DTIC FILE COPY

USAARL Report No. 91-4

AD-A231 885

Coding Manual for the U.S. Army Aviation Epidemiology Data Register

By

Thomas J. Burke
Biomedical Applications Research Division

and

Renee Kingsley
Universal Energy Systems

DTIC
ELECTE
FEB 25 1991
S B D

January 1991

91 2 20 066

Approved for public release; distribution unlimited.

United States Army Aeromedical Research Laboratory
Fort Rucker, Alabama 36362-5292

Notice

Qualified requesters

Qualified requesters may obtain copies from the Defense Technical Information Center (DTIC), Cameron Station, Alexandria, Virginia 22314. Orders will be expedited if placed through the librarian or other person designated to request documents from DTIC.

Change of address

Organizations receiving reports from the U.S. Army Aeromedical Research Laboratory on automatic mailing lists should confirm correct address when corresponding about laboratory reports.

Disposition

Destroy this document when it is no longer needed. Do not return it to the originator.

Disclaimer

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation. Citation of trade names in this report does not constitute an official Department of the Army endorsement or approval of the use of such commercial items.

Reviewed:

DENNIS F. SHANAHAN
LTC, MC, MFS
Acting Director, Biomechical
Applications Research Division

ROGER W. WILEY, O. D., Ph.D.
Chairman, Scientific
Review Committee

Released for publication:

DAVID H. KARNEY
Colonel, MC
Commanding

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) USAARL Report No. 91-4	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Aeromedical Research Laboratory 6b. OFFICE SYMBOL (If applicable) SGRD-UAB	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 577 Fort Rucker, AL 36362-5292	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Medical Research & Development Command 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code) Fort Detrick Frederick, MD 21701-5012	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. 62787A; PROJECT NO. 3E162-787A879; TASK NO. BH; WORK UNIT ACCESSION NO. 170

11. TITLE (Include Security Classification)
(U) Coding manual for the U.S. Army Aviation Epidemiology Data Register

12. PERSONAL AUTHOR(S)
Thomas J. Burke, Renee Kingsley

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
	FROM _____ TO _____	1991 January	49

16. SUPPLEMENTARY NOTATION
* Physiological Training, * Data base,

17. COSATI CODES		
FIELD	GROUP	SUB-GROUP
05	09	
06	04	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
Aviation Epidemiology Data Register, Flying Duty Medical Examination, demographic data, patient history, physician history, physical findings, screening tests, diagnoses.

19. ABSTRACT (Continue on reverse if necessary and identify by block number)
The U.S. Army Aviation Epidemiology Data Register (AEDR) is an automated database which allows electronic storage, analysis, and retrieval of information of the Flying Duty Medical Examination (FDME). The FDME consists of a completed Report of Medical History (standard form (SF) 93), Report of Physical Examination (SF 88), Report of Electrocardiogram (SF 520) with the electrocardiogram tracing, and for certain classes of FDME, additional information on lifestyle factors and family history. Demographic data, patient history, physician history, physical findings, screening tests, and disgnoses information are included on these forms, each of which has a unique value in health care, administration, and research, and each of which must be handled differently in the AEDR. Demographic and screening test results are entered directly from the FDME to the AEDR. History, physical findings, and diagnoses are translated into a standardized alphanumeric code, a modification of the International Classification of Diseases (ICD). Because of the unique characteristics of the military aviation environment, the ICD is inadequate to support all the clinical, (Continued)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS	Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Chief, Scientific Information Center	22b. TELEPHONE (Include Area Code) (205) 255-6907
	22c. OFFICE SYMBOL SGRD-UAX-SI

DD Form 1473, JUN 86 Previous editions are obsolete. SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

19. Abstract (Continued)

administrative, and research functions of the AEDR. The ICD has been supplemented with additional diagnostic codes to provide extra specificity, codes for physical findings and electrocardiograms, and codes to automate the administrative process. These codes are presented and discussed.

Table of contents

Introduction 3

Introduction to the ICD-9-CM 5

Coding the record 22

Selected topics 27

Coding electrocardiograms 37

References 49

Accession For

NTIS GRA&I ☑

DTIC TAB ☐

Unannounced ☐

Justification

By

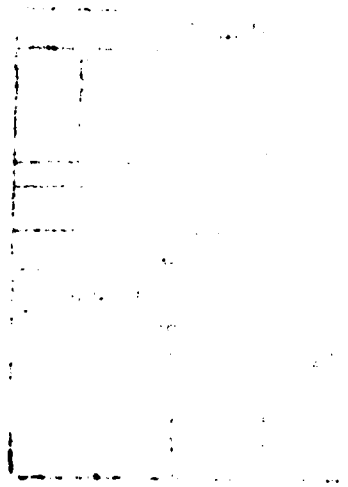
Distribution/

Availability Codes

Dist | Avail and/or Special

A-1

This page intentionally left blank.



Introduction

The Aviation Epidemiology Data Register (AEDR) is an automated database which allows electronic storage, analysis, and retrieval of information on the Flying Duty Medical Examination (FDME).

The FDME consists of a completed standard form (SF) 93 (Report of Medical History), SF 88 (Report of Physical Examination), SF 520 (Report of Electrocardiogram) with the electrocardiogram (ECG) tracing, and for certain classes of FDME, an additional form containing information on lifestyle factors and family history. There are several different types of information on these forms, each of which has a unique value in health care, administration, and research, and each of which must be handled differently in the AEDR.

1. Demographic data - Information used to identify the aviator.

2. Patient history - Information reported by the patient on the SF 93. It will vary from patient to patient in completeness and sophistication of medical terminology.

3. Physician history - Information recorded by the physician on the SF 93. This will be elaboration or summary of the history written on the SF 93 by the patient and additional information elicited by the physician during the interview. It will vary from physician to physician in completeness and sophistication of medical terminology, although it should be closer to standard medical terminology than the patient history.

4. Physical findings - Results of the physical examination by the physician recorded on the front of the SF 88.

5. Screening tests - Results of the tests recorded in blocks 50-70 on the SF 88 which are screening tests. Screening tests are simple, inexpensive examinations meant to detect disease in a preclinical state, that is, before the patient develops the signs, symptoms and loss of function typical of the disease.

6. Diagnoses - After considering all of the information gathered on the SF 93, SF 88, and SF 520 with any additional diagnostic testing required the physician will make up a list of diagnoses and record them in item 74 on the SF 88.

To achieve maximum flexibility from the AEDR, it is important to capture as much information as possible in the AEDR record. However, as the record is made larger, the AEDR requires

more resources to build and maintain and more time to search and analyze. In order to achieve maximum utility from the record without an unreasonable investment of resources, only useful and important information is recorded, in the most efficient manner possible.

Demographic data is entered on the FDME in text format or as an abbreviation representing one of a finite number of choices. Screening test results are entered in either a numeric format or as an abbreviation representing one of a finite number of choices. Both of these types of information can be entered directly in the AEDR.

Historical data, physical findings and diagnoses are recorded on the FDME in an unstructured text format. The exact wording of this information will vary among patients and even among physicians on the same patient. This information can be copied verbatim into the AEDR record, but this method requires large amounts of transcriber time for entry and large amounts of computer memory. Fields in an unstructured text format cannot be scanned rapidly by the computer, and the computer cannot scan for meaning, but must look for key words or phrases. If the text does not use a strictly standardized nomenclature, any analysis of a text field becomes meaningless. This problem is addressed in the AEDR by translating all of the history, physical findings, and diagnoses into a standardized alphanumeric code. This code is a modification of the International Classification of Diseases.

The ninth revision of the International Classification of Diseases was modified in 1977-79 to provide sufficient detail for clinical conditions encountered in the United States to allow the code to be used for coding and indexing of medical records, reporting of morbidity and mortality data, quality assurance and utilization review, ambulatory as well as hospital care programs, and third party reimbursement. The modification is called the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). The ICD-9-CM became the basis for the system of Diagnosis Related Groups (DRG) used to determine reimbursement for Medicare and Medicaid.

Because of the unique characteristics of the military aviation environment, the basic ICD-9-CM is inadequate to support all of the clinical, administrative, and research functions of the AEDR. The basic ICD-9-CM has been supplemented with additional diagnostic codes to provide extra specificity, codes for physical findings and electrocardiograms, and codes to automate the administrative process. These codes are a cooperative effort of the Department of Defense Medical Evaluation and Review Board (DODMERB), the U.S. Air Force School of Aerospace Medicine (USAFSAM), the U.S. Army Aeromedical Activity (USAAMA), and the U.S. Army Aeromedical Research Laboratory (USAARL).

Introduction to the ICD-9-CM

The ICD-9-CM is published in three volumes:

Volume 1: Tabular List of Diseases
Volume 2: Alphabetic Index of Diseases
Volume 3: Tabular List and Alphabetic Index of Procedures

The first volume contains the code numbers and their corresponding diagnoses. The codes are from three to five digits long, the amount of detail increasing with the number of digits used. There are also two supplementary classifications and five appendix in Volume 1:

Classification of factors influencing health status and contact with health services

Classification of external causes of injury and poisoning

Appendix A, Morphology of neoplasms; Appendix B, Glossary of Mental disorders; Appendix C, Classification of drugs by American Hospital Formulary list number and their ICD-9-CM equivalents; Appendix D, Classification of industrial accidents according to agency; Appendix E, List of three digit categories

The second volume contains the alphabetic index of most of the medical terminology now in use. There are more terms in the index than there are codes in the tabular list because there is often more than one term for each code. The primary key for the index is the abnormality, with secondary keys being different anatomical site or manifestation.

The third volume contains both the tabular list and the index of procedures. Procedure codes are four digits long. In the modification used with the AEDR, procedure codes are preceded with a letter to convey information about the timing of the procedure with respect to the examination.

