Comparability of Diagnostic Data
Coded by the 8th and 9th Revisions of the International Classification of Diseases

This report describes how the changes in the classification system used to code diagnoses reported in the National Hospital Discharge and the National Ambulatory Medical Care Surveys for utilization occurring in 1979 and later affect the comparability with similar data collected for utilization from 1968 through 1978. Comparability ratios are developed by coding the data using both coding classification revisions and dividing the national estimate based on one revision by the estimate based on the other revision. The comparability ratios can be used to estimate what the values published using one revision of the classification system would have been had coding been conducted according to the other revision.

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Preface

The study of the comparability of mortality data for each of the recent revisions of the International Classification of Diseases has been an important undertaking by the National Center for Health Statistics (NCHS). However, the study of the comparability of morbidity and health services utilization was not undertaken until the substitution of ICD–9–CM for ICDA–8 was implemented in 1979. The study described in this report was conducted between 1982 and 1984 and was made possible through the efforts of many individuals within and outside NCHS. The study was conducted under Contract No. 282–82–2122 between NCHS and JRB Associates, a company of Science Applications International Corp. (SAIC). JRB Associates directly conducted the reabstracting, recoding, and data processing of health survey data previously coded in ICDA–8. Much of the interpretation of the effects of the revision from ICDA–8 to ICD–9–CM was subcontracted to the Commission on Professional and Hospital Activities (CPHA). Delray Green, R.R.A., of NCHS, served as Project Officer for the contract. Benjamin C. Duggar, Sc.D., Vice President of JRB Associates, served as Principal Investigator; and Robert H. Seeman, chief nosologist for CPHA, managed the CPHA subcontract and provided much of the interpretive findings that explain the observed comparability ratios. Thomas McLemore of NCHS coordinated the comparability study of National Ambulatory Medical Care Survey data, while Eileen McCarthy, R.R.A., coordinated the National Hospital Discharge Survey analysis. W. Frank Lewis of NCHS served as the Government Project Officer for a subsequent contract with SAIC (Order No. 85A046392201D) to prepare the earlier findings for publication as an NCHS Series 2 report. The coding in ICD–9–CM was supervised by Carole Waldner, A.R.T., of SAIC; F. Faye Brown, R.R.A., served as data quality control consultant.

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Symbols

- - - Data not available

... Category not applicable

- Quantity zero

0.0 Quantity more than zero but less than 0.05

Z Quantity more than zero but less than 500 where numbers are rounded to thousands

* Figure does not meet standard of reliability or precision

Figure suppressed to comply with confidentiality requirements

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Comparability of Diagnostic Data

Coded by the 8th and 9th Revisions of the International Classification of Diseases

by Benjamin C. Duggar, Sc.D., La Jolla Management Corp., and W. Frank Lewis, M.S., Division of Health Care Statistics

Introduction

Purposes of the report

On January 1, 1979, the coding system used for diagnoses reporting in the National Hospital Discharge Survey (NHDS) and the National Ambulatory Medical Care Survey (NAMCS) was changed from the *Eighth Revision International Classification of Diseases, Adapted*[1] (ICDA-8), to the *International Classification of Diseases, 9th Revision, Clinical Modification*[2] (ICD-9-CM). There are major differences between ICDA-8 and ICD-9-CM in the classification of a number of important diseases and conditions. As a result, the change in coding system produced discontinuities in the morbidity and utilization by diagnosis trend data derived from data collected for years prior to 1979 compared with data collected for 1979 and beyond. To assist users of NHDS and NAMCS data to discriminate between the real changes in utilization by diagnosis and those changes that are artifacts of the changes to the coding system used, records have been coded using the former and the current coding systems, and comparability ratios derived. These comparability ratios can be used to develop estimates of what the diagnoses data previously reported for 1970 through 1978 using ICDA-8 would have been had ICD-9-CM been used at that time or, conversely, what data for 1979 or subsequent years would have been had they been coded in ICDA-8 instead of ICD-9-CM.

This report reviews previously published work concerning development and use of comparability ratios, describes the methods used to develop comparability ratios for NHDS and NAMCS, presents the comparability ratios for ICDA-8 to ICD-9-CM, explains the principal effects of coding system and coding instruction changes on comparability for these survey data, and provides illustrations of the use of the comparability ratios.

Prior comparability studies

Although the need for a statistical classification is documented in work dating back to the early seventeenth century, the move toward an international uniform classification can be said to have begun with the request by the International Statistical Congress of 1853 to William Farr and Marc d'Espine to develop a uniform classification. The general principles for such a classification as developed by Farr became the basis for the International List of Causes of Death. The first classifica-

tion to gain wide acceptance, however, was that presented by Jacques Bertillon at the 1893 meeting of the International Statistical Institute.[3] The Bertillon Classification of Causes of Death was recommended for use in the United States, Canada, and Mexico by the American Public Health Association in 1898. At that time, the idea of a decennial revision was also suggested. The first revision to the International Classification of Causes of Death was approved in 1900; the next in 1909; then in 1920, 1929, and 1938. In 1948, the classification of morbidity was added as part of the sixth revision. The seventh revision was prepared in 1955 and the eighth in 1965. The *Eighth Revision International Classification of Diseases* (ICD-8) was then adapted for use in the United States (ICDA-8) through the addition of further subdivisions of certain of the ICD-listed diseases and conditions.[1] ICDA-8 was used to code diagnosis and surgical procedure data collected in the NHDS for calendar years 1970 through 1978, and for coding diagnoses collected in calendar years 1973 through 1978 as part of NAMCS.

The evaluation of comparability for mortality data coded according to different revisions of the ICD dates back to the second revision of the ICD. In the United States, however, comparability ratios based on dual coding of cause of death data were first computed for the year 1950 using the fifth and sixth revisions. Because of the major changes from ICD-5 to ICD-6, there were important differences in the categories to which certain causes of death were assigned and discontinuities of mortality trend statistics resulted. The ICD-7 incorporated only a limited number of changes from the ICD-6, but comparability ratios were computed in the United States to measure these effects. ICDA-8 represented major changes from ICD-7 and again produced large discontinuities in cause-of-death statistics. Comparability ratios for the 1966 cause-of-death data were developed from dual coding in ICD-7 and ICDA-8, and were published by the National Center for Health Statistics (NCHS) in 1975.[4]

As with the seventh and eighth revisions, there were major changes from the eighth to the ninth revision. Therefore, NCHS also conducted a dual coding and comparability ratio development effort for a sample of 1976 deaths. The results of this study have been published and include comparability ratios for 72 selected causes of death as well as for 10 selected causes of infant deaths.[5] The comparability ratios of ICD-9 to ICDA-8 deaths for the major published categories varied from 0.1821

(certain other intestinal infections) to 3.3022 (hypertensive heart disease), ignoring newly created categories that did not exist in the standard ICDA–8. A comparability ratio of 0.1821 means that for every 10,000 deaths classified as due to certain other intestinal infections according to the eighth revision of the ICDA (codes 008 and 009), it is estimated that only 1,821 (the product of 0.1821 and 10,000) of these would be classified as due to certain other intestinal infections when the same 10,000 deaths were recoded according to the ninth revision. The remaining 8,179 deaths would be assigned to other cause-of-death categories when using ICD–9 definitions and coding instructions. The reciprocal of the comparability ratio for estimating ICD–9 data based on ICDA–8 data is the comparability ratio used for estimating ICDA–8 mortality from ICD–9 data. In the example of certain other intestinal infections, the reciprocal of 0.1821 is 5.4915. Therefore, if the universe of deaths coded according to ICD–9 contains 1,821 deaths classified as due to certain other intestinal infections, it is estimated that the same universe would have 10,000 deaths (the product of 5.4915 and 1,821) so classified when coded according to ICDA–8. The work on comparability of mortality statistics has resulted in a standard methodology and terminology for developing and using comparability ratios that is also applicable to developing and using morbidity comparability ratios.

Contrary to the well-established history for development and use of comparability ratios for mortality data, relatively little has been done with morbidity data comparability. In 1974, NCHS contracted with the Commission on Professional and Hospital Activities to determine comparability between hospital discharge abstracts coded in ICDA–8 or H–ICDA (the H–ICDA is a hospital adaptation of ICD–8 and ICDA–8 developed by the Commission on Professional and Hospital Activities in 1968).[6] That study involved dual coding in ICDA–8 and H–ICDA of the diagnoses contained on 150,478 NHDS abstracts. The purpose of the study was to determine, for various levels of grouping of diagnoses, the comparability of hospital utilization statistics for the two coding systems, and to identify which diagnostic categories could not be satisfactorily converted between the systems. The study provided empirical comparability ratios and an improved basis for conversion between the two systems.

A second study involving the dual coding approach to the development of comparability ratios was conducted by the Veterans Administration (VA) using a sample of 1981 hospitalized patients' records.[7] The results were published in 1984 and provide comparability ratios for the 120 recode categories used in VA reports. Because the study was based on dual coding

of records for a total of 13,595 patients who were hospitalized at the time of the VA annual census on September 24, 1980, the comparability ratios for some of the categories are based on relatively few occurrences; no data at all are reported for 3 of the 17 chapters of ICD–9–CM that are seldom represented in the VA hospitalized population (for example, chapter 11, Complications of pregnancy, childbirth, and the puerperium; chapter 14, Congenital anomalies; and chapter 15, Certain conditions originating in the perinatal period). However, the VA findings provide useful comparisons with those from the present study and illustrate the limitations of comparability ratios derived in one situation for application to another population group.

There have been a number of reports describing trends in morbidity data and their disruption by revisions in the coding system. These reports do not involve dual coding, but instead provide adjustment factors based on comparisons for the year prior to the change versus the year after the change, together with a correction for the estimation of true trend effects over the time period. Such a study was carried out by the Health Care Financing Administration using the medicare statistical system data for hospitalized medicare beneficiaries.[8] First-listed diagnoses coded in ICDA–8 for 1977 and 1978 were used to develop trends, then the 1978 data were compared with 1979 data coded in ICD–9–CM for approximately 2 million hospital bills. The projected trend totals divided by the actual number of discharges observed in each grouping of ICD–9–CM codes were then used to derive comparability ratios.

A literature search has confirmed the paucity of comprehensive comparability data for morbidity and utilization data. Consequently, in September 1982, the NCHS contracted for the "Evaluation of the Comparability of Diagnostic Data of National Health Care Surveys."[9] The study involved the NHDS, the NAMCS, and the National Health Interview Survey. Comparability ratios for the former two surveys are essential for users of the data interested in tracking trends, because the definitions for many of the recode categories for reporting survey results did not materially change between ICDA–8 and ICD–9–CM coded results. However, for the National Health Interview Survey, a major reorganization of the recode categories was performed to maintain continuity in spite of the code system revisions between 1978 and 1979. Thus, there is little need for comparability ratios when examining trends in health interview survey data, but such ratios are useful for evaluation of the recode process and assessment of coding instructions followed by the Health Interview Survey staff.

Design of the study

The National Hospital Discharge Survey

The National Hospital Discharge Survey (NHDS) has been conducted by the National Center for Health Statistics (NCHS) since 1965. The purpose of the survey has been to provide national estimates of hospital inpatient utilization for all non-Federal short-stay hospitals. The survey is based on a two-stage sampling process. First, a stratified sample of hospitals is selected for participation in the study. Second, discharge records are sampled from each participating hospital so that the product of the probability of any hospital being selected and the probability of any discharge record being selected is the reciprocal of the weighting factor used to provide the national estimate. About 6 percent of all U.S. short-stay non-Federal hospitals participate in the survey, and an average of about 8 percent of all discharges from the participating hospitals are sampled. The 1975 sample consisted of 511 hospitals, of which 432 participated and from which 232,000 discharges were abstracted. A detailed description of the design of the survey has been published elsewhere.[10]

Over the years, the techniques for obtaining NHDS data have varied, and these changes have significance for the development of comparability ratios. Two methods are used to abstract the discharges: Either the hospital medical records department will prepare the abstract or a representative of the U.S. Bureau of the Census will go to the hospital to prepare the abstract. Until 1980, the instructions to the abstractors required that only the medical record "face sheet" be used as a source of information, and that the order in which diagnoses are listed on the face sheet be reproduced exactly by the abstractor when preparing the abstract. These rules were changed in 1980 to require use of the face sheet and the discharge summary when feasible as the sources of data for the abstract. This combination provides more detailed information and permits more accurate coding.[11] The effects of this change in NHDS abstracting methods may also have had an effect on the comparability of the data collected prior to and subsequent to 1980, but such effects, if any, have not been measured.

