

DESCRIPTION OF SAS UTILITY PROGRAMS FOR THE DIAGNOSIS GROUPING SYSTEM (DGS) FOR CHILD ED VISITS

Introduction

To facilitate use of the Diagnosis Grouping System (DGS), a SAS program is available for download at <http://www.pecarn.org/tools/index.html>. The program uses SAS 9.1.3 for Windows and may not function on other versions of SAS.

The DGS is based on 2002 *International Classification of Diseases, 9th Revision*. This system was created in order to group diagnoses found commonly in Pediatric Emergency Medicine (PEM) into clinically relevant categories for research and reporting. The DGS includes 21 Major groups. Most Major groups have Subgroups (77 total Subgroups within the DGS) to provide further diagnosis specificity. In addition, Subgroups within different Major Groups that have a common clinical thread are aggregated into Combined Common Subgroups. (For example, the 16 Infectious Diseases subgroups may be aggregated into one Infectious Disease combined subgroup.) The program also assigns a five-level severity score to each diagnosis based on intensity of resources required for that diagnosis. Both systems utilize the 2002 International Classification of Diseases Version 9 Clinical Modification (ICD-9-CM) diagnosis codes.

Getting Started

Downloadable DGS files and tables

You will need to save the following two files to a local drive on your computer in order to use SAS to obtain DGS categories. These files can be downloaded here <http://www.pecarn.org/tools/index.html>.

1. ICD9_Master.sas7bdat: Look up table for ICD9-CM diagnosis codes and their associated DGS categories. This SAS dataset includes 8 fields. The size of file is 306 MB.
2. DGS_PROGRAM.SAS: This SAS program allows readers to map diagnosis codes into Diagnosis Grouping System categories for a single ICD-9-CM code or their own dataset with multiple ICD-9-CM codes and generate frequency reports for the DGS categories of Major groups or Subgroups.

Representation of ICD-9-CM Diagnosis Codes

In addition to the two files above, you will need to also have an input file of your own data with a unique patient visit or identifier and the patient's ICD-9-CM diagnosis

code(s). This file should contain a single diagnosis code per record or row (i.e., if your unit of analysis is the visit, you will need to choose just 1 ICD-9-CM code for that record or row; if your unit of analysis is the diagnosis and multiple diagnoses are present within a visit, each diagnosis should be listed in their own record or row).

The following are general guidelines for formatting of ICD codes for the DGS program. DGS is based on 2002 *International Classification of Diseases, 9th Revision*. Only valid 2002 ICD-9 codes represented as a 3 to 5 alphanumeric code **with** leading zeros and **without** decimals and found commonly in pediatric emergency medicine have been categorized in the DGS (2,688 codes). Valid 2002 ICD codes that are not found in the DGS will be designated "Not Categorized." Codes that are not formatted correctly, invalid codes, or codes introduced after 2002 will be designated as "ICD-9 Code Not Found." Records that have a missing ICD-9 code are listed as blank.

In clinical practice, ICD-9-CM diagnosis codes are represented as 3 to 5 character codes with decimals and leading zeros. In this program, ICD-9-CM diagnosis codes are represented as 5 character alphanumeric codes **with** leading zeros and **without** decimals. Examples are given below.

ICD-9-CM Code Description	ICD-9-CM Diagnosis Code	3-5 character Alphanumeric Code without Decimals
Septicemia	038	038
Septicemia due to other gram-negative organisms	038.4	0384
Septicemia due to serratia	038.49	03849
Venous thrombosis and embolism	V125.1	V1251 (case sensitive)
Bronchopneumonia, organism unspecified	485	485
Extrinsic asthma, unspecified	493.00	49300

* Diagnosis codes must be left justified with a minimum length of 3 and a maximum length of 5. No spaces are required following a 3 or 4 character diagnosis code.

Content of ICD9_Master table

ICD9_Master table includes 8 fields: ICD-9-CM diagnosis code, ICD-9 code full description, Major group description, Major group number, Subgroup description, Subgroup number, Combined common subgroup, and Severity score. The Major groups and Subgroups are also assigned numbers for data storage purposes. An example is given below.

ICD9_code: 00869

ICD9_Code_Desc: Intestinal infection, enteritis due to other viral enteritis
Major_Group_Desc: Gastrointestinal Diseases
Major_Group_Num: 8
Subgroup_Desc: Gastroenteritis
Subgroup_Num: 8.d
Combined_Common_Subgroup: Infectious disease
Severity Score: 2

Executing DGS_PROGRAM.SAS

To run this SAS program, you must do the following:

1. Download and save ICD9_Master.sas7bdat table onto your local C drive and name this SAS dataset as "C:\DGS\ICD9_Master".
2. Download and save DGS_program.sas to a local drive. Open this file in SAS.
3. Read your own dataset into SAS with ICD-9-CM diagnoses. Verify that the diagnoses are in the format described above.
4. In the SAS program, run the macros in section I and II for individual and multiple diagnosis look up.
5. Execute the macros as needed for your own datasets. This table is stored as a temporary SAS dataset (ICD9Codes).
6. If you want to generate a frequency report for your own dataset based on Major group and Subgroup categories, run Section III. This will generate a report in PDF format that is stored on your local C drive.