The adaptation of the ICD-9-CM, which is used with the AEDR, also contains additional alphanumeric codes, most of which were developed by the Department of Defense Medical Evaluation and Review Board (DODMERB) and the U.S. Air Force School of Aerospace Medicine, which allows more detailed coding of signs, symptoms, physical findings, and administrative information. These codes are five digits long, and the first digit is always a letter which indicates the category. The additional categories are:

B**** Burns
C**** Medications
D**** Disqualifying defects (Administrative code)

E**** External causes of poisoning and injuries (ICD-9-CM)
G**** Electrocardiogram
H**** Surgical procedures more than 1 year prior to examination
I**** Incomplete information (Administrative code)
K**** Surgical scars with keloid formation
M7*** Administrative codes
N**** Surgical scars
P**** Surgical procedures less than 1 year prior to examination
Q**** Tumor morphology (ICD-9-CM)
R**** Tumor morphology (ICD-9-CM)
S**** Surgical and burn scars
T**** Traumatic scars
V**** History and other conditions (ICD-9-CM)

Tabular list - format

Diseases can be classified in many ways. They can be arranged on the basis of anatomical site, etiology, clinical manifestation, morphology, or severity. These characteristics by which diseases are classified are called axes of classification. All of these axes may be used in various subsections of the Tabular list, as appropriate.[1]

There are five levels of subdivision of the tabular list:

1. Chapter. The tabular list is divided into 17 chapters based on the etiology of the systemic diseases and anatomical site of the local diseases.

2. Subchapter. Subchapters are groupings of closely related conditions within chapters.

3. Three digit category (referred to as "category"). These are the basic categories of the classification. Chapters and subchapters are collections of categories, four- and five-digit codes are subdivisions of a three digit category. There are 999 categories, which fall into three types:

   A. Unsubdivided three-digit categories. Some three-digit categories are very specific and have no four- or-five digit subdivisions. These categories can be used for the code to be used for this disease. This is the only situation where a three-digit code is acceptable.

   B. Subdivided three-digit categories. Most categories are general enough that they require further subdivision. This is done by adding a fourth and sometimes fifth digit to the category. Three-digit categories that have subdivisions are never used as codes. The fourth, and sometimes fifth, digit always is used.

   C. Residual three digit categories. Subchapters are groupings of closely related conditions. The three digit categories within these subchapters describe diseases or conditions, starting generally with the most specific classification and proceeding through less specific classifications. When it ceases to be useful to assign

---

[1] This section quoted from The International Classification of Diseases, Ninth Revision, Clinical Modification, publication (PHS) 80-1260. U.S. Department of Health and Human Services, 1980.

conditions to specific categories, a residual category is created for "other specified disease."

4. Four-digit category (referred to as a "subdivision"). The fourth digit is assigned according to a classification of the disease along an axis that is appropriate to that disease. The axis can be etiology, anatomic site, severity, morphology, clinical manifestation, or severity.

A. Unsubdivided four-digit categories. Some four-digit categories are very specific and have no fi e-digit subdivisions. These categories can be used for the code to be used for this disease.

B. Subdivided four-digit categories. Some four-digit categories are further subdivided into five-digit categories. Whenever possible all five digits should be used in coding the disease.

C. Residual four-digit categories. The breakdown of categories into subdivisions proceeds along the same lines as the breakdown of sections into categories. The first subdivisions are very specific, later subdivisions are more general, and when no further breakdown would be useful, a subdivision with the fourth digit of "8" is assigned to "other specified" forms of the disease. The last subdivision is given a fourth digit of "9" and is assigned when no further specification of the diagnosis made along the axis of classification.

D. Italicized four-digit categories. The ICD-9 provides two classification schemes. The primary classification is based on etiology and anatomic site of the disease, the second classification is based on clinical manifestations. The ICD-9-CM has eliminated the codes based on clinical manifestations and has only one classification scheme, based on etiology. The specificity of the ICD-9 concerning manifestations of disease is preserved in one of two ways:

1. Subdivisions of the four-digit category. In some subdivisions, a separate fifth-digit code is created to specifically identify an important clinical manifestation of the disease.

2. Italicized individual four- or five-digit categories. The italicized category is used to specify a disease with clinical manifestations for which the etiology is classified elsewhere. All italicized categories have an additional code which represents the etiology of the disease. It also must be listed whenever an italicized code is used.

5. Five-digit category. This is the most specific classification in the ICD-9-CM. It has two uses. The first is to provide a more detailed subdivision of a four-digit code along the same axis used to classify the four-digit code. The second is to provide further classification along a different axis. The fifth-digit codes are presented in three ways:

A. The fifth-digit codes that provide more specific classification along the same axis are written out in full under the four-digit category.

B. Fifth-digit codes that provide information along a second axis of classification and apply to one or more four-digit categories within a three-digit category are listed below the rubric and title of the three-digit category. The four-digit categories that require a fifth digit are listed in the same note.

C. Fifth-digit codes that provide more information along a second axis of classification and apply to one or more three-digit categories within a subchapter are listed below the subchapter heading. The three-digit categories that require a fifth digit are listed in the same note. There is a footnote on every page containing a three-digit category to which the fifth digit applies stating that a fifth digit is required.

6. Italicized five-digit categories. The italicized category is used to specify a disease with clinical manifestations for which the etiology is classified elsewhere. All italicized categories have an additional code which represents the etiology of the disease. Also, it must be listed whenever an italicized code is used.

Tabular list - conventions

The tabular list has certain conventions in format which allow brevity without loss of meaning. These conventions must be understood and followed exactly if the full meaning of the record is to be preserved and confusion avoided.

1. Abbreviations

   NEC Not elsewhere classifiable. The category number for the term including NEC is to be used only when the coder lacks the information necessary to code the term to a more specific category.

   NOS Not otherwise specified. This abbreviation is the equivalent of "unspecified."

2. Punctuation

   [] Brackets are used to enclose synonyms, alternative wordings, or explanatory phrases.

   () Parentheses are used to enclose supplementary words which may be present or absent in the statement of a disease or procedure without affecting the code number to which it is assigned.

   : Colons are used in the tabular list after an incomplete term which needs one or more of the modifiers which follow in order to make it assignable to a given category.

   { } Braces are used to enclose a series of terms, each of which is modified by the statement appearing at the right of the brace.

3. Punctuation

   $ The lozenge symbol printed in the left margin preceding the disease code denotes a four-digit rubric unique to ICD-9-CM. The contents of these rubrics in ICD-9-CM are not the same as those in ICD-9. This symbol is used only in Volume 1 Diseases: Tabular List.

   # The section mark symbol preceding a code denotes the placement of a footnote at the bottom of the page which is applicable to all subdivisions in that code.

4. Type face

   BOLD Bold type face is used for all codes and titles in the tabular list.

Italics Italicized type face is used for all exclusion notes and to identify those rubrics which are not to be used for primary tabulations of disease.

5. Format

ICD-9-CM uses an indented format for ease in reference.

6. Instructional notations

Includes: This note appears immediately under a three-digit code title to further define, or give example of, the contents of the category.

Excludes: Terms following the word excludes are to be coded elsewhere as indicated in each case.

Use additional code if desired:
This instruction is placed in the Tabular list in those categories where the user may wish to add further information (by using an additional code) to give a more complete picture of the diagnosis or procedure.

Code also underlying disease:
This instruction is used in those categories not intended for primary tabulation of disease. In such cases, the code, its title, and instructions appear in italics. The note requires that the underlying disease (etiology) be recorded first and the particular manifestation recorded secondarily. This note appears only in Volume 1 Diseases: Tabular List.

Alphabetic index - format

The alphabetic index has three parts:

1. The index to diseases and injuries. This is an alphabetic listing of terms from the diagnoses of illness and injuries from the tabular lists, the supplementary classification of factors influencing health status and contact with health services (V codes), and the morphology of neoplasms. The diagnoses of hypertension and neoplasm are arranged in a table due to their complexity.

2. The table of drugs and chemicals.

3. The alphabetic index to external causes of injuries and poisonings (E codes).

Alphabetic index - conventions[2]

1. Main term

The primary key of the index is the main term. It is printed in bold type. The main terms usually identify disease conditions and are usually the noun in the diagnosis. There are several exceptions to this general rule:

1. Obstetric conditions will be found under delivery, pregnancy, and puerperal.

2. Complications of medical and surgical procedures are indexed under Complications.

3. Late effects of cerebral infections, cerebrovascular lesions, injuries (e.g., fractures, dislocations, open wounds), and infectious diseases will be found under Late effects.

4. The V codes from the supplementary classifications of factors influencing health status and contacts with health services will be found under such main term references as:

Admission examination history (of) observation problem (with) status vaccination

2. Modifiers

A main term may be followed by a series of terms in parentheses. The presence or absence of these parenthetical terms in the diagnosis has no effect upon the selection of the code listed for the main term. These are called nonessential modifiers.

A main term also may be followed by a list of subterms (modifiers) which do have an effect upon the selection of an appropriate code for a given diagnosis. These subterms form individual line entries and describe essential differences in site, etiology, or clinical type.

General adjectives, such as "acute," "chronic," "epidemic," or "hereditary," and references to anatomic site, such as "arm," "stomach," and "uterus" will appear as main terms, but they will have only a "see condition" reference.

3. Not elsewhere classifiable

---

[2] This section quoted from The International Classification of Diseases, Ninth Revision, Clinical Modification, publication (PHS) 80-1260. U.S. Department of Health and Human Services, 1980.

NEC is used for two purposes which can be distinguished only by reference to the tabular list:

A. With ill-defined terms as a warning that specified forms of the condition are classified differently. The codes given for such terms should be used only if more precise information is not available.

B. With terms for which a more specific category is not provided in the tabular list, and no amount of additional information will alter the selection of the code.

4. Cross references

Cross references provide the user with possible modifiers for a term or its synonyms. There are three types of cross references:

A. "see ---" is an explicit direction to look elsewhere. It is used for anatomical sites and many general adjective modifiers not normally used in the main term under which all the information concerning a specific disease will be found.

