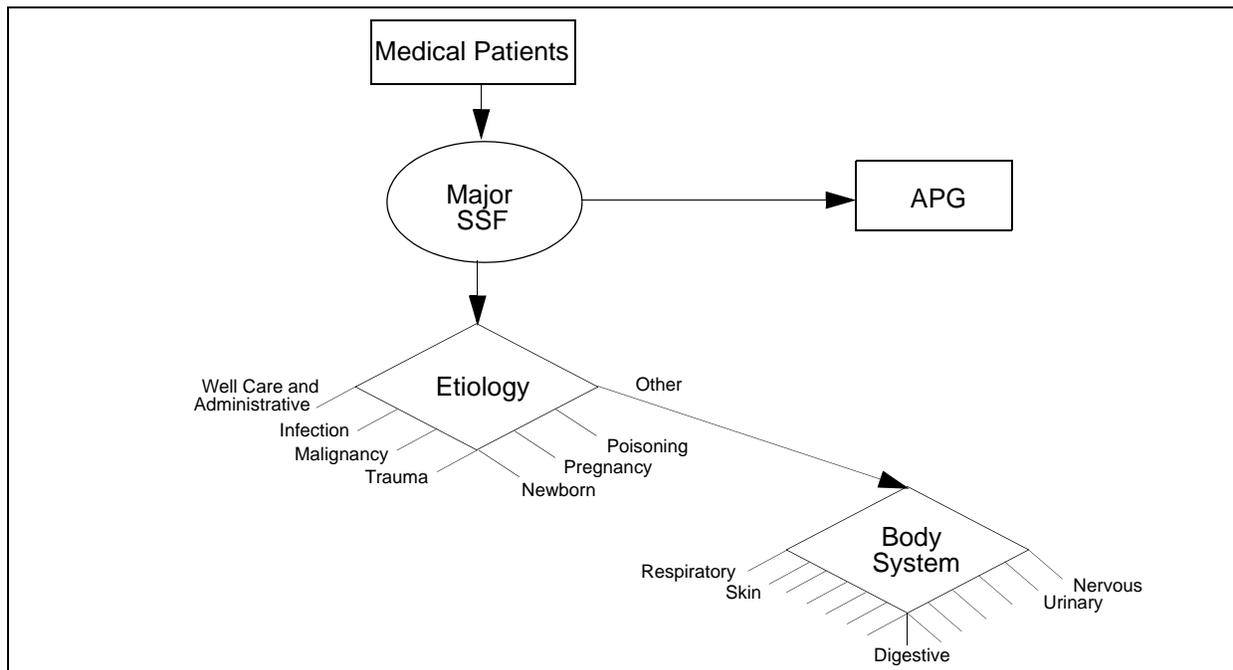
they had unique resources associated with the care provided (e.g., frequent radiology and laboratory services). The body system group encompasses a broad spectrum of diseases from acute diseases such as pneumonia to chronic diseases such as hypertension. The “other” group was then divided into subgroups based on the specific body system of the diagnosis that was the reason for the visit:

- Malignancy
- Poisoning
- Trauma
- Neonate
- Pregnancy
- Infectious Diseases
- Nervous System Diseases
- Eye Diseases
- Ear, Nose, Mouth and Throat Diseases
- Respiratory System Diseases
- Cardiovascular System Diseases
- Digestive System Diseases
- Major Signs, Symptoms and Findings
- Musculoskeletal Diseases

- Skin and Breast Diseases
- Endocrine, Nutritional and Metabolic Diseases
- Kidney and Urinary Tract Diseases
- Male Genital System Diseases
- Female Genital System Diseases
- Immunologic and Hematologic Diseases

The initial subdivision of the medical APGs is shown in Figure 2. Once all the subclasses based on the etiology and the body system were formed, then the other classification variables in Table 2 were used to further subdivide each etiology and body system.

Whether a diagnosis was acute or chronic was not explicitly used in the formation of the medical APGs. There are medical APGs that contain only diagnoses that are acute or chronic, but a medical APG was never formed for the explicit purpose of identifying acute or chronic diseases. Medical specialty was never explicitly used in the medical APG formation, but diseases normally treated by dif-



**Figure 2** Initial Medical APG Logic

ferent medical specialties were usually put in different APGs. Age was not used in the definition of medical APGs.

Whether a patient was a new patient or an old patient was considered as a possible variable in the formation of the medical APGs. However, the new patient old patient distinction was not used for the following reasons:

- There is difficulty in establishing a precise definition of a new patient. New can refer to either the physician or the facility. Thus, a patient may be considered new only the first time the patient is treated as an outpatient at the hospital. Alternatively, the patient may be considered new for each visit in which the patient is treated by a different physician. From a resource use perspective, the presence of new diagnoses or problems is often just as important as whether the patient is new to the facility or physician. The only definition of new that is not prone to upcoding is new to the facility.
- The impact on resources of whether a patient is a new patient varies by setting. For emergency room and same-day surgery units, the fact that the patient is new has little impact on resource use. For an outpatient clinic a new patient often utilizes more resources.
- To the extent that there are follow-up visits for a patient, they typically occur at the same facility as the initial visit. These lower cost visits balance out the often more costly initial visit.
- The designation of whether a patient is a new or old patient is not present on the Medicare UB-92 claim form. Thus, a change in reporting requirements would have been necessary.

Patient complexity basically refers to the amount of time and tests normally required to treat a patient. In a visit based

payment system, visit time is an important determinant of facility fixed cost because it directly affects both the number of visits that can be provided and the amount of overhead costs that are allocated to each visit. In forming the medical APGs, visit time was considered an important factor in the determination of resource use and the associated facility cost. Thus, separate medical APGs were formed to recognize differences in visit time. For example, a visit for a skin malignancy normally takes considerably less time than a visit for a hematological malignancy.

The final issue that was considered in the formation of the medical APGs was the amount and type of ancillary services that are typically provided to a patient. Because the cost of some ancillary services would be included in the base visit payment, patients with different profiles of ancillary service use needed to be in different APGs.

### **Development of Ancillary Service APGs**

Ancillary services refer to ancillary tests (i.e., laboratory, radiology and pathology) and ancillary procedures (e.g., immunization, anesthesia, insertion of an IUD, etc.). Ancillary APGs were formed for each type of ancillary service.

#### *Laboratory*

The laboratory department in which the laboratory test is typically performed was used as the primary variable in the formation of the laboratory APGs. Thus, tests performed by the different laboratory departments (e.g., hematology, microbiology, toxicology, etc.) were assigned to different APGs. The testing method (e.g., radioimmunoassay) was used to a limited extent when the method represented a substantially different type of test with relatively clear indication for usage. However, in general, different methods of performing

the same test were placed in the same APG. A laboratory technician will typically employ different methods depending on the precision of result that is needed. However, different methods are also employed depending on the training of the laboratory professional. For example, although there is a clear difference between a fluorimetric versus chromatographic method in the determination of the calcium level, there frequently are not precise indications on when to do one versus the other. As a consequence, the different methods for performing the same test were usually assigned to the same APG. The same type of laboratory test (e.g., chemistry) was sometimes differentiated by the source of specimen (e.g., blood versus urine) in order to account for the labor cost of collecting and transporting the specimen. Finally, the same type of laboratory test was usually differentiated based on the complexity of the test. Tests that required more time, technicians with greater skill levels or expensive equipment were assigned to different APGs. For example, multichannel chemistry tests were assigned to a separate APG from other chemistry tests because of the cost of the equipment used to perform a multichannel chemistry test. Laboratory tests that required no equipment and are typically performed during a visit (e.g., blood or urine dipstick tests) were assigned to a single APG as a result of their very low level of complexity. During the development of the laboratory APGs, physicians who either headed or worked in hospital laboratory departments and technicians who perform the tests were consulted. In addition, the laboratory relative value units (RVUs) developed by the College of American Pathologists were utilized.

### *Radiology*

The type of equipment (magnetic reso-

nance imaging [MRI], computerized assisted tomography [CAT], plain film, etc.) was the primary classification variable for the radiology APGs because the cost of the radiology equipment varies considerably across the different types of radiological procedures. Nuclear medicine was separated into diagnostic and therapeutic groups. Five of the radiological APGs were considered significant procedures. These radiological APGs were interventional and met the definition of a significant procedure.

### *Pathology*

Pathology was divided into two APGs based on the complexity of the pathology test. Pathology tests requiring more time or greater skill levels were assigned to the complex pathology APG. In addition, pap smears were assigned to a separate APG.

### *Anesthesia APG*

All of anesthesiology was assigned to a single APG. The APG payment system includes the cost of anesthesia in the payment for a significant procedure. The CPT-4 codes do not differentiate between general and local anesthesia and it was therefore not possible to create separate general and local anesthesia APGs. However, the procedures in each significant procedure APG typically have the same type of anesthesia administered. Thus, the absence of a differentiation on the type of anesthesia did not present a problem.

### *Ancillary Tests and Procedures*

Other ancillary tests include electrocardiograms, other minor cardiac and vascular tests and pulmonary function tests. Ancillary procedures are procedures that do not dominate the time and resources expended during a visit, but do increase the time and resources expended during a visit. Thus, ancillary procedures can be performed as part of a medical visit and do

increase the cost of the medical visit. Ancillary procedures include immunizations, introduction of needles and catheters, biofeedback, infusion therapy, tube changes, minor reproductive procedures and minor ophthalmological procedures. Immunizations were divided into three APGs based primarily on the cost of the vaccine (e.g., rabies vaccination is considered a complex immunization).

### *Chemotherapy*

There are two significant procedure APGs for chemotherapy that are based on the route of administration of the chemotherapy (i.e., intravenous push versus continuous infusion). These two significant procedure APGs reflect the difference in supplies and the labor cost of monitoring the administration of the chemotherapy drug. There is a second major cost component associated with chemotherapy and that is the cost of the chemotherapy drug. Chemotherapy drug costs can vary considerably and, therefore, five additional chemotherapy APGs were formed to reflect the costs of chemotherapy drugs. Thus, the payment for a chemotherapy visit is composed of two APGs, one for the route of administration and one for the chemotherapy drug.

### **Summary of Development**

The process of formulating the APGs was highly iterative, involving statistical results from historical data combined with clinical judgment. A preliminary classification was developed based solely on clinical judgment. The preliminary classification was then evaluated using several databases including both Medicare and non-Medicare patients and contact time between provider and patient as well as charge data. The databases used in the development of Version 1.0 of the APGs were as follows:

- 1987 Part B Medicare annual data consisting of summary charges by CPT-4 code.
- 1987 Medicare outpatient sample consisting of a 5 percent outpatient sample containing 232,827 procedure claims.
- 1988 Medicare outpatient data containing all Medicare hospital outpatients with a date of service from the last two weeks of October 1988 totalling 1.6 million outpatient claims.
- 1988 New York State data containing approximately 400,000 claims from New York hospitals and community health centers including contact time between provider and patient.
- 1985 National Ambulatory Care Survey Data consisting of 72,000 visits drawn from 2,789 office-based physicians that included contact time between provider and patient.
- U.S. Army Ambulatory Care data base consisting of 516,006 visits to army hospitals and clinics that included contact time between provider and patient.
- Relative Value Scales including Relative Values for Physicians (Relative Value Studies, Inc., 1984) and the Resource Based Relative Value Scale (RBRVS) (Hsaio et al, 1988).

The database used in the development of Version 2.0 of the APGs was the HCFA Common Working File (CWF). The CWF is a comprehensive file of all services rendered to Medicare beneficiaries. An extract from the CWF of all visits to hospital outpatient departments during the first three months of 1992 was obtained. The 1992 data from the CWF contained 14,883,101 claims. All claims for the same patient, for the same provider, on the same day were collapsed together into a single claim. The collapsing of claims reduced the CWF database from 14,883,101 claims to 14,513,354 claims.

The 14,513,354 claims were then evaluated for ambiguities in the identification of claims as a single visit and edited for the presence of errors. After eliminating claims with errors and claims with unreasonable charges or cost values, there were 11,412,738 claims in the CWF database.

The preliminary APG patient classes formed, based on clinical judgement, were evaluated using reports that displayed aggregate frequency and charge statistics as well as available RVU scales. For each CPT-4 code within an APG, the report for significant procedure and ancillary service APGs displayed the count, mean charge and standard deviation of charges from each data base as well as the available RVU scales. Using this report, the CPT-4 codes that comprise each APG were evaluated across all data bases and RVU scales simultaneously. The evaluation looked for consistency of average charges across the CPT-4 codes within an APG across all the data bases as well as for consistency across the available RVU scales. For each ICD-9-CM diagnosis code, the report for the medical APGs displayed the summary statistics for charges and visit time. The evaluation of the medical APGs looked for consistency of average charges and visit time across the ICD-9-CM codes within an APG across all the data bases. As the APGs were being formed, the definitions were circulated to clinical consultants for comments on clinical appropriateness. Nearly 100 professionals throughout the country commented and consulted on the construction of the APGs. This process of defining APGs and reviewing them both clinically and with the data was repeated numerous times. The overall objective of the process was to have clinically similar groups of patients with similar resource use but to achieve these objectives with as

few APGs as possible.

