3M™ Clinical Risk Groups (CRG) Classification System

Methodology Overview

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Chapter 1: Introduction to CRGs

The 3M™ Clinical Risk Groups (CRG) Classification System describes the health status and burden of illness of individuals in an identified population. The CRG methodology is a categorical clinical model that classifies each member of the population based on his or her burden of medical conditions, assigning each individual to a single mutually exclusive risk category. Individuals with one or more chronic conditions are classified based on those conditions or combinations of conditions, with further breakouts for condition-specific severity of illness. Individuals without a chronic condition are assigned to groups for one or more significant acute illness, or other significant health event such as delivery or newborn birth, and those without a significant acute condition, to various groups for "healthy." The CRG methodology can be used for stratifying populations, risk adjustment, predicting healthcare utilization and cost, tracking health outcomes, and analyzing the health of populations.

Individuals with severe disease consume a disproportionate share of healthcare resources. Because of the disproportionate use of resources by subgroups of the population, any attempt to understand and predict the resource use and expenditures for a population must risk adjust for the health status and burden of illness of individuals in that population. This is essential from both a population management and payment perspective. For payment purposes, failure to include adequate risk adjustment can result in the inequitable distribution of financial and other resources, causing significant problems for organizations that provide care to the sicker parts of the population and ultimately affect the quality of care given to those individuals most in need of it.

CRGs are a management tool that can also be used as a basis for risk adjusting capitated payments. The success of any risk-adjustment system depends on providers being able to respond appropriately to the incentives to deliver care efficiently and effectively, and not selecting healthier members of the population to the detriment of sicker individuals. Risk adjustment, incentives for efficiency, and management's response are all interrelated. Any effective risk-adjustment system must address these interrelated issues simultaneously. CRGs were developed to be clinically precise and therefore useful as both a management tool and a means of risk adjusting capitated payments.

The design and development of CRGs has been greatly influenced by the success of the Medicare inpatient Prospective Payment System (PPS). The Medicare PPS was the first large-scale implementation of a payment system that incorporated the clinical characteristics of a patient into the determination of the payment amount for the patient. The Medicare PPS is a per-case payment system that uses Diagnosis Related Groups (DRGs) as the basic unit of payment. DRGs assign each patient to a single, mutually exclusive, and clinically coherent group in which patients can be expected to consume similar amounts and types of hospital resources, allowing a prospective payment amount to be established for each DRG. This approach has allowed hospitals to respond to the incentives in the payment system, and more importantly, communicate them to physicians and others. The soundness of the DRG approach is best demonstrated by the fact that the basic assumptions of the DRG approach are as valid today as they were in the implementation of the first DRG-based systems in the early 1980s.

Like DRGs, CRGs consist of a set of mutually exclusive and clinically coherent groups. There are two central distinctions between CRGs and DRGs. The first is that DRGs classify a single encounter at a point in time (i.e., a hospitalization), while CRGs classify the individual and all their healthcare services for an extended period of time for members of a defined population. The second distinction is that although it is called a prospective payment system (payment rates are set prospectively), DRGs are assigned after the services are rendered or retrospectively. CRGs on the other hand, can be used both prospectively and retrospectively. Prospectively, the CRG assignment is used to predict healthcare utilization and costs for a time period that has yet to occur. Retrospectively, the CRGs are used to risk adjust for healthcare utilization and costs for the time period that has just finished.

The CRG Prospective Model and the CRG Concurrent Model both classify individuals based on the same information from the base period or "analysis period." Both models produce grouped output in the same format, and the majority of the grouping assignments are the same, but there are important differences. The two models process some of the information differently and give emphasis to certain factors. This leads to two main types of differences in the grouping assignments. The base category assignments are mostly the same for chronic illness categories, but are often different for non-chronic illness categories with the Concurrent Model making greater distinctions for significant acute illnesses and significant health events such as deliveries and newborn births. The other main difference is that severity of illness assignments for chronic disease conditions, while most often the same for the Prospective and Concurrent Models, are sometimes different. This is because certain factors that are very important for depicting the severity of illness and complexity of care for the Concurrent period are not quite as significant for the Prospective period.

CRGs provide healthcare planners, managers, and physicians a meaningful basis for evaluating both the processes of care and the associated financial impacts. The categorical nature of CRGs not only creates a powerful communications tool but also makes establishing the payment level for each category of individuals a relatively straightforward matter of computing the average cost of individuals in each CRG, after data edits are applied and approaches to outlier patients are decided. The categorical nature of CRGs permits separation of benefit coverage and payment level computation from the clinical definition of the CRG categories, allowing the underlying clinical model to remain stable while benefit levels, reimbursement levels, and practice patterns change.

As a categorical clinical model, CRGs are different than most other population risk adjustment systems, which are statistical models developed with regression analysis. The regression models produce a numeric score for each individual, and may also generate as part of its output a listing of diagnostic categories and their associated coefficients, but has minimal communication and management value. The update process for the coefficients can also be difficult to perform independent of the developers because it requires re-specification and re-estimation of the regression statistical model.

The data used in the assignment of CRGs are routinely collected by standard claims processing systems, electronic medical records, and other repositories of healthcare data. These data include age, sex, diagnoses, procedures, pharmaceuticals (if available), date of service or fill date for pharmaceuticals, site of service, and provider type. By using widely available data, CRGs are readily assignable. The main responsibility for a user, and it is an important responsibility, is to ensure that the claims and encounter data sets are complete and reliable.

In sum, the CRGs are a clinical classification methodology in which each individual is assigned to a single mutually exclusive risk group that relates the historical clinical and demographic characteristics of the individual to the amount and type of healthcare resources that individual has consumed (Concurrent Model) or will likely consume in the future (Prospective Model). Since the CRGs are clinically based, they create a language that links the clinical and financial aspects of care.

Following is an overview of the development process for CRGs, a description of the types of hierarchical and conditionality logic that are central to the CRG system, and an overview of the five phases of clinical logic in the CRG system and a sixth phase for Functional Status grouping. This includes the processes to edit medical claims and encounter data, assign diagnostic and procedure categories to each of the codes passing edits, and apply logic to evaluate all the diagnostic information and assign each person to a mutually exclusive final CRG category.

The following table displays the broadest levels of CRG categorization, the nine Health Status Groups (page 41), and the types and counts of categories within each including severity levels and aggregations for both the Concurrent Model (QCRGs) and Prospective Model (PCRGs) in CRG v2.0. The table also displays the number or categories, including severity levels, in each of the three levels of aggregation of the methodology, the QACRGs and the PACRGs. These are the final category counts after all five phases of logic are implemented.

Health Status Group	Health Status Description	Sample Conditions	PCRG/ QCRG	PACRG1/ QACRG1	PACRG2/ QACRG2	PACRG3/ QACRG3
9	Catastrophic	History of Major Organ Transplant	40	36	16	6
8	Malignancy Under Active Treatment	Metastatic Colon Malignancy	120	32	10	5
7	Dominant/Moderate Chronic Triplets	Diabetes + CHF+ COPD	168	54	12	6
6	Dominant or Moderate Chronic Pair	Diabetes + CHF	462	234	66	6
5	Single Dominant or Moderate Chronic	Diabetes	500	184	54	6
4	Multiple Minor Chronic	Migraine and BPH	4	4	4	4
3	Single Minor Chronic	Migraine	100	40	10	2
2P	Significant Acute (Prospective)	Chest Pain	19	19	19	4
2Q	Significant Acute (Concurrent)	Delivery with complications and antepartum conditions	22	22	22	4
1P	Healthy/Non-User (Prospective)	Acute Pain	15	15	15	5

Health Status Group	Health Status Description	Sample Conditions	PCRG/ QCRG	PACRG1/ QACRG1	PACRG2/ QACRG2	PACRG3/ QACRG3
1Q	Healthy/ Non-User (Concurrent)	Delivery without complications	18	18	18	5
	Totals (Prospective)		**1428**	**618**	**206**	**44**
	Totals (Concurrent)		**1434**	**624**	**212**	**44**

Note, the nine Health Status Groups are defined primarily by the presence of chronic illness, the type of chronic illness condition, and the presence of multiple chronic conditions. So, in general, individuals assigned to the higher Health Status Groups are more complex than those assigned to lower Health Status Groups, though there is a wide range of complexity within each Health Status Group so this is generally, but not always the case. For example, an individual assigned to a CRG in Status 5 for Single Dominant or Moderate Chronic Condition that is severity level 3 or 4, is likely to be as complex, or more so, than an individual assigned to a CRG in Status 6 for Dominant or Moderate Chronic Pair that is severity level 1.

It is also very important to note that there is a wide range of complexity within Health Status Groups 1 and 2, and that some of these individuals have greater complexity and greater need for medical care services than many of the individuals assigned to chronic illness CRGs in higher Status Groups, at least during the Concurrent time period. This includes individuals who have complicated pregnancies and deliveries, complicated newborn births, and major trauma and other major acute illness. This also includes individuals who don't have any chronic condition diagnoses that passed the CRG software data edit screens, but have at least one outpatient reporting of what may be a significant chronic health condition (or maybe a rule-out diagnosis) or have a significant prescription medicine suggestive of the presence of an ongoing chronic condition.

CRG development process

The development of CRGs began with a National Institute of Standards and Technology (NIST) Advanced Technology Program (ATP) grant in the late 1990's for "The Development of an Episode Grouper" (94-04-0028). The participants in the initial development of CRGs were 3M Health Information Systems, Aon Consulting, the National Association of Children's Hospitals and Related Institutions (NACHRI), and many clinical consultants.

The first version of the 3M™ Clinical Risk Grouping Software, version 1.0, was released in 2000. Since then, there have been annual updates. Some annual releases focus on new diagnosis, pharmaceutical and procedure code updates and selective enhancements, while others follow more extensive research, extending the knowledge that has been gained since the original and subsequent releases, and taking advantage of improvements in technology and the feedback from CRG users.

The basic process of development for CRGs remains similar to the original approach. The clinical logic of CRGs is developed in three stages of research:

1. Development of overall CRG algorithm
2. Clinical parameterization of the CRG algorithm
3. Review and testing of clinical parameterization of the CRG algorithm with historical data

Developing the CRG algorithm and the clinical parameterization of the methodology also involves the development of an extensive set of hierarchical rules and conditional relationships. This is to establish how to view various different diagnoses in relation to each other, and how to best represent the overall health status and burden of illness for the individual person.

The process of CRG development is fundamentally an iterative process of clinical hypothesis testing. During each of the stages of the CRG development process, panels of clinical experts form hypotheses. These hypotheses are tested against data and where the two differ, clinical judgment takes precedence over "fitting to the data." While this approach requires a significant investment in time and the involvement of clinical experts, it results in a categorical model with a high degree of clinical face validity.

Stage 1: Development of overall CRG algorithm

In the initial stage of development, the overall architecture of CRGs was designed. The first and most fundamental design decision was to develop the methodology as a categorical model, not a regression model. Then, a next level of design decisions for the building blocks of the methodology needed to be developed. The use of Diagnostic Subgroups (DSGs), Episode Diagnostic Categories (EDCs) and Episode Procedure Categories (EPCs), the defining of body systems, the role of the Primary Chronic Disease (PCD) within each body system, and the creation of the nine broad CRG Health Status Groups are additional examples of the more specific design decisions that define the overall architecture of CRGs.

Another important design decision was to develop somewhat different CRG models for concurrent and prospective applications. The two models are similar in most respects, with two main differences. One, the Concurrent CRG Model has additional categories distinguishing significant health events such as pregnancy, delivery and newborn birth, and also major acute illnesses. Two, there are some differences in severity of illness assignments for chronic disease CRGs because some of the severity leveling factors that are very important for the Concurrent time period are not quite as significant for the Prospective time period.

These design decisions were formulated into an algorithm that classifies all diagnostic conditions and assigns each person to a final mutually exclusive CRG. The criteria for the design of the algorithm for assigning a CRG was strictly clinical. The focus was to create an algorithm that would permit conditional and complex clinical characteristics to be specified. The premise was that the clinical characteristics are dependent on the nature and extent of an individual's underlying diseases. In particular, the ability to identify individuals with significant disease in multiple organ systems, along with an explicit specification of severity of illness, was emphasized.

In essence, the CRG algorithm combines detailed clinical distinctions into a meaningful overall clinical description of the individual. The diversity and complexity of the clinical issues required

an algorithm that could reflect the unique clinical characteristics of each disease and each combination of diseases, along with changes in disease processes over time for the individual.

Stage 2: Clinical parameterization of the CRG algorithm

Once the overall CRG algorithm was developed, the next step was to parameterize by identifying the clinical specification details. Very briefly, the building block categories of the system—DSGs, EDCs, and EPCs—first need to be defined and codes assigned to each. Next, all the diagnostic categories needed to be assigned to a set of defined body systems or Major Diagnostic Categories (MDCs). Then a set of hierarchies need to be specified to select a Primary Chronic Disease (PCD) when there are multiple chronic EDCs from within the same body system. Next, each individual needs to be assigned to a mutually exclusive CRG category, based upon another set of clinical rules and hierarchies.

For individuals assigned to a chronic illness CRG category, a set of severity of illness specifications are developed that are specific to each chronic condition. For individuals who do not have any chronic illness conditions, assignment to a CRG category is based upon the presence of one or more significant acute illnesses, or absent significant acute illness, to one of the CRG categories for "healthy." For the Concurrent Model, this includes specifying some additional categories and hierarchies and classification overrides for certain of the more serious acute illness, delivery and newborn categories over certain of the chronic illness categories. The last phase of CRG assignment logic involves developing specifications for rolling up each CRG to a set of Aggregated CRGs (ACRGs).

All decisions on the initial parameterization of the CRG algorithm are made on a clinical basis without any review of historical expenditure data. Outside clinical specialists are frequently consulted. The focus of the clinical decisions is on the identification of clinical characteristics that affected an individual's need for medical care, debility and death, both in the future and in the current time period.

Stage 3: Review and testing of clinical parameterization of the CRG algorithm with historical data

For the initial development of CRGs, three data sets were used: Medicare, Medicaid, and Commercial. The same approach was used for the revisions in CRG v2.0. Three data sets were obtained. The Medicare data did not include Part D (prescription drugs) while the other two data sets included pharmaceutical data. The approach used for all three data sets was to use two years to assign the CRGs (the "analysis period") and data from a third year for prospective analysis.

To increase the completeness, reliability, and usability of the population data sets, a series of edit screens were applied to enrollment eligibility and financial data. To have relatively complete diagnostic information for each data set, fairly strict edit criteria was established that required nine months of eligibility for service in each of the years of claims data. One exception was that a lesser eligibility requirement was established for newborns in the analysis period used for grouping the data. Fewer months are needed for newborns to capture the relevant newborn,

perinatal, congenital anomaly, and other infant diagnoses that are likely to occur. To require nine months of eligibility would also unnecessarily lead to the removal from the database of three-quarters of all newborns. Alternatively, if two years of claims data is available for the analysis period, then this can be searched to identify any newborn with 9-12 months of eligibility across the two year period. Finally, edit screens were applied to the data to check for the reasonableness of "allowed charges."

For each of the population data sets, detailed CRG analysis reports were then produced, examining the impact of a wide range of clinical characteristics on individuals with specific diseases and combinations of diseases. To illustrate, for establishing or revising the base CRGs, the frequency of each chronic and acute condition was identified across different population groups. For establishing or revising severity of illness levels, reports examined the impact of candidate severity factors for different chronic conditions. As an example, the impact of EDCs for pneumonia and other major or moderate infections for the chronic EDC of chronic obstructive pulmonary disease (COPD) was examined under various conditions such as having occurred in the most recent 12 months or multiple times in the last 12 months spanning a period of 90 days or longer. The impact of such illnesses was evaluated in a similar manner for a series of other chronic conditions where relevant. Thus, the reports were extremely detailed and examined essentially all conditions from the same body system as well as relevant complicating conditions from other body systems.

Based on the initial review of the data, the clinical parameterization of the CRG algorithm was modified, the CRGs were reassigned to the data, the CRG analysis reports were reproduced and the reports were reviewed again. The complete process was repeated multiple times. Thus, the process of finalizing the parameterization of the CRG algorithm was highly iterative.

The review of expenditures for specific clinical characteristics sometimes produced statistical results for which there was no clinical rationale. Statistical results that were clinically unreasonable were not used as a basis for modifying the parameterization of the CRG algorithm. If clinically unreasonable statistical results occurred with high frequency, additional confirmation of the CRG development process was obtained from outside clinical experts in the specialty area.

The end result of the process was a clinical model that had been extensively reviewed using historical data. And of particular importance, a single clinical model was developed that captured diagnostic conditions important to and appropriate for use across Medicare, Medicaid, and commercially insured populations.