After the abstracts have been prepared, they are coded centrally (ICDA–8 for discharges before January 1, 1979, and ICD–9–CM for discharges on or after that date). NCHS uses a sophisticated computer-based system to edit these coded data, and this system will automatically impute certain items, if missing, or reorder the diagnoses to follow certain rules. Coding the diagnosis and procedure data is conducted by trained coders operating under a rigorous quality control system. At present,

the principal or first-listed diagnosis and up to six other diagnoses, and the principal or first-listed procedure and up to three other procedures, are coded in ICD–9–CM. Before 1979, the NHDS coders used a specially modified version of the ICDA–8. The modifications were developed to provide more useful information when incomplete or ill-defined terminology appeared on the abstracts. Also, before 1979, up to five diagnosis and three surgical procedure codes were listed for each abstract.

Diagnosis and procedure data from the NHDS are published in several groupings and by individual codes. Diagnoses grouped according to the 17 chapters and special conditions in ICDA–8 were published in 121 categories, whereas the same chapters and the supplemental classifications in the ICD–9–CM are routinely published in 187 groups. Data for selected procedure categories are also published. In addition, NCHS now publishes data on each first-listed diagnosis code and tabulations for all-listed diagnoses and for all-listed procedure codes.

For the present comparability ratio study, a subsample of approximately 97,000 records from the 1975 NHDS was selected. Because there were an estimated 34,043,000 discharges nationally in 1975, each subsample record represents on the average 351 discharges (34 million divided by 97,000). A principal diagnosis or procedure that occurs in the sample on 142 discharge abstracts would, on the average, represent an estimated national frequency of approximately 50,000 discharges. The national estimate of 50,000 discharges must be qualified by the measure of variability that occurs by chance because a sample, rather than the entire universe, was tabulated. This variability measure, the standard error (or the relative standard error when expressed as the percent of the national estimate), is used to develop confidence intervals around the national estimates and comparability ratios.

The original coding of the 1975 NHDS abstracts using ICDA–8 occurred in 1975 and 1976. The recoding of the subsample of these same abstracts using ICD–9–CM was performed in 1983. The coders who conducted the recoding in 1983 were either accredited record technicians or registered record administrators with extensive previous ICD–9–CM coding experience. All coders using the ICD–9–CM participated in a training workshop to learn the special rules contained in the ICD–9–CM coding instruction manual prepared for the NHDS (*Hospital Discharge Survey's Instructions for Medical Classification, 1979*).[12] This manual contains general instructions as well as specific coding instructions for each ICD–9–CM category. The quality control procedure followed in the

present study duplicated, to the extent possible, the procedure followed by NCHS for 1975 NHDS coding. Guidelines found in the 1975 NCHS publication "Quality Control in the Hospital Discharge Survey" were followed.[13]

All diagnoses and surgical procedures appearing on the original abstract were coded in ICD-9-CM. These codes, and the hospital and record identification numbers, were then keyed and a data tape was prepared. This tape was then merged with the original 1975 NHDS data tape, and a new tape was prepared containing only the 97,000 dual-coded (ICDA-8 and ICD-9-CM) abstract records. The weighting factor for each abstract was then adjusted to take into account the subsampling ratio, and all subsequent tabulations, analyses, and reviews were performed using this dual-coded tape.

To assist with the analyses, a number of tabulations and comparisons were prepared. The first of these special printouts was developed using a conversion table that takes ICD-9-CM diagnosis codes and selects the ICDA-8 code or codes into which it may be converted. This conversion table was developed in 1978 for the Federal Department of Health and Human Services by the Commission on Professional and Health Activities and is available for purchase on magnetic tape from the National Technical Information Service or directly from the Commission.[14] By running the dual coded tape against the ICD-9-CM to ICDA-8 conversion tape, it was possible to sort all pairings of ICD-9-CM/ICDA-8 principal diagnosis codes into those that were expected, as represented by the conversion table, or unexpected when the pairing differed from that in the table. The unexpected pairings were printed out together with all other diagnoses, surgical procedures, and demographic characteristics of the patients. This printout was used to review and explain the reasons for unexpected pairings of ICD-9-CM and ICDA-8 principal diagnosis codes.

The second set of special printouts consisted of a set of matrices which display for each code in one coding revision the array of codes in the other revision with which it was paired. Each matrix lists the codes, the number of occurrences, and the sum of the sample weights. Matrices were prepared by numerically listing the ICDA-8 codes together with the array of ICD-9-CM pairings for each, and the reverse matrix that lists the ICD-9-CM codes together with the array of ICDA-8 codes with which they were paired. These matrices were prepared using codes at only the three-digit level and again using the full codes up to five digits. An example of a portion of the ICDA-8 to ICD-9-CM matrix appears in table A.

Using the matrices of all pairings, the principal diagnosis codes were grouped into the published ICDA-8 and ICD-9-CM recode categories. For each of those categories that were changed between ICDA-8- and ICD-9-CM-based NHDS publications, an attempt was made to develop and include a comparable recode category in the other coding system. These artificially developed, or surrogate, recode categories have been included in the lists of recode categories for which comparability ratios were derived.

The National Ambulatory Medical Care Survey

The NAMCS data were collected from May through December 1981 and again in 1985 on samples of office visits to non-Federal physicians classified as "office based" who practice in the coterminous United States. Physicians included in the survey represent a probability sample of office-based physicians (M.D. and D.O.). Approximately 2,000 physicians participated in the survey each year. For each participating physician, the patient visits for a randomly assigned week during

Table A. Sample ICDA-8 codes listed as principal diagnosis together with the array of comparable ICD-9-CM codes: National Hospital Discharge Survey

ICDA-8 code	Number of occurrences	Number of discharges	ICD-9-CM code	Number of occurrences	Number of discharges
171.0	1	207	191.9	1	207
171.1	5	1,921	238.1	3	1,141
			171.6	1	310
			171.3	1	470
171.2	4	866	171.2	3	611
			215.2	1	255
171.3	6	2,396	171.3	6	2,396
171.9	15	4,842	171.9	12	3,690
			V10.89	1	372
			162.5	1	275
			173.4	1	505
172.1	1	135	172.1	1	135
172.3	8	2,886	172.3	7	2,657
			172.5	1	229
172.4	3	882	172.4	2	582
			196.0	1	300
172.6	17	6,180	172.5	16	5,491
			789.0	1	689
172.7	7	1,613	172.6	6	1,344
			998.1	1	269
172.8	2	345	172.7	2	345

NOTE: For each code pairing, the frequency of occurrence and the number of discharges represented by the sum of subsample weights from the approximately 97,000 discharge abstracts are tabulated. Unexpected pairings were often due to incomplete or nonspecific descriptions on the abstract that were interpreted differently by the ICDA-8 and ICD-9-CM groups of coders.

the survey year were sampled. Sampling of visits during this week varies from 20 to 100 percent, depending upon the volume. A complete description of the survey methodology has been previously published.[15] Typically, the physician and his or her office staff complete the patient log and individual patient records for the sample visits. The patient record form has a space for the physician to list the principal diagnosis or problem and two lines for listing other significant current diagnoses. A maximum of three diagnoses are coded from the narrative information supplied by the physician. The data are extensively edited by computer, and imputed values are assigned for certain items when these items are missing. The physicians are encouraged to list tentative or provisional diagnoses if a definitive one is not available at the time of the visit. A significant proportion of visits is carried out for health maintenance purposes without sickness, and these are coded under the supplemental classifications. Because of the nature of ambulatory care and the manner of data collection, incomplete specification of diagnoses is often encountered, and the not otherwise specified codes and the symptoms, signs, and ill-defined conditions codes are frequently used.

National Ambulatory Medical Care Survey (NAMCS) data on diagnoses are published using 14 of the ICD chapter headings, a variety of principal diagnosis groups, and data on the 50 most frequent principal diagnoses (at the three-digit level).

For the comparability study, all of the NAMCS records for 1978 were obtained, coded in ICD–9–CM, linked with the original ICDA–8 coded data, and analyzed. Thus, no sub-sampling of the original sample data was involved. The 1978 NAMCS consisted of approximately 47,000 patient visit records.

In the course of retrieving the original 1978 NAMCS patient records for coding, a few records could not be located. Because certain data from the missing records were already on the NAMCS data tape, it was possible to examine the characteristics of the missing records and to determine that they appeared to be a randomly selected subgroup consisting of all medical specialties, sampling weeks, and geographic areas. Thus, although the number of available records for the com-

parability study was reduced by approximately 3 percent, there is no reason to believe that any bias was introduced that would affect the comparability ratios based on dual coding of the remaining 97 percent of the 1978 records.

The procedure for coding 1978 NAMCS records in ICD–9–CM involved using the same group of experienced and accredited coders used with the NHDS subsample. All of the patient record forms were coded in ICD–9–CM according to the NAMCS 1979 *Medical Coding Manual*.[16] Quality control of each coder's work duplicated the essential features of those used by NAMCS for the original coding of the 1978 sample using ICDA–8.

As with the NHDS study, a dual-coded tape was prepared by merging a tape containing the new ICD–9–CM coded diagnoses and record identifiers together with the original 1978 NAMCS data tape with all diagnoses coded in ICDA–8. The dual-coded tape was passed against the ICD–9–CM to ICDA–8 conversion tape described earlier, and a listing of unexpected pairings of ICD–9–CM and ICDA–8 codes was prepared.[14] Matrices were then prepared listing tabulations of all ICDA–8 codes in numerical order together with the array of ICD–9–CM codes with which each ICDA–8 code had been paired. The reverse matrices of all ICD–9–CM codes together with the paired ICDA–8 codes were also prepared. An example of a portion of the ICD–9–CM to ICDA–8 matrix appears in table B. Each matrix tabulates codes at the three-digit level, because NAMCS publications only display three-digit level recode categories. The listings of all occurrences of each code include the sampling weights for the patient visit records on which they appeared. The sum of the weightings for all occurrences in each recode category was then tabulated. These summed weightings represent the national estimates of numbers of patient visits for each diagnostic grouping. Estimates based on the ICDA–8 coded records, when divided by the estimate for the corresponding ICD–9–CM category, represent the comparability ratio. When the comparability ratios deviate from unity, the matrices can be used to determine which and how many occurrences of codes were paired with codes grouped into different recode categories.

Table B.   Sample first-listed ICD–9–CM codes together with the array of comparable ICDA–8 codes: National Ambulatory Medical Care Survey

ICD–9–CM code	Number of occurrences	Number of visits	ICDA–8 code	Number of occurrences	Number of visits
150.	3	28,462	150	3	28,462
151.	14	110,954	151	12	92,593
			230	1	5,282
			197	1	13,079
153.	88	851,578	153	84	830,163
			197	2	11,424
			793	1	6,277
			Y10	1	3,714
154.	17	172,572	154	14	146,971
			153	2	18,089
			230	1	7,512
155.	2	13,634	155	1	3,821
			197	1	9,813
156.	1	4,262	156	1	4,262
157.	5	51,494	157	3	35,252
			197	2	16,242
158.	2	20,918	158	2	20,918
159.	2	15,804	159	2	15,804
160.	1	30,919	160	1	30,919
161.	6	68,993	161	6	68,993
162.	53	581,156	162	51	570,410
			Y10	2	10,746

NOTE: For each code pairing, the frequency of occurrence and the number of visits represented by the sum of the sample weights from the approximately 47,000 patient visit records are tabulated. Unexpected pairings were often due to incomplete or nonspecific wordings on the record that were interpreted differently by the ICDA–8 and ICD–9–CM groups of coders.

National Hospital Discharge Survey Findings

Description of table 1

With the change from use of ICDA–8 for coding National Hospital Discharge Survey (NHDS) abstracts for the years 1970 through 1978 to use of ICD–9–CM for 1979 and subsequent years, there were also many changes in the diagnostic recode categories used in NHDS-published reports. Table 1 lists the original ICDA–8 recode categories and the corresponding ICD–9–CM recode categories or, if there were no corresponding categories, an artificially created, or surrogate, category that matches the former recode category as closely as possible. The same was done for comparison with new ICD–9–CM recode categories in that if they did not correspond to the former ICDA–8 recode category, a surrogate ICDA–8 category was created. In some cases, the changes between the two revisions of the coding system were so extreme as to render comparisons meaningless, and these recodes have been omitted from the table.

The included ICDA–8 and ICD–9–CM codes for each recode category, the estimated national number of discharges based on the dual-coded subsample, the comparability ratios, and the relative standard errors of the comparability ratios are listed in table 1. The comparability ratios displayed represent the national estimate for the ICDA–8-based category divided by the national estimate derived for the corresponding ICD–9–CM-based category. These ratios are used to estimate what number of discharges would have been coded to the ICDA–8 category by multiplying an ICD–9–CM-based estimate by the comparability ratio. To convert an ICDA–8-based NHDS estimate to the corresponding ICD–9–CM category estimate, the ICDA–8 reported figure is divided by the comparability ratio. The quotient is the best estimate of the ICD–9–CM category number of discharges. For example, the first comparability ratio in table 1 is for chapter 1, Infective and parasitic diseases. The comparability ratio is 1.5475, and the national estimate for number of discharges classified to diseases in this chapter using ICD–9–CM is 535,030. By multiplying the number of ICD–9–CM discharges (535,030) by the comparability ratio (1.5475), the product (827,970 discharges) is the national estimate for the same sample of records when coded in ICDA–8.