During the formation of DRGs, charge data was, in general, found to reflect the relative needs of patients. The number of bed-days and ancillary services consumed by inpatients depended on their needs. However, hospital ambulatory charges are also highly influenced by physician charges. A great deal of effort has been expended in the development of RVUs, such as the RBRVS developed for physician payment. RVU systems have been widely used for many years. Ambulatory charges for a procedure do not necessarily reflect the actual needs or complexity of an individual patient but are often based on the established RVU for the procedure. As a consequence, statistical results from charge data often simply reflect the established RVU scales. Although charge data were used extensively in the APG development, it was necessary for the clinical team to make judgments on whether observed hospital charge differences across different procedures reflect real differences in the resources required to perform the procedure or any bias in the established RVU scales.

For example, there are different CPT-4 codes for excisions of benign and malignant skin lesions. RVU and charge data implied that excisions of malignant skin lesions of the same site and size used significantly more resources than benign skin lesions. However, the histology of the lesion is often not known at the time of the procedure, but is established when a pathology report is returned. Further, the excision of a malignant and benign skin lesion of the same site and size is fundamentally the same procedure except that a wider margin is excised for lesions that are suspected to be malignant. Thus, the significant procedure APGs do not differentiate between malignant and benign skin

excisions. In addition, procedure APGs avoid assigning procedures to different APGs based on subtle or easily gameable distinctions in the CPT-4 codes. For example, deep and superficial muscle biopsies are in the same APG because the distinction between deep and superficial lacks a precise definition in the CPT-4 system.

The development of the APGs required a balance between the number of APGs, clinical consistency and homogeneity in charges and visit time. Clinical consistency was required in order for any procedures or diagnoses to be grouped into an APG. However, in general, APGs were not formed solely on clinical grounds. Verification of consistent differences in charges or visit time was required in order to form an APG. In general, infrequent APGs were not formed unless there was strong clinical justification and a large charge difference. For example, pacemaker replacements are infrequent on an outpatient basis, but pacemaker replacements do represent a clinically distinct group of patients with a very high cost. Thus, a pacemaker replacement APG was formed. The end result of the process of forming the APGs is a clinically consistent group of patient classes that are homogeneous in terms of resource use.

The development of Version 2.0 of the APGs involved a complete reevaluation of the Version 1.0 APG definitions. The decision to make any APG Version 2.0 modifications was based on a combination of clinical judgement and the results from the review of the CWF data. Decisions on specific Version 2.0 modifications were made in the following manner.

- Project medical staff, in conjunction with HCFA staff, made an initial assessment of the clinical meaningfulness of any potential APG modification. Potential APG modifications that are clinically

unreasonable often occur when reviewing statistical data on the average charges or cost of individual CPT-4 procedure or ICD-9-CM diagnosis codes. An individual code with a relatively low frequency of occurrence can sometimes appear to be in the wrong APG based on historical data. Statistical results that had no clinical rationale were not used as the basis of APG modifications. In general, potential APG modifications that were clinically unreasonable were not given further consideration. However, if the procedure or diagnosis in question occurred with a high frequency, additional confirmation was obtained from experts in the specialty area.

- If, in the judgement of the project medical staff and HCFA staff, there was any possible clinical merit to a potential APG modification, then the modification was reviewed with either the internal clinical consultants or outside experts in the specialty area of the modification. A wide cross section of outside experts were consulted during the development of Version 2.0 of the APGs. The purpose of the review was to provide additional clinical confirmation for APG modifications. While this was not a formal consensus panel process, every attempt was made to have all APG modifications clinically confirmed by outside experts.
- Any supporting data for the APG modifications was also reviewed. The supporting data that was evaluated included the historical cost or charges, relative values if available, the amount and type of packaged ancillaries, the overall frequency of occurrences and the frequency of treatment in the emergency room. The coding implications of any APG modification were also taken into consideration.
- All APG modifications were developed

in close collaboration with HCFA staff. Frequent meetings and briefings were held with members of the research, operations, coding and policy staffs at HCFA. Operational and policy implications of any APG modifications were discussed and evaluated with HCFA staff. The final decision on all APG modifications represents a consensus between the project staff and HCFA staff.

Version 2.0 of the APGs has 282 APGs plus 8 error APGs, whereas Version 1.0 of the APGs had 298 APGs plus one error APG. Table 3 contains the number of APGs by the different APG types. While the total number of APGs is relatively similar, the vast majority of APGs had some significant modifications. Appendix A contains a complete list of the Version 2.0 APGs.

Figure 3 provides an overview of the APG Version 2.0 assignment logic. Patients with any significant procedures or therapies are assigned to one or more significant procedure APGs. If there are no significant procedures present and there is a medical visit indicator, the patient is assigned to a medical APG. If there is nei-

ther a significant procedure nor a medical visit indicator present, but there are ancillary tests or procedures present, then the patient is only assigned one or more ancillary APGs. If there is no significant procedure, medical visit indicator or ancillary services present, the claim is considered an error.

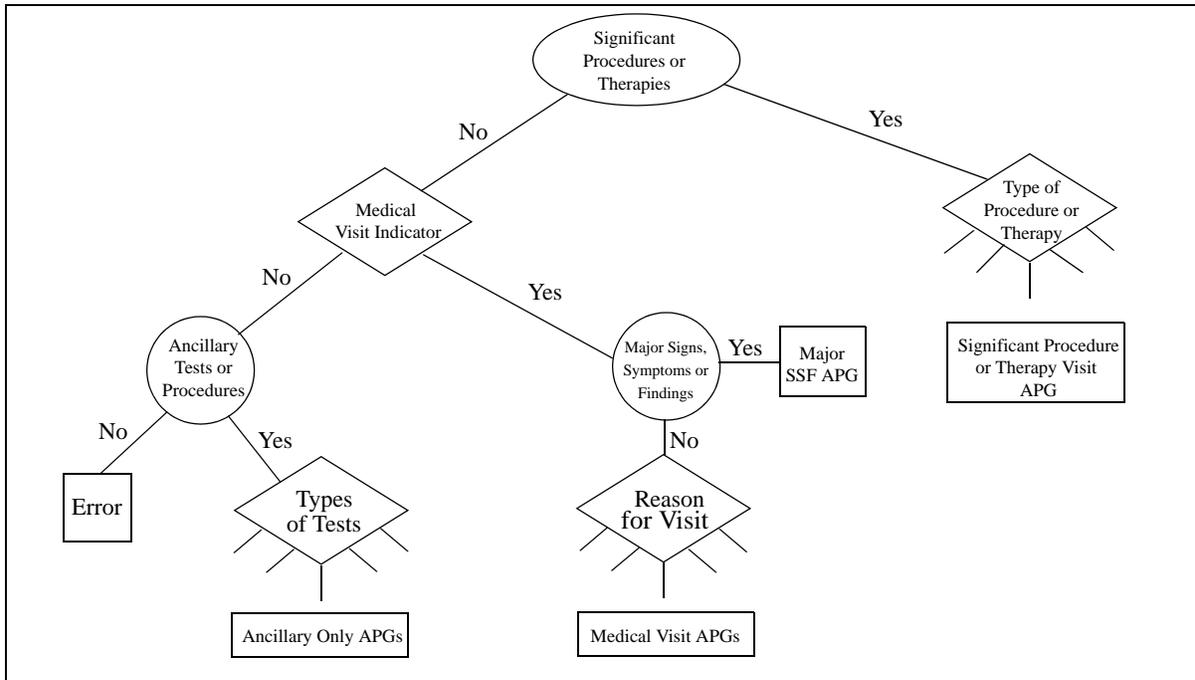
The APGs describe the complete range of services provided in the outpatient setting. The APGs can form the basic building blocks for the development of a visit-based outpatient prospective system and can provide a flexible structure for configuring a payment system to meet specific policy objectives.

### The APG Payment System

In the APG payment system a patient is described by a list of APGs that correspond to each service provided to the patient. The assignment of multiple APGs to a patient is in contrast with the DRG system that always assigns an inpatient to a single DRG. If a patient has multiple procedures then the DRGs use a procedure hierarchy to select the most appropriate DRG. The DRG payment includes the cost

APG Type	Version 1.0	Version 2.0
Significant procedure	145	126
Radiological significant procedure	0	5
Mental health and substance abuse significant procedure	0	8
Medical	80	83
Laboratory	23	20
Ancillary radiology	20	11
Pathology	2	3
Anesthesia	1	1
Ancillary tests and procedures	15	18
Chemotherapy	3	5
Incidental	8	2
Admitted or died	1	0
Error	1	8
Total	299	290

**Table 3:** Number of APGs by APG type



**Figure 3** Overview of APG assignment logic

of all ancillary services provided to the patient. In the outpatient setting, the diversity of sites of service (i.e., same day surgery units, emergency rooms and outpatient clinics), the wide variation in the reasons patients require outpatient care (e.g., well care to critical trauma care) and the high percentage of cost associated with ancillary services (i.e., the cost of ancillary services can often exceed the cost of the base visit) necessitates a patient classification scheme that can closely reflect the services rendered to the patient. The APGs address the diversity within the outpatient setting by assigning patients to multiple APGs when needed. For example, if a patient had two procedures performed plus a chest x-ray and a blood test, then there would be four APGs assigned to the patient (i.e., one APG for each procedure plus the APGs for the chest x-ray and the blood test). In a PPS, each APG would have a standard payment rate, and the payment for a patient could be computed by summing the pay-

ment rates across all the APGs assigned to the patient. However, in order to provide incentives for efficiency and to minimize opportunities for upcoding of APGs, not all the APGs assigned to a patient are used in the computation of the payment. The APG system uses two techniques for grouping different services provided into a single payment unit: ancillary packaging and multiple significant procedure and ancillary discounting.

### *Ancillary Packaging*

A patient with a significant procedure or a medical visit may have ancillary services performed as part of the visit. Ancillary packaging refers to the inclusion of certain ancillary services into the APG payment rate for a significant procedure or medical visit. For example, a chest x-ray is packaged into the payment for a pneumonia visit. The packaging of ancillaries does not imply that there would be no payment associated with the packaged ancillary. The cost of the packaged ancillaries would

be included in the payment amount for the significant procedure or medical APG. For example, if a packaged ancillary cost \$20 and is performed for 50 percent of the patients in a medical APG, then \$10 (i.e., 50 percent of \$20) would be included in the payment rate for the medical APG.

Under Medicare's DRG-based PPS for hospital inpatient care, all ancillary services provided to a patient are packaged into the payment for the DRG to which the patient is assigned. Because of the nature of outpatient care, it is not clear that all services provided or ordered during a visit can be packaged into one payment rate. Medicare's current payment system for ambulatory care involves separate payments for ancillary services provided in conjunction with a visit. Ancillary packaging will allow the Medicare program to make a single payment for a well defined package of ambulatory services, thereby creating a consistent definition of services across providers. Packaging will give providers the incentive to improve their efficiency by avoiding unnecessary ancillaries and by substituting less expensive but equally effective ancillary services for more costly options.

There are also some potential problems in the packaging of ancillaries. Packaging places providers at financial risk. If expensive ancillaries that are not usually performed for a particular type of visit are included in the packaged payment then the financial risk may be excessive. For example, if a \$500 test that occurs on average only once per hundred visits was packaged, then the packaged payment for each visit would include only \$5 for this test. Therefore, only relatively inexpensive, frequently performed ancillaries are packaged.

There are basically two alternative approaches to packaging: partial packag-

ing or all inclusive packaging. Under partial packaging, ancillary services that are inexpensive or frequently provided, are packaged into the payment for the significant procedure or medical visit. However, other ancillary services, particularly those that are expensive or infrequently performed (such as MRIs), are paid as separate ancillary APGs. Partial packaging limits the providers' risk. Under an all inclusive packaging, all services (including expensive ancillaries) that are provided during a visit are packaged into the visit payment. The partial packaging option is the most appropriate option because it does not impose a high level of risk for providers.

Because partial packaging was utilized in the APG payment system, the subset of ancillary services that would be packaged into a procedure or medical visit needed to be determined. There are two approaches to selecting the ancillaries to be packaged: clinical or uniform.