Chapter 2: Hierarchy and rules logic

The assignment of a 3M™ Clinical Risk Group (CRG) requires classification of large and variable amounts of data across many different contexts and periods of time.

In order to process all the information on diagnoses, procedures, and pharmaceuticals for a period of time and assign each individual to a single mutually exclusive category, an extensive set of clinical rules and relationships needs to be specified. Key to this process is the ability to be sensitive to the fact that the significance of diagnostic conditions varies based on context, recency, and sometimes sequence of occurrence. Therefore, the process of assigning a CRG involves specifying a series of hierarchical relationships and conditional relationships.

Hierarchy

Hierarchy is key to the assignment of the CRG and many of its component parts. Hierarchical rules and relationships are defined explicitly in the categorizations used by CRGs. It allows for CRG assignment to be based on the individual's most significant diagnoses when there are multiple diagnoses. The end objective is to assign all individuals to a category that best describes their most salient health condition or conditions, and the severity of those conditions.

There are a series of hierarchies that must be established in order to assign individuals to mutually exclusive clinical categories. As the CRG Classification System approaches this task, it first classifies diagnoses into acute and chronic disease categories, and within each, establishes a basic set of hierarchies. All chronic disease categories are classified as dominant chronic (DC) disease (e.g., COPD), moderate chronic (MC) disease (e.g., Asthma), or minor chronic (C) disease (e.g., Chronic Bronchitis). All acute diagnoses are classified as significant acute (SA) illness (e.g., Pneumonia) or minor acute (A) illness (e.g., Upper Respiratory Infection). Certain of the acute illness categories have a more extensive set of hierarchies (e.g., bacterial infections extreme, major, moderate, and minor), but all receive the basic distinction of whether they are considered significant acute illnesses for purposes of CRG classification.

Next, the CRG Classification System defines body systems or Major Diagnostic Categories (MDCs) and within each MDC, defines a set of hierarchies. Hierarchies are needed to select the most significant chronic condition from within each MDC, with other chronic (and acute) conditions considered for use in the severity level assignment of the condition selected as the Primary Chronic Disease. If there are multiple chronic EDCs from within an MDC, the selection hierarchy will choose a DC EDC over an MC EDC as PCD, and likewise will choose an MC EDC over a C EDC. In addition, all chronic EDCs within an MDC are assigned a rank, so if there are multiple chronic EDCs of the same “type” (DC, MC or C), then the chronic EDC with the highest rank is selected as PCD.

At the next level, if there are multiple PCDs from different MDCs, hierarchies are defined once again for assignment to CRG Pairs or CRG Triplets. DC PCDs will take precedence over MC PCDs, PCDs of the same type but higher severity will take priority over those with lower severity, et al. If PCD type and severity are the same, then hierarchies based upon clinically determined

rankings or specificity of the Pair or Triplet CRG category (Pairs or Triplets with specifically named members versus other DC or other MC conditions) will take priority.

If there aren't any chronic disease conditions, the CRG Classification System then assigns based on another set of hierarchies. These are defined by the presence of significant acute (SA) EDCs, with hierarchies for the most complicated SA EDCs and then hierarchies for the rest of the SA EDCs based upon which MDCs have SA EDCs, the presence of SA EDCs from multiple MDCs, SA EDCs meeting span rules for persistence or recurrence, SA EDCs not meeting span rules, and then the presence of any SA EPC(s). In addition, for this broad grouping of individuals with one or more SA EDCs, the hierarchies for category assignment take into account whether there is some evidence for the presence of an ongoing chronic condition, partially "validated" by the data edit screens of the CRG Classification System, (e.g., one outpatient reporting of a diagnosis for significant chronic conditions or a significant prescription medicine suggestive of an ongoing chronic condition). If so, assignment is made to a CRG category on this basis unless there are SA EDCs higher in the hierarchy for this broad group of individuals.

If none of these conditions are present, the last distinction made by the CRG logic is to distinguish users from non-users of health care services.

Rules - Conditionality

The exact meaning and significance of each diagnostic condition often depends on conditional relationships. This includes such factors as site of service, recency of occurrence, persistence or recurrence, and demographics. In the CRG Classification System, these conditional relationships are captured through what are referred to as “rules.” In addition, there are important conditional relationships that exist between different diagnoses, certain diagnoses and procedures, and the sequence of health events that are captured through various files and logic.

Conditionality relationships captured through “rules” are based on attributes expressed individually or in combination, and include:

- Site of service (page 15)
- Recency of occurrence (page 15)
- Recurrence or persistence (page 16)
- Demographic characteristics of the enrollee (page 16)

It is important to note that CRGs do not count the number of reported diagnoses beyond some basic edits and to the limited extent needed to satisfy span rules. To do so would give undue significance to factors such as variations in claims processing, practice patterns, etc., where healthcare providers might treat or report identical illnesses differently.

Conditionality relationships are also captured through various files and logic of the CRG Classification System that define relationships between:

- Different diagnoses (page 16)
- Certain diagnoses and procedures (page 17)

- Sequence of health events (page 17)

Site of service

CRGs make selective use of the site of service in classifying diagnoses and procedures. It is used for three purposes:

1. **Data Validation.** The most important use of site of service is as a method to validate data. Diagnoses from outpatient settings, with some exceptions, are required to be reported two times and on different days in order to minimize false positives stemming from "rule outs", data errors, and other less than rigorous coding often found in such settings. Data from inpatient facilities and emergency departments, on the other hand, where there is usually more rigorous coding, are only required to be reported once.
2. **Initial Acute Occurrence.** A second use of site of service is to distinguish the initial acute occurrence of a diagnosis from subsequent recordings of the same diagnosis, which can be important for certain diagnoses. To illustrate, hospitalization can be used to distinguish the initial occurrence of an acute myocardial infarction (AMI) or stroke. Outpatient recordings of the same diagnosis likely are for subsequent care related to the diagnosis but not a new separate occurrence of the diagnosis, which would be very significant for disease severity.
3. **Severity Leveling.** A third use of site of service is the selective use of hospitalization in severity leveling. Generally, the approach of the CRG Classification System, given additional emphasis as of CRG v2.0, is to focus severity leveling specifications on the use of certain disease complications, recurrence patterns, and combinations of severity factors, and not hospitalization. The rationale for this is that since a major thrust of patient case management is to try to limit the need for hospitalizations, it is best to limit the influence of hospitalization on severity level assignment. One exception is to use hospitalization for mental health conditions for pediatric patients because it is viewed to be a clinically meaningful distinguisher of severity for this age range.

Recency of occurrence

When appropriate, the CRG Classification System places greater significance on more recent diagnoses and procedures. This is used both in establishing diagnostic categories and especially in assigning severity of illness.

To establish a diagnostic or procedure category, the reported diagnosis, procedure, or pharmaceutical code needs to have occurred within certain defined time periods as relevant for the DSG, EDC or EPC (e.g., the last one-year or two-year or five-year period), to be accepted for grouping.

Recency of occurrence is used in severity leveling where, for example, a diagnosis or procedure reported in the most recent six or 12 months of the analysis period is used to assign a higher severity level than the same diagnosis or procedure reported for a more distant time period such as one to two years ago. Most diagnoses and procedures are not even included in the severity level specifications unless they occurred in the last 12 months. For example, MC PCD 478 Anomalies of Kidney or Urinary Tract is increased to level 4 if SA EDC 496 Acute Renal Failure is

present within six months of the end of the analysis period (rule 3). If SA EDC 496 occurs beyond six months but still within one year of the end of the analysis period (rule 2), the PCD 478 is increased to level 3 instead.

Recurrence or persistence

CRGs make frequent use of recurrence or persistence, both in establishing diagnostic categories and assigning severity levels.

There are some diagnoses that can be either acute or chronic, so rules of persistence or recurrence are used to distinguish whether the diagnosis represents an acute or chronic condition. For example, acute nephritis may resolve after treatment or may persist and become a chronic condition, so a span 90 days rule is used to convert from an acute to chronic EDC.

For severity leveling, multiple occurrences of a diagnosis spanning a period of time (e.g., greater than 90 days), is sometimes given additional weight. This mostly pertains to diagnoses that represent disease exacerbations or other related complications.

Demographics

CRGs make selective use of demographics, primarily age, for classification of diagnosis codes, and also in conjunction with pharmaceutical data.

Age is sometimes used to distinguish whether a diagnosis represents a chronic or acute disease (e.g., congestive heart failure age >17 years or hip fracture age >64 years are both viewed as representing ongoing chronic diseases).

Age is also sometimes used in severity leveling of chronic disease (e.g., for certain congenital conditions, age <1 year or age <2 years is given weight in severity leveling). For the pharmaceutical codes, age and sex are sometimes used to determine whether to create a diagnostic category based on the pharmaceutical.

Relationships between diagnoses

The majority of the relationships among diagnoses are defined by assignment to MDC, type of EDC (DC, MC, C, SA, A), and rank of EDC within MDC. There is also logic to define relationships between diagnoses assigned to different MDCs. Of particular importance, there are some chronic diseases that can exist either as their own disease unrelated to other diseases, or can be a byproduct or integral to another chronic disease from another MDC. This needs to be distinguished in determining whether the individual has multiple primary chronic diseases (PCDs) from different body systems.

For example, hypertension, one of the highest volume chronic conditions, is assigned to the cardiovascular MDC. It might be the only chronic EDC in the MDC in which case it could be selected as a PCD, or it may be integral to coronary artery disease or another higher ranked cardiovascular condition, in which case it would not be selected as a PCD. Hypertension can also

be integral to disease in other MDCs such as cerebrovascular, peripheral vascular and renal disease. If such other disease exist, hypertension would not be allowed to count as a separate PCD even if it was the only chronic EDC from the cardiovascular MDC.

Relationships between diagnoses and procedures

There are many different possible relationships between diagnoses and procedures, and some have important implications for disease state. To illustrate, some procedures indicate:

- a diagnosis is in an active treatment state (e.g., chemotherapy for malignancy).
- a diagnosis is in an advanced disease state (e.g., diabetes and limb amputation).
- a disease state no longer exists (e.g., gallbladder disease and cholecystectomy to remove the gallbladder).
- one disease state has been removed but replaced with another (e.g., liver transplant removes previous liver disease diagnoses but introduces a new post-transplant immunosuppressive state).

Sequence of occurrence of health events

The sequence of occurrence of diagnoses and procedures sometimes represents an important distinction. For example, an individual may have angina or other ischemic heart disease, but if a coronary artery bypass graft (CABG) or percutaneous coronary angioplasty procedure is performed, the EDC for angina/ischemic heart disease condition is removed and replaced by history of CABG or history of percutaneous coronary angioplasty. If however at some future time the angina returns, then the EDC for angina/ischemic heart disease is reestablished.

Chapter 3: CRG clinical logic

Overview of the process of assigning a CRG

The 3M™ Clinical Risk Groups (CRGs) clinical logic is implemented in five phases with a sixth phase to calculate the Functional Status Group (FSG). The diagram below provides a graphical overview of the process of assigning a CRG.

Phase I. (page 24) Claims and encounter information is processed and edited or "validated for use," and a disease profile and history of past medical interventions is created.

Phase II. (page 37) For each organ system, the most significant primary chronic disease is identified, if one exists, and its severity of illness level is determined.

Phase III. (page 40) The primary chronic disease(s) and its (their) associated severity of illness level(s) are used to determine the CRG category and severity level. Absent chronic disease, assignment to CRG category takes into account the presence of one or more significant acute illnesses.

Phase IV. (page 47) The initial CRGs are consolidated into three successive tiers of aggregation, referred to as Aggregated CRGs or ACRGs.

Phase V. (page 47) Final CRG assignments are made for prospective or concurrent/retrospective applications. The final assignments take into account additional information, and in particular for the Concurrent CRGs, the presence of significant health events such as pregnancy, delivery, and newborn births.

Phase VI. (page 57) 3M™ Functional Status Grouper (FSG) logic is called and delivered as part of the CRG output. The output does not impact CRG assignment but is made available as additional information for analytic and risk-adjustment purposes.

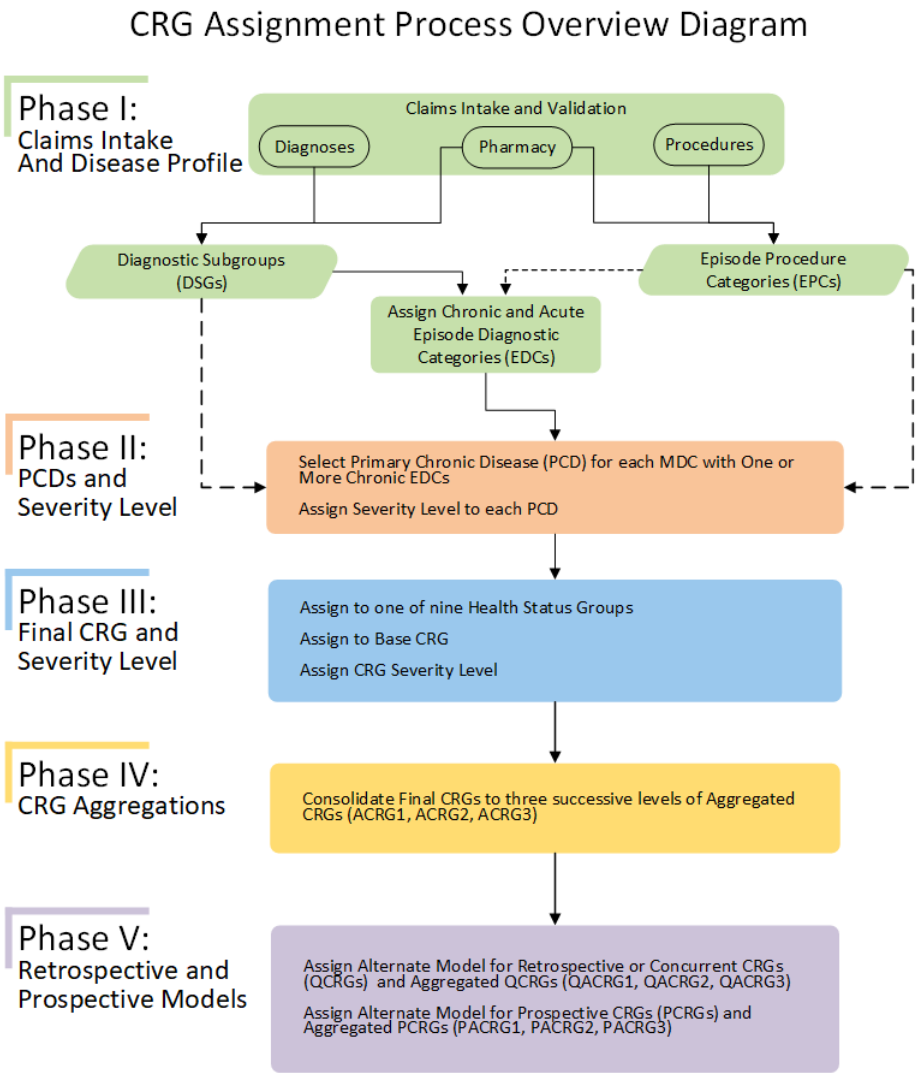
The five-phase process for determining CRG assignment for an individual is based on precise, hierarchically structured and detailed clinical logic. In particular, the development of clinical logic for identifying individuals with multiple interacting comorbid diseases and their associated severity of illness level is emphasized, along with other significant health events and significant acute illnesses (more so for the Concurrent Model).

The clinical logic in this five-phase process results in a severity adjusted set of mutually exclusive categories that differentiate the relative need for medical care in both the current (Concurrent Model) and future time periods (Prospective Model), as well as debility and death. CRGs have been constructed as a categorical clinical model using an iterative approach of sequential clinical hypothesis testing and data verification performed by panels of clinical experts. The multiple aggregations of CRGs provide the flexibility for CRGs to be used at a level of detail that corresponds to the needs of all users including payers and providers.

The CRG Classification System requires the specification of a start date and an end date, collectively referred to as the "analysis period." Diagnosis, procedure, and pharmacy codes with dates of service between the start date and the end date are used to assign the CRG

classifications. Diagnosis, procedure, and pharmacy codes with dates of service before the start date or after the end date or failing certain other data edits, are not used for grouping purposes.

The sixth phase of CRG processing is to utilize the Functional Status Groups (FSG) logic to deliver a functional status score based on inputs from any of three commonly-collected assessment tools (OASIS, MDS, or IRF-PAI). Though this functional status score does not affect CRG assignment, it can be used to enhance risk-adjustment and other analysis.



Overview of Concurrent and Prospective Models

The Prospective and Concurrent CRG Models are similar in most respects, but there are important differences designed to capture aspects of health and illness that are more or less important for the current versus future time period. Both Models classify individuals based on

the same information from the same base period or "analysis period", and most of the grouping logic and specifications are the same, but there are differences that sometimes result in an assignment to a different base CRG or severity level.