The descriptions that follow and the notes that accompany table 1 explain many of the major changes between ICDA–8 and ICD–9–CM. The following paragraphs summarize the major findings for each chapter and provide some additional explanations for the comparability ratios. In analyzing the reasons for comparability ratios that deviate substantially from unity, an attempt has been made to separate the causes inherent in the structure of ICD–9–CM from those due to the occasionally unique instructions that NHDS coders followed. In this way, it may be possible for certain of these NHDS ratios to be cautiously applied to other sets of hospital discharge data to gain estimates of the impact of changing code systems on trend data.

Chapter 1—Infective and parasitic diseases

The major change in ICD–9–CM for this chapter was the removal of colitis, diarrhea, enteritis, and gastroenteritis not specified as to whether of infectious origin. In ICDA–8, these conditions were assumed to be of infectious origin unless otherwise stated and were coded to chapter 1, but ICD–9–CM instructs that they are assumed to be noninfectious and assigned to other noninfective gastroenteritis and colitis in the chapter on digestive diseases. Notes 1 and 2 to table 1 explain the great impact this change has had on hospitalization data, largely because of the high incidence of hospitalization for diarrhea, not otherwise specified. In addition, there has been an increase in the number of discharges assigned to the viral disease category due to the reclassification of condyloma acuminatum, or viral warts. This disease was coded to 099.9 in ICDA–8; it is coded to 078.1 in ICD–9–CM. Serum hepatitis was previously assigned to chapter 17 (code 999.2 in ICDA–8), but in ICD–9–CM it is assigned to chapter 1 (code 070.3) as viral hepatitis B.

Chapter 2—Neoplasms

The larger number of records overall assigned to categories for neoplastic disease in the eighth revision reflects the previous classification of certain terms described as "cyst" or "polyp" that were, unless specifically directed elsewhere, classified as a benign neoplasm of the specified site. In the ninth revision, the terms "cyst" and "polyp" were specifically directed to be classified as a lesion or disease of the specified site in the various chapters on body systems. The frequency for these terms as a diagnosis explains the higher incidence of cases assigned to the ICDA–8 subcategories for benign neoplasms throughout the NHDS tables as compared with the records coded in ICD–9–CM. Similarly, terms recorded as "mass" or "lump" were directed to be classified as a neoplasm of unspecified nature in ICDA–8. In ICD–9–CM, these terms were reclassified to

categories referable to symptoms elsewhere in the various body system chapters. The reverse was true, however, for skin discolorations (pigmented nevus), which are coded to 216 in ICD–9–CM but are classified as congenital anomalies under chapter 14 (code 75) according to ICDA–8.

The comparability ratios for certain subcategories of malignant diseases in the NHDS tables appear to be at least partially an artifact of rules provided to the coders in NHDS. For example, more stringent and specific guidelines were provided for use of the ninth revision in regard to assignment of codes for diagnoses of metastatic lesions. Among 492 cases assigned to secondary malignant disease in ICDA–8, 200 of these were reassigned to a diagnosis of primary malignant neoplasms (codes 140–195) following the more explicit guidelines provided to the ICD–9–CM coder.

In the ninth revision, conditions described morphologically as carcinoma-in-situ are classified to a discrete range of categories (ICD–9–CM codes 230–234). In the eighth revision, carcinoma-in-situ, except that of the cervix, was included in the range of categories for neoplasms of unspecified behavior (codes 230–239). However, the NHDS coder using ICDA–8 was instructed to assign carcinoma-in-situ to ICDA–8 code 180.0 (malignant neoplasm of cervix), and presumably to assign all such diagnoses of carcinoma-in-situ to the codes for malignant neoplasm of specified site (codes 140–195). Thus, 144 cases of carcinoma-in-situ (including 105 of those of the cervix) are distributed into the subcategories of malignant disease in the ICDA–8 NHDS table. The higher number of cases tabulated for the NHDS subcategory of malignant neoplasms of uterus and other female genital organs in ICDA–8 (codes 180–184) stems from the instruction given to coders regarding the diagnosis of carcinoma-in-situ (105 cases), and other sites (15 cases), as well as other diagnoses so interpreted (16 cases). These same cases were assigned to ICD–9–CM codes 230–234 included within the NHDS category other benign neoplasms, carcinoma-in-situ, and neoplasms of uncertain behavior. (In 1983, the NHDS groupings were changed to include carcinoma-in-situ with malignant neoplasms.)

In ICDA–8, polyps were generally classified as benign neoplasms according to site. Polyps of the anus or rectum were assigned to ICDA–8 code 211.4. In ICD–9–CM, polyps are generally classified as nonneoplastic lesions and are assigned codes according to specified site within other chapters. Polyps of the anus or rectum are assigned to ICD–9–CM code 569.0 in chapter 9. Thirty-seven sample discharge abstracts previously coded as ICDA–8 code 211.4 were recoded to ICD–9–CM code 569.0 for this reason.

Reclassification of the term "polyp" from a benign neoplasm in the eighth revision to that of a nonneoplastic lesion in the ninth revision also accounts for the large comparability ratio encountered in the NHDS subcategory of benign neoplasms of uterus (codes 218–219). For the 142 cases originally reported as ICDA–8 code 219, 130 of these were reclassified as conditions within ICD–9–CM codes 621.0, 621.8, 622.7, and 622.8 in chapter 10.

Reclassification of the term "ovarian cyst of unspecified nature" from a neoplastic lesion to a nonneoplastic lesion accounted for 130 of 168 cases originally assigned to ICDA–8

code 220.1 to be reassigned to ICD–9–CM code 620.2. Thus, the comparability ratio for other female genital organs under benign neoplasms is large. Embryonic cysts of the fallopian tube were reclassified from ICDA–8 code 221.0 to ICD–9–CM code 752.11 (12 of 18 cases), with an additional five cases assigned to ICD–9–CM code 620.8. Forty-three of 54 cases of cyst of Bartholins gland or duct were reclassified from ICDA–8 code 221.2 to ICD–9–CM code 616.2, with 8 others being reassigned to codes in other chapters. Of the original 289 cases included in this NHDS subcategory under ICDA–8, over two-thirds will be found in other sections of the report according to ICD–9–CM code reassignments.

The comparability ratio for the NHDS subcategory in ICDA–8 of benign neoplasms of other and unspecified organs, tissue, and neoplasms of unspecified nature is affected by reclassification of terms already commented upon regarding carcinoma-in-situ, polyps, and cysts. In addition, this NHDS subcategory contains conditions previously assigned to ICDA–8 category 216, such as acanthotic and sebaceous nevi, epidermoid and dermoid skin cysts, senile or seborrheic warts, and seborrheic keratosis. These lesions were reclassified in the ninth revision to codes 702 and 706 in the chapter on diseases of skin and subcutaneous tissue, and 12 of the original 45 cases of such lesions were reassigned to these categories. In addition, a number of other cases were reclassified to other codes in the section on benign neoplasms and to other codes in chapters elsewhere.

Chapter 3—Endocrine, nutritional, and metabolic diseases

In ICDA–8, diagnoses of any thyroid disease, such as goiter, due to a functionally active neoplasm were classified solely to ICDA–8 code 241. In the ninth revision, such disorders were principally classified to benign neoplasm of thyroid gland (ICD–9–CM code 226). The functionally active disorder would be coded secondarily. Of the 109 cases previously classified to ICDA–8 code 241, 48 were reassigned to ICD–9–CM code 226.

The major influence on the comparability ratio for the NHDS subcategory of nutritional deficiencies and metabolic diseases (codes 260–279) revolves around the reclassification of dehydration and other related electrolyte disorders. In ICDA–8, these conditions were included under category 788.0 in the chapter on symptoms and other ill-defined conditions. In the ninth revision, these conditions were transferred to ICD–9–CM code 276. The study shows that 227 discharges in the sample were assigned to ICD–9–CM code 276 for which dehydration was the largest group (ICD–9–CM code 276.5). These dehydration cases were not coded in ICDA–8 to chapter 3. The reason for this was the NHDS prevailing rule followed by ICDA–8 coders in which symptoms, when accompanied by any other diagnosis on the record, were never coded as the principal diagnosis. In the instructions to the coders for use of ICD–9–CM, no such prohibition to recording symptoms was in effect. Thus, dehydration and other manifestations of electrolyte disturbance were often listed and coded as principal diagnoses when using ICD–9–CM.

Chapter 4—Diseases of blood and blood-forming organs

There were few effects of the ninth revision on conditions coded to this chapter. Few code pairings ranged outside of the chapter with the exception of the gain of the equivalent of about 7,400 discharges in the national estimates for ICD–9–CM code 289 (other diseases of blood and blood-forming organs), which were previously coded to ICDA–8 codes 208 and 209 (polycythemia vera and myelofibrosis, respectively).

Chapter 5—Mental disorders

NHDS rules for coders using ICDA–8 appear to limit the choice of codes for organic psychotic conditions (codes 290–294) to only ICDA–8 codes 290 and 294, and further directed the coder to choose the underlying condition (for example, cerebral arteriosclerosis) as the principal diagnosis. The comparison of codes for the organic brain syndromes as recorded in ICDA–8 and ICD–9–CM clearly shows this influence of artifact coding rules. At the same time, the structure of the classification of organic brain syndromes was markedly revised and expanded in ICD–9–CM. For the 225 cases classified with ICD–9–CM categories 290–294, only 99 were so classified in ICDA–8, the larger portion of cases being assigned to other codes elsewhere. Of the 108 cases assigned to ICD–9–CM code 291 (alcoholic psychoses), 50 were assigned to other ICDA–8 disease codes, the majority (43) being listed as ICDA–8 code 303 (alcoholism).

Another source of discrepancy is the difficulty coders experience in classifying cases of organic brain syndromes as psychotic (codes 290–294) or nonpsychotic (ICDA–8 code 309), a factor quite prevalent in matching cases when one compares all organic brain syndromes (ICDA–8 codes 290–294 and 309 versus ICD–9–CM codes 290–294 and 310).

In the eighth revision, the diagnosis of anxiety with any concomitant mention of depression or depressive feature was assigned to ICDA–8 code 300.0 (anxiety neurosis). In ICD–9–CM, the combination of anxiety with depression was reassigned to ICD–9–CM code 300.4 (neurotic depression). Of the 335 original cases assigned to ICDA–8 code 300.0, 235 were coded to ICD–9–CM code 300.0 (anxiety state, unspecified), 71 were recoded to ICD–9–CM code 300.4, and 29 cases were assigned to other codes.

The ICDA–8 residual category of other mental disorders (codes 302 and 305–315) is compared with the ICD–9–CM residual category other mental disorders and mental retardation (codes 302 and 306–319). The large increase in discharges for the ICD–9–CM group is primarily due to 118 discharges previously coded 300.4 (depressive neurosis) that were recoded to ICD–9–CM code 311 (depressive disorder, not elsewhere classified). In addition, post-concussion syndrome was coded in chapter 5 of ICD–9–CM as 310.2, whereas 23 such cases had previously been coded to 850.9 (late effects of concussion) according to ICDA–8.

Chapter 6—Diseases of the nervous system and sense organs

The overall comparability ratio for the chapter is very close to unity (0.9929), indicating that there were no substantial shifts.

Chapter 7—Diseases of the circulatory system

As noted in the extensive set of notes to table 1, the chapter on diseases of the circulatory system was greatly restructured in ICD–9–CM. The overall comparability ratio for the chapter, however, is 1.0102, indicating that the effects of the changes are largely restricted to shifts of discharges among the recode groups within the chapter. Among these important shifts was a change in the approach for handling mitral and aortic valve insufficiency, and aortic valve stenosis for which the origin is not specified. The ICDA–8 group on acute rheumatic fever and chronic rheumatic heart disease (codes 390–398) includes diseases of the pericardium, mitral valve, and aortic valve which are specified as rheumatic; and also those which are not otherwise specified. In ICD–9–CM, these conditions are classified with other diseases of the pericardium and endocardium (codes 423–424) when unspecified as to origin. The reclassification of 53 of the 62 discharges in the sample from ICDA–8 code 395.9 (diseases of aortic valve, not specified as rheumatic) to ICD–9–CM code 424.1 (aortic valve disorders of specified cause, except rheumatic, or not otherwise specified) accounts for more than two-thirds of the differences that produced the comparability ratio of 1.4463 in table 1.

Other major areas of change in ICD–9–CM deal with hypertensive and ischemic heart disease. In ICDA–8, hypertension was used as a subclassification axis for various ischemic heart and cerebrovascular diseases. Any mention of ischemic heart disease and hypertension on the same record was coded to 412 in ICDA–8 (chronic ischemic heart disease). In ICD–9–CM, this linkage is absent and any heart disease specified as due to hypertension is coded to 402 (hypertensive heart disease). In ICDA–8, unspecified cardiovascular diseases such as arteriosclerotic cardiovascular disease or cardiovascular arteriosclerosis are coded to chronic ischemic heart disease (code 412); but in ICD–9–CM, these cases are coded to 429.2 (cardiovascular disease, unspecified). As a result of these changes in the ICD–9–CM, codes of 402 and 429.2 have large increases, while 411, 412, and 414 have large decreases. Comparability ratios for groups that include these codes differ substantially from unity. Angina pectoris (code 413) is also increased when ICD–9–CM is used, with most of the shift coming from cases formerly coded to 410–412 in ICDA–8.