A clinical packaging approach selects the ancillaries to be packaged on an APG specific basis. The ancillaries to be packaged are selected primarily on clinical grounds. Thus, only ancillaries that are clinically expected to be a routine part of the specific procedure or medical visit are packaged. The clinical approach has the benefit that the resulting package for a visit is clinically meaningful.

The alternative to clinical packaging is to develop a uniform list of ancillaries that are always packaged into every significant procedure or medical visit. There are several advantages associated with a uniform packaging of ancillaries. A uniform packaging is administratively simple. Once the uniform list of ancillaries is developed, both the Medicare fiscal intermediaries and providers will know that every ancillary on the list is always packaged. Thus,

the tracking of the ancillaries that are packaged is straightforward. Further, a uniform list of packaged ancillaries is simple for hospitals to explain to their medical staff and thus, the incentive to efficiently utilize the packaged ancillaries can be effectively communicated. A uniform list of ancillaries is less prone to manipulation by providers. With a clinical packaging of ancillaries, procedure or medical visits have different levels of ancillaries packaged across the different APGs. Thus, there is an incentive to code the patient into the significant procedure or medical APG with the fewest packaged ancillaries. This presents a particular problem for medical visits in which multiple diagnoses are present. For medical visits with multiple diagnoses, the ancillary tests may be performed for the secondary diagnoses. Under a clinical packaging, low cost non-routine tests are not packaged into the visit payment. This provides a financial incentive for providers to perform such nonroutine tests. A uniform packaging includes a wider array of ancillaries in the packaging for each APG and thus, there is less opportunity for additional payments from nonroutine ancillaries.

A uniform packaging of ancillaries was selected for use in the APG payment model. An attempt to develop a clinical packaging of ancillaries proved difficult. The administrative simplicity, the relative freedom from manipulation and the wider scope of uniform packaging of ancillaries led to its adoption. In general, the ancillaries in the uniform packaging included ancillaries that are performed for a wide range of different types of visits and were relatively low cost compared with average cost of the procedure and medical APGs. Only relatively low cost ancillaries were included in the uniform packaging because if high cost ancillaries were packaged into the visit payment, the patients

who required such ancillaries would cause a substantial financial loss for the hospital. The list of ancillaries included in the uniform packaging is a policy decision. The cost of medical surgical supplies, drugs and all other facility related costs are included in the payment for a significant procedure or medical visit. The only exception is the cost of chemotherapy medication because it is frequently very costly.

### *Discounting*

When multiple significant procedures are performed or when the same ancillary service is performed multiple times, a discounting of the APG payment rates can be applied. Discounting refers to a reduction in the standard payment rate for an APG. Discounting recognizes that the marginal cost of providing a second procedure to a patient during a single visit is less than the cost of providing the procedure by itself. For example, discounting could compensate for the reduced cost per procedure of doing multiple significant procedures at the same time. When multiple significant procedures are performed, in general, the patient preparation, use of the operating room and recovery time is shared between the two procedures. Thus, the cost of doing two procedures at the same time is less than the cost of doing the two procedures at two different times. Discounting can also be used to provide a financial incentive not to repeat the same ancillary service multiple times. Because the performance of multiple ancillaries in the same APG may be clinically necessary and appropriate, there is no consolidation of ancillaries within the same APG. Thus, each nonpackaged ancillary in the same APG will result in an additional payment. However, in order to provide some financial incentive not to repeat ancillary tests, multiple ancillaries in the same APG could

be discounted. The level of any discounting is a policy decision and would be determined during system implementation.

The components of an APG payment system are shown in Figure 4. In this example, although there are four APGs assigned to the claim, only three of the APGs are used to compute the final payment amount. The bunion procedure (APG 32) and the hand and foot tenotomy (APG 34) are significant procedures and would have separate APG payments. The payment amount for the second significant procedure would be discounted. The simple surgical pathology (APG 332) is packaged, but the CAT scan (APG 307) is not. A visit-based APG PPS with uniform ancillary packaging and multiple APG discounting would have many advantages over the current outpatient payment method such as the following:

- Many similar units of service are aggregated together, greatly reducing the number of units of service.
- The need to establish separate payment rates for minor differences in the unit of service is eliminated.
- The opportunity for unbundling the units of service is greatly reduced.
- There is a financial incentive to use packaged ancillary services efficiently.
- Multiple procedures during a visit are reasonably compensated, but not excessively rewarded.
- Payment of medical visits is based on

the type of patient treated and not on the level of effort reported by the physician.

The structure of the APG payment model provides considerable flexibility. By modifying the level of ancillary packaging and discounting, the incentives in the system can be altered in order to achieve specific policy objectives.

### APG Payment Simulation

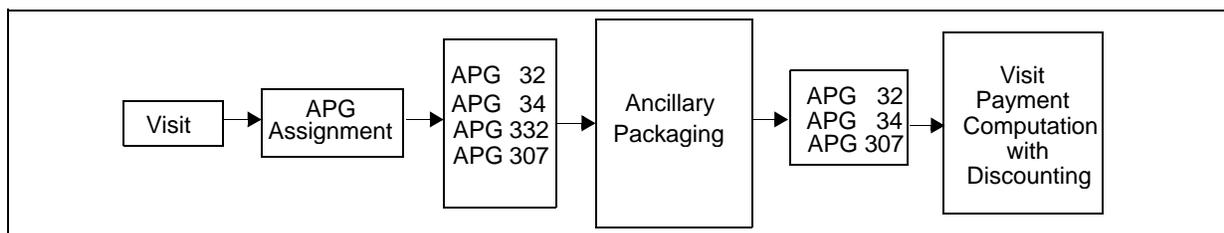
In order to evaluate the APG payment model, a payment simulation using the historical Medicare CWF data was performed. (Averill, Goldfield, et al 1997) The objective of the APG payment simulation was to evaluate the alternative formulations of the APG payment model. The design of an APG based outpatient PPS has five essential components:

#### *Basis of Payment Weights*

The APG payment weights can be computed based on either the charges or cost reported by hospitals. Since the markup from cost to charges can vary considerably across hospital outpatient departments, there can be substantial differences in the payment weights computed from charges versus those computed from cost.

#### *Ancillary Packaging*

A patient with a significant procedure or a medical visit may have ancillary services performed as part of the visit. Ancillary packaging refers to the inclusion of certain



**Figure 4** APG Payment System

ancillary services into the APG payment rate for a significant procedure or medical visit. The extent of ancillary packaging is a policy decision and can vary from none to the full packaging of all low cost, routine ancillary tests and procedures.

### *Outlier Policy*

Outliers are atypical cases that have costs much higher than the APG payment amount. Additional payments can be provided to outlier cases. The extent of outlier payments can vary from none to a significant percentage of cases being provided outlier payments.

### *Discounting*

When multiple significant procedures are performed or when the same ancillary service is performed multiple times, a discounting of the APG payment rates can be applied.

### *Window of Time for Ancillary Packaging*

Packaged ancillary services delivered on the day of a significant procedure or medical visit will always be included in the APG payment. The window of time for including packaged ancillaries in the APG payment can be expanded beyond the day of the visit.

The above components of an APG system can be configured to produce different formulations of an APG PPS. Thirteen different formulations of an APG PPS were selected for evaluation. The thirteen formulations of the APG PPS are summarized in Table 4.

Three alternative lists of packaged ancillaries were examined in the APG impact simulations. The three alternative packaging lists are summarized in Table 5. The cost of medical surgical supplies and drugs, except for chemotherapy, are always packaged and included in the APG relative weights. The cost of all incidental

services (i.e., APG 421) are also always packaged and included in the APG relative weights. The limited packaging option only packages the anesthesia services. The simple packaging option adds simple ancillary tests to the lists of packaged ancillaries. The full packaging option adds some additional ancillary services, plus some minor medical services, to the list of packaged ancillaries.

Outlier payments essentially represent a stop loss provision that protects providers from extreme losses on any individual patient. Cost outlier values were established for each significant procedure and medical APG. If the cost of the patient exceeds the cost outlier value, then the total payment for the patient was computed as the standard APG payment amount plus 100 percent of the difference between the actual cost and the cost outlier value. The cost outlier value was established based on a specified number of standard deviations above the mean for each APG. The precise number of standard deviations above the mean was established such that a specified percentage of total payments would be associated with outlier payments. Thus, the number of standard deviations varied depending on the exact percentage of total payments associated with outlier payments. Since there are some administrative costs associated with outlier payments, the cost outlier value was constrained to be, at a minimum, \$1700 for significant procedure APGs and \$350 for medical APGs. Thus, for patients whose cost exceeds the cost outlier value, the total payment would be:

$$\text{Total payment} = \text{APG payment} + (\text{actual cost} - \text{outlier value})$$

Outlier payments are only associated with significant procedure and medical claims; there are no outlier payments associated with ancillary only claims.

APG System	Basis of Relative Weights	Ancillary Packaging	Outliers	Ancillary Discounting	Window of Time
1	Cost	Limited	1%	No	Same Day
2	Charge	Limited	1%	No	Same Day
3	Cost	Full	1%	No	Same Day
4	Charge	Full	1%	No	Same Day
5	Cost	Simple	1%	No	Same Day
6	Cost	Limited	None	No	Same Day
7	Cost	Full	None	No	Same Day
8	Cost	Full	3%	No	Same Day
9	Cost	Limited	3%	No	Same Day
10	Cost	Limited	1%	Yes	Same Day
11	Cost	Full	1%	Yes	Same Day
12	Cost	Full	1%	No	Three Days
13	Cost	Full	1%	No	Seven Days

**Table 4:** Components of Alternative APG Systems

Three outlier alternatives were evaluated: no outliers, one percent of total payments associated with outlier payments and three percent of total payments associated with outlier payments. The inpatient DRG system currently has 5.1 percent of total payments associated with outlier payments. A 5.1 percent of total payments associated with outlier payments was not evaluated since it would produce a large volume of claims with outlier payments.

If there are multiple significant procedures, the significant procedure with the highest relative weight is paid at 100 percent and each additional significant procedure is discounted by 50 percent. The 50 percent multiple significant procedure discounting was included in all APG systems that were evaluated. In addition, a 20 percent discounting of multiple ancillaries in the same APG was evaluated.

Packaged ancillary services delivered on the day of a significant procedure or

medical visit are always included in the APG payment. The impact of expanding the window of time for including packaged ancillaries in the APG payment was evaluated. A three day and seven day window of time around the visit was evaluated

### **Evaluation of the Thirteen Alternative Formulations of an APG PPS**

For each of the thirteen formulations of an APG PPS, the APG payment amount for each patient was computed and compared to historical patient cost (referred to as an APG simulation). The APG payment levels for each of the APG simulations were set such that the aggregate APG payment, including any outlier payments, was equal to the aggregate cost across all patients. Thus, each APG simulation was performed on a budget-neutral basis. The APG simulation adjusted each hospital's APG payments for variations in wage rates using the 1993 Medicare inpatient PPS wage rate adjustment factors. In

Full	Simple	Limited		APG
X	X		310	Plain Film
X	X	X	321	Anesthesia
X	X		332	Simple Pathology
X	X		343	Simple Immunology Tests
X	X		345	Simple Microbiological Tests
X	X		347	Simple Endocrinology Tests
X	X		349	Simple Chemistry Tests
X	X		350	Basic Chemistry Tests
X	X		351	Multichannel Chemistry Tests
X	X		356	Simple Clotting Tests
X	X		358	Simple Hematology Tests
X	X		359	Urinalysis
X	X		360	Blood and Urine Dipstick Tests
X			371	Simple Pulmonary Function Tests
X	X		373	Cardiogram
X	X		383	Intro of Needle and Catheter
X			384	Dressings and Other Minor Proc
X			385	Other Misc Ancillary Proc
X			386	Biofeedback and Other Training
X			411	Psychotropic Med Management

**Table 5** Alternative APG Packaging Options

applying the wage rate adjustment factors, it was assumed that each hospital had 71.4 percent of its cost associated with labor. This is the same percentage used in the inpatient PPS.

Medicare payment for hospital outpatient services is based on a complex and confusing collection of payment methods. The current Medicare system pays hospital outpatient services under a number of different methods including fee schedules, blended payment methods and cost based payments. It was beyond the scope of this project to compute actual historical Medicare outpatient payments and compare actual payments to APG based payments. Thus, the results of the thirteen APG simulations do not reflect the actual payment impact on hospitals because the actual payments to hospitals based on the current complex and confusing system were

not calculated. In addition, APG payment rates were not calculated based on the current level of Medicare program expenditures, which is less than hospital costs, but instead, were calculated based on what total program expenditures would be under a pure cost based system. Thus, for purpose of comparing the thirteen different APG simulations, hospital payments under each formulation of an APG PPS were computed with the constraint that in the aggregate, Medicare total expenditures under any of the APG simulations was equal to total hospital costs. The most basic of the thirteen formulations of an APG PPS was selected as the reference APG simulation and the relative APG payment impact was computed by comparing cost based APG payments under each of the other APG simulations to the reference APG simulation. The relative APG pay-

ment impact was computed for different categories of hospitals and was used to evaluate each component of the APG system (e.g., the extent of outlier payments) in terms of its relative payment impact across the different categories of hospitals.