Following is an overview description of the ways in which the CRG logic and specifications are different for the Prospective and Concurrent Models, and how as a result, the grouping assignments are sometimes different. This will be presented in the sequence of the flow of the CRG logic and assignment Phases.

Phase I: Creation of a Disease Profile and History of Past Interventions

The logic for creating DSGs, EDCs, and EPCs is the same, but the logic for eliminating DSGs and EDCs is different.

- **EPC Eliminates EDC.** There is a piece of the CRG logic where the performance of certain procedures (EPC) leads to the elimination of certain EDCs. For example, performance of a cholecystectomy (removal of gall bladder) leads to the elimination of the chronic EDC for gall bladder disease. This is appropriate for PCRGs since the person will in the future no longer have chronic gall bladder disease, but is not relevant for QCRGs since the person did have chronic gall bladder disease during the Concurrent time period.

  The consequences of this difference in logic is that the Concurrent Model will classify somewhat more individuals to certain chronic illness CRGs, mostly minor chronic CRGs.

- **EDC Eliminates EDC.** There is a piece of the CRG logic where the occurrence of one EDC will eliminate prior occurrences of other EDCs, sometimes including an additional reporting window of time, such as 30 days. The most common of these specifications pertain to EDCs for Delivery, Abortion, and Antepartum DXes. For example, an occurrence of an EDC of Delivery will eliminate prior occurrences of EDCs for Antepartum DXes and Abortion (plus a window of 30 days). This is important for the Prospective time period as Antepartum DXes are not relevant unless they represent another pregnancy after having delivered, but is not an important distinction for the Concurrent time period. Rather, for the Concurrent Model, it is useful to have all information available for potential use in classifying pregnancy with delivery.

  Other examples include the EDC for Acute Myocardial Infarction eliminating prior occurrences of the EDC for Angina and Ischemic Heart Disease, and the EDC for Angina and Ischemic Heart Disease eliminating prior occurrences of the EDC for Chest Pain. These other examples mostly affect the EDCs available for severity leveling for a limited number of primary chronic conditions (PCDs)

Phase II: Selection of Primary Chronic Conditions (PCDs) and assignment of severity levels

The logic and specifications for the Phase II selection of PCD are the same, but the grouping results are sometimes different. This is because the EDCs and DSGs available for PCD selection

are sometimes different, the result of the Eliminations logic for DSGs and EDCs in Phase I being applicable to the Prospective Model (PCRGs) but not the Concurrent Model (QCRGs). This difference affects just selected areas, mostly certain base category assignments for CRGs in Status 1-4 and occasionally the severity level assignments for chronic CRGs in Status 3-9.

The specifications for assignment of severity of illness levels for PCDs are sometimes different for the Concurrent and Prospective Models, and so the grouping results are also sometimes different. This applies to all PCDs, but less so for minor chronic PCDs because minor chronic PCDs have only two severity levels and so there are fewer distinctions that can be made for Prospective versus Concurrent (or retrospective) severity leveling.

Very briefly, there are some severity leveling factors (DSGs, EDCs, EPCs) that are very important for Concurrent severity leveling and which receive a high severity level assignment, but do not have quite as much significance for the Prospective time period and so receive a lower Prospective severity assignment or require a stricter conditionality rule to be set at the same severity level (e.g., occurrence within the last six months instead of the last 12 months, or a multiple occurrence span rule of, say, 90 days).

The differences in PCD severity leveling for the Prospective and Concurrent Models are described in more detail in the Phase II section for PCD severity leveling (page 39). The differences pertain to the handling of six kinds of severity levelers:

- Certain acute illnesses and complications
- Trauma EDCs
- Acute EDCs that create a chronic EDC
- Procedures (EPCs) as a severity leveler
- Recency of occurrence, in particular, the last six months versus the last 12 months
- Malignancy PCDs and EDCs/DSGs for active disease state and active treatment.

Phase III: Determination of Base CRG and CRG severity level

The Phase III logic for assignment to base CRG for chronic disease CRGs in Health Status Groups 3- 9 is the same for the Prospective and Concurrent Models. The grouping assignment is sometimes different though for two reasons. First, as previously described, there are some differences in the EDCs and DSGs available for grouping, the result of the Eliminations logic in Phase I being applicable to the Prospective but not the Concurrent Model. Second, there are occasionally differences in assignment to base CRG in Status 6 Chronic Pairs and Status 7 Chronic Triplets because if there are multiple qualifying PCDs, the PCDs selected for use in assignment to Pair or Triplet CRGs depends in part on PCD severity level, which is sometimes different for PCRGs and QCRGs.

The Phase III logic for assignment to CRGs in Health Status 1 (Healthy) and Health Status 2 (Significant Acute Illness) is different in a very important respect for the Prospective and Concurrent Models. This is the time period requirement for a significant acute (SA) EDC or EPC to qualify for assignment to Status 2.

For the Prospective Model, the time period requirement is that an SA EDC or EPC must occur in the last six months or the base period or "analysis period." This is because the PCRGs focus on conditions and illnesses likely to be most important for the upcoming year.

Phase IV: Aggregation of CRGs into three successive tiers of consolidation (ACRGs)

The Phase IV logic and specifications are the same for QCRGs and PCRGs.

Phase V: Additional Status 1 and 2 Categories, hierarchies, and chronic illness overrides for the Prospective and Concurrent Models; and aggregation of PCRGs and QCRGs into three successive tiers of consolidation

Status 1 and 2 Categories: There are many differences between the Prospective and Concurrent Models in the number of Status 1 and 2 categories. The main difference is that the Concurrent Model has additional categories to distinguish certain health events and serious acute illness that are very important for the Concurrent time period, but much less so for the Prospective time period. This includes:

- **Deliveries:** Pregnancy with delivery is broken out into separate QCRG categories depending on presence of major complicating conditions, moderate complicating conditions, and the absence of complicating conditions.
- **Newborns:** Newborn births are broken out into separate QCRG categories depending on prematurity, level of prematurity (birthweight or gestational age), and respiratory complicating conditions.

Status 1 and 2 Hierarchies: The hierarchies for assignment to Status 1 and 2 categories are sometimes different for QCRGs and PCRGs. Key differences include:

- The QCRGs place Pregnancy With Delivery high in its Status 1 and 2 category hierarchies because this is generally the most distinguishing of health conditions and needed medical care services for this cohort of individuals. In contrast, the PCRGs place Pregnancy Without Delivery higher in the hierarchies because this identifies individuals who are pregnant going into the Prospective time period and likely to deliver a newborn during the Prospective time period (unless pregnancy is terminated by a miscarriage or abortion).
- The QCRGs place categories for very serious acute illnesses such as major trauma and major acute illness except trauma, higher in the Status 1 and 2 hierarchies than do the PCRGs. These represent major acute conditions for the Concurrent time period, but are not as defining for the Prospective time period.
- Status 1 and 2 Logic Overrides: The Concurrent Model has logic whereby the occurrence of certain Status 1 and 2 categories will override assignment to chronic illness CRGs in Status 3-6 or Status 3-4. This override applies for deliveries (vis-à-vis Status 3-6), complicated newborn births (Status 3-6), other newborn births (Status 3-4), and major trauma and other major acute illnesses (Status 3-4).

The rationale for this is that these health events and major acute illnesses are likely to have a larger impact on health care services needed during the Concurrent time period than the chronic illness CRGs that they are overriding. This override logic applies only to the QCRGs, not the PCRGs.

QACRGs and PACRGs: The CRG Classification System provides three successive levels of aggregation for both the QCRGs and PCRGs. At each level the base QCRGs/PCRGs are aggregated into broader category groupings, and at the higher levels of aggregation there are severity level adjustments when base categories are aggregated together that include some categories that are more or less complex than others.

Phase I: Creation of a disease profile and history of past medical interventions

In Phase I, claims and encounter information is processed and edited and a disease profile and history of past interventions is created. It does this through a series of steps for edit screen and classification of diagnosis codes, procedure codes, and certain pharmaceutical codes. There are also some reclassification steps based on changes over time in an individual's health conditions.

The Phase I processing and classification of information from medical claims and encounter files is accomplished through a series of seven steps. This is explained in the following three-part sequence. First, there is a brief overview description of each of the steps and substeps. Second, an explanation is provided about the Major Diagnostic Categories (MDCs) or body systems that are central to the overall schema of CRGs and provide a framework for viewing all of the specific diagnosis categories and their relationship to each other. Third, more detailed information is then provided about Phase I data edit screens, the kinds of classification categories that are created for diagnosis, procedure, and pharmaceutical codes, and the role and uses of each of these kinds of categories.

Once the CRG software has processed the claims and encounter information through all of these steps, DSGs, EPCs, EDCs, and MDCs are assigned. This represents the individual's full disease profile and history of past medical interventions from the analysis time period. This is the information upon which CRG categories and severity levels are assigned in Phases II, III, and IV. There is also additional diagnostic information that is used in Phase V for final category assignments for Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs).

1. Claims intake, data edits, and mapping of codes

The first part of this step is for the CRG software to read the information from medical claims and encounter files, per specified data formats, and to apply a basic set of edit screens for completeness of required data elements and for dates of services being within the analysis time period. The "analysis time period" is the period selected by the user that will be analyzed for purposes of CRG classification of all individuals in the population. The diagnosis, procedure, and pharmaceutical codes that pass these basic edits are mapped to their respective category, subject to further confirming edits.

The second part of this step is to apply additional, more specific data edit screens to the diagnosis, procedure and pharmaceutical codes. The codes that fail one of the additional edits are excluded, and those that pass have their mapping confirmed. Diagnosis codes are mapped to DSGs, procedure codes are mapped to EPCs, and pharmaceutical codes are mapped to pharmaceutical ingredient classes or categories.

2. Pharmaceutical ingredient terms create DSGs and EPCs

Pharmaceutical ingredients or combinations of pharmaceutical ingredients that meet certain specified conditionality rules (e.g., recency, duration, age, sex) will create either DSGs or EPCs. The rest of the pharmaceutical ingredients are not used for any part of the CRG assignment process.

3. Determining validity of DSGs for use in CRG grouping

To be accepted or validated for use in Phase I-IV of the CRG logic, a diagnosis-based DSG must pass one of three additional edit screens, which are intended to minimize the use of “rule-out” or temporary working diagnoses or other data reporting errors. The additional data edit screens are:

- One report of inpatient or emergency department diagnosis (DX) by institutional provider.
- Two or more reports on different dates of outpatient DX from the same DSG by an institutional or professional provider.
- One report of outpatient DX from a DSG that is on the list for one out patient occurrence called "DSGs not subject to edits" by an institutional or professional provider (diagnoses that are unlikely to be rule-out diagnoses).

4. EPCs eliminate DSGs; DSGs eliminate other DSGs

If certain DSGs occur before an EPC (plus a reporting time period), that is expected or intended to cure or resolve the DSG at least for the immediate future, the prior occurrences of the DSG are eliminated. For example, the EPC for cholecystectomy will eliminate the DSG for chronic gallbladder disease, plus a 30-day reporting period.

Similarly, if certain DSGs occur prior to another DSG, the prior occurrences are eliminated. For example, the DSG for cerebrovascular infarction will eliminate prior occurrences of the DSG for transient ischemia, plus a 90-day reporting time period.

5. DSGs generate EDCs

Each DSG that passes the edit screens for "Claims intake, data edits, and mapping of codes" and "Determining validity of DSGs for use in CRG grouping" and is not eliminated by an EPC or DSG,

together with a conditionality rule (e.g., recency, duration, age, sex), will create an EDC. In some instances, the DSG will create more than one EDC. Following are several examples:

- The DSG for convulsion NEC except febrile convulsion will create the SA EDC for convulsion NEC with rule 00, any site/last 2 years, and with a chronic seizure disorder with rule 12, any site/span 180 days.
- The DSG for unstable angina will create the MC EDC for coronary atherosclerosis with rule 00, any site/last years, and will also create the MC EDC for angina and ischeic heart disease with rule 02, any site/last 12 months.
- The DSG for peripheral vascular disease with ulcer (of specified site) with rule 00, any site/last 2 years, will create both the MC EDC for peripheral vascular disease and the MC EDC for chronic skin ulcer.

Two closely related DSGs that pass the edit screens for "Claims intake, data edits, and mapping of codes" but not the additional validation edit screen of "Determining validity of DSGs for use in CRG grouping," together with a conditionality rule, will create an EDC. Note, in this instance, the two DSGs will not be individually validated, but together they are sufficient to create the EDC. Following are several examples:

- One outpatient reporting of DSG for uncomplicated diabetes and one for diabetic retinopathy, will create the validated DC EDC of diabetes.
- One outpatient reporting of DSG for asthma and one for status asthmaticus, will create the validated MC EDC for asthma.
- One outpatient reporting of DSG for obesity NOS and one for morbid obesity, will create the validated C EDC for obesity NOS (the lesser of the two closely related EDCs).
- One outpatient reporting of DSG for major depressive disorder and one for depressive and other psychoses, will create the validated MC EDC for major depressive disorder (the lesser of the two closely related EDCs).

Once each EDC is created, it is also assigned to an MDC.

6. EPCs create EDCs; EDCs create additional EDCs

Certain EPCs that indicate the presence of a disease state, together with a conditionality rule (usually recency), will create an EDC. Following are some examples:

- The EPC for fitting/adjustment of cardiac pacemaker will create the MC EDC for cardiac pacemaker or defibrilllator device.
- The EPC for kidney transplant will create the DC EDC for history of kidney transplant.

Certain EDCs with specified conditionality rules can create additional EDCs. Most often this is an acute EDC that, together with certain conditionality rules (usually persistence or age), will create a chronic EDC and then will often itself be eliminated.

Certain pharmaceutical based categories, together with a conditionality rule (e.g., recency, duration, age, sex) can also create an EDC. This is for prescription medicines that can be clearly

linked to a specific chronic or acute EDC. For example, the Pharmacy Category for Insulins, occurring in the last 12 months, will create the EDC for diabetes.

7. EPCs eliminate EDCs; EDCs eliminate other EDCs; EPCs eliminate other EPCs

As with DSGs in "EPCs eliminate DSGs; DSGs eliminate other DSGs," if certain EDCs occur before an EPC (plus a reporting window) that is expected to cure or resolve the EDC, at least for the immediate future, the prior occurrences of the EDC are eliminated.

As with DSGs in "EPCs eliminate DSGs; DSGs eliminate other DSGs," if certain EDCs occur prior to another EDC (plus a reporting time period), the prior occurrences of the EDC are eliminated.

Lastly, certain EPCs are specified to eliminate other EPCs. This pertains to situations where one EPC makes the other EPC no longer relevant (e.g., kidney transplant EPC will make prior occurrences of renal dialysis EPC irrelevant).

Major Diagnostic Categories (MDCs)

Major Diagnostic Categories (MDCs) or body systems provide an overall framework for the diagnostic classification of the CRG methodology.

The International Classification of Diseases, 9th or 10th Revision, Clinical Modifications (ICD-9-CM or ICD-10-CM in the U.S.) and various other codes sets used outside the U.S. are used to code not only diseases, but also signs, symptoms, findings and other factors influencing health status. The CRG methodology classifies all ICD-9-CM and I-10-CM diagnoses codes, even the least serious which are assigned to body system-specific categories for minor acute diagnoses and symptoms or to a very broad category for signs, symptoms and other findings. The least serious diagnoses generally have no effect on the final CRG classification.

The CRG Classification System assigns each of the diagnosis codes to three classification categories, each at a more detailed or broader level of classification. The Diagnostic Subgroup (DSG) is the most detailed classification. The Episode Diagnostic Category (EDC), which consists of one or multiple DSGs, is the next broader classification. The MDC, which consists of a series of EDCs from the same organ system or etiology, is the broadest classification category.

MDCs represent organ or body systems and are central to the overall schema of the CRGs. The MDCs provide an organizing framework for viewing all of the specific diagnostic categories and their relationship to each other. In particular, the logic of the CRG Classification System is designed to identify the most serious chronic diagnosis within each MDC and the effects of having multiple significant chronic diagnoses from across different MDCs. There is also severity level logic to take into account the effects of having multiple serious diagnoses (chronic and acute) from within the same MDC.

Most of the MDCs are defined for diagnoses that are part of the same organ or body system (e.g., respiratory, musculoskeletal). There are also several MDCs defined for diagnoses that have a common etiology and may affect many organ or body systems. These include malignancies, systemic infectious diseases, and a broad grouping of trauma diagnoses. Generally, diagnoses

that include both a single body system and a particular etiology are assigned to an MDC based upon the body system (e.g., kidney infection is assigned to the MDC for kidney & urinary tract disorders). Finally, there are several diagnoses that are assigned to their own MDC. This includes diabetes because it is a high volume condition with multi-system implications, and HIV because it is a very distinctive condition with multi-system implications.