Chapter 8—Diseases of the respiratory system

Although the categories of respiratory diseases underwent major reorganization within chapter 8, there were few changes of diseases from this chapter to other chapters or vice versa. As a result, the overall comparability ratio for the chapter is close to unity, while there are comparability ratios for individual categories that range from 0.6288 to 1.7074. Changes in the inclusion of specific terms and combinations of terms within categories common to both ICDA–8 and ICD–9–CM, together with the creation of a separate category in ICD–9–CM to identify chronic obstructive pulmonary disease, affected the reporting of bronchitis, asthma, and emphysema. The term "asthmatic bronchitis," for example, was coded to 490 (bron-

chitis, unqualified) in ICDA–8, but in ICD–9–CM it is placed in 493.9 (asthma, unspecified). Nearly a third of the discharges categorized in ICDA–8 code 490 appear in ICD–9–CM coded as 493.9. Another change relates to the coding of the common concurrent reporting of bronchitis and emphysema. In ICDA–8, the coder usually reported both conditions using separate codes. However, in ICD–9–CM, the emphysema code specifically excludes emphysema with bronchitis and directs the coder to use 491.2 (obstructive chronic bronchitis).

There was also a change in the coding rules for NHDS dealing with classifying conditions reported as both acute and chronic. When using ICDA–8, the coders were to code only the chronic condition, but with ICD–9–CM, the instructions were to code both statements separately. Of the 174 sample discharges coded to 491 in ICDA–8, 29 went to ICD–9–CM code 466 (acute bronchitis and bronchiolitis).

Chapter 9—Diseases of the digestive system

The overall comparability ratio for this chapter was affected primarily by the large increase in cases coded to other noninfectious gastroenteritis and colitis (ICD–9–CM code 558), which previously had been coded to ICDA–8, chapter 1. Within chapter 9, there were a number of changes affecting comparability of specific categories. The coding of pylorospasm (ICD–9–CM code 537.81), for example, experienced a large increase because in ICDA–8 this condition is coded to the symptom chapter (ICDA–8 code 784.2). Instructions for ICDA–8 coding of NHDS abstracts, however, specify that symptoms were not to be coded as the principal diagnosis if another diagnosis was present. Thus, many of the conditions coded to pylorospasm in ICD–9–CM were previously coded to gastritis, peptic ulcer, other disorders of the stomach, and a variety of other unrelated conditions. Another change involves the coding of chronic enteritis, not otherwise specified. When coding with ICDA–8, this diagnosis goes to 563.9, whereas with ICD–9–CM, it is coded to 558.9. This accounts for about 15 percent of the cases previously assigned to ICDA–8 code 563.9. The large decrease in the number of discharges assigned to the ICD–9–CM category other disorders of intestine and peritoneum can be attributed to the shift of gastrointestinal hemorrhage from code 569 in ICDA–8 to 578 in ICD–9–CM.

Chapter 10—Diseases of the genitourinary system

The increase in discharges coded to this chapter in ICD–9–CM is primarily due to the changes in the coding of benign cysts and polyps of female genital organs from ICDA–8 chapter 2 to ICD–9–CM codes 616.2, 620.2, 621.0 and 622.7. Within chapter 10, the major shifts were between benign mammary dysplasia and inflammatory disease of the breast, codes 610 and 611, respectively. In ICDA–8, benign mammary dysplasia (code 610) was limited to terms describing chronic cystic mastitis. In the ninth revision, this category was expanded to include all conditions referable to benign mammary dysplasias, of which chronic cystic mastitis is one. The remainder

of these conditions had previously been assigned to ICDA–8 category 611. ICD–9–CM category 611 decreased because these cases were transferred to 610.

Chapter 11—Complications of pregnancy, childbirth, and the puerperium

The large overall comparability ratio obtained for this chapter primarily reflects a change in the NHDS instruction to coders. The ICD–9–CM instructions for NHDS coders require that the supplementary classification code V27 be listed as principal diagnosis for all admissions during which a delivery occurred. This rule was not in effect for the ICDA–8 coding and the diagnosis code from chapter 11 appears as first listed. By adding all discharges coded to V27 in ICD–9–CM, the comparability ratio is brought back to near unity.

Chapter 12—Diseases of the skin and subcutaneous tissue

There were relatively few changes within this chapter. The only category with any significant deviations involves other infections of skin and subcutaneous tissue. The decrease in cases coded to this category in ICD–9–CM is due primarily to instructions in ICD–9–CM to code infections of the navel of newborns to 771.4 (previously coded to ICDA–8 code 686.9) and panniculitis to 729.3 instead of ICDA–8 code 686.9.

Chapter 13—Diseases of the musculoskeletal system and connective tissue

Comparability ratios for the majority of subgroups of codes within this chapter are not valid because of the extensive reorganization of chapter 13 in ICD–9–CM. However, the overall increase in cases coded to this chapter can be largely attributed to the following changes:

- Acquired deformity of the nose cartilage is coded to 738.0 in ICD–9–CM but to 508.9 in ICDA–8.
- Exostosis is coded to 726 in ICD–9–CM but to 213 in ICDA–8.
- Sciatica, neuralgia, and neuritis are coded to chapter 13 in ICD–9–CM, but to various sections of chapter 6 in ICDA–8.

Chapter 14—Congenital anomalies

The overall comparability ratio for this chapter is very close to unity (0.9990), reflecting the absence of significant changes between ICDA–8 and ICD–9–CM.

Chapter 15—Certain causes of perinatal morbidity and mortality

A variety of factors contributed to the low comparability ratio of 0.3444 for cases classified to this chapter. In all, only 112 of the sample cases were principally listed with the allowable ICDA–8 codes (772 and 774–778), of which 34 were

reassigned codes outside this chapter in ICD–9–CM. When coding records of infants in ICD–9–CM, however, a far greater number of cases previously coded elsewhere in ICDA–8 were assigned to codes in this chapter when using ICD–9–CM (321 cases). The largest group was ICD–9–CM code 765.1 (prematurity), accounting for 169 cases, for which the coding in ICDA–8 was often that of the combining code denoting newborn with prematurity (ICDA–8 code Y21).

Chapter 16—Symptoms and ill-defined conditions

The major shift in this chapter involves a number of symptoms previously assigned to codes 780–796 in ICDA–8 that were transferred to other chapters in ICD–9–CM. Valid comparisons may only be made between certain specific symptoms such as convulsions or abdominal pain.

For the 110 cases assigned to chest pain of unspecified nature in ICD–9–CM code 786.50, 89 of these were assigned to the equivalent code in ICDA–8; the other 21 cases were assigned to codes for specific diseases elsewhere in accordance with the instructions to ICDA–8 coders to omit coding of symptoms as the principal diagnosis if another diagnosis was present on the record. Of 48 cases of anterior chest wall pain assigned to ICD–9–CM code 786.52, 17 were classified to myositis in ICDA–8 (717.9). These two shifts account for most of the large increase in cases coded to chest pain in ICD–9–CM.

Chapter 17—Accidents, poisoning, and violence (nature of injury)

Chapter 17 was renamed Injury and poisoning in ICD–9–CM and was reorganized. For example, late effects, included in code groupings for many injuries when using ICDA–8 codes, was made a separate category in ICD–9–CM. Other major changes included the restructuring of what was included under adverse effects of medicinal agents in ICDA–8 versus poisonings by drugs, medicinal agents, and biological substances in ICD–9–CM; and changes to the contents of code 995, certain early complications of trauma in ICDA–8 versus certain adverse effects not elsewhere classified in ICD–9–CM. As a result, certain NHDS categories are not comparable between the two coding systems and the user must be constantly alert to whether late effects were included with the eighth revision codes, but not for the ninth revision.

Late effect of injury codes were included as a subgroup within each detail site injury code in ICDA–8. In ICD–9–CM, codes for late effects of injuries were removed from the detailed code structure and relegated to a specific section of codes (ICD–9–CM categories 905–909). Moreover, there was a rule change in classification in which NCHS coding guidelines permitted codes for late effect of an injury as principal diagnoses in ICDA–8, but in ICD–9–CM the late effect code was not to be chosen as the first listed. Instead, the coder is to identify the specific condition reported as the late effect (for example, deformity, scar) with the choice of ICD–9–CM codes 905–909 as a secondary code only. This appears to account for most of the ICD–9–CM category decreases when compared with the ICDA–8-defined NHDS subcategories of reportable current injuries.

Other changes that affect comparability ratios within the chapter include the coding of concussion (code 850). In ICDA–8, concussions were coded separately as 850, whereas ICD–9–CM provides a fifth-digit specification to be used with other head injuries. Postconcussion syndrome was also previously coded to 850 in ICDA–8, while in ICD–9–CM it is assigned code 310.2 within mental disorders (chapter 5). The number of discharges assigned to the category of other injuries when recoded to ICD–9–CM is greatly influenced by the fact that the NHDS instructions for ICDA–8 coding specified that contusions be coded to 996 (other injury by site) rather than to a contusion code (as they are in ICD–9–CM). Also, ICDA–8 code 996 could only be used by NHDS coders when it was the only injury code listed. Sample abstracts representing nearly 40,000 annual discharges were coded to contusion in ICD–9–CM, which had been coded to other specified injuries in ICDA–8.

Special conditions—Supplemental classification

The large increase in use of supplemental classification codes with ICD–9–CM is primarily due to the rule change that requires coding V27 for all hospital stays in which a delivery occurred. Table 1 also includes ICD–9–CM codes V30–V39 (liveborn infants), but not the corresponding ICDA–8 codes (Y20–Y29). The increase in reported admissions for sterilization in ICD–9–CM was due to the NHDS coding rule that supplemental classification code Y09.0 not be used with other classifiable conditions. Thus, about one-third of the admissions for sterilization were coded to other reported conditions in ICDA–8, but to V25.2 when using ICD–9–CM.

National Ambulatory Medical Care Survey findings

Description of table 2

Although all diagnoses reported on National Ambulatory Medical Care Survey (NAMCS) abstracts are fully coded to the fifth digit, results are generally published using recode categories that are defined to the third digit. Because of the limitations in the sample size (approximately 50,000 visits) and the large proportion of physician office visits for which the diagnoses are not precisely defined, the number of published recode categories is small in comparison with the number of NHDS categories. Because of the fewer categories, there were fewer changes in category definitions between ICDA–8 and ICD–9–CM. Table 2 lists the original ICDA–8 recode categories and the corresponding ICD–9–CM recode categories. In two instances, there is no corresponding category between the former and current recode category. The reasons for each are explained in the notes to table 2.

The included ICDA–8 and ICD–9–CM codes are listed following the description for each recode category, but only to the three-digit level with the exception of one category in ICD–9–CM (conjunctivitis, which includes codes 372.0–372.3). The total estimated number of visits in thousands is given for each of the ICDA–8 and ICD–9–CM recode categories and the comparability ratios displayed. The comparability ratios displayed represent the national estimate for the ICDA–8-based category divided by the national estimate derived from the corresponding ICD–9–CM-based category. These ratios are used to estimate the corresponding number of visits if an estimate based on ICD–9–CM coded data had been coded in ICDA–8. To convert an ICD–9–CM estimate to the ICDA–8 estimate, the ICD–9–CM estimate is multiplied by the comparability ratio in table 2. To convert an ICDA–8-based NAMCS estimate to the corresponding ICD–9–CM category estimate, the ICDA–8 estimate is divided by the comparability ratio. The quotient is the best estimate of the ICD–9–CM category estimated number of visits.

The descriptions that follow and the notes that accompany table 2 explain why certain of the comparability ratios differ substantially from unity. Because certain diagnoses are seldom the reason for office visits to physicians, not all chapters of the ICD are published as recode categories nor are they discussed here. However, the individual code matrices can be used to develop comparability ratios for such codes, or for subgroups of the published recode categories.

Infectious and parasitic diseases

The major effect of classification change can be seen readily in the line category for diarrheal diseases. In the eighth revision, colitis, enteritis, and gastroenteritis, without further specification as to etiology, were assumed to be of infectious origin and reported under category 009. In the ninth revision, all conditions of intestinal inflammation, unless specified as infectious in origin, are classified to category 558 in the chapter on diseases of the digestive system. Because the etiology of gastritis, enteritis, and other intestinal disorders is seldom established for patients seen in the physician's office, more than 90 percent of the visits coded to 009 in ICDA–8 were coded to 558 in ICD–9–CM.