### **Converting Charges to Cost**

Based on the provider number, each claim was linked to a file provided by HCFA that contained departmental cost-to-charge ratios for each hospital. The charges on a claim were converted to cost by using the departmental cost-to-charge ratios. If there were no cost-to-charge ratios available for a hospital, the claims from that hospital were eliminated from the analysis. If a cost-to-charge ratio for the hospital was missing for only a subset of departments in a hospital, then the overall hospital cost-to-charge ratio was used for those departments. In general, the cost-to-charge ratios for ancillary departments tended to be lower than for other hospital departments. For example, the average cost-to-charge ratio for diagnostic radiology, laboratory and electrocardiology were 0.66, 0.54 and 0.39, respectively. In comparison, the average cost-to-charge ratio for clinics, emergency room and operating room were 1.30, 1.06 and 0.77, respectively.

### **Computing APG Relative Weights**

Relative weights for each APG were computed. Relative weights can be computed based on either historical charges or cost. APG simulations were performed using relative weights computed from both charges and cost in order to determine if the basis of the relative weights resulted in a substantial impact in relative APG payment. The APG relative weights for significant procedure or medical APGs include the costs associated with any ancillaries

that are packaged into these APGs.

Using charges and the three different packaging options, three sets of charge-based APG relative weights were computed. In addition, using costs and the three different packaging options, three sets of cost based APG relative weights were computed. The relative weights were computed based on the average cost or charge in each APG. The relative weights for significant procedure APGs were computed using only claims that had a single significant procedure because it was not possible to allocate accurately the costs (e.g., pharmaceuticals, medical-surgical supplies, etc.) across multiple significant procedure APGs.

In order to obtain an accurate estimate of the average cost or charge, it was necessary to eliminate the extreme charge or cost values from the computation of the average. In the computation of the inpatient DRG relative weights, claims with charges that were more than three standard deviations above the mean of the log of charges were eliminated. The same method of eliminating extreme charge or cost values was used in computing the six sets of APG relative weights. The percent of claims trimmed from the computation of the relative weights was only a fraction of one percent.

The relative weights computed from charges and cost were essentially the same. The Pearson correlation coefficient between charge based and cost based relative weights, with limited, simple and full packaging, was 0.990, 0.991 and 0.992, respectively. However, due to the lower cost-to-charge ratio for ancillary departments, the relative weights for ancillary APGs tend to be proportionately lower for cost based weights than for charge based weights.

	Count	Charge Based Relative Weights			Cost Based Relative Weights		
		Full Package	Simple Package	Limited Package	Full Package	Simple Package	Limited Package
Significant Procedure Claims	1,567,263	11.90	11.64	3.62	9.24	9.00	2.51
Medical Claims	2,186,728	45.38	45.20	0.94	31.34	31.18	0.52
Significant Procedure and Medical Claims Combined	3,753,991	20.00	19.76	3.20	15.44	15.22	2.07

**Table 6:** Percent of APG Relative Weights Derived from Packaged Ancillaries

Table 6 contains the overall percent of the relative weights derived from packaged ancillaries for the six sets of relative weights. In general, the percent of the relative weight from packaged ancillaries tends to be lower for cost based relative weights than for charge based relative weights. This reflects the relatively low cost-to-charge ratios associated with the ancillary departments. The medical APGs have a much higher percentage of the APG relative weight from packaged ancillaries than the significant procedure APGs. For the cost based relative weights with full packaging, the relative weight with the highest percent of the APG relative weight from packaged ancillaries is the medical APG for chest pain with cardiac enzymes to rule out myocardial infarction (APG 573), at 46.2 percent. The high percent of packaged ancillaries associated with this APG is the result of the packaging of the extensive laboratory tests that are performed for this type of patient. In general, the percent of the relative weight from packaged ancillaries tends to be 3 to 4 times higher for medical APGs than for significant procedure APGs. The high percent of the relative weights from packaged ancillaries for medical patients is primarily the result of the relatively low payment for a medical claim. The APG with the lowest percent of the APG relative weight from packaged ancillaries is the significant procedure APG for laser eye procedures

(APG 213), at 0.22 percent.

### Comparison of Alternative APG Systems

The thirteen APG simulations were compared by computing an overall  $R^2$  which provides a measure of the amount of variance in historical cost explained by the APG payment system. Positive values that approach 1.0 for  $R^2$  would indicate that the relative value of the total APG payment closely approximates the relative value of the historical cost. Table 7 contains the  $R^2$  for all thirteen APG simulations. Based on the results in these tables, the impact of each of the alternative formulations of an APG PPS was evaluated.

#### *Cost Based and Charge Based Relative Weights*

From Table 7, APG Systems 1 and 2 compare the effects of using relative weights based on charges and cost with the limited packaging option, while APG Systems 3 and 4 make the same comparison with the full packaging option. All four APG systems have one percent of payments associated with outliers, no ancillary and a same day window. The  $R^2$  for APG System 1 compared to APG System 2 is virtually identical, and the  $R^2$  for APG System 3 compared to APG System 4 is also virtually identical. Thus, the cost of individual  $R^2$  for alternative APG Systems patients can be predicted equally well (i.e.,

APG Systems	Sig Proc	Medical	Medical Plus Sig Proc	Anc Only	Total	Basis Wghts	Anc Pkg	Out	Anc Disc	Window of Time
1	0.683	0.745	0.686	0.746	0.773	Cost	Lim	1%	No	Same Day
2	0.688	0.744	0.690	0.739	0.774	Chg	Lim	1%	No	Same Day
3	0.668	0.588	0.660	0.746	0.757	Cost	Full	1%	No	Same Day
4	0.669	0.589	0.661	0.739	0.756	Chg	Full	1%	No	Same Day
5	0.668	0.590	0.660	0.746	0.757	Cost	Sim	1%	No	Same Day
6	0.620	0.439	0.605	0.746	0.721	Cost	Lim	None	No	Same Day
7	0.601	0.264	0.575	0.746	0.701	Cost	Full	None	No	Same Day
8	0.734	0.726	0.733	0.746	0.804	Cost	Full	3%	No	Same Day
9	0.760	0.804	0.762	0.746	0.823	Cost	Lim	3%	No	Same Day
10	0.682	0.744	0.684	0.746	0.772	Cost	Lim	1%	Yes	Same Day
11	0.668	0.587	0.660	0.746	0.756	Cost	Full	1%	Yes	Same Day
12	0.665	0.592	0.657	0.747	0.755	Cost	Full	1%	No	3 Days
13	0.664	0.596	0.656	0.747	0.754	Cost	Full	1%	No	7 Days

**Table 7:** R<sup>2</sup> for alternative APG systems

obtain the same R<sup>2</sup>) using relative weights computed from charges or relative weights computed from costs.

#### *Alternative Ancillary Packaging Lists*

APG Systems 1, 3 and 5 use limited, full and simple packaging, respectively, with cost based relative weights, one percent of payments associated with outliers, no ancillary discounting and a same day window of service. The simple packaging and the full packaging have virtually identical R<sup>2</sup> results. The R<sup>2</sup> for significant procedure claims is 2.2 percent lower with full packaging (0.668 versus 0.683). For medical claims, the R<sup>2</sup> is 21.1 percent lower with full packaging than it is with limited packaging (0.588 versus 0.745). The lower R<sup>2</sup> for medical claims with the full packaging option reflects the combined effect of the variability in the use of ancillaries for medical visits coupled with ancillaries being a large percent of the cost of a medical visit.

#### *Outliers*

APG Systems 6, 1 and 9 use 0 percent, 1 percent and 3 percent of payments associated with outliers, respectively, with

the limited packaging option, cost based relative weights, no ancillary discounting and a same day window of time. For significant procedure APGs, the 3 percent outlier option has the highest R<sup>2</sup>, while the 1 percent outlier option is 10.1 percent lower (0.760 versus 0.683) and the no outlier option is 18.4 percent lower (0.760 versus 0.620). For medical APGs, the 3 percent outlier option has the highest R<sup>2</sup>, while the 1 percent outlier option is 7.3 percent lower (0.804 versus 0.745) and the no outlier option is 45.4 percent lower (0.804 versus 0.439). Thus, there is a small reduction in R<sup>2</sup> if outlier payments are reduced from 3 percent to 1 percent, but a large reduction in R<sup>2</sup> for medical claims if outlier payments are eliminated entirely.

APG Systems 7, 3 and 8 use 0 percent, 1 percent and 3 percent payments associated with outliers with the full packaging option, cost based relative weights, no ancillary discounting and a same day window of service. For significant procedure APGs, the 3 percent outlier option has the highest R<sup>2</sup>, while the 1 percent outlier option is 9.0 percent lower (0.734 versus

0.668) and the no outlier option 18.1 percent lower (0.734 versus 0.601). For medical APGs, the 3 percent outlier option has the highest R<sup>2</sup>, while the 1 percent outlier option is 19.0 percent lower (0.726 versus 0.588) and the no outlier option is 63.6 percent lower (0.726 versus 0.264). Thus, with full packaging, there is a modest reduction in R<sup>2</sup> by reducing the outlier payments from 3 percent to 1 percent and a large reduction in R<sup>2</sup> for medical claims if outlier payments are eliminated entirely.

While the 3 percent outlier option has the highest R<sup>2</sup> it also results in significantly more claims having outlier payments. APG Systems 1 and 3, which use the 1 percent outlier option, have 1.277 percent and 1.241 percent of claims with outlier payments, respectively. APG Systems 8 and 9, which use the 3 percent outlier option, have considerably more claims with outlier payments with 4.571 percent and 3.588 percent of claims with outlier payments, respectively.

#### *Ancillary Discounting*

APG System 10 adds ancillary discounting to APG System 1. APG Systems 1 and 10 have limited packaging, with cost based relative weights, one percent of payments associated with outliers and a same day window of service. APG System 11 adds ancillary discounting to APG System 3. APG Systems 3 and 11 have full packaging, with cost based relative weights, one percent of payments associated with outliers and a same day window of service. The R<sup>2</sup> for APG Systems 1 and 10 and the R<sup>2</sup> for APG Systems 3 and 11 are virtually identical. Thus, there is virtually no reduction in R<sup>2</sup> from ancillary discounting.

#### *Window of Time*

In order to simulate a window of time of

three days and seven days for APG Systems 12 and 13, respectively, it was necessary to collapse some of the ancillary only claims into a significant procedure or medical claim. Thus, if there was an ancillary only claim for a patient two days following a medical visit, the ancillary only claim was deleted and the ancillary services provided were incorporated into the medical visit claim. In addition, the expanded window of time created some ambiguous situations, which necessitated the exclusion of some additional claims. For example, if the same ancillary only claim occurred two days after a medical visit and two days prior to a significant procedure visit, then it would be ambiguous as to whether the ancillary only claim should be associated with the medical visit or the significant procedure visit. In this example, all three claims would be excluded from the analysis because of the ambiguity. There were only a small percentage of significant procedure or medical claims eliminated due to ambiguities, and 3.02 percent and 6.65 percent of the ancillary only claims were collapsed or eliminated due to ambiguities for the three day and seven day window of time, respectively.

As a result of the expanded window of time, a larger proportion of the cost of a significant procedure or medical visit was associated with packaged ancillaries. For the full packaging option, the percentage of the APG cost associated with packaged ancillaries was 15.94, 15.83 and 16.32 percent for the one day, three day and seven day window of time, respectively. Thus, there was only a very small increase in the percentage of APG cost from packaged ancillaries as the window of time was expanded.

APG Systems 3, 12 and 13 use a same day, three day and seven day window of

time, respectively, with cost based weights, full ancillary packaging, 1 percent outliers, 50 percent multiple significant procedure discounting and no ancillary discounting. The R<sup>2</sup> for all three APG systems is virtually the same. Thus, there is no substantial impact on R<sup>2</sup> as a result of expanding the window of time of ancillary packaging.

### Comparison of Version 2.0 APGs and DRGs

Medicare inpatient data was used to compute the R<sup>2</sup> for the DRGs. In the payment model used for the DRG analysis, the payment for each patient was computed as the average standardized charge for the DRG to which the patient was assigned.

The APG simulation that most closely approximates the untrimmed DRGs is APG System 7, which uses cost based weights with full packaging, no outliers, significant procedure discounting, no repeat ancillary discounting and a same day window of time. Table 8 compares the R<sup>2</sup> for APGs and DRGs.