Altogether, the CRG Classification System organizes diagnosis codes into 30 distinctive MDCs. There are also five sets of diagnoses that are pulled out of the "regular" MDCs and assigned to "catastrophic" MDCs. This includes certain lifelong defining chronic conditions (e.g., nervous system – severe cerebral palsy or acquired quadriplegia; respiratory system – cystic fibrosis) and certain technology dependent conditions (e.g., renal dialysis status, liver transplant status). There is also a separate MDC for bone marrow transplant status, but this actually functions more as a part of the MDC for disorders of blood and blood-forming organs than as a separate MDC.

List of MDCs

The following table lists all of the MDCs in the CRG logic.

MDC	Description	DC rank	MC rank
042	Catastrophic Respiratory Conditions	1	1
012	Catastrophic Neurological Conditions	2	2
053	Heart Transplant Status	3	3
062	Intestinal Transplant Status	4	4
072	Liver or Pancreas Transplant Status	5	5
162	Bone Marrow Transplant Status	6	6
111	Diseases and Disorders of the Kidney and Urinary Tract	7	15
241	HIV Infection	8	7
172	Malignancies	9	8
152	Chromosomal Anomalies, Intellectual Disability, and Other Developmental/Cognitive Diagnoses	10	9
011	Diseases and Disorders of the Nervous System	12	10
051	Diseases and Disorders of the Cardiovascular System	13	20
041	Diseases and Disorders of the Respiratory System	14	28
101	Diabetes Mellitus	15	12
191	Mental Diseases and Disorders	16	11
061	Diseases and Disorders of the Digestive System	17	13
071	Diseases and Disorders of the Hepatobiliary System and Pancreas	18	14
161	Disease and Disorders of the Blood and Blood Forming Organs	19	16

MDC	Description	DC rank	MC rank
052	Peripheral Vascular Disease and Other Non-Cardiac Vascular Diseases	20	19
082	Connective Tissue Diseases	21	22
102	Other Endocrine, Metabolic and Thyroid Disorders	22	23
181	Infectious and Parasitic Diseases	23	18
081	Diseases and Disorders of the Musculoskeletal System	24	21
032	Craniofacial Anomalies	25	24
201	Substance Abuse	26	27
021	Diseases and Disorders of the Eye	27	25
031	Diseases and Disorders of the Ear, Nose, Mouth, and Throat	28	29
121	Diseases and Disorders of the Male Reproductive System	29	30
131	Diseases and Disorders of the Female Reproductive System	30	31
151	Newborns and Other Neonates	31	32
091	Diseases and Disorders of the Skin, Subcutaneous Tissue, and Breast	32	26
221	Burns	33	33
231	Factors Influencing Health Status and Other Contacts with Health Services	34	37
141	Pregnancy, Childbirth and the Puerperium	35	34
251	Other Trauma	36	35
211	Injuries, Poisoning, and Toxic Effects of Drugs	37	36

Diagnostic Subgroups (DSGs) - Role and use

Diagnostic Subgroups or DSGs are the most detailed level of classification in the CRG methodology. They are the starting set of building blocks for the CRG Classification System. Each diagnosis code that passes edit screens is assigned to a DSG. DSGs, in turn, create one or more Episode Diagnostic Categories (EDCs). DSGs, EDCs, and EPCs, along with hierarchical and conditionality rules, form the basis for assignment to a final mutually-exclusive CRG category.

DSGs are a structural enhancement introduced in CRG v2.0 released in 2016. They allow for finer clinical distinctions than previously possible and introduce a uniform structure applicable to all acute and chronic EDCs. Earlier versions of the CRG Classification System handled certain finer clinical distinctions by creating additional EDCs referred to as Chronic Manifestations (CM) EDCs, but these were only applicable to chronic condition EDCs and they were more limited in scope.

Each EDC may consist of one or more DSGs. In the CRG Classification System, there are nearly 1,000 DSGs and over 500 EDCs. Most EDCs consist of only one DSG, and about one-third of EDCs consist of two or more DSGs. There are also approximately 20 EDCs that are created by other EDCs.

The DSGs provide a mechanism to make three kinds of clinical distinctions within the more broadly defined EDCs:

- Distinct conditions within the EDC, some that are more complex than others and others that are just different.
  - Major Coagulation Disorders: Hemophilia Factor VIII/IX and other major coagulation disorders.
  - Alzheimer's Disease and Other Dementia: Alzheimer's disease, vascular dementia, and several other forms of dementia.
  - Other Significant Drug Abuse/Dependence: Amphetamine abuse/dependence, combined drug dependence except opioid, sedative & hypnotic drug abuse/dependence, and other significant drug abuse/dependence.
- Status, stage, or severity of a condition.
  - Alcoholic Liver Disease: Alcoholic cirrhosis, alcoholic liver failure, alcoholic liver disease with hepatic coma, and alcoholic liver disease (with no mention of complication).
  - Acute or Chronic Leukemia EDCs: Leukemia in remission, not in remission, or in relapse
- Complication of a condition, some that may be more severe than others.
  - History of CVA and Cerebrovascular DX with Late Effects: CV disease with late effects – aphasia, other speech & language deficits, dysphasia, other/unspecified late effects, and neurologic neglect syndrome.
  - Sickle Cell Anemia: Sickle cell anemia without crisis, sickle cell crisis, splenic sequestration, and acute chest syndrome.

In the CRG Classification System, DSGs:

- Create one or more EDCs (e.g., if DSG is for combination diagnosis code or if DSG is used to create both an acute EDC and history of chronic EDC), or if DSG also contributes to the creation of an EDC Cluster.
- Contribute to severity leveling of chronic EDCs.
- Specify the additional special categories of the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs) as part of the Phase V category assignment process.
- Enable users to conduct more detailed clinical analyses.
- Enable users to conduct more targeted case management.

Episode Procedure Categories (EPCs) – Role and use

The CRG system classifies all procedure codes to an Episode Procedure Category, though only uses a relatively small number of EPCs in the CRG assignment process. This includes ICD-9 and ICD-10 procedure codes, CPT®, HCPCS and international procedure code sets. It makes selective use of EPCs to: (1) to create certain EDCs, recognizing disease states implied by the EPC; (2) to eliminate certain EDCs, recognizing that the EPC is intended to remove or cure a disease state; and (3) to contribute to the severity level assignment for some chronic EDCs. In addition, in the final CRG classification assignments, if an individual does not have any chronic conditions or significant acute diagnoses, the CRG software will examine for the presence of significant EPCs for purposes of assignment to a CRG in Status 2, Significant Acute. Following are examples of each:

- Certain EPCs are used in the creation of disease profiles and history of past medical interventions. They may identify individuals who are dependent on some medical technology (e.g., mechanical ventilation), had a procedure that indicates advanced disease (e.g., leg amputation for a diabetic), a procedure that indicates active disease, (chemotherapy for a person with a malignancy), a procedure that has long-term consequences (e.g., heart transplant), or a procedure that indicates the presence of a significant chronic illness that might not be recorded as a diagnosis during the analysis period (e.g., cardiac pacemaker or defibrillator).
- Other EPCs are used to eliminate an EDC. For example, if a cholecystectomy procedure is done (removal of gallbladder), then the previously existing EDC for gallbladder disease is eliminated as the person no longer has a gallbladder. Some EPCs both eliminate and create EDCs. For example, the heart transplant EPC will eliminate previous cardiac EDCs as these pertain to the person's previous heart, and it also creates a new EDC for heart transplant status as this describes the person's current heart condition.
- Certain EPCs are used to contribute to a chronic EDC's severity level assignment when the EPC is indicative of a more advanced disease state. For example, an individual with diabetes with circulatory complications who has a leg amputation has an advanced disease state. Another example is an individual with cerebral palsy who receives a gastrostomy. The gastrostomy is indicative of a severe disease state and may be captured either through the reporting of the procedure code for gastrostomy or a diagnosis code for gastrostomy status, whichever is reported.

There can be concerns about basing certain classifications on procedures, but the view of the CRG system is that selective and limited use of procedures can provide important enhancements to disease classification. One possible concern is that the use of procedures in disease classification could inappropriately alter payment incentives. Specifically, if more extensive use of procedures in the CRGs could predict higher future payments for individuals who had one of these procedures, theoretically this could create the financial incentive to perform more of such procedures. However, the increase in future payments, with few exceptions, is small relative to the cost of such a procedure. Moreover, the financial gains from the procedure are far from assured, as they depend on the continued enrollment of the individual who may die, move, or discontinue enrollment for some other reason. It is unlikely that a fiscally prudent organization would incur substantial short-term costs in order to receive relatively small and far-from-guaranteed increases in future payments.

Another possible argument against the use of procedures in the CRG system is that providers who deliver poor quality care that results in the need for the procedure (e.g., a diabetic that needs the above-the-knee amputation because of poor quality care) would receive additional future financial compensation. However, a system with the financial incentive to avoid procedures may also create the financial incentive to avoid individuals with more severe disease and a history of a major procedure. The overall functioning of the system and access to care are better served when there is a clear recognition of the future costs of individuals, especially those with significant health problems.

For all these reasons, highly selective use is made of procedures in the CRG system as their use provides a more complete description of the individual's health condition. Financial incentives to avoid treating or covering individuals with a history of certain major procedures are viewed as a more serious issue than potentially providing some additional future compensation for individuals who had a procedure that might possibly have been avoidable.

Episode Diagnostic Categories (EDCs) - Definitions, roles, and uses

After diagnoses are mapped into DSGs, procedures into EPCs, and certain specified prescription drugs into EPCs, the DSGs and EPCs are used to form EDCs. Each EDC in turn is assigned to one MDC and one of five EDC types. Three of the EDC types relate to chronic diseases and two relate to acute diseases. Following is a description of the five types of chronic and acute EDCs and how they are organized within each body system or MDC.

A disease is classified as chronic if it is either life-long or prolonged in duration. Some diseases are progressive, others can sometimes be cured or resolve in time, and others, while usually not curable, may often be controlled. Examples are as follows:

- The duration of the disease is lifelong and progressive (e.g., diabetes, Parkinson's).
- The disease is lifelong or prolonged and sometimes is progressive, but often alternates through periods of exacerbation and remission (e.g., systemic lupus erythematosus).
- The disease has a prolonged duration but a cure is sometimes possible, i.e., where there is no evidence of the disease (e.g., malignancies).
- The disease is lifelong or prolonged, but can often be controlled by medication or other means (e.g., hypertension)
- The disease is prolonged, can often be controlled by medication or other means, and sometimes resolves over time (e.g., asthma).

A disease is classified as acute if the duration of the disease is short and the disease would normally resolve (e.g., pneumonia) or a treatment exists that cures the disease (e.g., fractured ankle). Signs, symptoms and findings (e.g., chest pain) are also considered acute.

In the CRG clinical logic, the categorization of an EDC as chronic or acute is a very important distinction because the majority of the CRG categories are based upon the presence of chronic disease and individuals who have chronic EDCs from multiple organ systems (i.e., MDCs) are assigned to a distinct set of CRGs. For example, individuals who have both congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) form a Pair CRG, and individuals who have CHF, COPD and diabetes form a Triplet CRG.

The classification of diagnoses as acute or chronic is not always a straightforward or simple process. When a diagnosis may be either acute or chronic, the CRG methodology will initially classify as acute and then convert to chronic if certain conditionality rules are met. The two rules most often used are persistence (defined by time period span rules) and age. Following are examples of acute and chronic classifications.

- Diseases such as acute nephritis, acute vasculitis and thrombocytopenia sometimes resolve after their initial acute presentation, but other times do not resolve and become chronic conditions. Some diagnosis codes are not clear enough to distinguish acute versus chronic, such as Convulsion not elsewhere classified. For these situations, a span rule is specified and if the diagnosis continues to be reported for a time period spanning a certain duration (e.g., greater than 90 or 180 days), then it is converted from an acute to chronic EDC.
- A similar but slightly different example is hypertension. This is generally considered a chronic disease, but the CRG methodology initially classifies hypertension as an acute EDC. The reasoning is that the process for establishing or ruling out a diagnosis of hypertension generally involves a series of visits to monitor and evaluate a person's blood pressure. Hypertension may be recorded for each of these visits, but ultimately it may be ruled out as a diagnosis. So hypertension is initially classified as acute and the converted to a chronic EDC if reported for two or more visits spanning 90 days or greater.
- Age can also be a differentiating factor for assessing whether a diagnosis is acute or chronic. For example, congestive heart failure when it occurs in adults is considered a chronic disease. However, congestive heart failure when it occurs in children and is not caused by rheumatic fever is usually associated with an underlying congenital anomaly and reflects the status of the underlying anomaly. In such cases, the condition is usually not lifelong and either significantly resolves or the child dies. Therefore, in children, non-rheumatic congestive heart failure is considered an acute disease and used for severity leveling of the underlying congenital or chronic disease EDC.
- Fracture of hip is an acute condition and is classified as such. At the same time, for elderly patients it generally also reflects a deteriorating health condition of the musculoskeletal system, and so for individuals age 65 years and older, it is converted to a chronic EDC for history of hip fracture.

There are also some EPCs that can create EDCs. These are usually EPCs where the history of the procedure, device, or implant conveys important information about a disease state (e.g., cardiac pacemaker, organ transplant, gastrostomy). In the CRG Classification System, no distinction is made between EDCs created from history of a procedure versus from a diagnosis code. In a number of instances, the same EDC could be created from either procedure codes or diagnosis codes (e.g., procedure to implant or revise a cardiac pacemaker, or a diagnosis for cardiac pacemaker status).

The following sections describe the kinds of diseases classified to the five types of EDCs and explain the rankings assigned to chronic EDCs within each MDC.

Dominant chronic EDCs

Dominant chronic EDCs are serious chronic diseases that often result in the progressive deterioration of an individual's health and often lead to, or significantly contribute to, an

individual's debility, death, and future need for medical care (e.g., congestive heart failure, diabetes, cerebral palsy, sickle cell anemia, malignancies, schizophrenia). With few exceptions, such as malignancies, dominant chronic EDCs are usually lifelong conditions.

Moderate chronic EDCs

Moderate chronic EDCs are serious chronic diseases that usually do not result in the progressive deterioration of an individual's health, but can significantly contribute to an individual's debility, death, and future need for medical care (e.g., asthma, epilepsy, atrial fibrillation, hypertension). Some of these conditions are lifelong, while others may resolve.

Minor chronic EDCs

Minor chronic diseases can usually be managed effectively throughout an individual's life with typically few complications and limited effect upon an individual's debility, death, and future need for medical care (e.g., migraine headache, hearing loss, chronic thyroid disease). However, minor chronic diseases may be serious in their advanced stages or a precursor to more serious diseases (e.g., hyperlipidemia). There are also some diseases classified as minor chronic that may require significant intervention before resolving or being brought under control (e.g., ventricular septal heart defect, gallbladder disease, vesicoureteral reflux).

Significant acute EDCs

A significant acute EDC is a serious acute illness or condition that can be a precursor to, or place the individual at risk, for the development of chronic disease (e.g., syncope, convulsions, failure to thrive, kidney stones, acute nephritis, and thrombocytopenia), or can potentially result in significant late effects (e.g., major trauma to the head, spinal cord or back, major burns). It also includes all very serious acute illnesses (e.g., intestinal obstruction, major pneumonia, septicemia) and all organ failure diagnoses (e.g., acute respiratory failure, acute renal failure, shock).

Minor acute EDCs

Minor acute EDCs are acute illnesses or events that may be mild or more serious but are usually self-limiting, and are not a precursor to chronic disease, do not place the individual at risk for the development of chronic disease, and usually do not result in significant sequelae (e.g., fractured wrist, common cold, appendicitis).

Ranking of Chronic EDCs within MDC

Within each MDC, the dominant, moderate, and minor chronic EDCs are ranked hierarchically in terms of their relative contribution to an individual's medical care needs, debility, or death.

Dominant chronic (DC) EDCs are always ranked higher in the EDC hierarchy than moderate chronic (MC) EDCs. Similarly, moderate chronic EDCs are always ranked higher than minor chronic EDCs.

The chronic EDC rankings are important because a key design feature of the CRG Classification System is to identify the most serious chronic condition from within each MDC that has one or more chronic conditions. In Phase II of the CRG assignment process, the highest ranked chronic EDC in each MDC is selected as the primary chronic disease or PCD for the MDC. If an individual has multiple chronic conditions from within the same MDC, the additional chronic EDCs are not ignored. They are considered as part of the Phase II process of assigning a severity level to each PCD, but only one is selected as the PCD for each MDC.