The low comparability ratio for reported cases of streptococcal sore throat (code 034) appears to derive more from coder practice than any inherent actual differences in classification. Chiefly an operating factor here is the semantic interpretation of the unqualified diagnosis of streptococcal infection (to be coded as 039.9 in ICDA–8 and 041.0 in ICD–9–CM). Although instructions to the coder are specifically directed at limiting the choice of code solely to the terminology recorded by the physician, it appears that to some coders the term "streptococcal infection" is interpreted as meaning streptococcus-caused pharyngitis or laryngitis. At the same time, some coders rigidly adhered to the rule of coding only the terminology encountered in item 8 (diagnoses) on the 1978 NAMCS form, and thus coded conditions of pharyngitis and laryngitis to categories in the chapter on diseases of the respiratory system, while ignoring explicit qualifying statements attributing the cause to streptococcal infection. Analysis of the original source documents showed a number of instances where cases should have been coded to categories 034 or 039.9 (041.0), but were not.

Neoplasms

The low comparability ratio for benign neoplasm of skin (code 216) is accounted for by a number of changes to the inclusion terms assigned to this title between the two revisions. Assigned to this category in ICDA–8 were such lesions morphologically described as acanthotic and sebaceous nevi, epidermoid and dermoid skin cysts, senile or seborrheic warts, and seborrheic keratosis. In the ninth revision, these terms were transferred to codes 702 and 706 in the chapter on dis-

eases of skin and subcutaneous tissue. However, transferred into ICD-9-CM code 216 were a wide variety of terms referring to nevi (for example, blue, amelanotic, epithelial, intradermal, hairy, and pigmented), which previously had been assigned to the category of congenital skin anomalies (ICDA-8 code 757.1) in the chapter on congenital anomalies.

Diseases of the circulatory system

The significant reduction of cases previously reported as chronic ischemic heart disease under ICDA-8 code 412 stems from the combined effects of a number of changes introduced in the ninth revision involving inclusion terms and rules of classification for such cases. In the eighth revision, hypertension was reflected as a subclassification axis for various forms of ischemic heart disease (and cerebrovascular disease—ICDA-8 codes 430-438). Any mention of ischemic heart disease with hypertension on the same record was directed to the ICDA-8 code 412. In the ninth revision, this link between hypertension and cardiovascular disorders was eliminated entirely. The effect of this was to direct cases of heart disease specified as caused by hypertension or hypertensive in nature to be assigned to ICD-9-CM code 402 (hypertensive heart disease). If the same record indicated the presence of chronic ischemic heart disease, the condition was coded separately. In the NAMCS study, this shift is reflected by the observation that of the 983 cases coded 412 in ICDA-8, when coded using ICD-9-CM, 646 cases retained their identity as chronic ischemic heart disease (ICD-9-CM code 414), and 123 cases were recoded as hypertensive heart disease (ICD-9-CM code 402). In addition, the term "arteriosclerotic cardiovascular disease," previously included under ICDA-8 code 412, is now identified by a separate code in ICD-9-CM (429.2). In the NAMCS data, 78 cases previously included under ICDA-8 code 412 were recoded as ICD-9-CM code 429.2. Also, an additional 76 cases of the original 983 cases recorded as ICDA-8 code 412 were coded to hypertension (ICD-9-CM code 401) as the principal diagnosis, with the secondary codes reflecting the presence of chronic ischemic heart disease.

Diseases of the respiratory system

A number of factors appear to influence the shifts in reporting of individual disorders for the various conditions now collected in the ICD-9-CM code book under the section entitled "chronic obstructive pulmonary disease and allied conditions" (codes 490-496). Changes to the inclusion of specific terms within certain categories common to ICDA-8 and ICD-9-CM, and the creation of a separate category to identify the clinical entity of chronic airway obstruction contribute to affect the reporting of bronchitis, asthma, and emphysema.

Bronchitis, unspecified as to acute or chronic (category 490), was reported more frequently in ICDA-8, largely through the direction given to the coder for the commonly used term "asthmatic bronchitis." In ICD-9-CM this term was reassigned to category 493 as an equivalent to asthma. The shift of some 68 cases reported with this diagnosis accounts for the differences between the two estimates.

The decrease in reported incidence of cases with a diagnosis of emphysema in ICD-9-CM is in part influenced by the introduction of the new category for chronic obstructive pulmonary disease (ICD-9-CM code 496). This category also affects in some way the reporting of cases with diagnoses of chronic bronchitis and bronchitis unqualified. The alphabetic index of ICD-9-CM contains explicit directions for the reporting of bronchitis with an associated diagnosis of emphysema, and instructs the coder to use ICD-9-CM code 491.2. In ICDA-8, the prevailing pattern of coding was to report the two conditions separately so that such cases are reported either as bronchitis of unqualified nature (category 490) or as emphysema (category 492), with a second code to identify the other condition.

Diseases of the digestive system

One of the major shifts in the restructuring of disease categories affects the low comparability ratio noted for this chapter; specifically, the transfer of gastrointestinal inflammation and diarrhea not specified as to whether of infectious or of noninfectious origin from the chapter on infective and parasitic diseases in the eighth revision to the chapter on digestive system disorders in the ninth revision. Approximately 92 percent (291 of 316) of all cases previously reported under category 009 in ICDA-8 were recoded to 558 in ICD-9-CM, covering diarrhea, colitis, enteritis, or gastroenteritis described as noninfectious or, when not specified, as to whether of infectious or noninfectious origin.

In addition, the increased assignment of cases reported for categories within this chapter is partially explained by the transfer of cases with malabsorption disorders from ICDA-8 code 269 in the chapter on endocrine, nutritional, and metabolic diseases (14 cases), and the transfer from the chapter on symptoms and ill-defined conditions in ICDA-8 of 15 cases reported with symptom diagnoses of pylorospasm (ICD-9-CM code 537.81), hematemesis (ICD-9-CM code 578.0), or melena (ICD-9-CM code 578.1).

Diseases of the skin and subcutaneous tissue

The remarkable difference for the subcategory of other eczema and dermatitis is due to the shift in assignment of cases recorded with diagnoses pertaining to allergic reactions. Over a third of the cases previously recorded with ICDA-8 code 692.9 are now reported with ICD-9-CM code 995.2 or 995.3 in a new section for allergic reactions in chapter 17. In addition to the 248 cases of the original 662 previously reported under ICDA-8 code 692.9, another 40 cases with multiple respiratory allergies were reassigned to ICD-9-CM code 477 (allergic rhinitis) by virtue of specific reference added to the alphabetic index, and another 7 cases recorded with a diagnosis of allergic dermatitis due to internal medicaments were reassigned to ICD-9-CM code 693.0.

Diseases of the musculoskeletal system

The NAMCS aggregate report retained the subcategory arthritis and rheumatism (retitled arthropathies and related dis-

orders) without substantive change in the range of categories used to identify these cases. However, the contents of conditions identified by the eighth revision categories 710–718 differ remarkably from those included under ninth revision categories 710–719. Transferred as inclusions from ICDA–8 codes 710–718 are any arthritis of the spine (ICD–9–CM codes 720–721); lumbago (ICD–9–CM code 724.2); scapulohumeral myofibrosis (ICD–9–CM code 726.2); torticollis (ICD–9–CM code 723.5); and other terminology referring to muscular rheumatism, fibrositis, myositis, and myalgia (ICD–9–CM code 729).

Conversely, ICD–9–CM categories 710–719 now include conditions previously classified elsewhere in ICDA–8, such as diffuse disease of connective tissues (ICDA–8 code 734); internal derangement of knee (ICDA–8 code 724.5); other joint derangements (ICDA–8 codes 724.0–724.4 and 724.9); other disorders involving the joints (ICDA–8 code 729); and various symptoms affecting the joints, transferred from chapter 16 (ICDA–8 codes 787.3–787.5).

Thus, the matrix of disorders contained in the NAMCS report subcategory is remarkably dissimilar for the two classifications. This finding undermines the utility and validity for the comparability ratio derived from the sample data.

Symptoms and ill-defined conditions

In the ninth revision, a significant number of symptoms previously classified within ICDA–8 codes 780–796 were transferred to other chapters, thus reducing the number assigned here when recodes were coded according to ICD–9–CM. This transfer of titles and inclusion terms to chapters 1–15 in ICD–9–CM accounts for at least 27 percent of the cases previously recorded with codes in the ICDA–8 syndromes and ill-defined conditions chapter. No longer part of this chapter in ICDA–8 are such conditions as visual and oculomotor disturbances (ICD–9–CM codes 368, 376, and 379), photophobia (ICD–9–CM code 368.13), disturbance of hearing (ICD–9–CM codes 388.3–388.4), encephalopathy (ICD–9–CM code 348.3), acute heart failure, undefined (ICD–9–CM code 428.9), pylorospasm (ICD–9–CM code 527.81), hematemesis (ICD–9–CM code 578.0), melena, not of newborn (ICD–9–CM code 578.1), stress incontinence of urine (ICD–9–CM code 625.6), priapism (ICD–9–CM code 607.3), pain referable to genital organs (ICD–9–CM codes 611.7, 625.0, 625.1, and 625.9), pain in limb (ICD–9–CM code 729.5), swelling of limb (ICD–9–CM code 729.81), pain in joint (ICD–9–CM code 719.4), swelling of joint (ICD–9–CM code 719.0), difficulty in walking (ICD–9–CM code 719.7), electrolyte disturbances (ICD–9–CM code 276), pyuria and bacteriuria (ICD–9–CM code 599.0), hematuria (ICD–9–CM code 599.7), depression (ICD–9–CM code 311), and uremia (ICD–9–CM codes 585 and 586).

Another major category previously included in this chapter in ICDA–8 was observation without further need for medical care (ICDA–8 code 793), which was transferred into the chapter on supplementary classification of factors influencing health status and contact with health services as ICD–9–CM code V71. Two-thirds of the cases recorded with ICDA–8 code 793 were reclassified to ICD–9–CM codes V70–V72 and are found in NAMCS publications under the subcategory medical or special examinations within the section on supplemental classification.

Also contributing to the disparate comparability ratios calculated for the ICDA–8 and ICD–9–CM codes in this section is the large number (66 of 87) of cases reported with ICDA–8 code 796.9 (other unknown and unspecified causes) for which the ICD–9–CM assigned code was in another chapter. This, in part, represents an NAMCS artifact for statements of diagnosis deferred or for missing entries in the diagnosis item on the patient record form. Instructions contained in the current NAMCS coding manual state that diagnosis deferred is to be assigned ICD–9–CM code 799.9, but nearly half of these records had been previously encoded in ICDA–8 to Y99, which was used for blank or illegible diagnoses and appears in the NAMCS report section on special conditions and examinations without sickness.

Special conditions and examinations without sickness

In the ninth revision, the section on medical or special examination was greatly expanded to provide reporting reasons for such encounters, many of which were not provided for in ICDA–8 specifically. At the same time, the organization of these sections in ICDA–8 and ICD–9–CM differs markedly because of transfer of certain categories between the two revisions, and thereby contributes principally to the comparability ratio that appears in table 2.

Examination of infants in the course of well baby and child care (ICDA–8 code Y00.5) was transferred to ICD–9–CM code V20, removing some 1,122 cases from inclusion in the NAMCS report subcategory. Approximately 84 cases assigned to ICDA–8 code Y00 were reassigned to ICD–9–CM code V65 (other persons seeking consultation without complaint or sickness) and ICD–9–CM code V53 (fitting and adjustment of other device). The principal diagnosis in the latter case appears often to have been originally recorded as eye examination (ICDA–8 code Y00.6), but for which the information in the diagnosis item on the visit record reflects a visit for prescription or adjustment of eyeglasses or contact lenses (ICD–9–CM code V53.1).

While these cases for well baby and child examination, consultation encounters, and contact lens evaluations no longer are included in the base data of cases constituting medical and special examination or screening as encompassed by the equivalent codes from ICD–9–CM, another group of cases is now included in this section, which was transferred from the chapter on symptoms and ill-defined conditions previously included in ICDA–8. Namely, this is the group of cases for whom the visit was for observation and examination for suspected disorders previously identified by ICDA–8 code 793 and now referenced to ICD–9–CM code V71. The NAMCS study shows that for the 253 cases assigned to ICD–9–CM code V71, 151 were previously assigned to ICDA–8 code 793. An additional 59 cases reported under ICD–9–CM code V71 were previously assigned ICDA–8 code Y00 for various reasons.