	Untrimmed DRGs	APG System 7
Procedure discharges/visits	0.425	0.601
Medical discharges/visits	0.267	0.264
Combined procedure/medical discharges visits	0.394	0.575

**Table 8:** R<sup>2</sup> for DRGs and APGs

The R<sup>2</sup> for untrimmed (i.e., without outliers for APGs) procedure and medical claims combined is higher for APGs than for DRGs (i.e., 0.575 for APGs versus 0.394 for DRGs). For procedure claims, the APGs have a higher R<sup>2</sup> than the DRGs (i.e., 0.601 for APGs versus 0.425 for DRGs). For medical claims the DRGs

have a slightly higher R<sup>2</sup> than the APGs for untrimmed claims (i.e., 0.264 for APGs versus 0.267 for DRGs). The higher R<sup>2</sup> for the APGs means that the APGs predict historical outpatient costs better than the DRGs predict historical standardized inpatient charges.

### Hospital APG Impact Simulation

Hospital characteristics were identified by linking the provider number on each claim to the FY1993 PPS Payment Impact File. Hospitals were categorized into 67 categories. The categories were not mutually exclusive and the same hospital could appear in multiple categories. The hospital categories replicated the hospital categories used by HCFA to display the inpatient PPS impact results. All information necessary to create the hospital categories was available in the FY 1993 PPS Payment Impact File, except hospital ownership. Hospital ownership was obtained using a separate file provided by HCFA.

The hospital categorization was done in two different ways, one based on geographic location and the other on payment categories. In the geographic location section, the metropolitan statistical area (MSA), the region of the country and the urban/rural status is based on the *actual* location of the hospital. Since these hospital location characteristics affect the inpatient PPS payment levels, the Executive Office of Management and Budget reclassifies the urban/rural designation, as well as the MSA and geographic region. In the payment categories section the MSA, the region of the country and the urban/rural status was based on the *reclassified* location of the hospital used in the inpatient PPS.

The FY 1993 PPS Payment Impact File contained 5,491 hospitals. Only hospitals covered by the inpatient PPS were

included in the PPS Payment Impact File. The analysis database included 5,118 (92.3 percent) of the PPS hospitals. In addition, the analysis database contained data from 356 hospitals that were not covered by the inpatient PPS (e.g., psychiatric hospitals). The non PPS hospitals had very few claims per hospital in the analysis database. For PPS hospitals there was an average of 2,222 claims per hospital in the analysis database, but for non PPS hospitals there was only an average of 60.2 claims per hospital. There were also 16 hospitals that were PPS hospitals that were not in the 1993 PPS Payment Impact File. Since the data was from 1992, these are probably hospitals that closed or merged with other hospitals in 1993. In total, there were 5,490 hospitals in the analysis database.

Table 9 and Table 10 contain for each hospital category the impact of each of the 13 APG systems. APG System 6 represents the most basic version of an APG system. APG System 6 uses cost based relative weights, limited packaging, no outliers, no ancillary discounting and a same day window of time. The impact of an APG system APG system was measured by taking the aggregate APG payment to hospitals in the hospital category under the APG system, subtracting the aggregate APG payments to hospitals in the hospital category under APG System 6 and dividing the difference by the aggregate APG payments to hospitals in the hospital category under APG System 6. The result is the percent difference between hospital payments under the APG system being evaluated and hospital payments under APG System 6. A impact of +2.0 would indicate that the hospitals in the hospital category would receive two percent more in aggregate payments under the APG system being evaluated than the hospitals would have under the

basic APG system (i.e., APG System 6). The relative APG payment impact measures how the aggregate payments to hospitals in each hospital category would change as the basic APG system (i.e., APG System 6) is expanded (e.g., more extensive ancillary packaging, the addition of outlier payments, etc.). Thus, the relative APG payment impact provides a means of evaluating each component of the APG system in terms of its effect on aggregate APG based payments to different categories of hospitals. It does *not* provide a measure of the change in actual payments that hospitals would receive under an APG payment system. The discussion of the relative APG payment impact is based on Table 6 and Table 7. APG System 1 adds one percent outlier payments to the basic APG system (i.e., APG System 6) and APG System 9 adds three percent outlier payments. There was relatively little APG payment impact across categories of hospitals as a result of adding outlier payments to the APG system. In general, the APG payment impact with outlier payments added was within one percent of the basic APG system.

The discussion of the relative APG payment impact is based on Table 9 and Table 10. APG System 1 adds 1% outlier payments to the basic APG system (i.e., APG System 6), and APG System 9 adds 3% outlier payments. There was relatively little APG payment impact across categories of hospitals as a result of adding outlier payments to the APG system. In general, the APG payment impact with outlier payments added was within 1% of the basic APG system.

APG System 7 adds full packaging to the basic APG system. The addition of full packaging does tend to have a substantial APG payment impact across categories of

Hospital Categories	APG System												
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>LOCATION:</b>													
URBAN HOSPITALS	0.00	-0.25	-0.07	-0.34	-0.05	0.00	-0.08	0.01	0.12	-0.01	-0.07	-0.16	-0.68
LARGE URBAN AREAS	0.13	-0.68	0.19	-0.62	0.23	0.00	0.04	0.55	0.56	0.11	0.18	0.11	-0.42
OTHER URBAN AREAS	-0.13	0.23	-0.35	-0.03	-0.36	0.00	-0.21	-0.59	-0.38	-0.13	-0.36	-0.47	-0.97
RURAL AREAS	-0.07	1.11	0.17	1.42	0.10	0.00	0.26	-0.17	-0.51	-0.03	0.20	-0.20	-0.82
<b>BED SIZE (URBAN):</b>													
0-99 BEDS	0.55	0.87	0.43	0.71	0.41	0.00	-0.13	1.27	1.38	0.60	0.47	0.12	-0.41
100-199 BEDS	0.05	0.36	-0.31	-0.07	-0.29	0.00	-0.39	0.27	0.74	0.03	-0.31	-0.44	-1.03
200-299 BEDS	0.06	0.76	-0.58	-0.02	-0.55	0.00	-0.65	-0.52	0.15	0.05	-0.59	-0.68	-1.11
300-499 BEDS	-0.17	-0.36	-0.34	-0.57	-0.33	0.00	-0.18	-0.63	-0.47	-0.18	-0.35	-0.34	-0.79
500 OR MORE BEDS	-0.06	-3.02	1.42	-1.23	1.43	0.00	1.51	1.25	-0.18	-0.07	1.40	1.28	0.56
<b>BED SIZE (RURAL):</b>													
0-49 BEDS	0.50	0.87	2.77	3.65	2.59	0.00	2.38	2.85	0.14	0.51	2.81	2.31	1.75
50-99 BEDS	0.03	1.29	0.34	1.72	0.25	0.00	0.34	0.21	-0.27	0.05	0.38	-0.17	-0.91
100-149 BEDS	-0.25	1.43	-0.66	0.95	-0.72	0.00	-0.38	-1.12	-0.78	-0.20	-0.64	-1.00	-1.65
150-199 BEDS	-0.30	0.88	-0.50	0.65	-0.53	0.00	-0.19	-1.30	-1.09	-0.25	-0.48	-0.65	-1.18
200 OR MORE BEDS	-0.33	0.86	-0.97	0.10	-0.96	0.00	-0.64	-1.48	-0.73	-0.28	-0.95	-1.24	-1.71
<b>URBAN BY CENSUS DIV:</b>													
NEW ENGLAND	-0.59	-2.36	0.25	-1.44	0.29	0.00	0.83	-0.24	-0.87	-0.59	0.25	-0.30	-1.50
MIDDLE ATLANTIC	-0.23	-0.01	0.36	0.66	0.37	0.00	0.60	0.63	0.36	-0.18	0.37	-0.12	-1.83
SOUTH ATLANTIC	0.18	0.21	-0.76	-0.90	-0.75	0.00	-0.98	-0.47	0.38	0.15	-0.77	-0.72	-0.83
EAST NORTH CENTRAL	-0.28	0.16	-0.57	-0.22	-0.56	0.00	-0.30	-0.81	-0.40	-0.31	-0.57	-0.78	-1.50
EAST SOUTH CENTRAL	0.24	0.38	-0.57	-0.55	-0.59	0.00	-0.83	-0.67	0.08	0.22	-0.60	-0.63	-0.81
WEST NORTH CENTRAL	0.22	-0.18	0.10	-0.30	0.17	0.00	-0.12	-0.08	-0.04	0.18	0.08	0.13	0.04
WEST SOUTH CENTRAL	0.68	0.36	-0.41	-0.88	-0.48	0.00	-1.16	0.57	1.64	0.58	-0.43	-0.12	0.12
MOUNTAIN	0.38	-2.35	1.81	-0.58	1.73	0.00	1.46	2.13	0.39	0.37	1.79	1.91	1.66
PACIFIC	0.10	-0.43	0.51	0.03	0.60	0.00	0.46	0.49	-0.06	0.15	0.50	0.71	0.89
PUERTO RICO	-0.93	-4.28	2.07	-0.14	2.16	0.00	3.03	0.34	-2.51	-0.87	2.14	2.46	1.83
<b>RURAL BY CENSUS DIV:</b>													
NEW ENGLAND	-0.51	1.57	0.02	2.11	0.02	0.00	0.56	-0.44	-0.91	-0.37	0.08	-0.41	-1.15
MIDDLE ATLANTIC	-0.70	1.03	0.16	1.98	0.09	0.00	0.89	-1.32	-2.11	-0.63	0.15	-0.87	-2.86
SOUTH ATLANTIC	0.15	1.06	-1.00	-0.23	-0.97	0.00	-1.18	-0.91	-0.03	0.14	-0.97	-1.19	-1.51
EAST NORTH CENTRAL	-0.21	2.26	-0.82	1.53	-0.88	0.00	-0.59	-1.30	-0.69	-0.21	-0.79	-1.37	-2.33
EAST SOUTH CENTRAL	-0.27	0.80	0.00	1.23	-0.08	0.00	0.31	-0.76	-1.10	-0.25	0.02	-0.36	-0.76
WEST NORTH CENTRAL	0.18	0.67	1.43	2.19	1.36	0.00	1.34	1.23	-0.15	0.27	1.46	1.02	0.45
WEST SOUTH CENTRAL	0.26	0.17	0.97	1.12	0.76	0.00	0.72	1.30	0.49	0.24	0.99	0.76	0.52
MOUNTAIN	0.07	1.12	1.82	3.22	1.66	0.00	1.84	1.48	-0.44	0.15	1.86	1.65	1.61
PACIFIC	-0.16	0.76	1.10	2.25	1.00	0.00	1.31	0.63	-0.85	-0.07	1.14	1.13	0.90
PUERTO RICO	-0.96	1.41	2.35	5.64	2.52	0.00	3.39	0.51	-2.86	-0.73	2.44	0.16	-5.43