B. "see also ---" directs the user to look under another main term if all the information searched for cannot be located under the first main term entry.

C. "see category ---" directs the user to Volume 1, Diseases: Tabular List for important information governing the use of the specific code.

5. Notes

Certain main codes are followed by notes which are used to define terms and give coding instructions.

Notes are also used to list the fifth-digit subclassifications for those groups of categories - all of which use the same fifth digits - such as "Tuberculosis," "Diabetes mellitus," "Ulcer," "Inguinal hernia," etc. In these cases only the four-digit code is given for the individual entry; the user must refer to the note following the main term to obtain the appropriate fifth digit subclassification.

6. Eponyms

Eponyms (diseases or their syndromes named for persons) are listed both as main terms in their appropriate alphabetic sequence and under the main terms "Disease" or "Syndrome." A description of the disease or syndrome usually is included in parentheses following the eponym.

7. Hypertension table

The table, found under the main term, "Hypertension," contains a complete listing of all conditions due to or associated with hypertension and classifies them according to malignant, benign, and unspecified.

8. Neoplasms

Neoplasms are listed in the alphabetic index in two ways:

A. Anatomic site: A comprehensive list of anatomic sites is found in a table under the main term "Neoplasm." The table contains six columns: Malignant, primary, secondary, carcinoma-in-situ, benign, uncertain behavior, and unspecified

B. Morphology: Histological terms for neoplasms such as "carcinoma," and "adenoma" are listed as main terms in the appropriate alphabetic sequence and are usually followed by a cross reference to the neoplasm table. Each morphological term will appear with its morphology code from ICD-Oncology (ICD-O). These morphology codes are used to supplement the appropriate ICD-9-CM neoplasm code which indicates the site of the neoplasm. A complete listing of ICD-O morphology codes is found in Appendix A of Volume 1.

9. Etiology and manifestation of disease

For certain conditions, it is important to record both the etiology and the manifestation of the disease. In many cases, this is accomplished with the use of a single five-digit code (e.g., gonococcal cystitis 098.11). For some conditions, it was not possible to provide specific fifth-digit subclassifications giving both etiology and manifestation. In such cases, the two facets of the disease are coded individually, and the alphabetic index lists both codes.

Procedures list - format

The structure of Volume 3: Procedures list and index is based on Fascicle V, "Surgical procedures" of the ICD-9 procedure classification. The surgical procedures are maintained as closely as possible with ICD-9 and have code numbers from 01-86. Nonsurgical procedures are given code numbers 87-99 wherever possible.

There are four levels of subdivision in the tabular list of procedures:

1. Chapter. The tabular list is divided into 16 chapters using anatomical system as the axis of classification. They group the organs classified by the two digit categories into organ systems.

2. Two-digit category. The two-digit categories again use anatomical system as the axis of classification, each category classifying an organ or structure within an organ system.

3. Three-digit category. The three-digit subdivisions use type of procedure as the axis of classification. Some of the three-digit categories are so general that they require a fourth digit to allow sufficient specificity.

4. Four-digit category. The fourth digit specifies the procedure.

Procedures list - conventions[1]

1. **Abbreviations**

   NEC Not elsewhere classifiable. The category number for the term including NEC is to be used only when the coder lacks the information necessary to code the term to a more specific category.

   NOS Not otherwise specified. This abbreviation is the equivalent of "unspecified."

2. Punctuation

   [] Brackets are used to enclose synonyms, alternative wordings, or explanatory phrases.

   () Parentheses are used to enclose supplementary words which may be present or absent in the statement of a disease or procedure without affecting the code number to which it is assigned.

   : Colons are used in the tabular list after an incomplete term which needs one or more of the modifiers which follow in order to make it assignable to a given category.

   { } Braces are used to enclose a series of terms, each of which is modified by the statement appearing at the right of the brace.

3. Symbols

   # The section mark symbol preceding a code denotes the placement of a footnote at the bottom of the page which is applicable to all subdivisions in that code.

4. Type face

   BOLD Bold type face is used for all codes and titles in the tabular list.

   Italics Italicized type face is used for all exclusion notes.

---

[1] This section quoted from The International Classification of Diseases, Ninth Revision, Clinical Modification, publication (PHS) 80-1260. U.S. Department of Health and Human Services, 1980.

5. Format

ICD-9-CM uses an indented format for ease of reference.

6. Instructional notations

Includes: This note appears immediately under a three-digit code title to further define, or give example of, the contents of the category.

Excludes: Terms following the word excludes are to be coded elsewhere as indicated in each case.

Code also: This instruction is used in the tabular list for two purposes:

A. As an instruction to code each component of a procedure when they are accomplished at the same time.

B. As an instruction to code the use of special adjunctive procedures or equipment.

Alphabetical index to procedures list - format

The Alphabetical Index of Procedures is composed of a single part.

Alphabetical index to procedures list - conventions[4]

1. Main term

The alphabetic index is organized by "main terms" which are printed in bold type face for ease of reference.

Main terms usually identify the type of procedure performed, rather than the anatomic site involved.

2. Modifiers

A main term may be followed by a series of terms in parentheses. The presence or absence of these parenthetical terms in the procedure description has no effect upon the selection of the code listed for the main term. These are called nonessential modifiers.

A main term also may be followed by a list of subterms (modifiers) which do have an effect upon the selection of the appropriate code for a given procedure. These subterms form individual line entries and describe essential differences in site or surgical technique.

3. Not elsewhere classifiable

NEC is used for two purposes which can only be determined by referring to the tabular list:

A. With ill-defined terms as a warning that specified forms of the procedure are classified differently. The codes given for such terms should be used only if more precise information is not available.

B. With terms for which a more specific category is not provided in the tabular list and no amount of additional information will alter the selection of the code.

4. Omit code

Terms which identify incisions are listed as main terms in the alphabetic index. If the incision was made only for the purpose of performing further surgery, the instruction "omit code" is given.

---

[4] This section quoted from The International Classification of Diseases, Ninth Revision, Clinical Modification, publication (PHS) 80-1260. U.S. Department of Health and Human Services, 1980.

5. Synchronous procedures

For some operative procedures, it is necessary to record the individual components of the procedure. In these instances the alphabetic index will list both codes.

6. Cross references

Cross references provide the user with possible modifiers for a term or its synonyms. There are three types of cross references:

A. "see ---" is an explicit direction to look elsewhere. It is used with terms which do not define the type of procedure performed.

B. "see also ---" directs the user to look under another main term if all the information searched for cannot be located under the first main term entry.

C. "see category ---" directs the user to the tabular list for further information of specific site references.

7. Notes

Notes are used to list fourth-digit subclassifications for those categories which use the same fourth-digit subdivisions. In these cases, only the three-digit code is given for the individual entry; the user must refer to the note following the main term to obtain the appropriate fourth-digit subclassification.

8. Eponyms

Operations named for persons (eponyms) are listed both as main terms in their appropriate alphabetic sequence and under the main term "operation." A description of the procedure of anatomic site affected usually follows the eponym.

Coding the record

There are five steps to follow in coding the record. Each step must be executed carefully in order to accurately reflect the contents of the record.

Step 1: Analyze the record.

Step 2: Look up the item in the alphabetic index and select a tentative code.

Step 3: Find the tentative code in the tabular list or the AEDR dictionary.

Step 4: Code the record following the coding conventions specified in the tabular list.

Step 5: Check the AEDR coding dictionary to confirm that the code is listed.

Step 1: Analyze the record

There are several types of information that must be coded. There are codes designed for each type of information. The first step in coding is analyzing the record to determine what information must be coded, determining the meaning of the medical terminology, and finding the main term, essential and nonessential modifiers.

The first category of information is diagnoses. Diagnoses are the names of diseases that the person has or has had. This information may be found in the patient history, the physician history, and the physician diagnosis portions of the FDME.

Examples:

- Atherosclerotic heart disease
- Diabetes mellitus
- Renal stone
- Cholelithiasis

The second category of information is signs, symptoms, and physical findings. These items of information are important enough to be recorded on the FDME, but are not names of diseases. They may be found in the statement of patient health, the patient history, the physician history, and the physical examination. Codes for signs, symptoms, and physical findings may be found in the ICD-9-CM diagnostic codes or may be found in the additional alphanumeric codes of the ICD-9-CM-A.

Examples:

- Angina pectoris
- Retinal exudates
- Flank pain
- Right upper quadrant (RUQ) abdominal scar

The third category of information is procedures. Procedures are surgical operations or other actions performed on a person in order to improve their health or to treat the effects of some disease.

Examples:

- Coronary artery bypass
- Fitting of prosthetic leg
- Lithotripsy
- Cholecystectomy

Step 2: Look up the item in the alphabetic index and select a tentative code.

After analyzing the record and extracting the diagnoses, significant signs, symptoms, physical findings, and procedures, the next step is to find main terms and look in the alphabetic index to assign a tentative code.

Review the section alphabetic index - conventions. The first step in this section is to find the main terms. Main terms are generally the noun in the diagnosis, but there are exceptions, as noted in the conventions. Find the main terms in the following examples.

	Answer
- Broken left leg	broken
- Tuberculous meningitis	meningitis
- Ohara's disease	disease
- Myocardial infarction	infarction

After the main term is selected, look it up in the alphabetic index. Compare the diagnosis with the list of terms headed by the main term to see if there are any modifiers that apply. Nonessential modifiers will be in parentheses directly following the main term. Essential modifiers will form separate line items in the list directly under the main term. In the following examples, find the main term, go to the alphabetic index and assign a tentative code.

	Answer
- Ogilvie's syndrome	syndrome - 56089
- Acute coronary occlusion	occlusion - 4109
- Primary open angle glaucoma	glaucoma - 36511

Some diagnoses fall into the category not elsewhere classifiable (NEC). Review the situations in which you would classify a condition into the NEC category. In the following examples, find the main term, look it up in the index, and then assign the most specific code possible.