To illustrate, following is a sample table of the EDCs in **MDC 041 Respiratory**.

EDC	Type	EDC Description	Rank Within MDC
132	DC	Major Respiratory Anomalies and Bronchopulmonary Dysplasia	1
133	DC	Chronic Obstructive Pulmonary Disease and Bronchiectasis	2
134	DC	Other Major Chronic Pulmonary Diagnoses	3
137	MC	Other Chronic Pulmonary Diagnoses - Moderate	4
138	MC	Asthma	5
141	C	Chronic Bronchitis	6
142	C	Other Chronic Pulmonary Diagnoses	7
143	C	Sleep and Obstructive Apnea	8
148	SA	Acute Pulmonary Diagnoses - Major / Extreme	0
149	SA	Acute Respiratory Diagnoses - Moderate	0
150	SA	Pleural Effusion	0
151	SA	Pneumonia and Major Lung Infection	0
152	SA	Pneumonia - Moderate	0
153	SA	Viral Pneumonia	0
154	SA	Pneumonia NOS	0
155	SA	Pulmonary Embolism	0
156	SA	Respiratory Failure and Lung Edema	0
157	SA	Respiratory Arrest	0
159	A	Acute Bronchitis and Bronchiolitis	0
160	A	Acute Respiratory Symptoms - Minor	0
162	A	Surgical Complications - Respiratory System	0
163	A	Upper Respiratory Infections	0

EDC	Type	EDC Description	Rank Within MDC
165	SA	Dependence on Supplementary Oxygen	0
166	A	Cluster: Pneumonia and Acute Respiratory Diagnoses Major/ Moderate	0

DSGs, EPCs and EDCs can create additional EDCs

The initial steps in Phase I are to identify and assign DSGs and EPCs to the individual. All DSGs assigned to an individual are used to create one or, in some instances, several EDCs. A subset of the EPCs are also used to create EDCs. Once the EDCs have been assigned, additional EDCs are sometimes also created based on the clinical and temporal relationships among the EDCs. Following are examples where DSGs, EDCs, and EPCs create additional EDCs.

DSGs may create multiple EDCs. A DSG may create one EDC or, in some circumstances, it may create several EDCs.

- DSG may create both an acute EDC and a "History of" chronic EDC. For example, DSG 904201 for Cerebrovascular Infarction creates SA EDC 43 Cerebrovascular Infarction and DC EDC 4 HX of CVA and Cerebrovascular Diagnosis with Late Effects. The same is true for acute myocardial infarctions.
- DSG may create multiple EDCs if it contains diagnosis codes that reflect the presence of multiple conditions, i.e., DSG 939010 Systemic Lupus with Renal Manifestations. This DSG creates DC EDC 390 Connective Tissue Disease and Vasculitis and also MC EDC 477 Chronic Nephritis/Nephrosis.
- DSG may create multiple EDCs if it is also part of an EDC Cluster. EDC Clusters are mostly comprised of a collection of EDCs. For example, the EDC Cluster for Moderate Infections is comprised of all the infection EDCs considered to be moderate infections. However, if only certain DSG constituents of an EDC are judged appropriate for the EDC cluster, then it is defined at the level of the DSG. For example, the DSG for Adjustment Disorder with Depression/Anxiety will create the Cluster EDC 777 Cluster-Minor Mental Health, but the DSG for Adjustment Disorder Not Otherwise Specified will not create the Cluster.

EDCs may create additional EDCs. Once an EDC is created, there are circumstances when it will in turn create an additional EDC.

- Acute EDCs may create chronic EDCs when reflective of underlying chronic disease. For example, SA EDC 381 Pathological Fractures and Aseptic Necrosis creates the additional EDC of MC EDC 350 Chronic Musculoskeletal Disease Moderate and Amputation Status.
- Acute EDCs may create chronic EDCs based on age conditionality. For example, SA EDC 377 Hip Fracture creates DC EDC 344 History of Hip Fracture Age >64 Years for persons in this age range because it generally represents a significant deterioration in musculoskeletal health.

- Acute EDCs may create a chronic EDC depending on rules for recurrence or persistence. For example, SA EDC 221 Hypertension NOS/NEC meeting the recurrence rule of span 90 or more days creates MC EDC 192 Hypertension.

EPCs can create EDCs. Some procedures that indicate advanced disease state or have long term sequelae create a chronic EDC.

- EPC reflects a certain disease state. For example, EPCs for Cardiac Pacemaker or Implantation of Defibrillator will create MC EDC 190 Cardiac Pacemaker or Defibrillator Device Status.
- EPC reflects a new or changed disease state or sequelae condition. For example, if a person had an EDC for end stage renal disease (ESRD), followed by an EPC for kidney transplant procedure, then they no longer have ESRD. The EPC for Kidney Transplant is used to both remove the previous EDC of Chronic Renal Failure/Stage V or ESRD and to create a new EDC for Kidney Transplant Status.

Temporal relationships can be used to eliminate EDCs, DSGs, and EPCs

An individual's health status can change over time. It is dynamic, not static. Therefore, it is important to have logic that can identify newer health conditions that should eliminate previous reported health conditions, if they are no longer applicable.

To accomplish this, the CRG Classification System implements logic to eliminate certain EDCs, DSGs and EPCs based upon the temporal relationship between certain of the EDCs, DSGs and EPCs.

Phase II: Selection of primary chronic disease(s) and the assignment of severity of illness levels

In Phase II,

- The EDC that represents the most significant chronic disease, referred to as the primary chronic disease (PCD), is selected (page 38) for each organ system (MDC) that has one or more chronic illness EDCs.
- A special process is used for selecting the PCD in MDC 172, Malignancies (page 39).
- As each PCD is selected, it is assigned a severity of illness level (page 39).

PCDs are selected from each MDC and assigned severity levels until no more chronic EDCs are available for consideration. At the end of Phase II, individuals can have a single PCD selected, multiple PCDs selected, or no PCDs selected if the data indicate no chronic conditions.

Selection of PCD (non-malignancy)

For every MDC with at least one chronic EDC, a dominant chronic, moderate chronic, or minor chronic EDC is selected as the primary chronic disease (PCD) for the MDC, unless it is considered a byproduct or integral part of a primary chronic disease in another MDC that is present.

An underlying assumption and central organizing principle of the CRG Classification System is that individuals with chronic diseases from multiple body systems will generally be more complex, require significant medical care, and be at risk for poor outcomes. Thus, defining MDCs and selecting the most significant chronic disease from each organ or body system (MDC) is a critical component of the CRG Classification System.

As described earlier in Phase I of this document, the CRG methodology classifies all accepted diagnosis codes into 30 distinctive MDCs, plus another five that are subsets of diagnoses from the 30 MDCs pulled out for classification as "catastrophic" conditions. Of the 30 MDCs, 27 have chronic illness diagnoses and 23 have diagnoses classified as Dominant Chronic (DC) or Moderate Chronic (MC). Some MDCs only have acute diagnoses - Obstetrics, Injuries/Poisonings/ Toxic Effects, and Other Trauma. MDCs such as Ear, Nose, Mouth & Throat, Male Reproductive, Female Reproductive, and Newborn only have diagnoses classified as minor chronic. Thus, there are 23 MDCs that can potentially represent significant chronic disease from multiple body systems and 21 MDCs that can potentially represent minor chronic disease from multiple body systems.

The first step in selecting the PCD is to identify chronic EDCs that are not candidates to be PCDs (meaning, they are PCD exclusions). Certain chronic diseases can exist either as their own disease unrelated to other diseases, or can be a byproduct of or an integral part of another chronic disease from another MDC that is present. In the latter instance, the chronic EDC is PCD excluded but may, if indicated, contribute to the severity level of the other chronic EDC. Following are several examples:

- The highest volume example is hypertension. The hypertension EDC is assigned to the Cardiovascular MDC and may not have any other related diseases, but can also be integral to certain diseases in other MDCs (e.g., cerebrovascular, peripheral vascular, and renal disease). In the presence of certain specified chronic EDCs in these other MDCs, hypertension is not allowed to count as a separate PCD.
- As a second example, the CRG methodology classifies Hepatobiliary & Pancreas diagnoses into a separate MDC from Digestive, but recognizes there are some areas of overlap, so it does not allow Chronic Gastrointestinal DX Moderate (which includes diagnoses such as malabsorption disorders) to count as a separate PCD.
- As a third example, the CRG methodology classifies Alzheimer's Disease and Other Dementias as part of the Nervous System MDC, but recognizing the overlap with mental health disorders it does not allow mental health EDCs to count as having chronic disease from separate body systems.
- As a fourth example if an individual with rheumatoid arthritis (Connective Tissue MDC) which primarily affects the hip is also diagnosed with a pelvis, hip, and femur deformity (Musculoskeletal MDC), the EDC for rheumatoid arthritis is selected as a PCD while the EDC for pelvis, hip and femur deformities is viewed as overlapping and too closely associated with the rheumatoid arthritis to be counted as a separate PCD.

The second step is to identify the remaining chronic EDCs that are candidates to become PCDs, and following a series of hierarchical rules, to select however many PCDs an individual may have. The general approach is to select the highest level chronic EDC first as a PCD, assign its severity level, and then continue to select the next highest chronic EDC and assign severity level and so on until there are no more MDCs with chronic EDCs that are candidates to become a PCD.

The hierarchy for determining which chronic EDCs are selected first as PCDs is determined by both EDC type (DC, MC, C) and MDC rank. Which chronic EDC is selected first as a PCD is important because it will have all potential severity level factors available to use, and each next selected PCD and subsequent PCDs will have severity level assigned using severity factors that have not yet been used. The severity matrix for each PCD has severity factors that are unique to that PCD or MDC, but there are also a number of severity factors that are common and applicable to many different PCDs and MDCs (e.g., pneumonia, respiratory failure, acute gastrointestinal, malnutrition, acute hematological, septicemia and other major infections). PCD selection order is also important because if a chronic EDC is used in the severity matrix of another chronic EDC, then it cannot itself become a PCD.

Selection of malignancy PCD

There is a multi-step process for the Malignancy MDC to select a malignancy PCD, based on factors specific to malignancies. An individual may have several malignancy diagnoses in which case one may be reported as a primary malignancy and the others as secondary or metastatic malignancies, or the several malignancy diagnoses may all be reported as primary malignancies. It is not too often that a person will have several malignancy diagnoses that are both primary malignancies and are both currently active malignancies, and so special logic is needed to select that malignancy diagnosis that is the PCD and others that may be secondary malignancies even if not reported as such.

The intent and approach of this multistep process is to focus on primary malignancies and select the malignancy most recently treated as the PCD. Secondary or metastatic malignancies can also be selected as the PCD in some circumstances, but are mostly reserved to be used as part of the severity level assignment process. If there are multiple primary malignancies reported, several different criteria are applied to identify the one that is most currently receiving “active treatment” or other treatment.

Assignment of severity of illness levels

Once a Major Diagnostic Category's PCD is selected, it is assigned two severity of illness levels, referred to as "severity levels." The two severity levels represent two different types of severity of illness: retrospective and prospective. The retrospective severity of illness is indicative of the degree of treatment difficulty and need for medical care during the analysis period used to assign the CRG. The prospective severity of illness is indicative of the expected future degree of treatment difficulty and need for future medical care following the period used to assign the CRG. The two severity level assignments are very often, but not always, the same.

The severity level numbers 1-4 describe the extent and progression of the disease selected as the PCD. A higher severity level number is indicative of a higher degree of treatment difficulty and a need for substantial medical care. Level 1 is the default severity level which is assigned if there are no level 2, 3 or 4 severity factors present that meet conditionality rules.

The assignment of the two types of severity levels is specific to each PCD and takes into account factors associated with more severe or advanced forms of the disease, comorbid conditions, and related illnesses and complications. The severity levels can be assigned by an EDC, a single DSG from within an EDC, or an EPC, together with a conditionality rule (e.g., recency, duration, age).

The maximum severity level specified in the severity leveling matrix varies by type of EDC. Minor chronic EDCs are allowed only severity levels 1 and 2 because of the generally more limited clinical spectrum of these diseases. All dominant chronic and moderate chronic EDCs have levels 1, 2, 3 and 4. A higher number represents a more severe level of illness.

The CRG Classification System assigns a PCD's retrospective and prospective severity levels in three steps:

1. Initial severity levels are assigned for retrospective and prospective severity using the PCD's severity leveling matrix and selecting the highest severity level factor present and satisfying the specified conditionality rules (e.g., recency, duration, age).
2. After the initial severity levels for a PCD are established, other DSG/EDC/EPCs in its severity leveling matrix that are clinically distinct and satisfy the conditionality rules for setting the PCD at severity level 2 or 3 are counted. Separately, for retrospective and prospective severity levels, if the number of these "extra levelers" exceeds a certain threshold, the initial severity level is increased by one up to a maximum of level 4.
3. Chronic EDCs from other MDCs that are in the severity matrix and were used, or could have been used, to set the PCD's two severity levels, then become ineligible to become PCDs in their own MDC or to set another PCD's severity levels. In addition, any other EDC, DSG or EPC in the severity matrix that was used, or could have been used, to set the PCD's two severity levels also become ineligible to be used to set another PCD's severity level.

Phase III: Determination of the base CRG and severity level for the individual

At the end of Phase II, all MDCs have been reviewed, and one or more chronic EDCs may have been identified and selected as PCDs and assigned a severity level. Based on the PCDs, EDCs, DSGs, and EPCs present, the individual is assigned to one of nine CRG Health Status Groups or Statuses. The CRG Status is assigned hierarchically starting with Status 9 Catastrophic. The highest Status in the hierarchy for which the Status criteria are met is assigned as the individual's CRG Health Status Group. Statuses are often referred to by the number, ranging from the highest or most significant, Status 9, Catastrophic Conditions, to Status 1, Healthy.

Following is a brief description of each Status, followed by a fuller description of the criteria for assignment to each Status and to a base CRG and severity level. This assignment process is done two times, once for the Concurrent Model and once for the Prospective Model.

- Status 9 - Catastrophic Conditions. Catastrophic conditions include long term dependency on a medical technology (e.g., dialysis, respirator, total parenteral nutrition) and life-defining chronic diseases or conditions that dominate the medical care required (e.g., acquired quadriplegia, severe cerebral palsy, cystic fibrosis, history of heart transplant).
- Status 8 - Malignancy, Under Active Treatment. A malignancy under active treatment.
- Status 7 - Dominant Chronic Disease in Three or More Organ Systems. Three or more (usually) dominant PCDs. In selected instances, criteria for one of the three PCDs may be met by selected moderate chronic PCDs.
- Status 6 - Significant Chronic Disease in Multiple Organ Systems. Two or more dominant or moderate chronic PCDs.
- Status 5 - Single Dominant or Moderate Chronic Disease. A single dominant or moderate chronic PCD.
- Status 4 - Minor Chronic Disease in Multiple Organ Systems. Two or more minor chronic PCDs.
- Status 3 - Single Minor Chronic Disease. A single minor chronic PCD.
- Status 2 - History of Significant Acute Disease. For the Prospective Model, this is defined by the presence, within the most recent six months of the analysis period, of one or more significant acute EDCs or significant EPCs along with the absence of any validated PCDs present. For the Concurrent Model, this definition is similar but different in that certain acute EDCs, i.e., pregnancy, can override the assignment to chronic illness CRGs in Status 3-6 or Status 3-4.
- Status 1 - Healthy. For the Prospective Model, the Healthy Status is defined by the absence of any significant acute EDCs or EPCs occurring within the last six months of the analysis period along with the absence of any validated PCDs reported at any time during the analysis period.

Once the CRG Status is determined, two base CRGs are selected and two severity levels for the individual are assigned (retrospective and prospective), if a chronic illness CRG. The logic for determining the base CRGs and severity levels for the individual is dependent on the CRG Status of the individual.

The nine CRG Statuses are subdivided into base CRGs which, when expanded by severity level, represent the full, final CRG assignments. Following is more description of the criteria for assignment to each of the Statuses, the criteria or approach for assignment to base CRG, and the approach to severity level assignment for chronic illness CRGs.

Status 9 - Catastrophic Conditions

First in the CRG Status hierarchy is Status 9, Catastrophic Conditions. Status 9 CRGs are either associated with long term dependence on medical technology or life-defining chronic conditions that dominate the medical care required.

For each catastrophic condition, there is a four-level severity leveling matrix specific to the catastrophic condition. This is determined first by assigning an initial severity level based upon

the highest EDC/DSG/EPC in the severity matrix, and then evaluating for the presence of multiple other EDCs/DSGs/EPCs that are clinically distinct. If the multiple threshold criteria are met (same criteria as for “regular” PCDs as described in Phase II), then the initial severity level is incremented by one, up to a maximum of severity level 4. The additional adjustment to the severity level is done to ensure the severity level of the catastrophic condition fully reflects the total burden of illness.