**Table 9:** Impact by hospital categories by geographic location across APG systems

Hospital Category	APG Systems												
	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>PAYMENT LOCATION:</b>													
URBAN HOSPITALS	0.00	-0.18	-0.10	-0.31	-0.09	0.00	-0.11	-0.03	0.10	-0.01	-0.11	-0.21	-0.74
LARGE URBAN AREAS	0.07	-0.55	0.08	-0.55	0.12	0.00	-0.01	0.38	0.42	0.05	0.08	-0.01	-0.55
OTHER URBAN AREAS	-0.09	0.29	-0.33	0.00	-0.35	0.00	-0.23	-0.55	-0.32	-0.09	-0.34	-0.47	-0.98
RURAL AREAS	-0.06	1.00	0.36	1.53	0.28	0.00	0.45	0.00	-0.52	-0.01	0.39	-0.01	-0.57
<b>TEACHING STATUS:</b>													
NON-TEACHING	0.05	1.28	-0.55	0.56	-0.55	0.00	-0.61	-0.48	0.04	0.05	-0.54	-0.72	-1.14
RESIDENT TO BED RATIO < 25	-0.12	0.06	-0.18	-0.04	-0.18	0.00	-0.05	-0.30	-0.14	-0.11	-0.17	-0.24	-0.80
RESIDENT TO BED RATIO >= 25	-0.05	-6.95	3.33	-2.84	3.37	0.00	3.42	3.27	0.05	-0.08	3.31	3.02	1.91
<b>DISPROP SHARE HOSPITALS:</b>													
NON-DSH	-0.05	0.97	-0.36	0.58	-0.36	0.00	-0.32	-0.34	-0.01	-0.03	-0.35	-0.55	-1.08
<b>URBAN DSH:</b>													
100 BEDS OR MORE	0.06	-1.59	0.56	-0.96	0.57	0.00	0.51	0.56	0.03	0.03	0.55	0.48	-0.08
FEWER THAN 100 BEDS	0.25	0.29	0.08	0.17	0.08	0.00	-0.16	-0.15	-0.53	0.24	0.12	0.07	-0.05
<b>RURAL DSH:</b>													
SOLE COMMUNITY (SCH)	0.08	-0.08	0.02	0.01	-0.12	0.00	-0.04	0.29	0.09	0.02	0.05	-0.13	-0.29
RURAL REFERRAL CENTERS (RRC)	-0.23	-0.96	-0.33	-1.00	-0.25	0.00	-0.08	-0.65	-0.56	-0.19	-0.32	-0.51	-0.96
<b>OTHER RURAL DSH HOSP:</b>													
100 BEDS OR MORE	-0.37	0.27	-0.68	-0.05	-0.77	0.00	-0.30	-1.17	-0.75	-0.30	-0.64	-1.06	-1.45
FEWER THAN 100 BEDS	-0.06	0.10	1.25	1.83	1.12	0.00	1.33	0.73	-0.95	-0.08	1.28	1.04	0.85
<b>URBAN TEACHING AND DSH:</b>													
BOTH TEACHING AND DSH	0.09	-3.26	1.62	-1.38	1.62	0.00	1.57	1.45	-0.11	0.05	1.61	1.49	0.71
TEACHING AND NO DSH	-0.28	-0.14	-0.23	-0.13	-0.22	0.00	0.05	-0.20	0.04	-0.25	-0.22	-0.35	-0.98
NO TEACHING AND DSH	0.03	0.86	-0.97	-0.32	-0.95	0.00	-1.03	-0.73	0.22	-0.01	-0.99	-0.98	-1.22
NO TEACHING AND NO DSH	0.10	1.54	-0.85	0.38	-0.83	0.00	-0.98	-0.65	0.23	0.10	-0.85	-0.98	-1.41
<b>RURAL HOSPITAL TYPES:</b>													
NONSPECIAL STATUS HOSPITALS	0.00	1.09	0.60	1.86	0.52	0.00	0.64	0.31	-0.43	0.03	0.63	0.09	-0.58
RURAL REFERRAL CENTER (RRC)	-0.43	0.83	-0.67	0.53	-0.70	0.00	-0.24	-1.39	-1.06	-0.36	-0.65	-0.90	-1.37
SOLE COMMUNITY HOSPITAL (SCH)	0.12	1.29	0.77	2.12	0.66	0.00	0.71	0.74	-0.16	0.16	0.81	0.47	-0.03
SCH AND RRC	-0.01	0.46	-0.10	0.34	-0.11	0.00	-0.08	-0.95	-0.95	0.06	-0.08	-0.13	-0.33
MEDICARE DEPENDENT SMALL	0.39	0.94	1.93	2.84	1.80	0.00	1.60	2.05	0.24	0.40	1.96	1.36	0.53
RURAL HOSPITAL													
<b>TYPE OF OWNERSHIP:</b>													
VOLUNTARY	-0.16	0.35	-0.27	0.18	-0.27	0.00	-0.12	-0.36	-0.19	-0.14	-0.27	-0.45	-1.07
PROPRIETARY	0.40	0.82	-0.75	-0.49	-0.71	0.00	-1.21	-0.14	0.82	0.32	-0.77	-0.69	-0.74
GOVERNMENT	0.43	-2.23	1.84	-0.46	1.82	0.00	1.45	1.82	0.32	0.41	1.84	1.67	1.20

Table 10: Impact by hospital categories and by payment categories across APG systems

DSH = Disproportionate Share Hospital

hospitals. As a result of the addition of full packaging to the basic APG system, teaching hospitals with a resident-to-bed ratio greater than 0.25 have a 3.42 percent increase relative to the basic APG system. Urban hospitals over 500 beds, urban disproportionate share teaching hospitals, rural Medicare dependent hospitals, small rural hospitals and government hospitals experienced an increase between one and two percent as a result of adding full packaging to the basic APG system. There were no hospital categories that experienced a substantial decrease, except for proprietary hospitals, which experienced a 1.21 percent decrease.

APG Systems 3 and 8 add one percent and three percent outlier payments to the full packaging option in APG System 7, respectively. The addition of outliers to the full packaging option of APG System 7 does not substantially change the results, except that with full packaging and three percent outliers, rural hospitals over 100 beds do experience a more substantial decrease.

The addition of ancillary discounting (APG System 11) or the addition of an expanded window of service (APG Systems 12 and 13) to the full packaging APG system with one percent outliers (APG System 3) does not substantially change the results across categories of hospitals.

APG Systems 2 and 4 use charge based relative weights whereas all other APG systems use cost based relative weights. The change to charge based relative weights has a substantial APG payment impact across hospital categories. APG Systems 3 and 4 are the same except that APG System 3 uses cost based relative weights and APG System 4 uses charge based relative weights. For example, for teaching hospitals with a res-

ident to bed ratio greater than 0.25, APG System 3 would result in an increase relative to the basic APG system, of 3.33 percent, while APG System 4 would result in a decrease of 2.84 percent. The cause of this relative APG payment impact is the low cost-to-charge ratios for ancillary departments. Hospitals that have the majority of their outpatient services as ancillary services would experience a decrease using cost based relative weights, since cost based ancillary APG relative weights are proportionately lower. Conversely, hospitals that have the majority of their services as direct patient care services (e.g., emergency room visits) would have an increase using cost based relative weights, since cost based significant procedure and medical APG relative weights are proportionately higher. To illustrate this impact, hospitals were categorized based on the percent of patients who only received ancillary services (i.e., no significant procedure or medical visit). APG System 3 and APG System 4 are the same, except that APG System 3 uses cost based relative weights and APG System 4 uses charge based relative weights. The difference in APG payment under APG System 3 and APG System 4 was computed and divided by the APG payment under APG System 4. The result is the percent difference in APG payment due to cost based relative weights as opposed to charge based relative weights. Table 11 shows the results across hospitals categorized by the percent of ancillary only claims.

In Table 11, the 269 hospitals having less than 5 percent of their claims with only ancillaries had an increase equal to 6.921 percent by using cost based relative weights instead of charge based relative weights. Conversely, the 72 hospitals having 95 percent or more of their claims with only ancillaries had a decrease equal to

Percent Ancillary Only	Count Hosp	Percent Diff APG Impact
0-5	269	6.921
5-10	50	11.776
10-15	62	14.121
15-20	47	9.556
20-25	65	8.580
25-30	82	6.679
30-35	119	3.845
35-40	130	2.008
40-45	184	1.807
45-50	268	1.384
50-55	361	0.569
55-60	398	0.033
60-65	467	-0.426
65-70	574	-1.146
70-75	592	-1.759
75-80	666	-2.775
80-85	578	-4.043
85-90	340	-5.609
90-95	166	-7.439
95-100	72	-10.948

**Table 11:** Percentage difference in impact between APG System 3 and APG System 4 by percentage of hospital claims that are ancillary only

10.948 percent by using cost based relative weights instead of charge based relative weights.

In summary, the alternative formulations of APG systems did not result in substantial differences in impact across different categories of hospitals. The only components of the APG system that caused any substantial variations in impact across different categories of hospitals were the selection of charge versus cost based relative weights and the extent of ancillary packaging.

## Discussion

The statistical performance of the APGs, in terms of  $R^2$  was evaluated for 13 different APG systems. The statistical results provide a measure of the extent to which

simulated APG payments for a patient correspond to the historical cost for the patient. In general, the statistical performance of the APGs is better than the statistical performance of the inpatient DRGs. The evaluation of the 13 different APG systems resulted in the following conclusions:

- There is virtually no difference in  $R^2$  results for APG relative weights derived from charges or cost.
- The extent of ancillary packaging does affect the  $R^2$  of the APGs. The  $R^2$  results for the simple packaging and full packaging are virtually identical. In comparison to limited packaging, full packaging has minimal impact on  $R^2$  for significant procedure claims, but causes a modest decrease in  $R^2$  for medical claims.
- The APG outlier policy has a significant impact on the  $R^2$  of the APGs. Failure to have any outlier policy causes a large reduction in  $R^2$ , especially for medical claims. An outlier policy of having one percent of total APG payments associated with outliers results in a large improvement in  $R^2$ . A three percent outlier policy further improves  $R^2$  but results in a substantial increase in the number of claims with outlier payments.
- The addition of a 20 percent discount for repeated ancillaries within the same APG has no substantial impact on  $R^2$ .
- Expanding the ancillary packaging of window of service for significant procedure and medical claims beyond the same day has no substantial impact on  $R^2$ .
- Across the 13 APG systems, the only factors that have a substantial payment impact by category of hospital are the extent of ancillary packaging and the basis of the relative weights.

Based on the above results, the recommended APG system is as follows:

- Although the charge and cost based APG relative weights were highly correlated and there was virtually no difference in  $R^2$  between the charge and cost based APG relative weights, the use of cost based relative weights is preferable. Since the cost-to-charge ratio for ancillary departments tends to be lower than other departments, the charge based APG relative weights for ancillary services tend to be higher than the cost based APG relative weights. This would result in proportionately higher APG payments for ancillary services with charge based relative weights than with cost based relative weights. In particular, it would result in an increase for hospitals that deliver ancillaries as their primary outpatient service. As a result of this bias, cost based relative weights are recommended. This bias is the source of the impact differences across hospital categories that would result from using charge based relative weights.
- Ancillary packaging provides the financial incentives for hospital outpatient departments to utilize ancillary services efficiently. In order to provide such incentives, the full ancillary packaging option is preferable. There was a moderate decrease in  $R^2$  for medical claims associated with the full packaging option, and there was some impact across hospital categories as a result of full ancillary packaging.
- Failure to have an outlier policy would result in a significant decrease in  $R^2$  of the APGs. An outlier policy in which one percent of total payments are associated with outliers is preferable.
- While the discounting of repeated ancillary services did not affect  $R^2$  the discounting of high volume, low cost ancillary services in the same APG would add complexity to the system with relatively few benefits. Thus, discounting

of repeated ancillary services is not recommended.

- While it would be desirable to have a wide window of time for ancillary packaging, in order to avoid the incentive to have ancillaries provided on a different day, the current UB-92 does not identify the provider who ordered the ancillary service. Thus, the packaging of ancillaries ordered by a provider and delivered on a different day would impose a significant administrative burden because there is no automated way to identify such ancillaries within the Medicare billing system. It is recommended that the initial implementation of the APGs should have a same day window of time for ancillary packaging. If a wider window of time for ancillary packaging is desired, the identification of the provider who ordered the ancillary must be added to the claim.

In summary, the recommended APG system is APG System 3, which consists of cost based relative weights, full ancillary packaging, a one percent outlier policy, fifty percent discounting of each additional significant procedure, no repeat ancillary discounting and a same day window of time for ancillary packaging. The statistical performance of this APG system exceeded the statistical performance of the current inpatient DRGs. Relative to the basic APG system, APG System 3 does impact relative APG payment in some categories of hospitals. The magnitude of the APG payment impact to any hospital category is always less than four percent. The APG payment impact in some hospital categories due to APG System 3 is largely the result of the full ancillary packaging.

### **Implementation Issues**

The APG system provides the framework for a hospital based outpatient pro-

spective payment system. However, there are a series of additional issues that must be addressed as part of the implementation of an APG based prospective payment system:

#### *Volume of Visits*

In any visit based system, hospitals can increase revenue by increasing the number of visits. Under the existing Medicare outpatient payment system an increase in visits will increase hospital revenue but not necessarily hospital profits. A change to an APG based PPS may create greater incentives to increase visits for certain services. Thus, some means of monitoring and controlling the number of visits should be implemented.

#### *Upcoding and Fragmentation of Procedure Codes*

Although the aggregation of codes into the APGs minimizes the opportunities for upcoding, hospital coding practices will need to be monitored. Procedure code fragmentation occurs when a single procedure is reported using multiple procedure codes. Currently, the Outpatient Code Editor is applied by Medicare to outpatient claims. The Outpatient Code Editor should be expanded in scope to address issues such as procedure code fragmentation.

#### *Identification of Visits*

Since APGs are a visit based payment system, it is essential that visits can be unambiguously identified from the claim form. Batch bills, in which the dates of service span more than one day, present difficulties for the identification of individual visits. Clear rules for the reporting of the dates of service, the units field on the revenue trailers and the submission of batch bills need to be established. The result of these rules should be the ability to uniquely identify an individual visit and the services rendered during that visit.