	Answer	
- Hemorrhagic fever	fever	- 0659
- Temporomandibular joint instability	instability	- 71888

Cross references provide further information necessary to assign a tentative code. Review the conventions regarding cross references. Use the cross references to assign a tentative code in the following examples.

	Answer	
- Hypertrophic adrenal gland	hypertrophic	- 2558
- Tuberculosis of the retina	tuberculosis retina	- 0173 - 36313
- Oidiomycosis	oidiomycosis	- 1129

Notes also provide further information on classifying the condition correctly. Some lists of codes under one main term extend over more than one page. Always start at the main term heading, not in the middle of the list, to assure that you see any notes that pertain to the main term. In the following examples, use the notes to assign the appropriate tentative code.

	Answer	
- Greenstick fracture of the shaft of the forearm	fracture	- 81320
- Toxic nodular goiter	goiter	- 24230
- Inguinal hernia	hernia	- 55090
- Abrasion of right toe	abrasion	- 9170

Step 3: Find the tentative code in the tabular list or the AEDR dictionary.

Look up the code in the tabular list. In some cases, there will be exclusion notes or further instructions which may require

modification of the original code assignment. In the following examples, perform coding steps one through three, noting any changes that might have to be made to the tentative code assigned.

	Answer
- Acute serous otitis media after altitude chamber ride. No infection.	otitis - 38101
- Sprained ankle	sprained - 84500
- Grand mal seizure	seizure - 7803
- Grand mal epilepsy	epilepsy - 3451
- Multiple sclerosis	sclerosis - 340
- Mitral valve prolapse	prolapse - 4240
- Kidney stone	stone - 5920
- Stroke	stroke - 436

Step 4: Code the record following the coding conventions specified in the tabular list.

Review the conventions for the tabular list. Some codes cannot be used as primary codes, others have optional extra codes that should be added.

Step 5: Check the AEDR coding dictionary to confirm that the code is listed.

Not all codes that may be required will be in the AEDR coding dictionary. However, if a code is entered into a record without being listed in the dictionary, the computer will have no label to print out when the record is printed. If you use a code that is not listed in the coding dictionary, make a note of the code and tell your supervisor so the dictionary can be updated.

Selected topics

1. Hypertension

Hypertension, for the purposes of the AEDR, is defined as an average blood pressure on multiple readings of greater than 140 mm Hg systolic or 90 mm Hg diastolic.

The ICD-9-CM allows coding of a great deal of detail about hypertension, its causes, and the end organ damage that results from it. Not all of these categories will be valuable for coding the AEDR because complications of hypertension result in indefinite suspension and loss of the aviator from the population described by the AEDR.

Hypertensive disease is classified to categories 401-405. The fourth digit categories are:

0 - Malignant 1 - Benign 9 - Unspecified

Malignant hypertension is prolonged elevation of the diastolic blood pressure above 120 and can result in heart and kidney failure, papilledema, encephalopathy, and stroke. Benign hypertension is chronic hypertension with diastolic values between 90-120 and can contribute to heart and kidney disease, and increases the risk of stroke.

Category 401 is essential hypertension. This is hypertension without a specific cause. There are three fifth-digit categories in the AEDR dictionary which are modifications of significance to aviation. Aviators with waivers or codes for information only will use these codes:

40111	Hypertension, benign, controlled on medication
40112	Hypertension, labile
40114	Hypertension, benign, diet controlled

If an aviator has a screening blood pressure done which is followed up by a normal 3-day blood pressure check, it will be coded as an isolated finding:

7962	Elevated blood pressure reading, without diagnosis of hypertension.

Categories 402, 403, 404 are diseases involving hypertension which causes damage to other organs. They will be used only when the record specifically states "hypertensive ---- disease," or "---- disease caused by hypertension." Otherwise, the organ disease and the hypertension must be coded separately. For example:

Atherosclerotic heart disease with hypertension and congestive heart failure.

4140	Coronary atherosclerosis
4280	Congestive heart failure
4019	Essential hypertension, unspecified

Hypertensive heart disease with congestive heart failure

40291	Hypertensive heart disease, unspecified, with congestive heart failure

2. Ischemic heart disease

All but minimal ischemic heart disease (coronary artery disease, atherosclerotic heart disease) is disqualifying for aviation service. It is important to distinguish laboratory and electrocardiographic findings from diagnoses. For instructions on coding the findings in a coronary artery disease evaluation, see the section on coding electrocardiograms.

The category for acute myocardial infarction (heart attack) is 410. The fourth digit classifies the diagnosis on the axis of location. The codes for myocardial infarction are:

4100-4108	Acute myocardial infarction (of specified sites, see tabular list)
4109	Acute myocardial infarction, unspecified site
412	Old myocardial infarction (history of MI)

The classifications for coronary artery disease, including modifications are:

4140	Coronary atherosclerosis
41401	Intimal roughening only; myocardial bridging in coronary artery; minimal coronary artery disease
41402	Calcification in coronary arteries without atherosclerosis or coronary stenosis

3. Diabetes mellitus

The three-digit category for diabetes mellitus is 250. The fourth-digit subdivision classifies diagnoses on the axis of complications. The following fifth digit should be used with the classification:

0	Adult onset or unspecified as to type
1	Juvenile type

Waivers are recommended for aviators with glucose intolerance controlled by dietary restriction. If their glucose

tolerance returns to normal with dietary therapy, use both of the following codes:

7902	Abnormal glucose tolerance test
2500D	Diabetes mellitus, adult onset type, diet controlled

5. Pregnancy

Pregnancy is disqualifying for all aviation personnel with duties involving aerial flight.

Codes for uncomplicated pregnancy are found in the V codes:

V220	Supervision of first pregnancy
V221	Supervision of other than first pregnancy

Six weeks after the pregnancy is terminated, the disqualification is removed and the aviator is returned to flying duties. The FDME which is done to requalify the aviator should have information about the delivery. All information about the delivery or other termination of the pregnancy should be recorded.

6. Acquired immune deficiency syndrome (AIDS)

The ICD-9-CM codes for AIDS were issued in an addendum effective 1 October 1986. The codes for AIDS testing are:

V7370	HIV viral culture
V7371	HIV antibody testing

The codes for AIDS as it pertains to the aviation environment are:

7958	Positive HIV antibody test or viral culture
0449	HIV NOS (with or without other conditions not classifiable to 042, 043, 0440)

7. Neoplasms

The alphabetic index contains the codes for neoplasms in a table. The rows list anatomic sites, the columns list behavior of the tumor. There are six types of tumor behavior: malignant primary, malignant secondary, malignant in situ, benign, of uncertain behavior, of unspecified behavior.

Primary malignancies are tumors whose site of origin is in the organ in which the tumor is found. In the case of tumors which overlap anatomic sites and the site of origin cannot be determined, the tumor should be coded to the appropriate category with the fourth digit "8," "other."

Secondary malignancies are metastases, tumors whose site of origin is an organ other than that in which it is found. If a diagnosis of metastatic cancer is made, it is important to code the primary site first, then the secondary site. If the site for the primary is not defined, then use 199.1 for the primary site and code the secondary site. If the site for the secondary is not defined, code the primary site and use 199.1 for the secondary site. If the record reads "metastatic cancer of ****," but does not specify whether the organ mentioned is the primary or secondary site, assume it is the primary site and code the secondary site as unknown except for the following organs: bone, meninges, brain, peritoneum, diaphragm, pleura, heart, retroperitoneum, liver, spinal cord, lymph nodes, sites classifiable to 195 (other and ill defined sites).

In the case of these organs, assume they are the secondary site and code the primary site as unknown.

A malignancy in situ is one which has not metastasized nor invaded beyond the tissue in which it originated.

When an aviator develops a neoplasm, it is very likely that he will be suspended indefinitely from flying duties, and he may or may not apply at a later date for a waiver. In either case, the follow-up information we receive for the AEDR may be incomplete. It is important we capture as much of the information as possible. Whenever the information is available, tumor morphology as well as site and behavior should be coded. The codes for tumor morphology in the tabular list have six characters. Because of the constraints of the AEDR software, only five characters can be entered in the code fields. The neoplasm table was modified to meet this requirement by replacing the first two characters in each neoplasm code with a single letter. "M8" is replaced by "Q," and "M9" is replaced by "R."

8. Urinary tract stone disease

Waivers are given for urinary tract stone disease based on the risk of recurrence, the probability of symptoms, the presence of retained stones, or a history of multiple stones. The codes for urinary tract stone disease are:

5920	Calculus of kidney
59202	Spontaneously passed or surgically removed calculus of kidney
59203	Retained calculus of kidney
59204	Recurrent calculus of kidney

A retained calculus of the kidney is a stone that has been seen radiographically, and has not been passed or removed. All kidney stones except the first one that the aviator has had should be coded as recurrent.

9. Injuries

Fractures and dislocations must be coded as "closed" or "open." Fractures and dislocations that are not defined as "closed" or "open" should be coded as closed. The descriptions "closed" and "open" used in the fourth-digit subdivisions include the following terms:

Closed: comminuted, impacted, depressed, linear, elevated, march, fissured, simple, fracture, NOS, slipped, epiphysis, greenstick, spiral

Open: compound, puncture, infected with foreign body, missile

Burns should be coded according to the ICD-9-CM conventions into categories 940-947. Category 948 should be used to specify the percentage of body covered with third-degree burns or when the site of the burn is not specified. Do not use the B codes for coding a current burn injury.

If multiple injuries are present, use multiple codes to the greatest extent possible. Only use the codes for multiple injuries when there is insufficient information to code the injuries separately.

If an injury causes long-term damage which persists after the acute injury is resolved, the persistent condition is termed a "late effect." Late effects are coded in four steps:

Step 1: Code the persistent condition

Step 2: Find the code for the acute condition

Step 3: Find the tentative code under "late effect" in the alphabetic index

Step 4: Check the tabular list to be sure that the code for the acute condition falls in the category mentioned in the title of the code for the late effect

10. Poisoning and adverse effects

A poisoning is the harmful outcome of a substance which is taken internally or applied externally, and was the wrong substance, or taken in the wrong amount, or taken at the wrong time, or taken in the wrong way.