Status 8 - Malignancy, Under Active Treatment

Second in the CRG Status hierarchy is Status 8, Malignancy, Under Active Treatment. A malignancy EDC will have already been selected as the Malignancy MDC's PCD by a multistep process in Phase II that takes into account factors specific to malignancies. In the event that multiple malignancy EDCs are reported, the process gives priority to recently treated primary malignancies to be selected as the PCD with secondary or metastatic malignancies mostly used as part of the severity leveling.

Regardless of how the malignancy PCD is selected, there are three ways that the individual could meet criteria for "active treatment" and be assigned to Status 8, Malignancy Under Active Treatment. They are as follows:

- Malignancy patient hospitalized with an EDC or EPC for chemotherapy or radiation therapy.
- Malignancy patient treated with certain specified chemotherapy drugs. The data sources for chemotherapy drugs can be HCPCS J codes and/or outpatient prescription pharmaceutical datasets such as the U.S. National Drug Codes (NDC). HCPCS is the Health Care Procedural Coding System, National Level II, and J codes are the codes containing chemotherapy drugs.
- Malignancy patients, age 0-21 years with hospitalization for PDX of Malignancy or with PDX or SDX of complicating condition such as acute hematologic EDCs that include aplastic anemia, pancytopenia, or neutropenia.

If an individual with a malignancy meets one of the criteria for active treatment, then assignment is made to Status 8, and to a CRG in Status 8 based on the malignancy selected as PCD in Phase II.

Each base CRG in Status 8 has four severity levels. There is one four-level severity matrix that is used for all Status 8 malignancy CRGs. All individuals in Status 8 are receiving active treatment, and so the same severity matrix has been applied.

Malignancies without evidence of aggressive treatment are handled like any other chronic disease and are included in the subsequent portions of the CRG Status hierarchy. They could be assigned to a CRG in Status 5, 6 or 7, depending on what other chronic illnesses the individual might have.

Status 7 - Dominant Chronic Disease in Three or More Organ Systems

Third in the CRG Status hierarchy is Status 7, Dominant Chronic Disease in Three or More Organ Systems. This status consists mostly of combinations of three dominant chronic PCDs, but also some combinations of two dominant chronic PCDs plus one specified moderate chronic PCD.

The Status 7 base CRGs that consist of three DC PCDs can either be for three explicitly defined PCDs (e.g., congestive heart failure, diabetes, and chronic obstructive lung disease), or for one or two explicitly defined PCDs plus a broader collection of PCDs (e.g., congestive heart failure plus diabetes plus one other DC PCD, or cerebrovascular disease plus two other DC PCDs), or for three broad collections of three DC PCDs (e.g., three other DC PCDs).

The Status 7 base CRGs that consist of two DC PCDs plus a third MC PCD are defined based upon one of several specified MC PCDs or a collection of PCDs that include both DC and MC PCDs. For example, there is a Status 7 base CRG that includes as one member of the Triplet a collection of two PCDs that define advanced coronary artery disease–history of myocardial infarction, which is a DC PCD, and angina and ischemic heart disease, which is an MC PCD.

Once the three PCDs are selected, then the Status 7 base CRG is assigned based upon certain hierarchical rules. The hierarchy gives preference to Triplet CRGs with more specifically defined PCDs over those with more broadly defined collections of PCDs, and to DC PCDs over MC PCDs. If all of these factors are the same, then the final tie-breaking criteria is to assign the individual to the higher ranking Status 7 Triplet CRG which is conveyed by the lower base CRG number.

To illustrate, if the three PCDs are COPD, diabetes, and an Other DC PCD, there isn't a Triplet CRG defined for that specific three-way combination. Instead, there is a more broadly defined Triplet CRG for COPD plus Two Other DC PCDs and another for Diabetes plus Two Other DC PCDs. The CRG assignment would be made to COPD + Two Other DC PCDs because it is the higher ranking of the two Triplet CRGs.

Each base CRG in Status 7 has severity levels from 1 to 6. The initial retrospective severity level is determined using the combined retrospective severity levels for each of the three PCDs that comprise the CRG. In the same manner, the initial prospective severity level is determined using the combined prospective severity levels for each of the PCDs that comprise the CRG. The combinations are computed by mapping from the 64 different possible combinations of three PCD severity levels, each ranging from 1 to 4 (4 x 4 x 4 = 64), to a CRG severity level ranging from 1 to 6. The mapping does not depend on the order in which the PCD severity levels are considered. As a practical matter, this means there are 20 (not 64) possible different combinations of three PCD severity levels.

Status 6 - Significant Chronic Disease in Multiple Organ Systems

Fourth in the CRG Status hierarchy is Status 6, Significant Chronic Disease in Multiple Organ Systems. Individuals who do not meet the criteria for a Status 9, 8 or 7 CRG, but who have two or more dominant chronic or moderate chronic PCDs, are assigned a Status 6 base CRG and severity level.

The Status 6 base CRGs consist of individuals defined by either two DC PCDs, one DC PCD plus one MC PCD, or two MC PCDs. If an individual has exactly two DC PCDs, then those two are used

to determine the base CRG. If the individual has exactly one DC PCD plus one MC PCD, then those two are used to determine the base CRG. And if the individual has exactly two MC PCDs, then those two are used to determine the base CRG.

The Status 6 base CRGs can be defined for combinations of two specific PCDs, sets of closely related PCDs from two MDCs, MDC-wide collections of PCDs from two MDCs, or combinations of very broadly defined collections of PCDs. The more explicitly defined combinations are generally for higher volume chronic conditions. Following are examples:

- Pairs defined by two specific PCDs: congestive heart failure plus COPD, diabetes plus hypertension, diabetes plus asthma.
- Pairs defined by one specific PCD and one of several closely related PCDs: congestive heart failure plus dementing disease (includes Alzheimer's and Parkinson's diseases).
- Pairs defined by one specific PCD and one MDC-wide collection of PCDs: DC mental health (includes three PCDs) plus alcoholism, HIV plus DC substance abuse (includes three PCDs).
- Pairs defined by one specific PCD and a very broad collection of PCDs: HIV plus any other DC PCD, breast malignancy plus any other DC PCD.
- Pairs defined by one of several closely related PCDs and a very broad collection of PCDs: DC cerebrovascular disease (includes acquired hemiplegia and history of CVA/cerebrovascular disease with late effects) plus any other DC PCD.
- Pairs defined by two MDC-wide collections of PCDs: DC mental health (included three PCDs) plus DC substance abuse (includes three PCDs).
- Pairs defined by one MDC-wide collection of PCDs and one very broad collection of PCDs: MC developmental disability (includes three PCDs) plus any other MC PCD, and MC mental health (includes four PCDs) plus any other MC PCD.
- Pairs defined by two very broad collections of PCDs: any two other DC PCDs, any other DC PCD plus any other MC PCD, and any two other MC PCDs.

Each base CRG in Status 6 has severity levels from 1 to 6. The initial retrospective severity level is determined using the combined retrospective severity levels for each of the two PCDs that comprise the CRG. In the same manner, the initial prospective severity level is determined using the combined prospective severity levels for each of the PCDs that comprise the CRG.

Status 5 - Single Dominant or Moderate Chronic Disease

Fifth in the CRG Status hierarchy is Status 5, Single Dominant or Moderate Chronic Disease. These individuals have only one PCD, which becomes the base CRG. For example, if the single PCD for the individual is diabetes, the base CRG is diabetes.

Each Status 5 base CRG has severity levels from 1 to 4. These severity levels correspond to the PCD's retrospective and prospective severity levels assigned in Phase II. As described earlier, this is determined through a two-step process, first assigning an initial severity level based upon the highest severity level factor present and meeting the conditionality rules, and then potentially

incremented one more level to a maximum of severity level 4 if criteria are met for multiple additional clinically distinct severity level factors.

Status 4 - Minor Chronic Disease in Multiple Organ Systems

Sixth in the CRG Status hierarchy is Status 4, Minor Chronic Disease in Two or More Organ Systems. Individuals with two or more minor chronic PCDs from different MDCs are assigned to a single base CRG for minor chronic disease in two or more organ systems. This one base CRG includes all combinations of two or more chronic PCDs.

The Status 4 base CRG has four severity levels. This is determined by using the combined severity levels for each of the two or more minor chronic PCDs that comprise the CRG. The specific approach to using the combined PCD severity levels to assign a final severity level of 1-4 for retrospective and concurrent is as follows:

- Severity level 4: Two or more minor chronic PCDs of level 2.
- Severity level 3: One minor chronic PCD of level 2 and the other minor chronic PCD(s) level 1.
- Severity level 2: Three or more minor chronic PCDs, all with severity level 1.
- Severity level 1: This is the severity level assigned for those not meeting one of the above higher criteria.

Status 3 - Single Minor Chronic Disease

Seventh in the CRG Status hierarchy is Status 3, Single Minor Chronic Disease. These individuals have only one minor chronic PCD. The base CRG is the same as the PCD. The severity level for the CRG is the same as the PCD severity level. Each Status 3 single minor chronic PCD has a severity level of 1 or 2.

Status 2 - History of Significant Acute Disease

Eighth in the CRG Status hierarchy is Status 2, History of Significant Acute Disease. The individual has no PCDs present, but in the most recent six months of the analysis period has had at least one significant acute EDC or significant EPC. If the significant acute EDC (e.g., pathologic fractures and aseptic necrosis) creates a chronic EDC for the history of the significant acute (e.g., EDC for amputation and chronic musculoskeletal disease moderate), the individual would have a PCD present. Individuals with significant acute diseases that create chronic conditions would therefore be assigned to a higher Status CRG and not be included in Status 2.

Significant acute diseases can be a precursor to chronic disease or place the individual at risk for the development of chronic disease (e.g., chest pain, failure to thrive, major pneumonia, convulsion not elsewhere classified). Although individuals in the History of Significant Acute Disease Status do not have any chronic diseases, they are distinct from healthy individuals. Certain EPCs are also considered equivalent to a significant acute disease. For example, if the EPC for excisional skin debridement or skin graft is present, the individual is assigned to the

history of significant acute disease status even if no significant acute EDCs are present. The performance of either of these EPCs is indicative of significant acute disease.

There are six base CRGs for individuals in Status 2 for History of Significant Acute Disease, including a CRG for multiple significant acute diseases from different MDCs. The six base CRGs are assigned hierarchically based on the number, general nature (e.g., ENT versus other body systems), and duration (e.g., span 90 days) of the significant acute diseases present. There are not explicit severity levels assigned to the history of significant acute disease CRGs. Rather, the more complex or resource intensive are distinguished by the Status 2 categories and hierarchy which takes into account the presence of multiple significant acute diseases from different MDCs, and the general nature and duration of the significant acute diseases.

Note, these are the six Status 2 CRGs that are produced as part of the "standard" or initial grouper output. See Phase V (page 23) for description of additional Status 2 CRGs produced for the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs) as the final grouper output.

Status 1 - Healthy

The ninth and final Status in the CRG Status hierarchy is Status 1, Healthy. These are individuals who did not meet criteria for presence of significant acute EDCs or EPCs during the last 12 months of the analysis period for the Concurrent model, or the last six months for the Prospective Model, AND did not have any chronic illness present that passed data edit screens and would have led to assignment to a CRG in Status 3-6. They may have had a significant acute EDC or EPC from earlier in the analysis period and may have minor acute EDCs from any time during the analysis period (e.g., upper respiratory infection, hernia, fracture of lower limb minor).

There are two CRGs in the initial CRG grouping output for healthy individuals. One CRG is for individuals who have encounters with the healthcare system during the analysis time period. This includes encounters containing valid dates of service within the analysis period even if the reported provider type, site of service, code type, or code is invalid. The other CRG includes individuals who have had no healthcare system encounters. No severity levels are assigned to Status 1 CRGs.

In addition, it is important to note that some individuals assigned to Status 1 and Status 2 might have a chronic disease but this either was not reported during the analysis period or did not pass the data edit screens of the CRG Classification System. There are a number of possible reasons for this. An individual may not have sought treatment for the chronic disease during the analysis period, or may have been seen by a health professional but the diagnosis was not reported, or the diagnosis was reported but with an invalid code or other information missing.

Still another possibility is that there was a report of the diagnosis code but only in one outpatient visit. The CRG Classification System generally requires (with some exceptions) that an outpatient diagnosis be reported from two different visits on different dates to minimize the use of “rule-out” diagnoses and other data errors. So, these individuals will be assigned to Status 1 if there are no other chronic or significant acute diagnoses. The diagnoses reported in one outpatient visit are not all ignored however. In Phase V of the CRG assignment process, one

outpatient report of certain specified diagnoses are assigned to special Prospective CRG (PCRG) and Concurrent CRG (QCRG) categories in Status 1 and 2. See Phase V for a fuller description.

Phase IV: Aggregation of CRGs into three successive tiers of consolidation

The full CRG model from Phase III contains about 330 base CRGs and a total of over 1,400 risk groups including all the severity levels. This is intended to provide a detailed clinical description of the many prevalent and important health conditions across all age ranges and population groups. Additional clinical information is also available by examining the Diagnostic Subgroups (DSGs) that comprise the CRG categories. These detailed groupings are intended to maximize both the accuracy of the methodology for predictive performance and its usefulness for population health management including population profiling, utilization management, and targeted case management.

In addition to these detailed groupings, it is important to have broader groupings with different levels of clinical specificity. For this the CRG Classification System provides three successively broader tiers of aggregation described as the Aggregated CRGs (ACRGs). This includes ACRG1, ACRG2 and ACRG3, with ACRG3 being the highest level of aggregation. The ACRGs can be used to sort the population into higher level groupings to complement the analyses that are possible with the more detailed CRG groupings.

The ACRGs maintain the same basic structure as the CRGs. Each level of aggregation begins with the same nine Health Status Groups, then aggregates the base CRGs into broader categories, and either retains the existing severity level assignment or makes certain adjustments. Adjustments to the severity levels are mostly needed for certain of the ACRG2 and ACRG3 categories. Whenever the Aggregated CRG is sufficiently broad that it contains some groups that are relatively more complex and resource intensive than others, it is necessary to either increase the severity level of the more serious group(s) or decrease the severity level of the relatively less serious group(s). This sometimes involves expanding the number of severity levels for the aggregated groups within a Health Status Group.

For most of the Aggregated CRGs, the specifications are the same for QACRGs and PACRGs. The categories are rolled up the same way and the severity level adjustments are done the same way.

Phase V: Assign models for prospective or concurrent (retrospective) applications

Phase V produces the final grouping outputs for the CRG Classification System, referred to as the models for Prospective CRGs (PCRGs) and Retrospective or Concurrent CRGs (QCRGs). It does this by accepting all the grouping output from Phases I-IV, referred to as the initial output for Prospective CRGs and Retrospective (or Concurrent) CRGs, and then applying additional logic

and classifications to produce the final output which is further differentiated with additional categories for prospective and concurrent applications.

Phase V serves three roles. One role is to recognize certain diagnoses that did not quite make it through all of the Phase I data edit screens. This is done by recognizing a selected subset of these diagnoses and creating additional categories, albeit at a lower level of classification in the CRG methodology (Status 1 and 2). A second role is to implement additional logic and and hierarchies for assignment to Status 1 and 2 categories, including logic to have certain of the Status 2 categories override assignment to CRGs in Status 3-6 for the Concurrent Model (QCRGs). Some of the additional categories are relevant to both Prospective and Concurrent applications. Other categories and logic are relevant only to Concurrent applications and give more emphasis to health events such as pregnancy, delivery, newborn birth, and major acute illnesses and complications. A third role is to specify the aggregations for these additional QCRGs and PCRGs through the QACRGs and PACRGs.

To understand the nature and scope of the Phase V additions for the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs), it is helpful to first highlight certain key design features of the initial grouping output from Phases I-IV. One key design feature is the deliberate approach in Phase I to apply a relatively strict set of data editing screens to determine which diagnoses will be accepted for use in grouping. Another key design feature is the approach to keep assignments to Health Status Group the same for initial Retrospective and Prospective CRGs in Phases I-IV and to keep assignments to base CRG very similar with just very modest differences for Status 6 Pairs and Status 7 Triplets. The main difference between the initial Retrospective CRGs and Prospective CRGs is severity level assignment, mostly with some of the severity leveling factors assigned to a somewhat lower level for Prospective than Retrospective CRGs.

Following is a description of the Phase V approach to recognizing certain additional diagnoses, creating additional categories for Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs) in Status 1 and 2, and aggregating the additional Status 1 and 2 categories through the QACRGs and PACRGs.