#### *Shift of Ancillaries to Nonhospital Settings as a Result of Ancillary Packaging*

If the implementation of an APG based PPS includes the full packaging of ancillary services, hospitals will have the financial incentive not to provide the ancillary services directly but to send the patient to a nonhospital setting for the ancillary tests. The nonhospital facility could then bill Medicare separately for the ancillary tests. Thus, ancillaries ordered by hospital outpatient departments but delivered by nonhospital settings must be able to be identified within the claims processing system. In order to expand the window of services for ancillary packaging and to include within the ancillary packaging, all ancillaries ordered by the hospital outpatient department, the claim processing system must identify the provider that ordered an ancillary service.

#### *Payment of Ancillaries Ordered Outside the Hospital*

A large volume of the services provided by the ancillary department of hospitals are ordered by private physicians or other nonhospital based providers. If hospitals are paid on an APG basis for ancillaries ordered outside the hospital, and nonhospital facilities are paid on a different basis, then there will be a payment differential for the same ancillary depending on whether the ancillary service is delivered by a hospital or a nonhospital facility. If hospital ancillary departments are paid less than nonhospital facilities, then hospitals will be at a competitive disadvantage. A negative price differential could cause a shift of ancillary services out of the hospital.

#### *Applicability*

An outpatient PPS need not be limited to hospital outpatient departments but could also include entities that provide similar services. For example, ambulatory sur-

gery centers and free-standing radiology centers that provide services similar to hospital outpatient departments could also be included in an outpatient PPS.

#### *Consistency with Inpatient Payment Levels*

The increase in hospital based ambulatory surgery was, in part, the result of the financial incentives in the Medicare payment system. Since inpatient surgery was paid at the fixed DRG rate and hospital based ambulatory surgery was essentially paid at cost, there was a financial incentive to shift patients to the ambulatory setting where there were no cost controls. If ambulatory surgery is paid at a fixed price, then, depending on the payment rate for surgery performed on an inpatient basis, there may be a financial incentive to perform surgery on an inpatient basis. The inpatient and outpatient payment rates for the same surgical procedure need to be established to provide the proper financial incentives.

#### *Computation of Prospective APG Payment Rates*

Historical charges or cost can be used to compute an initial set of APG relative weights. If the historical charges or cost for some procedures are artificially high, then the APG relative weights would be disproportionately high. Consideration needs to be given to reevaluating some of the APG relative weights based on actual resource use instead of historical cost.

#### *Hospital Specific Payment Adjustments*

The inpatient PPS adjusts the DRG payment levels for hospitals based on hospital specific factors such as disproportionate share and teaching status. The APG simulations included adjustments for labor costs and outliers. An evaluation of whether additional adjustments are necessary in an APG based outpatient PPS

needs to be performed.

#### *APG Update Process*

The APGs will need to be reviewed and updated on an annual basis to reflect changes in technology and practice patterns as well as the annual changes in the procedure and diagnosis codes.

### **Conclusions**

A visit based APG prospective payment system can provide an effective system for the payment of the facility component of hospital based outpatient care. The APGs form a manageable, clinically meaningful set of patient classes that relate the attributes of patients to the resource demands and associated costs experienced by a hospital outpatient department. The components of the APG payment system can be configured to achieve specific policy objectives and to provide financial incentives for hospitals to provide efficient care. Based on the R<sup>2</sup> results and relative APG payment impact across the alternative formulations of the components of an APG system, an APG system with cost based weights, full ancillary packaging, one percent of payments derived from outlier payments, 50 percent multiple significant procedure discounting, no repeat ancillary discounting and a same day window of time is recommended. Remaining implementation issues can be readily resolved and an APG based outpatient PPS can be implemented within a short time frame. The current Medicare payment system for outpatient services is a complex and confusing collection of payment methods, many of which are based on the cost in the hospital department providing the service. In an era of health care cost containment, a cost based payment system for hospital outpatient care is an anachronism which provides no incentives for the efficient

delivery of care and, therefore, must be replaced. An APG based outpatient prospective payment system can be a practical and effective basis for the reform of the Medicare cost based outpatient payment system.

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## **Appendix A**

### **List of Version 2.0 APGs**

#### **SIGNIFICANT PROCEDURE AND THERAPY APGs**

##### **APC 1 Integumentary System**

- 001 PHOTOCHEMOTHERAPY
- 002 SUPERFICIAL NEEDLE BIOPSY AND ASPIRATION
- 003 COMPLEX INCISION AND DRAINAGE
- 004 SIMPLE INCISION AND DRAINAGE
- 005 NAIL PROCEDURES
- 006 SIMPLE DEBRIDEMENT AND DESTRUCTION
- 007 COMPLEX EXCISION, BIOPSY AND DEBRIDEMENT
- 008 SIMPLE EXCISION AND BIOPSY
- 009 COMPLEX SKIN REPAIRS INCL INTEGUMENT GRAFTS, TRANSFER & REARRANGE
- 010 SIMPLE SKIN REPAIR
- 011 SIMPLE INCISION AND EXCISION OF BREAST
- 012 BREAST RECONSTRUCTION AND MASTECTOMY

##### **APC 2 Musculoskeletal System**

- 021 COMPLEX MUSCULOSKELETAL PROCEDURES EXCLUDING HAND AND FOOT
- 022 SIMPLE MUSCULOSKELETAL PROCEDURES EXCLUDING HAND AND FOOT
- 023 COMPLEX HAND AND FOOT MUSCULOSKELETAL PROCEDURES
- 024 SIMPLE HAND AND FOOT MUSCULOSKELETAL PROCEDURES
- 025 ARTHROSCOPY
- 026 REPLACEMENT OF CAST
- 027 SPLINT, STRAPPING AND CAST REMOVAL
- 028 CLOSED TREATMENT FX & DISLOCATION OF FINGER, TOE & TRUNK
- 029 CLOSED TREATMENT FX & DISLOCATION EXC FINGER, TOE & TRUNK
- 030 OPEN OR PERCUTANEOUS TREATMENT OF FRACTURES
- 031 BONE OR JOINT MANIPULATION UNDER ANESTHESIA
- 032 BUNION PROCEDURES
- 033 ARTHROPLASTY
- 034 HAND AND FOOT TENOTOMY
- 035 ARTHROCENTESIS AND LIGAMENT OR TENDON INJECTION

##### **APC 3 Respiratory System**

- 051 PULMONARY TESTS
- 052 NEEDLE AND CATHETER BIOPSY, ASPIRATION, LAVAGE AND INTUBATION
- 053 COMPLEX ENDOSCOPY OF THE UPPER AIRWAY
- 054 SIMPLE ENDOSCOPY OF THE UPPER AIRWAY
- 055 ENDOSCOPY OF THE LOWER AIRWAY
- 057 RESPIRATORY THERAPY

##### **APC 4 Cardiovascular System**

- 071 EXERCISE TOLERANCE TESTS
- 072 ECHOCARDIOGRAPHY
- 073 PHONOCARDIOGRAM
- 074 CARDIAC ELECTROPHYSIOLOGIC TESTS
- 075 PLACEMENT OF TRANSVENOUS CATHETERS
- 076 DIAGNOSTIC CARDIAC CATHETERIZATION

- 077 ANGIOPLASTY AND TRANSCATHETER PROCEDURES
- 078 PACEMAKER INSERTION AND REPLACEMENT
- 079 REMOVAL AND REVISION OF PACEMAKER AND VASCULAR DEVICE
- 080 MINOR VASCULAR REPAIR AND FISTULA CONSTRUCTION
- 081 SECONDARY VARICOSE VEINS AND VASCULAR INJECTION
- 082 VASCULAR LIGATION
- 083 RESUSCITATION AND CARディオVERSION
- 084 CARDIAC REHABILITATION

**APC 5 Hematologic, Lymphatic and Endocrine**

- 091 CHEMOTHERAPY BY EXTENDED INFUSION
- 092 CHEMOTHERAPY EXCEPT BY EXTENDED INFUSION
- 093 PHLEBOTOMY
- 094 BLOOD AND BLOOD PRODUCT EXCHANGE
- 095 DEEP LYMPH STRUCTURE AND THYROID PROCEDURES
- 096 ALLERGY TESTS
- 097 TRANSFUSION

**APC 6 Digestive System**

- 111 ALIMENTARY TESTS AND SIMPLE TUBE PLACEMENT
- 112 ESOPHAGEAL DILATION WITHOUT ENDOSCOPY
- 113 ANOSCOPY WITH BIOPSY AND DIAGNOSTIC PROCTOSIGMOIDOSCOPY
- 114 PROCTOSIGMOIDOSCOPY WITH EXCISION OR BIOPSY
- 115 DIAGNOSTIC UPPER GI ENDOSCOPY OR INTUBATION
- 116 THERAPEUTIC UPPER GI ENDOSCOPY OR INTUBATION
- 117 LOWER GASTROINTESTINAL ENDOSCOPY
- 118 ERCP AND MISCELLANEOUS GI ENDOSCOPY PROCEDURES
- 119 HERNIA AND HYDROCELE PROCEDURES
- 120 COMPLEX ANAL AND RECTAL PROCEDURES
- 121 SIMPLE ANAL AND RECTAL PROCEDURES
- 122 MISCELLANEOUS ABDOMINAL PROCEDURES
- 123 COMPLEX LAPAROSCOPIC PROCEDURES
- 124 SIMPLE LAPAROSCOPIC PROCEDURES

**APC 7 Urinary System**

- 131 RENAL EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY
- 132 SIMPLE URINARY STUDIES AND PROCEDURES
- 133 URINARY CATHETERIZATION AND DILATATION
- 134 COMPLEX CYSTOURETHROSCOPY AND LITHOLAPAXY
- 135 MODERATE CYSTOURETHROSCOPY
- 136 SIMPLE CYSTOURETHROSCOPY
- 137 COMPLEX URETHRAL PROCEDURES
- 138 SIMPLE URETHRAL PROCEDURES
- 139 HEMODIALYSIS
- 140 PERITONEAL DIALYSIS

**APC 8 Male Genital System**

- 151 TESTICULAR AND EPIDIDYMAL PROCEDURES
- 152 INSERTION OF PENILE PROSTHESIS
- 153 COMPLEX PENILE PROCEDURES
- 154 SIMPLE PENILE PROCEDURES

155 PROSTATE NEEDLE AND PUNCH BIOPSY

**APC 9 Female Genital System**

171 ARTIFICIAL FERTILIZATION  
172 PROCEDURES FOR PREGNANCY AND NEONATAL CARE  
173 TREATMENT OF SPONTANEOUS ABORTION  
174 THERAPEUTIC ABORTION  
175 VAGINAL DELIVERY  
176 COMPLEX FEMALE REPRODUCTIVE PROCEDURES  
177 SIMPLE FEMALE REPRODUCTIVE PROCEDURES  
178 DILATION AND CURETTAGE  
179 HYSTEROSCOPY  
180 COLPOSCOPY

**APC 10 Nervous System**

191 EXTENDED EEG STUDIES  
192 ELECTROENCEPHALOGRAM  
193 ELECTROCONVULSIVE THERAPY  
194 NERVE AND MUSCLE TESTS  
195 NERVOUS SYSTEM INJECTIONS, STIMULATIONS OR CRANIAL TAP  
196 REVISION AND REMOVAL OF NEUROLOGICAL DEVICE  
197 NEUROSTIMULATOR AND VENTRICULAR SHUNT IMPLANTATION  
198 NERVE REPAIR AND DESTRUCTION  
199 SPINAL TAP

**APC 11 Eye and Ocular Adnexa**

211 MINOR OPHTHALMOLOGICAL TESTS AND PROCEDURES  
212 FITTING OF CONTACT LENSES  
213 LASER EYE PROCEDURES  
214 CATARACT PROCEDURES  
215 COMPLEX ANTERIOR SEGMENT EYE PROCEDURES  
216 MODERATE ANTERIOR SEGMENT EYE PROCEDURES  
217 SIMPLE ANTERIOR SEGMENT EYE PROCEDURES  
218 COMPLEX POSTERIOR SEGMENT EYE PROCEDURES  
219 SIMPLE POSTERIOR SEGMENT EYE PROCEDURES  
220 STRABISMUS AND MUSCLE EYE PROCEDURES  
221 COMPLEX REPAIR AND PLASTIC PROCEDURES OF EYE  
222 SIMPLE REPAIR AND PLASTIC PROCEDURES OF EYE  
223 VITRECTOMY

**APC 12 Facial, Ear, Nose, Mouth and Throat**

231 COCHLEAR DEVICE IMPLANTATION  
232 OTORHINOLARYNGOLOGIC FUNCTION TESTS  
233 NASAL CAUTERIZATION AND PACKING  
234 COMPLEX FACIAL AND ENT PROCEDURES  
235 SIMPLE FACIAL AND ENT PROCEDURES  
236 TONSIL AND ADENOID PROCEDURES  
237 SIMPLE AUDIOMETRY