An adverse effect is the harmful or undesired effect of a substance taken internally or applied externally, which was the

intended substance, taken at the right time, in the right amount, in the right way.

Coding a poisoning involves up to three codes. The poisoning itself can be coded, the manifestations of the poisoning can be coded, and the circumstances of the poisoning can be coded. The code for the poisoning is found in the first column of the table in section 2, Volume 2 of the ICD-9-CM. The manifestations of the poisoning are coded as are conditions of any other etiology. The circumstances of the poisoning are the E codes, and are found in an appendix of Volume 1 of the ICD-9-CM. The index to the poisoning codes and the E codes is found in section 2, Volume 2 of the ICD-9-CM. There are four circumstances coded by the E codes in association with poisoning: accident, suicide attempt, assault, and undetermined. The therapeutic use codes are for use with adverse effects, not with poisoning.

Coding an adverse effect requires only two codes. The effect is coded as is a condition of any other etiology. The external cause is selected from the table in section 2, Volume 2 of the ICD-9-CM under the column headed "therapeutic use."

11. Mental disorders

Mental disorders may be difficult to code because of the imperfect correspondence between the ICD-9-CM classification scheme and the Diagnostic and statistical manual, Third Revision, which many mental health workers use to assign diagnoses.

Drug and alcohol related diagnoses must be analyzed carefully before being assigned a code. There are significant differences between dependent and nondependent abuse that will be reflected in the disposition.

The adaptability rating for military aeronautics (ARMA) is a measure of the ability of the aviator to adapt to the demands of military aviation. There are several facets of the ARMA that can be disqualifying. When coding an unsatisfactory ARMA, the code should be as specific as possible. The codes for unsatisfactory ARMA are:

3019A	Unsatisfactory ARMA NOS
3019B	Unsatisfactory ARMA Lack of motivation, poor attitude
3019C	Unsatisfactory ARMA Concealment of medical history
3019D	Unsatisfactory ARMA Psychiatric CH2 or CH4 condition
3019E	Unsatisfactory ARMA Personality traits
3019F	Unsatisfactory ARMA Multiple recurring physical complaints

3019G	Unsatisfactory ARMA History of arrests, drug use, acting out
3019H	Unsatisfactory ARMA Interpersonal or family problems
3019J	Unsatisfactory ARMA Factors exacerbated by military aviation service

Fear of flying is a state in which the aviator is unconsciously afraid of flying. The aviator is not aware of this fear, and is willing and motivated to fly. The fear expresses itself in other ways such as failure of flight examinations in an aviator who is well qualified, or physical complaints without evidence of disease. The code for fear of flying is:

30024	Fear of flying

12. V codes

V codes are used to classify medical information other than diseases or injuries which provides significant medical history or brings the patient into contact with the medical care system. Included in the V codes are codes for personal history of infectious or systemic diseases, diseases affecting specific organ systems, and family history of disease.

Codes for uncomplicated pregnancy are found in the V codes:

V220	Supervision of first pregnancy
V221	Supervision of other than first pregnancy

13. Procedures

Procedures are coded in accordance with the conventions in Volume 3: Procedures - tabular lists and alphabetic index, with two exceptions: codes for procedures which are performed within 1 year of the examination are preceded with a "P," those performed greater than 1 year prior to the examination are preceded with an "H." For example:

An FDME is performed on 18 October 1987, and two procedures are noted on it: a right inguinal herniorrhaphy, done on 12 June 1987 and an appendectomy, done in 1966.

The procedures are coded as follows:

P5300	Unilateral repair of inguinal hernia, NOS; procedure occurred within 1 year of examination
H470	Appendectomy; procedure occurred more than 1 year prior to examination

The following year, when the next annual FDME is coded, the procedures would be coded as follows:

H5300	Unilateral repair of inguinal hernia, NOS; procedure occurred more than 1 year prior to examination.
H470	Appendectomy; procedure occurred more than 1 year prior to examination

14. Signs and symptoms

Symptoms are subjective sensations reported by the patient such as pain or nausea. Signs are objective findings discovered during physical examination such as tenderness or inflammation. Diagnoses are disease states or other conditions assigned to the patient after evaluation of signs, symptoms, and laboratory findings. Signs, symptoms, and laboratory findings are only evidence of disease, not diseases themselves. Sometimes, there is not enough evidence to assign a diagnosis, but there are still signs and symptoms which are important to record because other evidence may become available which makes a diagnosis possible.

There are some signs and symptoms which are important in the aviation environment, because the sign or symptom itself is disqualifying until a diagnosis can be made. The following are signs and symptoms which have aeromedical significance and must be coded:

7802	Syncope (loss of consciousness)
7803	Convulsions (seizure)
7804	Vertigo
5781	Melena (blood in stool)
78650	Chest pain
78608	Wheezing
7840	Headache
7851	Palpitations
7902	Abnormal glucose tolerance test
79402	Abnormal electroencephalogram

15. Environmental diseases

The aviation environment is hazardous because of the extremes of pressure and temperature encountered. Of particular interest are the altitude related diseases: barotrauma, decompression sickness, and acute mountain sickness. It is important to code these diseases correctly.

Injury to an organ because of the effects of changes in pressure on gas trapped in a closed cavity is called barotrauma. It is common in the ears and the paranasal sinuses. The codes for these conditions are:

9930 Barotrauma, otitic
9931 Barotrauma, sinus

Decompression sickness is caused by a rapid reduction in the pressure surrounding the body which allows the gas dissolved in the tissues to form bubbles. The phenomenon is the same regardless of the starting and ending pressures, therefore decompression sickness that occurs at altitude while flying and decompression sickness that occurs at sea level after diving are given the same code. To distinguish between decompression sickness arising under the two sets of circumstances, use an E code for the external cause. Use the following combinations of codes:

Decompression sickness occurring during flight

9933 Caisson disease (decompression sickness)
E9021 In aircraft

Decompression sickness occurring after ascent from diving

9933 Caisson disease (decompression sickness)
E9022 Due to diving

Decompression sickness occurring during altitude chamber exposure

9933 Caisson disease (decompression sickness)
E9023 Exposure in an altitude chamber

Rapid ascent and prolonged exposure to high altitude may result in a syndrome of lethargy, headache, nausea, vomiting, and possibly cerebral and pulmonary edema. This syndrome has several names, among them acute mountain sickness, high altitude pulmonary edema, and high altitude cerebral edema. The code for this syndrome is:

993.2 Other and unspecified effects of high altitude

Motion sickness is a common problem in the aviation environment. The codes for motion sickness are:

9946 Motion sickness
99461 Motion sickness, single episode at any age
99463 Air sickness
99468 Motion sickness, two or more episodes after age 12

16. Medications

Medications which are currently being taken will be coded using the same numeric groups as the E codes for adverse effects

of medications. The E will be replaced by a C to indicate that these are current medications and not the external causes of an adverse effect.

Coding electrocardiograms

Electrocardiograms are tests, the results of which may or may not be associated with a diagnosis of disease. It is important to record the findings on the EKG, even when they are not a result of a diagnosed disease.

The U.S. Air Force School of Aerospace Medicine (USAFSAM) has developed a system for coding the findings on an EKG. The codes are three characters long, with each character conveying part of the meaning of the code.

In order to be consistent with the format of the rest of the code, the USAFSAM code has been modified by increasing the codes from three characters to four, with the first character a letter. The first character is "G," the letter prefix indicating that the code pertains to an EKG finding, not to a disease entity. The second character designates the major subdivision of abnormality to which the finding belongs or the group to which other cardiovascular procedures belong.

Major subdivisions of EKG abnormality:

G0** - Rhythm disturbances
G1** - Conduction disturbances
G2** - Repolarization abnormalities
G5** - P wave abnormalities
G6** - Myocardial damage

Other electrocardiographic procedure interpretation

G3** - Stress testing
G4** - Other EKG diagnostic procedures
G7** - Other EKG, vector and pattern interpretations
G8** -
G9** - Other cardiovascular related procedures
G0** - Rhythm disturbances

The third digit in codes under the major subdivision "rhythm disturbances" describes the site of origin of the beat or the location of the pacemaker.

Site of origin

G00* - Sinus node
G02* - Atrium
G04* - Junction or AV node
G06* - Ventricle
G08* - Miscellaneous

The fourth digit in codes under the major subdivision "rhythm disturbances" describes the type of arrhythmia.