Phase V approach to recognizing certain other diagnoses

The initial CRG output requires the medical claims and encounter information to pass a set of edits that are specific to diagnosis, pharmaceutical, and procedure codes. The first set of data edits are basic edits designed to ensure all required data elements are present and dates of service are within the time frame of the analysis period. The second set of edits are designed mostly to ensure that all codes are valid and to screen out single occurrence diagnoses that may be rule-outs, temporary working diagnoses or data reporting errors.

As described earlier in Phase I, one report of an inpatient hospital or emergency department diagnosis is accepted, but otherwise the general rule is that an outpatient diagnosis needs to be reported two times and on different dates to be accepted. This serves to help ensure the accuracy and reliability of the DSG, EDC, and CRG classifications. There is also an exceptions list for outpatient diagnoses that are unlikely to be rule-outs and for which one outpatient report is accepted and another list of closely related one outpatient occurrence DSGs that are used to create validated EDCs. In addition, there are a limited number of pharmaceutical codes, that if meeting certain conditionality rules, will create a validated EDC. Notwithstanding, there are

some diagnoses that may not be used initially, but are important to recognize in the last phase of CRG assignment.

To explain further, there are four situations in which one outpatient report may accurately represent a diagnosis including: (1) persons newly eligible for coverage who may have had few medical care encounters, (2) illness first occurs toward the end of time period, (3) illness may be generally under control and there was only one visit during the time period (e.g., asthma, hypertension, diabetes); or (4) the person had a number of outpatient visits throughout the time period but the underlying chronic condition was only recorded once.

To illustrate, if there is a single outpatient report of diabetes and no prescription for insulin, how is this to be interpreted? This could well be a rule-out or temporary working diagnosis or data error, but it might also be a correct diagnosis. One of the above four situations might apply. Possibly, the person's diabetes is mild and well-controlled and there is only an occasional maintenance medical care encounter, or maybe the diagnosis is just emerging and there has only been one visit, or maybe the person is newly enrolled in the health plan and hasn't yet had many medical care visits.

This example helps to illustrate an important data reporting issue with medical claims and encounter data and the approach of the CRG Classification System. It is not possible to know for sure whether one outpatient report of diabetes (with no prescription for insulin, or perhaps multiple prescriptions for blood glucose lowering drugs) represents a person who truly has diabetes. There is the possibility that it is a correct diagnosis, but if it is, it is unlikely to represent a person with severe or advanced disease. Taking this into account, it is the approach of the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs) to recognize one outpatient report of diabetes (without prescription for insulin or other blood glucose lowering drugs), but at a lower level of classification in the CRG methodology.

The rationale for this approach can also be illustrated with an acute illness diagnosis such as cerebrovascular infarction (stroke). At the time it occurs, a cerebrovascular infarction typically requires a hospitalization and multiple follow-up outpatient visits, often including visits for rehabilitation services. A single reported outpatient visit for cerebrovascular infarction then is unlikely to represent a new stroke. It is possible that it represents a follow-up visit to a stroke from an earlier time period, or it may represent a rule-out diagnosis or coding error. Thus, as with diabetes, one outpatient report of cerebrovascular infarct is recognized, but at a lower level classification in the CRG methodology.

To summarize, the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs) recognize one outpatient occurrence for a subset of the more serious chronic and acute diagnoses for three reasons:

1. While many of these may be rule-out diagnoses or data-entry errors, for a variety of reasons there will likely also be some that represent a significant chronic or acute illness.
2. Since these are among the more serious chronic and acute diagnoses, even a rule-out diagnosis may represent a risk factor or health situation different from others classified to CRGs in Health Status Groups 1 and 2.
3. Average resource use, while variable, is generally higher than for others classified to Health Status 1 and 2, though less than those classified to Health Status 3-9 who have data edit screen "validated" diagnoses for chronic illness CRGs.

Following is a description of the Prospective CRGs (PCRGs) and Concurrent CRGs (QCRGs), including the additional categories that they both create to recognize certain diagnoses with only one outpatient report, and for QCRGs, the additional categories to recognize the importance of deliveries, newborn births and acute illnesses to concurrent applications. A description is also provided of the Aggregated Prospective CRGs (PACRGs) and Aggregated Concurrent CRGs (QACRGs).

From the user perspective, it is important to select the CRG output that is most appropriate for the intended application or analysis. If the intent is to risk adjust for healthcare services, expenditures or outcomes for the time period just completed, then Concurrent CRGs (QCRGs) are the best option. If the intent is to risk adjust for a future time period, then Prospective CRGs (PCRGs) are the best option.

Prospective CRGs (PCRGs)

The PCRGs start from the Prospective CRGs of the initial output, and then add certain additional groupings. The PCRGs supplement the initial groupings with 13 additional categories for Status 1 Healthy and the same 13 additional categories for Status 2 Significant Acute, increasing the total number of risk groups in the system from 1,408 to 1,434.

To create these additional categories, the PCRGs recognize one outpatient report for six kinds of diagnoses. They are as follows:

- Most DC conditions (e.g., Alzheimer's, COPD, CHF, rheumatoid arthritis, diabetes, malignancy, bipolar disorder, chronic alcoholism)
- Many of the MC conditions (e.g., epilepsy, coronary artery disease, cardiac dysrhythmia and conduction disorders, chronic renal disease stage I, II, or NOS/NEC, developmental delay, major depression (without psychosis), other significant drug abuse/dependence)
- Certain of the minor chronic conditions (e.g., gallbladder disease with obstruction or inflammation, chronic pelvic inflammatory disease)
- Many of the more serious or potentially serious acute conditions (e.g., convulsion NEC, pleural effusion, ventricular tachycardia, thrombophlebitis, acute GI extreme or major, GI hemorrhage, ascites, lack of normal physiologic development, acute mental health major, drug withdrawal)
- DSGs for pregnancy and abortion
- DSGs for extreme prematurity and major neonatal complications

List of PCRGs

PCRG	PCRG description
10000	Healthy
10010	Healthy, Non-User

PCRG	PCRG description
10020	Delivery or Other Termination of Pregnancy, without Other Significant Illness
10040	Pregnancy without Delivery, without Other Significant Illness
10050	One DX Reporting - Significant Gynecological Diagnosis, without Other Significant Illness
10069	Newborn >999 Grams, without Other Significant Illness
10080	One DX Reporting - Major Trauma or Infection Diagnosis, without Other Significant Illness
10100	One DX Reporting - Malignancy Diagnosis, without Other Significant Illness
10105	One DX Reporting - Developmental Condition, without Other Significant Illness
10110	One DX Reporting - Significant Neurological Diagnosis, without Other Significant Illness
10120	One DX Reporting - Significant Cardiovascular, Pulmonary or Other Vascular Diagnosis, without Other Significant Illness
10130	One DX Reporting - Major Mental Illness or Substance Abuse Diagnosis, without Other Significant Illness
10140	One DX Reporting - Significant Connective Tissue or Orthopedic Diagnosis, without Other Significant Illness
10150	One DX Reporting - Significant Gastrointestinal, Hepatic or Pancreas Diagnosis, without Other Significant Illness
10155	One DX Reporting - Significant Renal, Metabolic, Blood or Other Diagnosis, without Other Significant Illness
10160	One DX Reporting - Diabetes Diagnosis, without Other Significant Illness
17210	Antipsychotic Prescription Medicines, without Other Significant Illness
17220	Blood Glucose Lowering Drugs Excluding Insulin, without Other Significant Illness
17230	Neurologic Prescription Medicines, without Other Significant Illness
17240	Cardiovascular Prescription Medicines, without Other Significant Illness
17250	Mental Health Prescription Medicines Except Antipsychotics, without Other Significant Illness
17260	Prescription Medicines for Peptic Ulcer and Gastroesophageal Reflux (GERD), without Other Significant Illness
17270	Inhalants and Other Respiratory Prescription Medicines, Span 90 Days, without Other Significant Illness
17280	Other Significant Prescription Medicines, without Other Significant Illness
17300	Immunosuppressants and Major Malignancy Related Prescription Medicines, without Other Significant Illness

PCRG	PCRG description
17301	Other Malignancy Related Prescription Medicines, without Other Significant Illness
20720	Delivery or Other Termination of Pregnancy, with Other Significant Acute Illness
20740	Pregnancy without Delivery, with Other Significant Illness
20750	One DX Reporting - Significant Gynecological Diagnosis, with Other Significant Illness
20769	Newborn, BWT >999Grams, with Other Significant Illness
20772	Major Trauma Diagnosis, with or without Other Significant Illness
20774	Major Acute Diagnosis Except Trauma, with or without Other Significant Illness
20780	One DX Reporting - Major Trauma or Infection Diagnosis, with Other Significant Illness
20800	One DX Reporting - Malignancy Diagnosis, with Other Significant Illness
20805	One DX Reporting - Developmental Condition, with Other Significant Illness
20810	One DX Reporting - Significant Neurological Diagnosis, with Other Significant Illness
20820	One DX Reporting - Significant Cardiovascular, Pulmonary or Other Vascular Diagnosis, with Other Significant Illness
20830	One DX Reporting - Major Mental Illness or Substance Abuse Diagnosis, with Other Significant Illness
20840	One DX Reporting - Significant Connective Tissue or Orthopedic Diagnosis, with Other Significant Illness
20850	One DX Reporting - Significant Gastrointestinal, Hepatic or Pancreas Diagnosis, with Other Significant Illness
20855	One DX Reporting - Significant Renal, Metabolic, Blood or Other Diagnosis, with Other Significant Illness
20860	One DX Reporting - Diabetes Diagnosis, with Other Significant Illness
27210	Antipsychotic Prescription Medicines, with Other Significant Illness
27220	Blood Glucose Lowering Drugs Excluding Insulin With Other Significant Illness
27230	Neurologic Prescription Medicines, with Other Significant Illness
27240	Cardiovascular Prescription Medicines, with Other Significant Illness
27250	Mental Health Prescription Medicines Except Antipsychotics, with Other Significant Illness
27260	Prescription Medicines for Peptic Ulcer and Gastroesophageal Reflux (GERD), with Other Significant Illness

PCRG	PCRG description
27270	Inhalants and Other Respiratory Prescription Medicines, Span 90 Days, with Other Significant Illness
27280	Other Significant Prescription Medicines, with Other Significant Illness
27300	Immunosuppressants and Major Malignancy Related Prescription Medicines, with Significant Illness
27301	Other Malignancy Related Prescription Medicines, with Other Significant Illness

Concurrent CRGs (QCRGs)

The QCRGs start from the Retrospective CRGs of the initial CRGs, and then add certain additional groupings. The QCRGs contain the same additional 13 Status 1 and Status 2 categories as the PCRGs, plus another three categories for a total of 16 additional categories for Status 1 and Status 2. This increases the total number of risk groups from 1,408 to 1,440. The additional QCRG categories are to distinguish deliveries with complications from deliveries without complication, and to recognize the importance of newborn births (even without major diagnoses), and major trauma and infections for Concurrent applications.

The QCRGs also order some of its categories differently than the PCRGs. This is to give higher ranking to delivery, newborn birth, and certain acute illnesses over one outpatient report of a chronic condition. Any person giving birth will require a number of pregnancy-related services during the perinatal time period along with the delivery hospitalization, and newborns will have a hospitalization at birth along with a number of outpatient visits during their first year of life. In the instance of obstetric deliveries, the QCRG logic goes one step further and regroups all deliveries from chronic illness CRGs in Status 3-6 together with those in Status 2.

To create the additional concurrent categories, the QCRGs first recognize one outpatient report for three additional kinds of diagnoses: (1) major infections such as pneumonia and other major lung infections, septicemia and other major and extreme bacterial or non-bacterial infections; (2) major trauma such as major head trauma, abdominal trauma, hip fracture, and fracture of limb or pelvis-major; and (3) other acute conditions that are serious for the current time period but unlikely to persist or recur in future time periods such as appendicitis, hernia.

List of QCRGs

QCRGs	QCRG description
10000	Healthy
10010	Healthy, Non-User
10020	Delivery with Major Complicating Diagnosis, without Other Significant Illness
10025	Delivery with Moderate Complicating Diagnosis, without Other Significant Illness

QCRGs	QCRG description
10030	Delivery without Major/Moderate Complicating Diagnosis, without Other Significant Illness
10040	Pregnancy without Delivery, without Other Significant Illness
10050	One DX Reporting - Significant Gynecological Diagnosis, without Other Significant Illness
10064	Premature Newborn, BWT 1,500-1,999 Grams or GA 31-34 Weeks, without Other Significant Illness
10066	Newborn BWT>1,999 Grams, With Respiratory Complicating Diagnosis, without Other Significant Illness
10069	Newborn BWT>1,999 Grams, Without Respiratory Complicating Diagnosis, without Other Significant Illness
10080	One DX Reporting - Major Trauma or Infection Diagnosis, without Other Significant Illness
10100	One DX Reporting - Malignancy Diagnosis, without Other Significant Illness
10105	One DX Reporting - Developmental Condition, without Other Significant Illness
10110	One DX Reporting - Significant Neurological Diagnosis, without Other Significant Illness
10120	One DX Reporting - Significant Cardiovascular, Pulmonary or Other Vascular Diagnosis, without Other Significant Illness
10130	One DX Reporting - Major Mental Illness or Substance Abuse Diagnosis, without Other Significant Illness
10140	One DX Reporting - Significant Connective Tissue or Orthopedic Diagnosis, without Other Significant Illness
10150	One DX Reporting - Significant Gastrointestinal, Hepatic or Pancreas Diagnosis, without Other Significant Illness
10155	One DX Reporting - Significant Renal, Metabolic, Blood or Other Diagnosis, without Other Significant Illness
10160	One DX Reporting - Diabetes Diagnosis, without Other Significant Illness
17210	Antipsychotic Prescription Medicines, without Other Significant Illness
17220	Blood Glucose Lowering Drugs Excluding Insulin, without Other Significant Illness
17230	Neurologic Prescription Medicines, without Other Significant Illness
17240	Cardiovascular Prescription Medicines, without Other Significant Illnesses
17250	Mental Health Prescription Medicines Except Antipsychotics, without Other Significant Illness

QCRGs	QCRG description
17260	Prescription Medicines for Peptic Ulcer and Gastroesophageal Reflux (GERD), without Other Significant Illness
17270	Inhalants and Other Respiratory Prescription Medicines, Span 90 Days, without Other Significant Illness
17280	Other Significant Prescription Medicines, without Other Significant Illness
17300	Immunosuppressants and Major Malignancy Related Prescription Medicines, without Other Significant Illness
17301	Other Malignancy Related Prescription Medicines, without Other Significant Illness
20710	Delivery with Major Complicating Diagnosis, with Other Significant Illness
20720	Delivery with Moderate Complicating Diagnosis, with Other Significant Illness
20730	Delivery without Major/Moderate Complicating Diagnosis, with Other Significant Illness
20740	Pregnancy without Delivery, with Other Significant Illness
20750	One DX Reporting - Significant Gynecological Diagnosis, with Other Significant Illness
20761	Premature Newborn, Birthweight <1,000 Grams or Gestation <27 Weeks, with Other Significant Illness
20762	Premature Newborn, Birthweight 1,000-1,499 Grams or Gestational Age 27-30 Weeks, with Other Significant Illness
20764	Premature Newborn, Birthweight 1,500-1,999 Grams or Gestational Age 31-34 Weeks, with Other Significant Illness
20766	Newborn, BWT>1,999 Grams, with Respiratory Complicating Diagnosis, with Other Significant Illness
20769	Newborn, BWT>1,999 Grams, without Respiratory Complicating Diagnosis, with Other Significant Illness
20772	Major Trauma Diagnosis, with or without Other Significant Illness
20774	Major Acute Diagnosis Except Trauma, with or without Other Significant Illness
20780	One DX Reporting - Major Trauma or Infection Diagnosis with Other Significant Illness
20800	One DX Reporting - Malignancy Diagnosis with Other Significant Illness
20805	One DX Reporting - Developmental Condition with Other Significant Illness
20810	One DX Reporting - Significant Neurological Diagnosis, with Other Significant Illness

QCRGs	QCRG description
20820	One DX Reporting - Significant Cardiovascular, Pulmonary or Other Vascular Diagnosis, with Other Significant Illness
20830	One DX Reporting - Major Mental Illness or Substance Abuse Diagnosis, with Other Significant Illness
20840	One DX Reporting - Significant Connective Tissue or Orthopedic Diagnosis with Other Significant Illness
20850	One DX Reporting - Significant Gastrointestinal, Hepatic, or Pancreas Diagnosis, with Other Significant Illness
20855	One DX Reporting - Significant Renal, Metabolic, Blood or Other Diagnosis, with Other Significant Illness
20860	One DX Reporting - Diabetes Diagnosis, with Other Significant Illness
27210	Antipsychotic Prescription Medicines, with Other Significant Illness
27220	Blood Glucose Lowering Drugs Excluding Insulin, with Other Significant Illness
27230	Neurologic Prescription Medicines, with Other Significant Illness
27240	Cardiovascular Prescription Medicines, with Other Significant Illness
27250	Mental Health Prescription Medicines Except Antipsychotics, with Other Significant Illness
27260	Prescription Medicines for Peptic Ulcer and Gastroesophageal Reflux (GERD), with Other Significant Illness
27270	Inhalants and Other Respiratory Prescription Medicines, Span 90 Days, with Other Significant Illness
27280	Other Significant Prescription Medicines, with Other Significant Illness
27300	Immunosuppressants and Major Malignancy Related Prescription Medicines, with Significant Illness
27301	Other Malignancy Related Prescription Medicines, with Other Significant Illness

PACRGs and QACRGs

Status 2 Significant Acute: For the Concurrent Model, the 38 QCRG categories that are maintained through QACRG1 and QACRG2 are combined into 10 categories for QACRG3. For the Prospective model, the 32 PCRG categories that are maintained through PACRG1 and PACRG2 are combined into seven categories for PACRG3. There are no severity levels.