**APC 13 Therapeutic and Other Significant Radiological Procedures**

- 251 THERAPEUTIC NUCLEAR MEDICINE
- 252 RADIATION THERAPY AND HYPERTHERMIA
- 253 VASCULAR RADIOLOGY EXCEPT FOR VENOGRAPHY OF EXTREMITY
- 254 MYELOGRAPHY
- 255 MISCELLANEOUS RADIOLOGICAL PROCEDURES WITH CONTRAST

**APC 14 Physical Medicine and Rehabilitation**

- 271 OCCUPATIONAL THERAPY
- 272 PHYSICAL THERAPY
- 273 SPEECH THERAPY

**APC 15 Mental Illness and Substance Abuse Therapies**

- 281 NEUROPSYCHOLOGICAL TESTING
- 282 FULL DAY PARTIAL HOSPITALIZATION FOR SUBSTANCE ABUSE
- 283 FULL DAY PARTIAL HOSPITALIZATION FOR MENTAL ILLNESS
- 284 HALF DAY PARTIAL HOSPITALIZATION FOR SUBSTANCE ABUSE
- 285 HALF DAY PARTIAL HOSPITALIZATION FOR MENTAL ILLNESS
- 286 COUNSELLING OR INDIVIDUAL BRIEF PSYCHOTHERAPY
- 287 INDIVIDUAL COMPREHENSIVE PSYCHOTHERAPY
- 288 FAMILY PSYCHOTHERAPY
- 289 GROUP PSYCHOTHERAPY

**ANCILLARY SERVICES APGs****APC 16 Radiology**

- 301 COMPLEX DIAGNOSTIC NUCLEAR MEDICINE
- 302 INTERMEDIATE DIAGNOSTIC NUCLEAR MEDICINE
- 303 SIMPLE DIAGNOSTIC NUCLEAR MEDICINE
- 304 OBSTETRICAL ULTRASOUND
- 305 DIAGNOSTIC ULTRASOUND EXCEPT OBSTETRICAL
- 306 MAGNETIC RESONANCE IMAGING
- 307 COMPUTERIZED AXIAL TOMOGRAPHY
- 308 A MAMMOGRAPHY
- 309 DIGESTIVE RADIOLOGY
- 310 PLAIN FILM
- 311 THERAPEUTIC RADIATION TREATMENT PREPARATION

**APC 17 Anesthesia**

- 321 ANESTHESIA

**APC 18 Pathology**

- 331 COMPLEX PATHOLOGY
- 332 SIMPLE PATHOLOGY
- 333 PAP SMEARS

**APC 19 Laboratory**

- 341 BLOOD AND TISSUE TYPING
- 342 COMPLEX IMMUNOLOGY TESTS
- 343 SIMPLE IMMUNOLOGY TESTS
- 344 COMPLEX MICROBIOLOGY TESTS
- 345 SIMPLE MICROBIOLOGY TESTS

- 346 COMPLEX ENDOCRINOLOGY TESTS
- 347 SIMPLE ENDOCRINOLOGY TESTS
- 348 COMPLEX CHEMISTRY TESTS
- 349 SIMPLE CHEMISTRY TESTS
- 350 BASIC CHEMISTRY TESTS
- 351 MULTICHANNEL CHEMISTRY TESTS
- 352 ORGAN OR DISEASE ORIENTED PANELS
- 353 TOXICOLOGY TESTS
- 354 THERAPEUTIC DRUG MONITORING
- 355 COMPLEX CLOTTING TESTS
- 356 SIMPLE CLOTTING TESTS
- 357 COMPLEX HEMATOLOGY TESTS
- 358 SIMPLE HEMATOLOGY TESTS
- 359 URINALYSIS
- 360 BLOOD AND URINE DIPSTICK TESTS

**APC 20 Other Ancillary Tests and Procedures**

- 371 SIMPLE PULMONARY FUNCTION TESTS
- 372 INFUSION THERAPY EXCEPT CHEMOTHERAPY
- 373 CARDIOGRAM
- 374 COMPLEX IMMUNIZATION
- 375 MODERATE IMMUNIZATION
- 376 SIMPLE IMMUNIZATION AND ALLERGY IMMUNOTHERAPY
- 377 MINOR REPRODUCTIVE PROCEDURES
- 378 MINOR CARDIAC AND VASCULAR TESTS
- 379 MINOR OPHTHALMOLOGICAL INJECTION, SCRAPING AND TESTS
- 380 PACEMAKER ANALYSIS
- 381 TUBE CHANGE
- 382 PROVISION OF VISION AIDS
- 383 INTRODUCTION OF NEEDLE AND CATHETER
- 384 DRESSINGS AND OTHER MINOR PROCEDURES
- 385 OTHER MISCELANEOUS ANCILLARY PROCEDURES
- 386 BIOFEEDBACK AND OTHER TRAINING

**APC 21 Chemotherapy Drugs**

- 391 CLASS ONE CHEMOTHERAPY DRUGS
- 392 CLASS TWO CHEMOTHERAPY DRUGS
- 393 CLASS THREE CHEMOTHERAPY DRUGS
- 394 CLASS FOUR CHEMOTHERAPY DRUGS
- 395 CLASS FIVE CHEMOTHERAPY DRUGS

**APC 22 Ancillary Mental Illness and Substance Abuse Services**

- 411 PSYCHOTROPIC MEDICATION MANAGEMENT
- 412 ACTIVITY THERAPY

**APC 23 Incidental Procedures and Services**

- 421 INCIDENTAL TO MEDICAL, SIGNIFICANT PROCEDURE OR THERAPY VISIT
- 422 MEDICAL VISIT INDICATOR

## **MEDICAL APGs**

### **APC 24 Malignancy**

- 431 HEMATOLOGICAL MALIGNANCY
- 432 PROSTATIC MALIGNANCY
- 433 LUNG MALIGNANCY
- 434 BREAST MALIGNANCIES
- 435 GI MALIGNANCIES
- 436 SKIN MALIGNANCY
- 437 OTHER MALIGNANCIES

### **APC 25 Poisoning**

- 451 POISONING

### **APC 26 Trauma**

- 461 HEAD AND SPINE INJURY
- 462 MINOR SKIN AND SOFT TISSUE INJURIES EXCEPT BURNS
- 463 SKIN AND SOFT TISSUE INJURIES EXCEPT BURNS
- 464 FRACTURE, DISLOCATION AND SPRAIN
- 465 BURNS
- 466 OTHER INJURIES

### **APC 27 Neonate**

- 481 NEONATE AND CONGENITAL ANOMALY

### **APC 28 Pregnancy**

- 491 ROUTINE PRENATAL CARE
- 492 MATERNAL ANTEPARTUM COMPLICATION
- 493 ROUTINE POSTPARTUM CARE
- 494 MATERNAL POSTPARTUM COMPLICATION

### **APC 29 Infectious Diseases**

- 501 COMPLEX INFECTIOUS DISEASE
- 502 MISCELLANEOUS INFECTIOUS DISEASES
- 503 INFECTIOUS DISEASES OF GENITAL ORGANS

### **APC 30 Nervous System Diseases**

- 511 TIA, CVA AND OTHER CEREBROVASCULAR EVENTS
- 512 HEADACHE
- 513 EPILEPSY
- 514 NON TRAUMATIC LOSS OF CONSCIOUSNESS
- 515 OTHER DISEASES OF THE NERVOUS SYSTEM

### **APC 31 Eye Diseases**

- 531 CATARACTS
- 532 REFRACTION DISORDER
- 533 CONJUNCTIVITIS AND OTHER SIMPLE EXTERNAL EYE INFLAMMATION
- 534 EYE DISEASES EXCEPT CATARACT, REFRACTION DISORDER & CONJUNCTIVITIS

### **APC 32 Ear, Nose, Mouth and Throat Diseases**

- 541 DENTAL DISEASE
- 542 INFLUENZA, URI AND ENT INFECTIONS

- 543 HEARING LOSS
- 544 OTHER COMPLEX EAR, NOSE, THROAT AND MOUTH DISEASES
- 545 OTHER SIMPLE EAR, NOSE, THROAT AND MOUTH DISEASES

**APC 33 Respiratory System Diseases**

- 561 EMPHYSEMA, CHRONIC BRONCHITIS, AND ASTHMA
- 562 PNEUMONIA
- 563 COMPLEX RESPIRATORY DIS EXC EMPHYSEMA, CHR BRONCHITIS & ASTHMA
- 564 SIMPLE RESPIRATORY DIS EXC EMPHYSEMA, CHR BRONCHITIS & ASTHMA

**APC 34 Cardiovascular System Diseases**

- 571 CONGESTIVE HEART FAILURE AND ISCHEMIC HEART DISEASE
- 572 HYPERTENSION
- 573 CHEST PAIN W CARDIAC ENZYMES TO RULE OUT MYOCARDIAL INFARCT
- 574 CHEST PAIN WO CARDIAC ENZYMES TO RULE OUT MYOCARDIAL INFARCT
- 575 SIMPLE CARDIOVASCULAR DIS EXC CHF, ISCHEMIC HEART DIS & HYPERTN
- 576 COMPLEX CARDIOVASCULAR DIS EXC CHF, ISCHEMIC HEART DIS & HYPERTN

**APC 35 Digestive System Diseases**

- 591 NONINFECTIOUS GASTROENTERITIS
- 592 ULCERS, GASTRITIS AND ESOPHAGITIS
- 593 HEPATOBILIARY DISEASE
- 594 HERNIA
- 595 HEMORRHOIDS AND OTHER ANAL-RECTAL DISEASES
- 596 OTHER COMPLEX GASTROINTESTINAL DISEASES
- 597 OTHER SIMPLE GASTROINTESTINAL DISEASES

**APC 36 Major Signs, Symptoms and Findings**

- 611 MAJOR SIGNS, SYMPTOMS AND FINDINGS

**APC 37 Musculoskeletal Diseases**

- 621 BACK DISORDERS
- 622 COMPLEX MUSCULOSKELETAL DISEASES EXCEPT BACK DISORDERS
- 623 SIMPLE MUSCULOSKELETAL DISEASES EXCEPT BACK DISORDERS

**APC 38 Skin and Breast Diseases**

- 631 DISEASE OF NAILS
- 632 CHRONIC SKIN ULCER
- 633 CELLULITIS, IMPETIGO AND LYMPHANGITIS
- 634 BREAST DISEASES
- 635 SKIN DISEASES

**APC 39 Endocrine, Nutritional and Metabolic Diseases**

- 651 DIABETES
- 652 COMPLEX ENDOCRINE, NUTRIT & METABOLIC DIS EXC DIABETES & OBESITY
- 653 SIMPLE ENDOCRINE, NUTRITIONAL & METABOLIC DISEASE EXC DIABETES
- 654 FLUID AND ELECTROLYTE DISORDERS

**APC 40 Kidney and Urinary Tract Diseases**

- 661 URINARY TRACT INFECTION
- 662 RENAL FAILURE
- 663 COMPLEX URINARY DIS EXC URINARY TRACT INFECTION & RENAL FAILURE

664 SIMPLE URINARY DIS EXC URINARY TRACT INFECTN & RENAL FAILURE

**APC 41 Male Genital System Diseases**

671 BENIGN PROSTATIC HYPERTROPHY

672 MALE REPRODUCTIVE DISEASES EXCEPT BENIGN PROSTATIC HYPERTROPHY

**APC 42 Female Genital System Diseases**

681 GYNECOLOGIC DISEASES

**APC 43 Immunologic and Hematologic Diseases**

691 HIV INFECTION

692 ANEMIA

693 OTHER COMPLEX IMMUNOLOGIC AND HEMATOLOGIC DISEASE

694 OTHER SIMPLE IMMUNOLOGIC AND HEMATOLOGIC DISEASE

**APC 44 Well Care, Administrative**

701 ADULT MEDICAL EXAMINATION

702 WELL CHILD CARE

703 CONTRACEPTION AND PROCREATIVE MANAGEMENT

704 AFTERCARE

705 NONSPECIFIC SIGNS & SYMPTOMS & OTH CONTACTS W HEALTH SVCS

**APC 45 Unknown Cause of Mortality**

721 UNKNOWN CAUSE OF MORTALITY

**APC 46 Error**

992 INVALID PROCEDURE CODE

993 INPATIENT PROCEDURE

994 AUTOPSY SERVICES

995 NON COVERED CARE SETTINGS AND SERVICES

996 INVALID RVDX CODE

997 ECODE CANNOT BE USED AS RVDX

998 UNACCEPTABLE RVDX, REQUIRES PROCEDURE

999 UNGROUPABLE