Type of arrhythmia

G0*0 - Major location with unspecified rhythm
G0*1 - Tachycardia
G0*2 - Bradycardia
G0*3 - Premature beat
G0*4 - Escape beat
G0*5 - Arrest
G0*6 - Fibrillation

The following list contains the codes which deal with rhythm disturbances and their descriptions:

G001 Sinus tachycardia (rate > 100 bpm)
G002 Sinus bradycardia (rate < 50 bpm)
G003 Sinus node reentrant tachycardia (an abrupt SVT > 100 bpm initiated by an APB or VPB with the P waves of the tachycardia having the same morphology as sinus P waves.)
G005 Sinus arrest (a pause > 1.5X the average P-P interval but not an exact multiple of the P-P interval)
G006 Sinus node echo beat (supraventricular premature beat with a coupling interval of less than 0.5 of an average P-P interval with a P wave morphology similar to sinus)
G007 Sinus arrhythmia (variation of < +/-0.5 of the average P-P interval)
G008 S-A Block, type I - SA Wenckebach (progressive shortening of the P-P interval with a pause < 2 calculated sinus node P-P intervals)
G009 S-A Block, type II - sinus exit block (pause in which the P-P interval is a multiple of the average P-P interval)
G021 Atrial tachycardia (120-220 bpm to include both automatic and reentrant types)
G023 Atrial premature beat (APB)
G024 Atrial escape beat
G026 Atrial fibrillation (atrial rate > 350 bpm)
G027 Atrial flutter
G028 Ectopic atrial rhythm (coronary sinus pacemaker =< to 120 bpm with a P wave configuration that differs from sinus, must be at least three beats in a row and must have PR interval >= 0.10 s)
G029 Short PR interval (longest PR interval =< 0.11 s)
G031 Atrial echo beat (inverted P wave in II, III, or aVF following a supraventricular beat)
G032 Paired atrial premature beats
G033 Paced atrial rhythm
G035 Atrial parasystole

G036 Multifocal atrial tachycardia (three different P wave morphologies with a rate >= 110 bpm)
G040 Junctional rhythm (narrow QRS =< 60 bpm)
G041 Junctional tachycardia (narrow QRS >= 100 bpm)
G043 Junctional premature beat
G044 Junctional escape beat
G045 Junctional parasystole
G046 Paired junctional premature beats
G047 Accelerated junctional rhythm (60-100 bpm)
G060 Idioventricular rhythm (=< 40 bpm)
G061 Ventricular tachycardia (>= three beats in a row, >= 120 bpm)
G063 Ventricular premature beat (VPB), uniform
G064 Ventricular escape beat
G065 Asystole
G066 Ventricular fibrillation
G067 Ventricular flutter
G068 Ventricular premature beat, multiform
G070 Fused ventricular premature beat
G072 Paired ventricular premature beats
G073 Ventricular paced rhythm
G074 Ventricular capture
G075 Ventricular parasystole
G076 Accelerated idioventricular rhythm
G080 Supraventricular rhythm (unable to differentiate atrial from junctional)
G081 Supraventricular tachycardia
G083 Supraventricular premature beat (SVPB)
G084 Supraventricular escape beat
G085 Wandering atrial pacemaker (three different P wave morphologies with a heart rate =< 110 bpm)
G086 Reciprocating bidirectional tachycardia (alternating left and right bundle branch blocks)
G087 Bigeminy or trigeminy (secondary finding)
G088 Block (secondary finding)
G091 Aberrancy (secondary finding)
G092 Retrograde conduction (secondary finding)
G093 A-V Dissociation (secondary finding)(the lower pacemaker is faster than the higher pacemaker with intact antegrade conduction)
G095 R on T phenomenon

G1** Conduction distrubances

The third digit in codes under the major subdivision "conduction disturbances" describes the site of the block.

Site of origin

G10* - Atrioventricular (AV) node
G12* - Intraventricular

The fourth digit in codes under the major subdivision "conduction disturbances" describes the type of block.

The following list contains the codes which deal with conduction disturbances and their descriptions:

G100 First degree AV Block (shortest PR is >= 0.20 s)
G103 Second degree AV Block, undetermined type
G104 Second degree AV Block, Mobitz type I
G105 Second degree AV Block, Mobitz type II
G108 Complete heart block, undetermined site
G109 Complete heart block, AV node
G110 Complete heart block, infranodal
G120 Right bundle branch block (QRS >= 0.12 s)
G121 Incomplete right bundle branch block (QRS 0.10 to 0.12 sec)
G122 Intermittent right bundle branch block
G123 Terminal conduction delay (terminal S in lateral precordial leads > 0.03 s)
G124 Left bundle branch block (>= 0.12 s)
G125 Intermittent left bundle branch block
G126 Left anterior hemiblock, persistent (axis =< 45 deg with Q in I, aVL and an R in II, III, aVF)
G127 Left anterior hemiblock, intermittent
G128 Left posterior hemiblock, persistent (axis >= 105 deg with an R in I and aVL and a Q in II, III, and aVF)
G129 Left posterior hemiblock, intermittent
G132 Unclassified intraventricular conduction defect (QRS >= 0.12 s)
G133 Incomplete left bundle branch block (QRS 0.10-0.12 s)

G2** Repolarization disturbances

The codes under the major subdivision "conduction disturbances" describe abnormalities of the T wave.

The following list contains the codes which deal with repolarization disturbances and their descriptions:

G200 Low amplitude T waves
G201 Nonspecific primary T wave changes
G202 Secondary T wave changes
G203 Nonspecific ST segment depression
G204 Nonspecific ST segment elevation (early repolarization)
G205 ST segment straightening
G206 Wide frontal plane QRS-T angle (> 45 deg)
G207 Wide horizontal plane QRS-T angle (> 90 deg)
G208 Increased ventricular gradient
G209 Postextrasystolic T wave changes
G210 Increased T loop EMF (high amplitude T waves)
G211 T loop length:width ratio < 2.6
G212 T loop rotation opposite QRS

G213 Transitional (juvenile) repolarization
G214 T alternans
G215 Prolonged QT interval
G216 Shortened QT interval
G217 Prominent U waves
G218 History of serial ST and/or T wave changes
G299 Unspecified ST and/or T wave abnormality

G3** Stress testing

The third digit in codes under the major subdivision "stress testing" describes the type of stress test.

Type of stress test

G30* - Master's single
G31* - Master's double
G32* - Submaximal treadmill
G33* - Submaximal ergometry
G34* - Maximal treadmill
G35* - Maximal ergometry
G36* - Other types exercise stress
G37* - Tilt table
G38* - Lower body negative pressure

The third digit in codes under the major subdivision "stress testing" describes the results of the test.

Test results

G**0 - Normal
G**1 - Borderline because of 0.5-0.9 mm ST segment horizontal or downward depression and/or inadequate ST slope (< 1 mv/s)
G**A - Borderline plus significant stress arrhythmia*
G**B - Borderline plus symptoms suggestive of angina
G**C - Borderline, history of
G**2 - Abnormal because of 1mm or more of horizontal or downward sloping ST depression
G**3 - Abnormal plus significant stress arrhythmia*
G**4 - Abnormal plus symptoms suggestive of angina
G**5 - Abnormal, history of
G**6 - Abnormal BP response to stress
G**7 - Normal ST response but with significant stress arrhythmia*
G**8 - Abnormal due to symptoms
G**9 - Other

* Significant stress arrhythmia - ectopic beats "dangerously" increased by exercise or induced by exercise test (during or post exercise). "Dangerously" is defined as bigeminy, trigeminy, or 50% or more of 12 beats or more in a row being ectopics.

Abnormalities on the stress test can be recorded with an additional stress test code. The second digit of the code defines the origin of the abnormality or the leads in which the abnormality is found. The third digit describes the time during the test when the abnormality appeared. The fourth digit describes the frequency or appearance of the abnormality. The lists on the next pages give values and descriptions for these codes.

Origin or leads of appearance

GA** - Supraventricular
GB** - Ventricular (unifocal or multiformed)
GC** - Ventricular (multifocal)
GD** - Mixed origin
GE** - Uncertain origin
GG** - Sinus arrest w/wo supraventricular escape
GH** - Sinus arrest with ventricular escape
GX** - X only
GY** - Y only
GZ** - Z only
GV** - Lateral precordial leads (V4, V5, V6)
GL** - I and/or V4, V5, V6
GI** - AVF and/or II
GF** - AVF/II and Y
GP** - X, V4, V5, V6, and/or I
GQ** - X, Y, and/or Z
GR** - Other combinations (standard and/or bipolar)
GK** - Old Y (2nd ICS sternum to 6th ICS - AAL)

Time of appearance

G*R* - Recumbent; baseline tilt table; baseline LBNP
G*H* - Hyperventilation
G*U* - Early standing
G*S* - End of 2-minute standing
G*E* - Early exercise (=<5 min); first 4 minutes of tilt table; first 5 minutes LBNP
G*M* - Mid-exercise; second 4 minutes of tilt table; second and third 5 minutes LBNP
G*L* - Late exercise (last 3 minutes); third 4 minutes of tilt table; last 5 minutes LBNP
G*1* - Immediate recovery; during BH on tilt table; first 5 minutes of recovery LBNP
G*2* - Second minute of exercise recovery; first minute post BH on tilt table; second 5 minutes recovery LBNP
G*3* - Third minute of exercise recovery; second minute post BH on tilt table; third 5 minutes recovery LBNP
G*4* - Fourth minute of exercise recovery; third minute post BH on tilt table; fourth 5 minutes recovery LBNP
G*5* - Fifth minute of exercise recovery; HV and BH tilt table

G*6* - Sixth minute of exercise recovery; first minute post HV and BH tilt table
G*7* - Seventh minute of exercise recovery; second minute post HV and BH tilt table
G*8* - Eighth minute exercise recovery; third minute post HV and BH tilt table
G*A* - Throughout prestress periods
G*B* - Midstress and fifth or later minutes of recovery only
G*C* - Progressing through stress and persisting through immediate and later recovery
G*D* - Late stress and immediate recovery
G*F* - Through mid and late stress
G*G* - Prestress plus other periods without change
G*T* - Late stress and/or immediate recovery persisting into later recovery
G*J* - Ectopic beats at rest or early stress that decrease with stress
G*K* - Ectopic beats at rest or early stress that increase with stress

Frequency or manner of appearance

G**0 - Once
G**1 - Occasional
G**2 - Frequently
G**3 - Two ectopic beats consecutively only
G**4 - Three ectopic beats consecutively only
G**5 - Four or more ectopic beats consecutively only
G**6 - Two consecutive ectopics plus frequent other ectopics
G**7 - Three consecutive ectopics plus frequent other ectopics
G**8 - Four consecutive ectopics plus frequent other ectopics
G**9 - Other
G**A - T wave inversion
G**B - ST straightening less than 0.5 mm
G**C - J jct depression of >= 1 mm with >= 1 mv/s slope
G**D - J jct depression with inadequate heart rate adjusted slope
G**E - ST straightening or downward slope of 0.5 mm to < 1 mm
G**F - ST straightening or downward slope of 1 mm to < 2 mm
G**G - ST straightening or downward slope of >= 2 mm
G**H - >= 1 mm of ST segment coving
G**I - >= 1 mm of ST segment elevation
G**N - ST normalizing after being abnormal (if coded abnormal, time code for when EKG normalizes can be given)
G**K - Heart block (including AV dissociation)
G**P - Labile repolarization ST or T (includes early repolarization)

G4** Other EKG diagnostic procedures

The third digit in codes under the major subdivision "other EKG diagnostic procedures" describes the general category of procedure.