Uses of the comparability ratios

The major objectives for the development of comparability ratios for National Hospital Discharge Survey (NHDS) and National Ambulatory Medical Care Survey (NAMCS) data are to provide measures of the expected discontinuity between trend data tabulated by diagnosis and coded according to the ICD-9-CM and ICDA-8. These measures, the comparability ratios, can also be used to estimate what numbers of cases would have been tabulated using one coding revision when data coded using only the other revision are available. The effects on estimates are illustrated in figure 1. The graph on the left shows a slowly rising trend in the number of hospitalizations due to infective and parasitic diseases until 1979, when the NHDS coding system was changed from ICDA-8 to ICD-9-CM. After a sharp decline of about 35 percent between 1978 and 1979, the number of discharges resumed its upward trend until 1983. However, the graphs on the right in figure 1 illustrate what the trends would have been if the discharges after 1978 were converted to their equivalent ICDA-8 estimates by multiplying
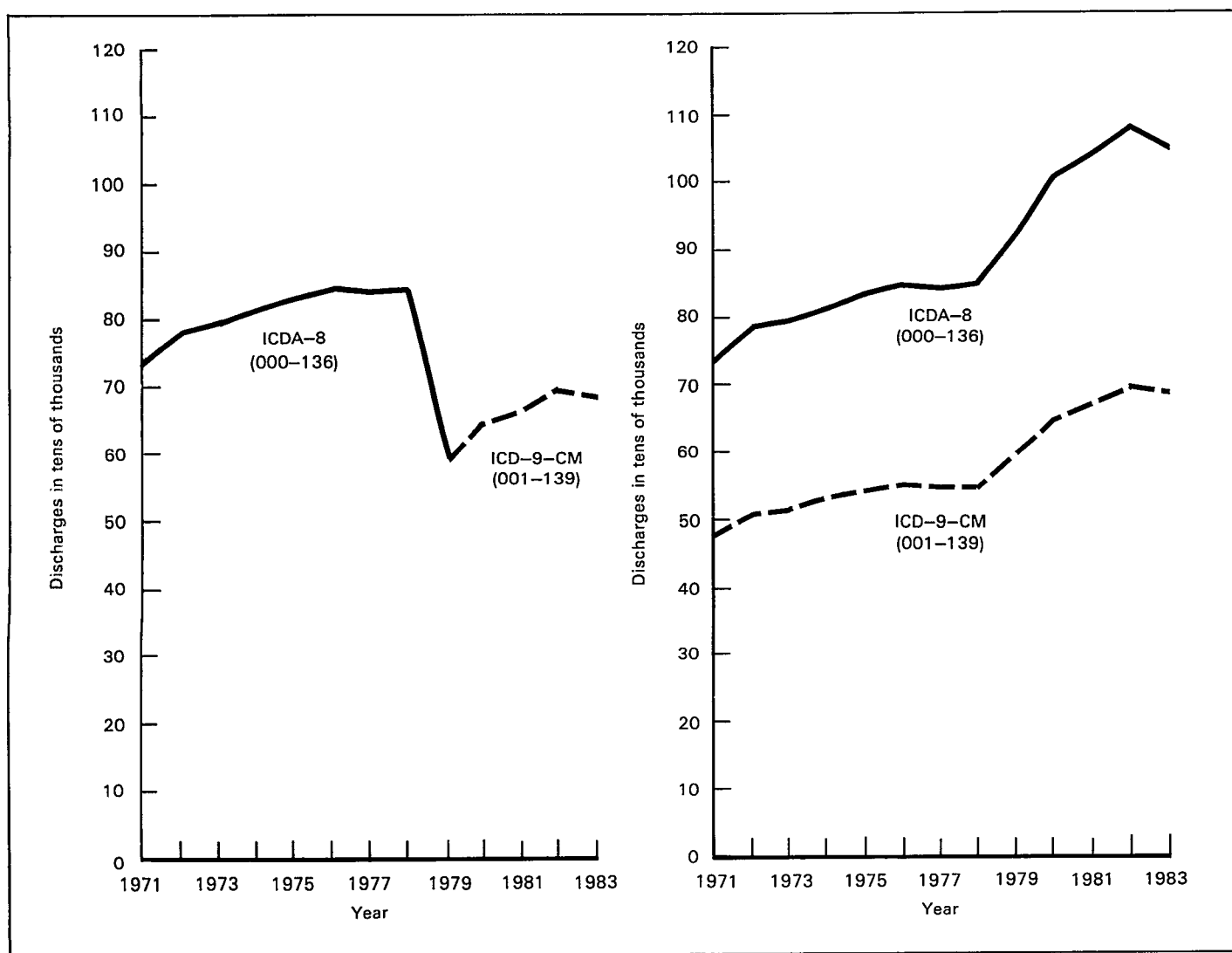
Figure 1.   Estimated number of hospital discharges for which the first-listed or principal diagnosis was classified to chapter 1, Infectious and parasitic diseases, ICDA-8 or ICD-9-CM

them by the comparability ratios (upper curve), or if the discharges from 1978 and before were converted to their ICD–9–CM estimates by dividing them by the comparability ratios (lower curve). What appeared to have been a dramatic reduction in hospitalizations for infective and parasitic diseases is shown to be an artifact of the differences in what conditions were classified as infective and parasitic diseases between the coding system in use in 1978 and that used for 1979 data. In fact, the adjusted data show an increase in hospitalizations between 1978 and 1979, rather than a decrease. In the case of infective and parasitic diseases, the comparability ratio for NHDS (see table 1) is 1.5475. Therefore, adjusting for the changes in the coding systems produces large changes in the data. Diabetes, however, has a comparability ratio of 1.0053 for NHDS, indicating that the numbers of discharges classified to diabetes using either coding system will be equivalent.

Figure 2 displays trends in NHDS estimates using either ICDA–8 or ICD–9–CM for the following groups of diagnoses:

- Cancer of the uterus and other female genital organs (ICDA–8 codes 180–184, comparability ratio of 1.3580).
- Hypertensive disease (ICDA–8 codes 400–404, described as essential hypertension and hypertensive heart disease in ICD–9–CM, codes 401–402 and 404, with a comparability ratio of 0.6973).
- Chronic ischemic heart disease (ICDA–8 code 412, comparability ratio of 1.4186).
- Acute myocardial infarction (ICDA–8 code 410, comparability ratio of 1.0257).

Estimates for cancer of the uterus hospitalizations are about 35 percent greater when ICDA–8 is used in comparison with estimates based on ICD–9–CM data. As explained earlier, this is due primarily to the classification of carcinoma-in-situ of the cervix to code 180.0 (malignant neoplasm of the cervix) according to NHDS coding instructions used with ICDA–8. When using ICD–9–CM, these cases of carcinoma-in-situ of the cervix were assigned to codes 230–234. The trends for hypertension disease show large differences, depending on the coding revision used. In this case, there are large increases in the estimates for essential hypertension and hypertensive heart disease when coded to ICD–9–CM that are attributable to major restructuring of the coding definitions. In particular, what was coded to chronic ischemic heart disease in ICDA–8 (code 412) included cases with any mention of ischemic heart disease *and* hypertension. When these same cases are coded to ICD–

9–CM, the rules lead to selecting hypertensive heart disease (code 402). Conversely, chronic ischemic heart disease estimates are dramatically lower when ICD–9–CM data are used than when coded in ICDA–8, largely because of the shift of cases from 412 in ICDA–8 to 402 in ICD–9–CM. Acute myocardial infarction estimates, however, are within a few percent of one another when either coding revision is used.

Because coding rules, narrative descriptions used by physicians, and morbidity rates change over time and may vary with the demographic characteristics of the patient population, there is a risk in applying the comparability rates developed for one data base to another. This is readily evident when comparing the comparability ratios for NHDS (table 1) with those for NAMCS (table 2) for the same chapters of the two revisions to the classification coding system. The entire chapter 1, Infective and parasitic diseases, for NHDS has a comparability ratio of 1.5475, while the corresponding ratio for NAMCS is 1.1780. Thus, it is clear that comparability ratios based on hospital discharge diagnoses are not useful for estimating the effects of coding system revisions on diagnoses tabulated from physician office visits.

Trends for selected disease categories as the diagnosis reported for physician office visits tabulated in NAMCS appear in figure 3. The conditions selected for this figure are those with comparability ratios that differ substantially from unity and that represent diagnoses accounting for 5 million or more office visits to physicians (see table 2). The conditions are as follows:

- Chronic ischemic heart disease (ICDA–8 code 412, comparability ratio of 1.3436).
- Bronchitis, unqualified (ICDA–8 code 490, comparability ratio of 1.2275).
- Asthma (ICDA–8 code 493, comparability ratio of 0.7248).
- Arthritis and rheumatism (ICDA–8 codes 710–718, comparability ratio of 1.2479).

The visit rates for each of these disease groups shift by 22–38 percent, depending upon the coding system revision used. Although the trend lines for any given disease are parallel when consistently expressed in either ICDA–8 or ICD–9–CM, a failure to recognize the effects of the coding system changes in NAMCS-published data between 1978 and 1979 may lead to erroneous conclusions about morbidity trends and utilization of services in physicians' offices for certain groups of diagnoses.
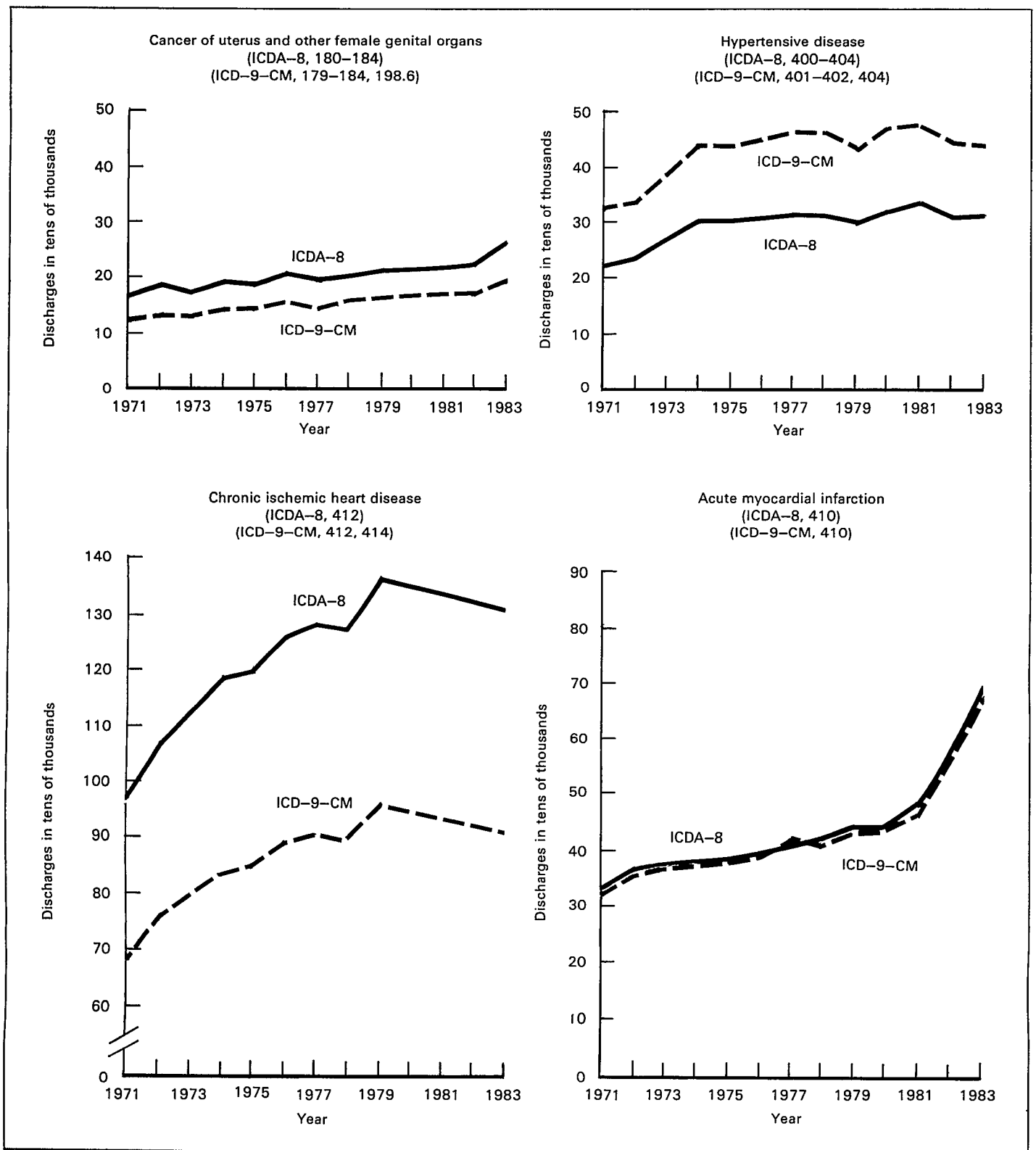
Figure 2. Trends in estimates for selected conditions using either ICDA–8- or ICD–9–CM-coded data with adjustments for comparability: National Hospital Discharge Survey
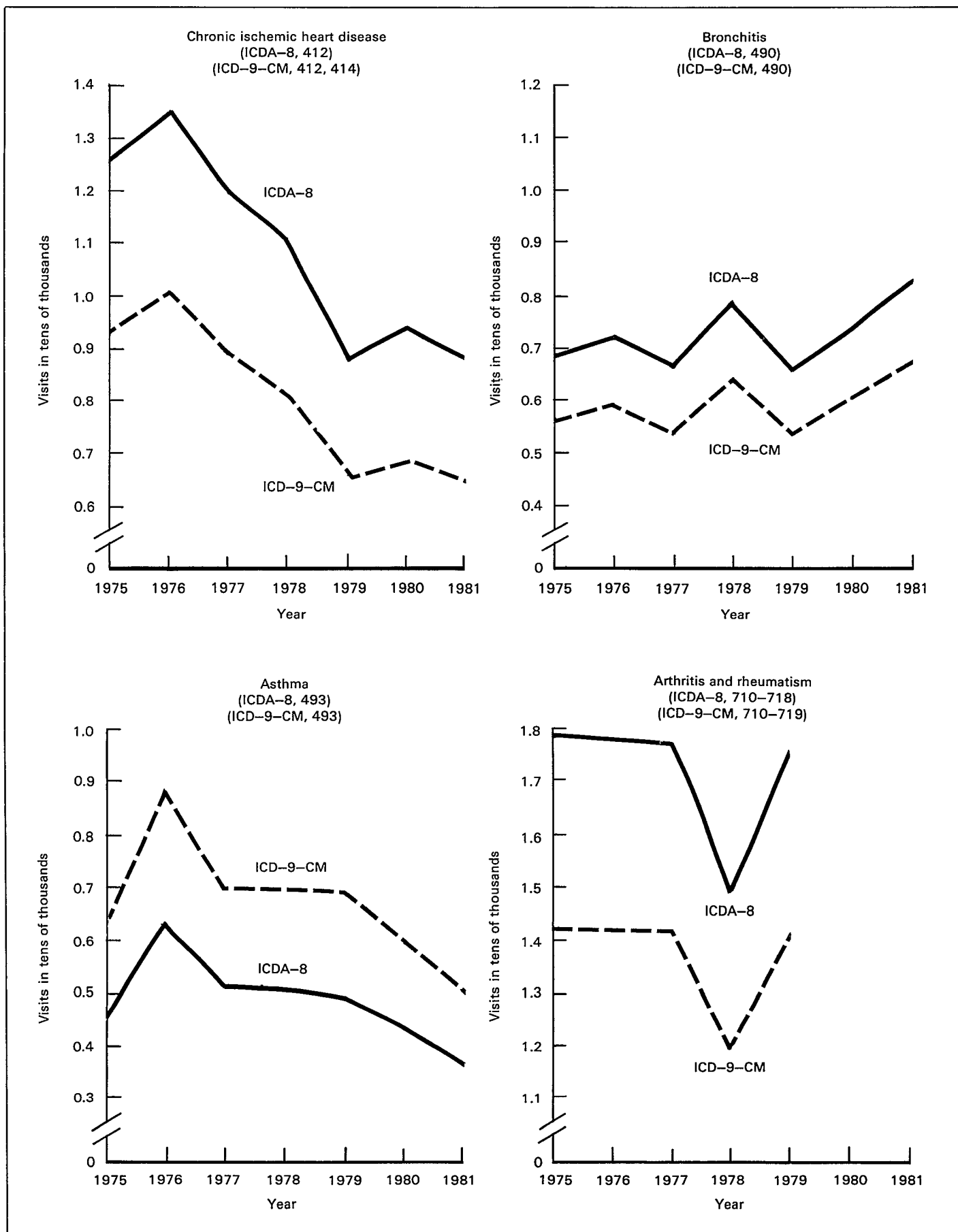
Figure 3. National estimates of numbers of physician office visits for selected conditions using ICDA–8– or ICD–9–CM-coded data adjusted for comparability