Appendix: The Diagnosis Grouping System for Child ED Visits

- 1. Allergic, Immunologic & Rheumatologic Diseases**
- 2. Child Abuse**
- 3. Circulatory & Cardiovascular Diseases**
 - a. Congenital Circulatory & Cardiovascular Diseases
 - b. Devices & Complications of the Circulatory System
 - c. Dysrhythmias
 - d. Other Circulatory & Cardiovascular Diseases
- 4. Diseases of the Eye**
 - a. Infectious Diseases of the Eye
 - b. Non-Infectious Diseases of the Eye
- 5. Endocrine, Metabolic & Nutritional Diseases**
 - a. Diabetes Mellitus
 - b. Other Endocrine, Metabolic & Nutritional Diseases
- 6. ENT, Dental & Mouth Diseases**
 - a. Infectious Ear Disorders

- b. Infectious Dental Disorders
- c. Infectious Mouth & Throat Disorders
- d. Infectious Nose & Sinus Disorders, including URI
- e. Non-Infectious ENT, Dental & Mouth Diseases

7. Fluid & Electrolyte Disorders

- a. Dehydration
- b. Other Fluid & Electrolyte Disorders

8. Gastrointestinal Diseases

- a. Abdominal Pain
- b. Appendicitis
- c. Devices & Complications of the Gastrointestinal System
- d. Gastroenteritis
- e. Infectious Gastrointestinal Diseases
- f. Vomiting
- g. Other Gastrointestinal Diseases

9. Genital & Reproductive Diseases

- a. Infectious Genital & Reproductive Diseases
- b. Pregnancy
- c. Other Genital & Reproductive Diseases

10. Hematologic Diseases

- a. Sickle Cell Anemia
- b. Other Hematologic Diseases

11. Musculoskeletal & Connective Tissue Diseases

- a. Chest Pain
- b. Devices & Complications of the Musculoskeletal System
- c. Infectious Musculoskeletal & Connective Tissue Diseases
- d. Musculoskeletal Pain
- e. Non-Infectious Musculoskeletal & Connective Tissue Diseases

12. Neoplastic Diseases (Cancer, Not Benign Neoplasms)

13. Neurologic Diseases

- a. Developmental Disorders
- b. Devices & Complications of the Nervous System
- c. Headache
- d. Infectious Neurologic Diseases
- e. Seizures
- f. Other Neurologic Diseases

14. Psychiatric and Behavioral Diseases & Substance Abuse

15. Respiratory Diseases

- a. Asthma
- b. Bronchospasm & Wheezing
- c. Devices & Complications of the Respiratory System
- d. Infectious Respiratory Diseases
- e. Other Respiratory Diseases

16. Skin, Dermatologic, & Soft Tissue Diseases

- a. Infectious Skin, Dermatologic & Soft Tissue Diseases
- b. Non-Infectious Skin, Dermatologic & Soft Tissue Diseases

17. Systemic States

- a. Acute Systemic States
- b. Bacterial & Fungal Illnesses
- c. Chronic Systemic States
- d. Fever
- e. Viral Illnesses

18. Toxicologic Emergencies (Including Environmental)**19. Trauma**

- a. Abdominal Trauma
- b. Brain & Skull Trauma
- c. Burns (External, Of Any Body Part)
- d. Chest Trauma
- e. Complications of Trauma
- f. Contusions & Abrasions (External, Of Any Body Part)
- g. Face, Dental, Mouth & Eye Trauma
- h. Fractures & Dislocations (Extremities)
- i. Lacerations, Amputations & Uninfected Foreign Bodies (External)
- j. Pelvis & External Genitalia Trauma
- k. Spinal Trauma (Incl. Spinal cord and vertebrae trauma)
- l. Strains & Sprains (Extremities)
- m. Other Extremity Trauma
- n. Other Trauma

20. Urinary Tract Diseases

- a. Devices & Complications of the Urinary System
- b. Infectious Urinary Tract Diseases
- c. Other Non-Infectious Urinary Tract Diseases

21. Other

- a. Screening Exams, Labs & Administrative Issues
- b. Other Devices & Complications
- c. Other Infectious Diseases
- d. Other Neonatal Disorders

e. Other Non-Infectious Diseases