Category of procedure

G41* - Other lead systems
G42* - Diagnostic maneuvers
G43* - Drug effects

The fourth digit in codes under the major subdivision "Other EKG diagnostic procedures" describes the specific procedure.

Other lead systems

G411 Lewis lead
G412 Esophageal lead
G413 Intracavity lead
G414 His EKG
G415 Rhythm strip only

Diagnostic maneuvers

G421 Valsalva
G422 Carotid massage
G423 Hyperventilation

Drug effects

G431 Amyl nitrate and/or nitroglycerine
G432 Edrophonium chloride
G433 Vasopressors - alpha agonists
G434 Beta agonists
G435 Atropine
G436 Alpha blockers
G437 Beta blockers

G5** P wave abnormalities

The fourth digit in codes under the major subdivision "P wave abnormalities" describes the specific procedure.

P wave abnormalities

G500 Compatible with left atrial enlargement
G501 Compatible with right atrial enlargement
G502 Compatible with biatrial enlargement
G503 Compatible with intraatrial conduction defect
G504 Wide P loop
G505 Left axis deviation of P waves (< 0 deg)

G506 Right axis deviation of P waves (> 60 deg)
G507 Compatible with atrial infarction
G599 Unspecified P wave abnormality

G6** Myocardial damage

The third digit in codes under the major subdivision "myocardial damage" describes the location of the damage.

Location of damage

G60* - Inferior
G61* - Anterior
G62* - Posterior
G63* - Lateral
G64* - Apical
G65* - Septal
G66* - Anteroseptal
G67* - Anterolateral
G68* - Inferoposterior
G69* - Inferolateral
G6A* - Posterolateral

The fourth digit in codes under the major subdivision "myocardial damage" describes the finding indicative of the damage.

G**0 - ST elevation (convex)
G**1 - > 1 mm ST depression (flat or negative slope)
G**2 - Flat or negative ST slope, > 1 mm depression
G**3 - T wave inversion
G**4 - Increased T wave amplitude
G**5 - Q or QS pattern
G**6 - Q or QS pattern with conduction defect
G**7 - Significant change - extension
G**8 - Significant change - improvement (evolution)
G**9 - Significant change - deterioration
G**A - R/S ratio >= 1 in V1 or RSR'
G**B - History of myocardial damage

G7** Other EKG, vector, and pattern interpretations

The third digit in codes under the major subdivision "other EKG, vector, and pattern interpretations" describes the minor subdivision.

Minor subdivision

G70* - Other EKG interpretations
G72* - Ventricular hypertrophies
G73* - Vectorcardiogram, frontal plane
G75* - Vectorcardiogram, horizontal plane

G77* - Vectorcardiogram, sagittal plane
G79* - Vectorcardiogram, miscellaneous

The fourth digit in codes under the major subdivision "other EKG, vector, and pattern interpretations" describes the finding.

Other EKG interpretations

G700 Normal tracing
G701 Technical error or artifact
G702 Wolff-Parkinson-White (WPW) syndrome, type A
G703 Wolff-Parkinson-White (WPW) syndrome, type B
G704 Wolff-Parkinson-White (WPW) syndrome, intermediate type
G705 Lown-Ganong-Levine (LGL) syndrome (PR interval < 0.12 s with normal QRS)
G706 Compatible with pericarditis
G707 Compatible with myocarditis
G708 Compatible with ischemia
G709 Change due to anatomic variation
G710 Electrolyte influence on EKG
G711 Drug effect on EKG
G712 Metabolic influences on EKG
G713 Dextrocardia
G714 Dextroversion
G715 Low voltage

Ventricular hypertrophies

G720 LVH (voltage plus ST-T wave changes)
G721 RVH (tall R type)
G722 RVH (rSR' type)
G723 Acute cor pulmonale
G724 Chronic cor pulmonale
G725 Emphysema without cor pulmonale
G726 Age related right ventricular preponderance
G727 Biventricular enlargement
G728 Septal hypertrophy
G729 LVH, indicated by voltage alone

Vectorcardiogram, frontal plane

G730 Clockwise loop
G731 Counterclockwise loop
G732 Figure of eight loop
G733 Reversal of afferent limb
G734 Increased EMF (> 1.5 mv)
G735 Left axis deviation (>= -30 deg)
G736 Right axis deviation (>= 100 deg)
G737 Indeterminate axis
G738 Deviation of initial and terminal QRS forces (180 deg)
G739 Prominent Q in II, III, aVF (increased msec superior, > 25 msec)

G740 Increased left mv superior (> 0.16 mv)
G741 Increased mv superior (> 0.13 mv)
G742 Scimitar loop
G743 S1S2S3 pattern
G744 S1S2S3 pattern with r' in V1, or V1, V2 (right superior and anterior forces)
G745 Low voltage QRS (< 0.5 mv)

Vectorcardiogram, horizontal plane

G750 Clockwise loop
G751 Counterclockwise loop
G752 Figure of eight loop
G753 Reversal of afferent limb
G754 Increased EMF (> 1.5 mv)
G755 R>S in V1 or V2 (increased anterior
G756 ATT > 25 msec and TTA > 40 msec
G757 Half area vector > 25 deg
G758 Decreased posterior forces
G759 Poor R wave progression (decreased anterior forces, 0.02 sec vector < 0 deg)
G760 qrS in V2
G761 Increased posterior forces due to counterclockwise rotation of loop
G762 AP compression of loop
G763 Lateral force loss (clockwise rotation initial forces around E point)
G764 r' in V1, or V1, V2 (right and anterior terminal forces)
G765 Transitional loop
G766 Normal precordial map
G767 Abnormal precordial map
G768 Absence of rightward initial forces

Vectorcardiogram, sagittal plane

G770 Clockwise loop
G771 Counterclockwise loop
G772 Figure of eight loop
G773 Reversal of afferent limb
G774 Increased EMF
G775 Decreased inferior forces
G776 Increased anterior forces
G777 0.025 sec vector superior to X-axis

Vectorcardiogram, miscellaneous

G790 Irregular loop
G791 Lead artifact
G792 Disagreement of corrected and uncorrected leads
G793 History of vectorcardiogram
G794 Vectorcardiogram in record

G9** Other cardiovascular and related procedures

The third digit in codes under the major subdivision "other cardiovascular and related procedures" describes the minor subdivision.

Minor subdivision

G91* - Vectorcardiogram
G92* - X-ray
G93* - Cardiac catheterization
G94* - Phonocardiogram
G95* - Cardioversion
G96* - Serial enzyme changes

References

1. The international classification of diseases, ninth revision, clinical modification, publication (PHS) 80-1260. U.S. Department of Health and Human Services, 1980.

2. Commission on professional and hospital activities: ICD-9-CM basic coding. Institute for Professional Development, Ann Arbor, Michigan. 1987.

Initial distribution

Commander, U.S. Army Natick Research, Development and Evaluation Center
ATTN: STRNC-MIL (Documents Librarian)
Natick, MA 01760-5040

Naval Submarine Medical Research Laboratory
Medical Library, Naval Sub Base
Box 900
Groton, CT 06340

Commander/Director
U.S. Army Combat Surveillance and Target Acquisition Lab
ATTN: DELCS-D
Fort Monmouth, NJ 07703-5304

Commander
10th Medical Laboratory
ATTN: Audiologist
APO New York 09180

Naval Air Development Center
Technical Information Division
Technical Support Detachment
Warminster, PA 18974

Commanding Officer, Naval Medical Research and Development Command
National Naval Medical Center
Bethesda, MD 20814-5044

Deputy Director, Defense Research and Engineering
ATTN: Military Assistant for Medical and Life Sciences
Washington, DC 20301-3080

Commander, U.S. Army Research Institute of Environmental Medicine
Natick, MA 01760

U.S. Army Avionics Research and Development Activity
ATTN: SAVAA-P-TP
Fort Monmouth, NJ 07703-5401

U.S. Army Communications-Electronics Command
ATTN: AMSEL-RD-ESA-D
Fort Monmouth, NJ 07703

Library
Naval Submarine Medical Research Lab
Box 900, Naval Sub Base
Groton, CT 06349-5900

Commander
Man-Machine Integration System
Code 602
Naval Air Development Center
Warminster, PA 18974

Commander
Naval Air Development Center
ATTN: Code 602-B (Mr. Brindle)
Warminster, PA 18974

Commanding Officer
Harry G. Armstrong Aerospace Medical Research Laboratory
Wright-Patterson
Air Force Base, OH 45433

Director
Army Audiology and Speech Center
Walter Reed Army Medical Center
Washington, DC 20307-5001

Commander, U.S. Army Institute of Dental Research
ATTN: Jean A. Setterstrom, Ph. D.
Walter Reed Army Medical Center
Washington, DC 20307-5300

Naval Air Systems Command
Technical Air Library 950D
Room 278, Jefferson Plaza II
Department of the Navy
Washington, DC 20361

Naval Research Laboratory Library
Shock and Vibration
Information Center, Code 5804
Washington, DC 20375

Director, U.S. Army Human
Engineering Laboratory
ATTN: Technical Library
Aberdeen Proving Ground, MD 21005

Commander, U.S. Army Test
and Evaluation Command
ATTN: AMSTE-AD-H
Aberdeen Proving Ground, MD 21005

Director
U.S. Army Ballistic
Research Laboratory
ATTN: DRXBR-OD-ST Tech Reports
Aberdeen Proving Ground, MD 21005

Commander
U.S. Army Medical Research
Institute of Chemical Defense
ATTN: SGRD-UV-AO
Aberdeen Proving Ground,
MD 21010-5425