Comparisons with other studies

As explained above, comparability ratios developed for diagnoses collected in one setting may not apply to diagnoses collected in another setting. Even within similar settings there may be systematic differences in comparability ratios developed from data collected for demographically differing patient populations. Thus, for example, the discrepancy between estimates of hospitalizations for neoplasms reported for National Hospital Discharge Survey (NHDS) data coded in ICDA–8 versus ICD–9–CM (comparability ratio of 1.0980) largely disappeared in a comparability study conducted by the Veterans Administration (VA). The VA reported a comparability ratio of 0.9810. The difference between the comparability ratios can be attributed primarily to the fact that NHDS patient records represent more women than men, while the VA patient population is overwhelmingly male. The comparability ratios are greater than unity for female malignant neoplasms (uterus and other female organs, for example, has a comparability ratio of 1.3580) in the NHDS data, but less than 1 for strictly male neoplasms (prostate malignant neoplasms have a comparability ratio of 0.9004). Comparability ratios for malignant neoplasms of the lip, oral cavity, and pharynx (ICDA–8 codes 140–149) are nearly identical for the NHDS and VA data (1.0173 and 1.0138, respectively).

As the level of aggregation increases among the groups of diagnoses for which comparability ratios are computed, the ratios tend to average closer to unity. National Ambulatory Medical Care Survey (NAMCS) publications, for example, report data for relatively few groups of diagnoses within the chapters of the classification system. Thus, the effects of important discreet changes in coding instructions or inclusions are often diluted within a large group of diagnoses having minimal changes. The effects of different patient populations or case settings are also likely to be concentrated in certain specific diagnoses, and the use of comparability ratios for individual diagnoses are likely to be highly specific to the study from which they were developed. At the level of aggregation represented by entire chapters, however, adjusting for lack of comparability is generally less important. To a certain extent, the importance of the changes in the coding revisions to various populations and groups of diagnoses can be predicted. Thus, although all of the comparability studies dealing with morbidity and the change from ICDA–8 to ICD–9–CM cover the same codes and followed, with some exceptions, similar coding instructions, the reported comparability ratios vary predictably from one another. Infective and parasitic diseases, for example, represent a large proportion of physician office visit diagnoses (nearly 4 percent in 1978), of which nearly 20 percent in 1978 were diarrheal diseases coded to the chapter on endocrine, nutritional, and metabolic diseases in ICD–9–CM. The comparability ratio for NAMCS is 1.1780 for infective and parasitic diseases. For hospitalizations, however, infective and parasitic diseases represent only about 1.6 percent of the total discharges, while diarrheal diseases represent nearly 40 percent of the discharges classified as infective and parasitic diseases in the 1975 NHDS. The comparability ratio for the entire set of infective and parasitic diseases should, therefore, be larger for NHDS than it is for NAMCS. This is the case; the comparability ratio is 1.5475. However, hospital admissions for diarrheal diseases are concentrated among infants and it would be predicted that the comparability ratio for hospitalization due to infective and parasitic diseases would be closer to unity for adult patient populations than is the case for the NHDS. This is the case, with the VA reporting a ratio of 1.1387 to convert ICD–9–CM estimates of infective and parasitic disease hospitalizations to ICDA–8 figures.

Reliability of the comparability ratios

The reliability of the comparability ratio is determined by the relative errors of the two national estimates represented by the numerator and the denominator used in the ratio, corrected for the correlation between the two sets of coded data. The expression for the relative variance of the comparability ratio is of the following form:

$$V^2_{\text{comparability ratio}} = V^2_{I\text{-}8} + V^2_{I\text{-}9} - 2R_{89}(V_{I\text{-}8}V_{I\text{-}9})$$

where $V_{I\text{-}8}$ = relative standard error for estimate based on ICDA–8 codes

$V_{I\text{-}9}$ = relative standard error for estimate based on ICD–9–CM codes

R_{89} = correlation coefficient

R_{89} can be estimated by constructing a simple contingency table:

ICD–9–CM

		Specific	Other
ICDA–8	Specific	a	b
	Other	c	d

In this table, if dual-coded records in which a given specific ICDA–8 code was always exactly paired with the expected specific ICD–9–CM code, and no other ICD–9–CM code was paired with that ICDA–8 code, nor was any other ICDA–8 code paired with the specific ICD–9–CM code, then only cells a and d would have any entries and these codes would have a correlation coefficient of unity. The correlation coefficient is as follows:

$$R_{89} = \frac{ad - bc}{\sqrt{(a + b)(c + d)(a + c)(b + d)}}$$

As the correlation approaches unity, the relative variance of the comparability ratio will become increasingly smaller because $V_{I\text{-}8}$ will approach $V_{I\text{-}9}$, and the expression will reduce to the following:

$$V^2_{\text{comparability ratio}} = V^2_{I\text{-}8} + V^2_{I\text{-}9} - 2R_{89}(V_{I\text{-}8}V_{I\text{-}9})$$

$$= 2V^2_{I\text{-}8} - 2(V^2_{I\text{-}8})$$

$$= 0$$

In the present study, the values for the simple contingency table were extracted from the ICDA–8-to-ICD–9–CM and the ICD–9–CM-to-ICDA–8 matrices which list each code, the number of occurrences in the sample, and the sample weights. The correlation coefficients were then computed for the groups of codes used for each comparability ratio. The relative standard errors of national estimates of 1975 discharges by diagnosis have been published previously in chart form.[17] Because the present comparability study involved use of a subsample of the original 1975 sample, the published relative standard errors understate the variance of the subsample and must be inflated by the square root of the ratio of the two samples (for example, multiply the relative standard errors obtained from reference 17 by 1.54 to obtain relative standard errors for national estimates contained in this comparability study report). Because the sampling errors apply equally to those records coded in ICDA–8 or ICD–9–CM, relative standard errors can be obtained for both sets of figures from the line representing all hospitals that appears in figure II, page 69, of reference 17. By performing these computations, relative standard errors for each of the comparability ratios that appear in table 1 were computed and appear in the last column. The chances are 95 out of 100 that the value of the comparability ratio that would have been derived had all 34 million discharges been dual coded is contained in the interval represented by two standard errors above and two standard errors below the comparability ratio based on the sampled data.

The actual correlations observed for the dual-coded NHDS National Hospital Discharge Survey data were, with several exceptions, high. As a result, with only a few exceptions, the relative standard errors of the comparability ratios range from about 25 to 75 percent of the relative standard errors of the numerator or denominator, whichever has the greater relative error. When the comparability ratio is used to estimate the number of discharges coded according to one revision of the ICD from a number of discharges coded according to a different revision, the relative standard error of the new estimate can be

approximated by the expression:

$$V_{\text{new code}} = \sqrt{V^2_{\text{original}} + V^2_{\text{comparability ratio}}}$$

Thus, for frequently occurring diagnoses for which the relative standard error of the comparability ratio is small, the frequency with which the diagnosis is estimated to be coded in the other coding revision will have a standard error that will range from close to that for the estimate for the original code revision, to on the order of 125 percent of that figure.

The National Center for Health Statistics also computes and publishes estimates of the standard errors and relative standard errors of NAMCS data.[18] The relative standard error (in percent) for 1978 National Ambulatory Medical Care Survey data can be estimated from the following formula:

$$\text{RSE}(x) = 100\sqrt{0.00161 + \frac{32.405}{x}}$$

where x = aggregate statistic of interest, in thousands. For the estimated numbers of visits that appear in table 2, the relative standard error ranges from 4 to 20 percent. The relative standard errors of the comparability ratios have been computed and appear in the last column of table 2. With a few notable exceptions, the relative standard errors of the comparability ratios range from 30 to 70 percent of the relative standard error of the numerator or denominator, whichever has the greater relative error.