Status 1 Healthy: For the Concurrent Model, the 30 QCRG categories that are maintained through QACRG1 and QACRG2 are combined into nine categories for QACRG3. For the

Prospective Model, the 26 PCRG categories that are maintained through PACRG1 and PACRG2 are combined into seven categories for PACRG3. There are no severity levels.

Phase VI: Functional Status Grouping

The 3M™ Functional Status Groups (FSG) is a clinically-based classification tool that can augment a diagnosis-based classification. The interaction of functional status impairments can potentially play a significant role in the improvement of risk-adjustment outcomes for a patient. The FSG Classification System uses a subset of functional health indications from three functional assessment instruments that are based on data submitted by post-acute providers. These functional assessment instruments are:

- home health assessments using the Outcome and Assessment Information Set (OASIS)
- skilled nursing facility assessments using the Minimum Data Set (MDS)
- assessments from rehabilitation hospitals using the Inpatient Rehabilitation Facility - Patient Assessment Instrument (IRF-PAI)

The functional health indications are organized info four domains believed to capture the most significant effects of functional health status upon predicted resource use. These four domains are:

- self-care
- mobility
- cognitive impairment
- incontinence

An individual's functional health indications are standardized across the three instruments and separated into three ranges (high, moderate, and low) for each of the four domains. The standardized scores are summed for an overall score. This overall score may be used as a summary statistic to provide additional information on the patient's overall health.

Glossary

A

Acronyms used in this manual

Acronym	Definition
A	Minor Acute
ACRG	Aggregated Clinical Risk Group
ACRG1	Aggregated Clinical Risk Group Tier 1
ACRG2	Aggregated Clinical Risk Group Tier 2
ACRG3	Aggregated Clinical Risk Group Tier 3
ATC	Anatomic Therapeutic Chemical code
ATP	Advanced Technology Program
C	Minor Chronic
CCI	Canadian Classification of Health Interventions
CCP	Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures
CHF	Congestive Heart Failure
COPD	Chronic Obstructive Pulmonary Disease
CPT	Current Procedural Terminology
CRG	Clinical Risk Group/Grouper
DC	Dominant Chronic
DIN	Drug Identification Number
DRG	Diagnosis Related Groups
DSG	Diagnostic Subgroup
EDC	Episode Diagnostic Category
EPC	Episode Procedure Category
FSG	Functional Status Grouper
HCPCS	Healthcare Common Procedure Coding System
HIPAA	Health Insurance Portability and Accountability Act
ICD	International Classification of Diseases
ICD-9-CM	International Classification of Diseases - Revision 9 - Clinical Modifications

Acronym	Definition
ICD-10-CM	International Classification of Diseases - Revision 10 - Clinical Modifications
ICD-10-WHO	International Classification of Diseases, 10th Version, World Health Organization
ICPC	International Classification of Primary Care
IRF-PAI	Inpatient Rehabilitation Facility - Patient Assessment Instrument
MC	Moderate Chronic
MDC	Major Diagnostic Category
MDS	Minimum Data Set
NACHRI	National Association of Children's Hospitals and Related Institutions
NDC	National Drug Code
NIST	National Institute of Standards and Technology
OASIS	Outcome and Assessment Information Set
PCD	Primary Chronic Disease
PCRG	Prospective Clinical Risk Group
PACRG1	Prospective Aggregated Clinical Risk Group Tier 1
PACRG2	Prospective Aggregated Clinical Risk Group Tier 2
PACRG3	Prospective Aggregated Clinical Risk Group Tier 3
PCS	Procedure Coding System (ICD-10-PCS)
PDX	Principal Diagnosis Code
PPS	Prospective Payment System
QCRG	Concurrent or Retrospective Clinical Risk Group
QACRG1	Concurrent or Retrospective Aggregated Clinical Risk Group Tier 1
QACRG2	Concurrent or Retrospective Aggregated Clinical Risk Group Tier 2
QACRG3	Concurrent or Retrospective Aggregated Clinical Risk Group Tier 3
SA	Significant Acute
SDX	Secondary Diagnosis Code

Acute

A disease is classified as "acute" if the duration of the disease is short and the disease would normally resolve (e.g., pneumonia) or a treatment exists that cures the disease (e.g., fractured ankle). Signs, symptoms and findings (e.g., chest pain) are also considered acute. Some

diagnoses that are either acute and resolve, or are chronic and persist, are categorized as acute and converted to chronic if they persist long enough (90 or 180 days).

Aggregated CRGs (ACRGs)

The CRGs are rolled up to three successive tiers of aggregation referred to as ACRG1, ACRG2, and ACRG3. The ACRGs maintain the same basic structure as the CRGs. Each level of aggregation begins with the same nine Health Status Groups, then aggregates the base CRGs into broader categories, and either retains the existing severity level assignment or makes certain adjustments.

Analysis period

The specification of a start date and an end date to be used by the CRG software logic to determine what data to use for grouping purposes. Diagnosis, procedure and pharmacy codes with dates of service before the start date or after the end date are not used in computing CRG results.

B

Base CRG

The base CRG is the CRG category without its severity level.

C

Catastrophic

Catastrophic conditions (Health Status 9) include long term dependency on a medical technology (e.g., dialysis, respirator, TPN) and life-defining chronic diseases or conditions that dominate the medical care required (e.g., acquired quadriplegia, severe cerebral palsy, cystic fibrosis, history of heart transplant).

Chronic

A disease is classified as chronic if it is either life-long or prolonged in duration. Some diseases are progressive, others can sometimes be cured or resolve in time, and others, while usually not curable, may often be controlled. Examples are as follows:

- The duration of the disease is lifelong and progressive (e.g., diabetes, Parkinson's).
- The disease is lifelong or prolonged and sometimes is progressive, but often alternates through periods of exacerbation and remission (e.g., systemic lupus erythematosus).
- The disease has a prolonged duration but a cure is sometimes possible, i.e., where there is no evidence of the disease (e.g., malignancies).
- The disease is lifelong or prolonged, but can often be controlled by medication or other means (e.g., hypertension).
- The disease is prolonged, can often be controlled by medication or other means, and sometimes resolves over time (e.g., asthma).

Chronic manifestation EDCs (CM)

In versions prior to CRG v2.0, a chronic manifestation EDC is a manifestation or acute exacerbation of a chronic disease (e.g., diabetic neuropathy). The CM EDC describes the manifestation or acute exacerbation (i.e., the neuropathy) and indicates the presence of the underlying chronic disease (i.e., diabetes). In addition, these EDCs are used to identify uncommon but distinct diseases within a more frequently occurring EDC and are used in determining the severity level of the EDC. In versions beginning with CRG v2.0, CM EDCs have been re-expressed as Diagnostic Subgroups (DSGs).

Clinical Risk Group (CRG)

A CRG is the severity adjusted risk group to which an individual is assigned. Each individual is assigned to one concurrent or retrospective risk group and one prospective risk group.

Concurrent Clinical Risk Groups

See "QCRGs (Concurrent Clinical Risk Groups)" (page 65).

D

Diagnostic Subgroup (DSG)

Diagnosis Subgroups (DSGs) are the most granular grouping of diagnoses in the CRG Classification System. All diagnosis codes are assigned to a DSG. The DSGs in turn create broader groupings referred to as Episode Diagnostic Categories (EDCs).

DSGs provided a mechanism to make three kinds of distinctions within the more broadly defined EDCs: distinct conditions, stage/status/severity of a condition, and complication of a condition. To illustrate, the DSGs for the Diabetes EDC distinguish Type I from Type II diabetes, insulin dependence, acute complications such as ketoacidosis, and chronic manifestations such as retinopathy, neuropathy, renal disease, and peripheral vascular disease.

There are also pharmaceutical codes or combinations of codes, which if included by the user, can create DSGs in the event they are not already created by diagnosis codes.

Dominant Chronic EDCs (DC)

Dominant chronic EDCs are serious chronic diseases that often result in the progressive deterioration of an individual's health and often lead to or significantly contribute to an individual's debility, death, and future need for medical care (e.g., congestive heart failure, diabetes, cerebral palsy, sickle cell anemia, malignancies, schizophrenia). With few exceptions, such as malignancies, dominant chronic EDCs are lifelong conditions.

E

Episode Diagnostic Categories (EDCs)

The diseases in each MDC are subdivided into EDCs. Each EDC is assigned to one of five EDC types. Three of these types refer to chronic diseases; the other two refer to acute diseases. A

disease is classified as chronic if the duration of the disease is lifelong or of a prolonged duration. A disease is classified as acute if the duration of the disease is short or the disease would naturally resolve. The six EDC types are:

- Dominant Chronic EDC (DC)
- Minor Acute EDCs (A)
- Minor Chronic EDCs (C)
- Moderate Chronic EDCs (MC)
- Significant Acute EDCs (SA)
- Chronic Manifestation EDCs (CM) is a sixth type of EDC that existed prior to CRG v2.0

Episode Procedure Categories (EPCs)

The CRG methodology classifies all procedure codes, though it only uses a relatively small number of EPCs in the CRG assignment process. This includes ICD-9 and ICD-10 procedure codes, CPT®, and HCPCS and international procedure code sets. It makes selective use of EPCs to:

- create certain EDCs, recognizing disease states implied by the EPC
- eliminate certain EDCs, recognizing that the EPC is intended to remove or cure a disease state
- contribute to the severity level assignment for some EDCs.

In addition, in the final CRG classification assignments, if an individual does not have any chronic conditions or significant acute diagnoses, the CRG software will examine for the presence of EPCs for purposes of assignment to a CRG in Status 2, Significant Acute.

H

Health Status (or Health Status Group)

Broadest level of aggregation in CRGs, based on the presence or one or more chronic conditions in different body systems, or recent treatment of significant acute condition. The nine CRG health statuses or health status groups, listed from the highest to lowest are:

- Status 9—Catastrophic Conditions
- Status 8—Malignancy, Under Active Treatment
- Status 7—Dominant Chronic Disease in Three or More Organ Systems (Triplets)
- Status 6—Significant Chronic Disease in Multiple Organ Systems (Pairs)
- Status 5—Single Dominant or Moderate Chronic Disease
- Status 4—Chronic Disease in Multiple Organ Systems
- Status 3—Single Minor Chronic Disease
- Status 2—History of Significant Acute Disease
- Status 1—Healthy

Healthy

CRG defines "Healthy" as individuals not qualifying for any of the eight other Health Statuses. Generally, this means there are no chronic conditions identified and no Significant Acute conditions noted within the most recent six months of the review period. These individuals may still have a significant health event such as pregnancy, obstetric delivery, or newborn birth and may be assigned to a CRG category to reflect this.

M

Major Diagnostic Category (MDC)

Each diagnosis code is categorized into one of 37 mutually exclusive and exhaustive categories referred to as Major Diagnostic Categories (MDCs). The diseases in each MDC correspond to a single organ system or disease etiology. With the exception of catastrophic conditions, malignancies, systemic infectious diseases, and multiple trauma (are were assigned to their own MDCs), diseases that include both a particular organ system and a particular etiology are assigned to the MDC corresponding to the organ system involved.

Minor acute EDCs (A)

Minor acute EDCs are minor acute illnesses or events that may be mild or more serious but are self-limiting, are not a precursor to chronic disease, do not place the individual at risk for the development of chronic disease, and do not result in significant sequelae (e.g., fractured wrist, common cold, appendicitis).

Minor chronic EDCs (C)

Minor chronic diseases can usually be managed effectively throughout an individual's life with typically few complications and limited effect upon an individual's debility, death, and future need for medical care (e.g., migraine headache, hearing loss). However, minor chronic diseases may be serious in their advanced stages or may be a precursor to more serious diseases (e.g., hyperlipidemia). Still other diseases may require significant intervention before being resolved or brought under control (e.g., ventricular septal defect, gall bladder disease, vesicoureteral reflux).

Moderate chronic EDCs (MC)

Moderate chronic EDCs are serious chronic diseases that usually do not result in the progressive deterioration of an individual’s health but can significantly contribute to an individual's debility, death, and future need for medical care (e.g., asthma, epilepsy, atrial fibrillation, hypertension, foster care status). Some of these conditions are lifelong while others may resolve.

N

Non-User

Refers to individuals grouped to CRG Health Status 1—Healthy/Non-User. Defined as enrollees/individuals with no healthcare encounters within the analysis time period. Individuals

with encounters during the analysis period are assigned to Health Status 1 even if the reported provider type, site of service or code type is invalid.

P

Pair

Refers to categories in CRG Health Status 6, defined to include two chronic illnesses from different body systems that are either Dominant or Moderate Chronic EDCs.

Primary chronic disease (PCD)

The EDC that represents the most significant chronic disease in each body system or MDC is referred to as the primary chronic disease (PCD). For each MDC that has one or more chronic EDCs, the chronic EDC that is the highest ranked is selected as a PCD. If chronic diseases from more than one MDC are present, multiple PCDs may be assigned for the individual.

Prospective Clinical Risk Groups (PCRGs)

The PCRG is a set of alternative risk group assignment designed for prospective applications. It is a limited reassignment of the standard CRGs produced from the first four phases of the CRG logic. Like the CRGs, it has a set of aggregated groups (ACRGs) called PACRGs.

Q

QCRGs (Concurrent Clinical Risk Groups)

The QCRGs are a set of alternative risk group assignments designed for concurrent or retrospective applications. It is a limited reassignment of the CRGs. Like the CRGs it has a set of aggregated groups (ACRGs) called the QACRGs.

R

Rank

CRGs make extensive use of hierarchies in the clinical logic. Hierarchies allow for the CRG assignment to be based upon the individual's most significant diagnoses when there are multiple diagnoses reported. This logic in large part relies on an assigned rank. All MDCs and chronic EDCs within them are assigned an explicit rank which is used to determine which MDC or EDC takes precedence over another.

Rule

The exact meaning and significance of each diagnostic condition often depends on conditional relationships. This includes such factors as site of service, recency of occurrence, persistence or recurrence, and demographics. In the CRG methodology, these conditional relationships are captured through what are referred to as "rules."

S

Severity adjustment (leveling)

Each primary chronic disease (PCD) in each MDC is assigned a severity level. There severity level reflects the extent and progression of the chronic illness condition, and is indicative of treatment difficulty and need for medical care. There is a separate determination for prospective severity of illness and concurrent severity of illness.

The severity of illness assignment is based upon such items of DSGs from the chronic EDC reflecting a more advanced stage or severe condition, other chronic and acute illness conditions from the same MDC, and relevant other EDCs (mostly acute) from other MDCs.

There are four severity levels for Dominant and Moderate Chronic PCDs, and two severity levels for Minor Chronic PCDs. CRG Pairs and Triplets have six severity levels.

Significant acute EDCs (SA)

A significant acute EDC is a serious acute illness or condition that can be a precursor to, or place the individual at risk for, the development of chronic disease (e.g., chest pain, syncope, convulsions, failure to thrive, kidney stones, acute nephritis, and thrombocytopenia), or can potentially result in significant late effects (e.g., major trauma to the head, spinal cord or back, major burns). It also includes all very serious acute illnesses (e.g., intestinal obstruction, major pneumonia, septicemia) and all organ failure diagnoses (e.g., acute respiratory failure, acute renal failure, shock).

Status

(See also: Health Status) CRGs are arranged into nine Health Status Groups or health statuses ranging from healthy individuals to individuals with catastrophic conditions. Each Status contains a series of CRGs for various specified conditions.

T

Triplet

Refers to categories in CRG Health Status 7, defined to include dominant or moderate chronic illnesses in three or more different body systems.