Commander, U.S. Army Medical
Research and Development Command
ATTN: SGRD-RMS (Ms. Madigan)
Fort Detrick, Frederick, MD 21702-5012

Director
Walter Reed Army Institute of Research
Washington, DC 20307-5100

HQ DA (DASG-PSP-O)
5109 Leesburg Pike
Falls Church, VA 22041-3258

Naval Research Laboratory
Library Code 1433
Washington, DC 20375

Harry Diamond Laboratories
ATTN: Technical Information Branch
2800 Powder Mill Road
Adelphi, MD 20783-1197

U.S. Army Materiel Systems
Analysis Agency
ATTN: AMXSY-PA (Reports Processing)
Aberdeen Proving Ground
MD 21005-5071

U.S. Army Ordnance Center
and School Library
Simpson Hall, Building 3071
Aberdeen Proving Ground, MD 21005

U.S. Army Environmental
Hygiene Agency
Building E2100
Aberdeen Proving Ground, MD 21010

Technical Library Chemical Research
and Development Center
Aberdeen Proving Ground, MD
21010--5423

Commander
U.S. Army Medical Research
Institute of Infectious Disease
SGRD-UIZ-C
Fort Detrick, Frederick, MD 21702

Director, Biological
Sciences Division
Office of Naval Research
600 North Quincy Street
Arlington, VA 22217

Commander
U.S. Army Materiel Command
ATTN: AMCDE-XS
5001 Eisenhower Avenue
Alexandria, VA 22333

Commandant
U.S. Army Aviation
Logistics School ATTN: ATSQ-TDN
Fort Eustis, VA 23604

Headquarters (ATMD)
U.S. Army Training
and Doctrine Command
Fort Monroe, VA 23651

Structures Laboratory Library
USARTL-AVSCOM
NASA Langley Research Center
Mail Stop 266
Hampton, VA 23665

Naval Aerospace Medical
Institute Library
Building 1953, Code 03L
Pensacola, FL 32508-5600

Command Surgeon
HQ USCENTCOM (CCSG)
U.S. Central Command
MacDill Air Force Base FL 33608

Air University Library
(AUL/LSE)
Maxwell Air Fore Base, AL 36112

U.S. Air Force Institute
of Technology (AFIT/LDEE)
Building 640, Area B
Wright-Patterson
Air Force Base, OH 45433

Henry L. Taylor
Director, Institute of Aviation
University of Illinois-Willard Airport
Savoy, IL 61874

Chief, Nation Guard Bureau
ATTN: NGB-AR (COL Urbauer)
Room 410, Park Center 4
4501 Ford Avenue
Alexandria, VA 22302-1451

Commander
U.S. Army Aviation Systems Command
ATTN: SGRD-UAX-AL (MAJ Gillette)
4300 Goodfellow Blvd., Building 105
St. Louis, MO 63120

U.S. Army Aviation Systems Command
Library and Information Center Branch
ATTN: AMSAV-DIL
4300 Goodfellow Boulevard
St. Louis, MO 63120

Federal Aviation Administration
Civil Aeromedical Institute
Library AAM-400A
P.O. Box 25082
Oklahoma City, OK 73125

Commander
U.S. Army Academy
of Health Sciences
ATTN: Library
Fort Sam Houston, TX 78234

Commander
U.S. Army Institute of Surgical Research
ATTN: SGRD-USM (Jan Duke)
Fort Sam Houston, TX 78234-6200

AAMRL/HEX
Wright-Patterson
Air Force Base, OH 45433

University of Michigan
NASA Center of Excellence in Man-
Systems Research
ATTN: R. G. Snyder, Director
Ann Arbor, MI 48109

John A. Dellinger,
Southwest Research Institute
P. 0. Box 28510
San Antonio, TX 78284

Product Manager
Aviation Life Support Equipment
ATTN: AMCPM-ALSE
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

Commander
U.S. Army Aviation
Systems Command
ATTN: AMSAV-ED
4300 Goodfellow Boulevard
St. Louis, MO 63120

Commanding Officer
Naval Biodynamics Laboratory
P.O. Box 24907
New Orleans, LA 70189-0407

Assistant Commandant
U.S. Army Field Artillery School
ATTN: Morris Swott Technical Library
Fort Sill, OK 73503-0312

Commander
U.S. Army Health Services Command
ATTN: HSOP-SO
Fort Sam Houston, TX 78234-6000

Director of Professional Services
HQ USAF/SGDT
Bolling Air Force Base, DC 20332-6188

U.S. Army Dugway Proving Ground
Technical Library, Building 5330
Dugway, UT 84022

U.S. Army Yuma Proving Ground
Technical Library
Yuma, AZ 85364

AFFTC Technical Library
6510 TW/TSTL
Edwards Air Force Base,
CA 93523-5000

Commander
Code 3431
Naval Weapons Center
China Lake, CA 93555

Aeromechanics Laboratory
U.S. Army Research and Technical Labs
Ames Research Center, M/S 215-1
Moffett Field, CA 94035

Sixth U.S. Army
ATTN: SMA
Presidio of San Francisco, CA 94129

Commander
U.S. Army Aeromedical Center
Fort Rucker, AL 36362

U.S. Air Force School
of Aerospace Medicine
Strughold Aeromedical Library Technical
Reports Section (TSKD)
Brooks Air Force Base, TX 78235-5301

Dr. Diane Damos
Department of Human Factors
ISSM, USC
Los Angeles, CA 90089-0021

U.S. Army White Sands
Missile Range
ATTN: STEWS-IM-ST
White Sands Missile Range, NM 88002

U.S. Army Aviation Engineering
Flight Activity
ATTN: SAVTE-M (Tech Lib) Stop 217
Edwards Air Force Base, CA 93523-5000

Ms. Sandra G. Hart
Ames Research Center
MS 262-3
Moffett Field, CA 94035

Commander, Letterman Army Institute
of Research
ATTN: Medical Research Library
Presidio of San Francisco, CA 94129

Mr. Frank J. Stagnaro, ME
Rush Franklin Publishing
300 Orchard City Drive
Campbell, CA 95008

Commander
U.S. Army Medical Materiel
Development Activity
Fort Detrick, Frederick, MD 21702-5009

Commander
U.S. Army Aviation Center
Directorate of Combat Developments
Building 507
Fort Rucker, AL 36362

U. S. Army Research Institute
Aviation R&D Activity
ATTN: PERI-IR
Fort Rucker, AL 36362

Commander
U.S. Army Safety Center
Fort Rucker, AL 36362

U.S. Army Aircraft Development
Test Activity
ATTN: STEBG-MP-P
Cairns Army Air Field
Fort Rucker, AL 36362

Commander U.S. Army Medical Research
and Development Command
ATTN: SGRD-PLC (COL Sedge)
Fort Detrick, Frederick, MD 21702

MAJ John Wilson
TRADOC Aviation LO
Embassy of the United States
APO New York 09777

Netherlands Army Liaison Office
Building 602
Fort Rucker, AL 36362

British Army Liaison Office
Building 602
Fort Rucker, AL 36362

Italian Army Liaison Office
Building 602
Fort Rucker, AL 36362

Directorate of Training Development
Building 502
Fort Rucker, AL 36362

Chief
USAHEL/USAAVNC Field Office
P. O. Box 716
Fort Rucker, AL 36362-5349

Commander U.S. Army Aviation Center
and Fort Rucker
ATTN: ATZQ-CG
Fort Rucker, AL 36362

Commander/President
TEXCOM Aviation Board
Cairns Army Air Field
Fort Rucker, AL 36362

Dr. William E. McLean
Human Engineering Laboratory
ATTN: SLCHE-BR
Aberdeen Proving Ground,
MD 21005-5001

Canadian Army Liaison Office
Building 602
Fort Rucker, AL 36362

German Army Liaison Office
Building 602
Fort Rucker, AL 36362

LTC Patrick Laparra
French Army Liaison Office
USAAVNC (Building 602)
Fort Rucker, AL 36362-5021

Brazilian Army Liaison Office
Building 602
Fort Rucker, AL 36362

Australian Army Liaison Office
Building 602
Fort Rucker, AL 36362

Dr. Garrison Rapmund
6 Burning Tree Court
Bethesda, MD 20817

Commandant Royal Air Force
Institute of Aviation Medicine
Farnborough Hants UK GU14 65Z

Dr. A. Kornfield, President
Biosearch Company
3016 Revere Road
Drexel Hill, PA 29026

Commander
U.S. Army Biomedical Research
and Development Laboratory
ATTN: SGRD-UBZ-I
Fort Detrick, Frederick, MD 21702

Defense Technical Information Center
Cameron Station
Alexandra, VA 22313

Commander, U.S. Army Foreign Science
and Technology Center
AIFRTA (Davis)
220 7th Street, NE
Charlottesville, VA 22901-5396

Director,
Applied Technology Laboratory
USARTL-AVSCOM
ATTN: Library, Building 401
Fort Eustis, VA 23604

U.S. Army Training
and Doctrine Command
ATTN: Surgeon
Fort Monroe, VA 23651-5000

Aviation Medicine Clinic
TMC #22, SAAF
Fort Bragg, NC 28305

U.S. Air Force Armament
Development and Test Center
Eglin Air Force Base, FL 32542

Commander, U.S. Army Missile
Command
Redstone Scientific Information Center
ATTN: AMSMI-RD-CS-R/ILL
Documents Redstone Arsenal, AL 35898

U.S. Army Research and Technology
Laboratories (AVSCOM)
Propulsion Laboratory MS 302-2
NASA Lewis Research Center
Cleveland, OH 44135

Dr. H. Dix Christensen
Bio-Medical Science Building, Room 753
Post Office Box 26901
Oklahoma City, OK 73190

Col. Otto Schramm Filho
c/o Brazilian Army Commission
Office-CEBW
4632 Wisconsin Avenue NW
Washington, DC 20016

Dr. Christine Schlichting
Behavioral Sciences Department
Box 900, NAVUBASE NLON
Groton, CT 06349-5900