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List of detailed tables

Table 1. National Hospital Discharge Survey disease categories and codes

Disease categories and codes — ICDA–8	Disease categories and codes — ICD–9–CM	Discharges ICDA–8	Discharges ICD–9–CM	Comparability ratio	Relative standard error
		Number in thousands			Percent
Chapter 1. Infectious and parasitic diseases 000–136	Chapter 1. Infectious and parasitic diseases 001–139	827.97	535.03	1.5475	5.6
Diarrheal diseases[1] 009	Ill-defined intestinal infections, other and unspecified noninfectious gastroenteritis and colitis[2] 009, 558.9	320.91	537.76	0.5968	5.8
Viral diseases 040–079	Viral diseases... 045–079, 138, 139.0–139.1	220.48	255.17	0.8641	4.1
Other infectious and parasitic diseases 000–008, 010–039, 080–136	Other infectious and parasitic diseases 001–041, 080–137, 139.8	286.58	279.87	1.0240	3.2
Chapter 2. Neoplasms........... 140–239	Chapter 2. Neoplasms........... 140–239	2,349.44	2,138.49	1.0980	4.5
Malignant neoplasms of—........ 140–209	Malignant neoplasms of—........ 140–208	1,553.19	1,428.98	1.0869	3.1
Buccal cavity and pharynx 140–149	Lip, oral cavity, and pharynx 140–149	32.97	32.41	1.0173	5.0
Large intestine and rectum ... 153–154, 197.5	Large intestine and rectum ... 153–154, 197.5	164.72	148.11	1.1121	3.7
Other digestive organs and peritoneum.................... 150–152, 155–159, 197.4, 197.6–197.9	Other digestive organs and peritoneum.................... 150–152, 155–159, 197.4, 197.6–197.8	114.38	115.87	0.9871	3.8
Thoracic organs[3] 162–163, 197.0–197.3	Trachea, bronchus, and lung[3]................. 162, 197.0, 197.3	194.19	189.76	1.0233	2.8
Bone, connective, and other soft tissue and skin 170–173, 198.2, 198.5	Bone, connective tissue, and skin 170–173, 198.2, 198.5	97.06	100.41	0.9666	6.1
Breast.............................. 174	Breast.............................. 174	191.91	179.30	1.0703	3.1
Uterus and other female organs[4].... 180–184	Female genital organs[4]........ 179–184, 198.6	186.49	137.33	1.3580	6.4
	Female genital organs plus carcinoma-in-situ[4] 179–184, 198.6, 233.1–233.3	...	186.43	1.0003	3.5
Prostate 185	Prostate 185	90.62	100.64	0.9004	4.9
Urinary organs 188–189, 198.0–198.1	Urinary organs 188–189, 198.0–198.1	103.4	92.53	1.1136	3.7
Lymph and hematopoietic tissues[5]................. 196, 200–209	Leukemia and all other hematopoietic tissue[5] 196, 200–208	179.23	158.79	1.1287	9.1
Leukemia..................... 204–207	Leukemia..................... 204–208	57.03	51.67	1.1037	4.6
All other hematopoietic tissues[5]................. 196, 200–203	All other hematopoietic tissue[5] 196, 200–203	108.08	107.12	1.0090	3.9
Other and unspecified sites 160–161, 186–187, 190–195, 198.3–198.4, 198.9, 199	Other and unspecified sites 160–161, 163–165, 186–187, 190–195, 197.1–197.2, 198.3–198.4, 198.7, 198.82–199	198.57	173.82	1.1424	6.1
Benign and unspecified neoplasms.................... 210–239	Benign neoplasms, carcinoma-in-situ, and neoplasms of uncertain behavior ... 210–239	796.25	709.51	1.1223	5.3
Uterine fibroma and other benign neoplasms of uterus[6] 218–219	Uterus 218–219	239.55	183.19	1.3077	3.2
Other female genital organs[6]...... 220–221	Other female genital organs[6]...... 220–221	115.07	19.83	5.8028	19.5
Other and unspecified organs and tissues and neoplasms of unspecified nature[7].............. 210–217, 222–239	Digestive system, bone and connective tissue, breast, and other benign neoplasms, carcinoma-in-situ, and neoplasms of uncertain behavior[7]..... 210–217, 222–239	441.63	506.49	0.8719	4.8
Benign neoplasms of digestive system..................... 210–211	Digestive system 210–211	71.30	47.52	1.5008	9.1
Benign neoplasms of bone and connective tissue 213–215	Bone and connective tissue...... 213–215	107.32	99.45	1.0792	5.9
Benign neoplasm of breast........... 217	Breast........................... 217	88.83	86.48	1.0272	3.0
Other and unspecified, excluding those of the digestive system, bone and connective tissue, and breast[7] ... 212, 216, 222–239	Other benign neoplasms, carcinoma-in-situ, and neoplasms of uncertain behavior[7].......... 212, 216, 222–239	174.18	273.04	0.6379	7.6
Chapter 3. Endocrine, nutritional, and metabolic diseases.............. 240–279	Chapter 3. Endocrine, nutritional, and metabolic diseases, and immunity disorders...................... 240–279	885.53	924.68	0.9577	3.6
Diseases of thyroid gland 240–246	Diseases of thyroid gland 240–246	124.67	101.06	1.2336	5.1
Diabetes mellitus[8]................... 250	Diabetes mellitus with and without complications[8]..................... 250	532.85	530.03	1.0053	2.6
	Diabetes mellitus without complications[8] 250.0	...	334.44	...	...
	Diabetes mellitus with complications[8] 250.1–250.9	...	195.59	...	...

NOTE: See footnotes at end of table.

Disease categories and codes		Discharges		Compa-rability ratio	Relative standard error
ICDA–8	ICD–9–CM	ICDA–8	ICD–9–CM		
		Number in thousands			Percent
Chapter 3. Endocrine, nutritional, and metabolic diseases—Con.	**Chapter 3. Endocrine, nutritional, and metabolic diseases, and immunity disorders—Con.**				
Other endocrine diseases 251–258	Other diseases of endocrine glands 251–259	75.05	78.37	0.9576	8.2
Obesity, not of endocrine origin......... 277	Obesity 278.0	47.81	41.65	1.1479	6.8
Nutritional deficiencies and metabolic diseases 260–279	Obesity plus other nutritional deficiencies, metabolic and immunity disorders... 260–279	152.96	215.22	0.7107	7.7
Nutritional deficiencies and metabolic diseases, excluding obesity............ 260–276, 278–279	Other nutritional deficiencies and metabolic and immunity disorders 260–277, 278.1–279	105.15	173.57	0.6058	8.4
Chapter 4. Diseases of the blood and blood-forming organs 280–289	**Chapter 4. Diseases of the blood and blood-forming organs 280–289**	294.27	296.46	0.9926	2.9
Anemias 280–285	Anemias 280–285	189.14	187.70	1.0077	2.7
Other disorders of blood and blood-forming organs 286–289	Other disorders of blood and blood-forming organs 286–289	105.13	108.75	0.9667	4.0
Chapter 5. Mental disorders...... 290–315	**Chapter 5. Mental disorders...... 290–319**	1,493.85	1,477.52	1.0111	2.2
Psychosis 290–299	Organic psychotic conditions, schizophrenic disorders, and other psychoses... 290–299	346.48	364.82	0.9497	3.1
Organic psychotic conditions 290–294	Organic psychotic conditions 290–294	50.52	72.09	0.7008	10.2
Schizophrenic disorders 295	Schizophrenic disorders 295	165.41	165.41	1.0000	1.5
Other psychoses............... 296–299	Other psychoses............... 296–299	130.55	127.32	1.0254	4.1
Anxiety neurosis..................... 300.0	Anxiety states...................... 300.0	144.15	105.23	1.3699	6.3
Other neuroses and personality disorders 300.1–301	Other neuroses and personality disorders 300.1–301	315.28	278.01	1.1341	5.2
Alcoholism[9] 303	Alcohol dependence syndrome[9]......... 303	423.93	395.76	1.0712	3.4
	Alcohol dependence plus alcohol abuse, nondependent[9] 303, 305.0	...	413.75	1.0246	2.5
Drug dependence[10]................... 304	Drug dependence[10]..................... 304	33.65	24.36	1.3814	10.9
	Nondependent abuse of drugs[10] 305	...	24.71	...	...
Other mental disorders 302, 305–315	Other mental disorders and mental retardation 302, 306–319	230.38	284.64	0.8094	6.0
Chapter 6. Diseases of the nervous system and sense organs 320–389	**Chapter 6. Diseases of the nervous system and sense organs 320–389**	1,437.29	1,447.58	0.9929	2.5
Diseases of central nervous system........................ 320–349	Epilepsy and other disorders of central nervous system........ 320–336, 340–349	329.55	345.94	0.9526	3.5
Epilepsy 345	Epilepsy 345	60.78	61.48	0.9886	3.9
Diseases of nerves and peripheral ganglia 350–358	Diseases of nerves and peripheral nervous system 337, 350–359	177.94	172.97	1.0287	5.1
Cataract 374	Cataract 366	333.24	323.95	1.0287	1.6
Other conditions and diseases of eye.............. 360–373, 375–379	Other disorders of eye ... 360–365, 367–379	263.18	272.40	0.9662	3.0
Diseases of ear and mastoid process 380–389	Otitis media and eustachian tube and other disorders of the ear and mastoid process 380–389	333.38	332.32	1.0032	1.9
Otitis media and eustachian tube disorders................ 381–382	Otitis media and eustachian tube disorders................ 381–382	188.11	183.69	1.0241	2.4
Chapter 7. Diseases of the circulatory system[11] 390–458	**Chapter 7. Diseases of the circulatory system[11] 390–459**	4,417.74	4,373.28	1.0102	1.8
Acute rheumatic fever and chronic rheumatic heart disease[12].................. 390–398	Acute rheumatic fever and chronic rheumatic heart disease[12] 390–398	105.87	73.20	1.4463	7.5
Hypertensive disease[13] 400–404	Essential hypertension and hypertensive heart disease[13]............. 401–402, 404	301.28	432.07	0.6973	7.0
Essential hypertension.......... 400–401	Essential hypertension 401	232.30	277.08	0.8384	5.8
Hypertensive heart disease[13]..... 402–404	Hypertensive heart disease[13]..... 402, 404	68.98	154.99	0.4451	14.2
Acute myocardial infarction 410	Acute myocardial infarction 410	390.11	380.34	1.0257	2.9
Chronic ischemic heart disease[14]........ 412	Coronary atherosclerosis, and other chronic ischemic heart disease[14] 412, 414	1,194.21	841.80	1.4186	4.4

NOTE: See footnotes at end of table.

Table 1. National Hospital Discharge Survey disease categories and codes—Con.

Disease categories and codes — ICDA-8	Disease categories and codes — ICD-9-CM	Discharges ICDA-8	Discharges ICD-9-CM	Comparability ratio	Relative standard error
		Number in thousands			Percent
Chapter 7. Diseases of the circulatory system—Con.	**Chapter 7. Diseases of the circulatory system—Con.**				
Other ischemic heart disease . . . 411, 413–414	Other acute and subacute ischemic heart disease, plus angina pectoris 411, 413	247.62	269.51	0.9188	5.0
Other acute and subacute ischemic heart disease[14] 411	Other acute and subacute ischemic heart disease[14] 411	160.30	136.89	1.1710	4.9
Angina pectoris[14] 413	Angina pectoris[14] 413	87.32	132.62	0.6584	8.5
Congestive heart failure 427.0	Congestive heart failure 428.0	245.42	260.22	0.9431	3.9
Other heart disease[15] . . . 420–426, 427.1–429	Pulmonary heart disease, cardiac dysrhythmias, and unspecified cardiovascular disease[15] 415–416, 427, 429.2	347.84	427.09	0.8144	7.9
Cerebrovascular disease 430–438	Intracranial hemorrhage, occlusion of cerebral arteries, transient cerebral ischemia, acute but ill-defined cerebrovascular disease, and other cerebrovascular disease 430–438	607.78	652.29	0.9318	3.4
Intracranial hemorrhage 430–431	Intracranial hemorrhage 430–432	46.20	47.89	0.9647	6.6
Occlusion of cerebral arteries 433–434	Occlusion of cerebral arteries 434	91.69	100.25	0.9146	4.8
Transient cerebral ischemia[16] 435	Transient cerebral ischemia[16] 435	45.60	100.53	0.4536	12.0
Acute ill-defined cerebrovascular disease 436	Acute but ill-defined cerebrovascular disease 436	232.28	199.94	1.1617	4.0
Other cerebrovascular disease 432, 437–438	Other cerebrovascular disease 433, 437–438	192.01	203.68	0.9427	5.9
Atherosclerosis 440	Atherosclerosis 440	118.97	130.30	0.9130	5.5
Varicose veins of lower extremities 454	Varicose veins of lower extremities 454	108.45	107.39	1.0099	3.1
Hemorrhoids 455	Hemorrhoids 455	176.97	174.92	1.0117	1.6
Other diseases of veins, lymph, and circulatory system[16] 441–453, 456–458	Aneurysm, except cerebral and congenital; other diseases of arteries, arterioles, and capillaries; phlebitis and thrombophlebitis; and other diseases of the circulatory system[16] 390, 392.9, 403, 405, 417, 441–448, 451–453, 456–459	573.22	416.31	1.3769	5.7
Aneurysm, except cerebral and congenital 441–442	Aneurysm, except cerebral and congenital 441–442	50.20	48.88	1.0270	3.9
Other diseases of arteries, arterioles, and capillaries 443–448	Other diseases of arteries, arterioles, and capillaries 443–448	108.70	103.80	1.0472	8.0
Phlebitis and thrombophlebitis. 451	Phlebitis and thrombophlebitis. 451	169.42	165.32	1.0248	2.1
Chapter 8. Diseases of the respiratory system 460–519	**Chapter 8. Diseases of the respiratory system 460–519**	3,391.90	3,299.52	1.0283	1.5
Acute bronchitis and bronchiolitis 466	Acute bronchitis and bronchiolitis 466	251.77	225.98	1.1141	4.5
Acute upper respiratory infection, except influenza 460–465	Acute upper respiratory infection, except influenza 460–465	310.43	322.93	0.9613	2.7
Influenza 470–474	Influenza. 487	154.50	141.00	1.0957	3.4
Pneumonia, all forms 480–486	Pneumonia, all forms 480–486	714.81	698.53	1.0233	1.7
Bronchitis, chronic and unqualified[17] . . . 490–491	Bronchitis, chronic and unqualified[17] . . . 490–491	254.35	216.20	1.1765	6.1
Emphysema 492	Emphysema 492	85.51	78.17	1.0939	6.9
Asthma[18] 493	Asthma[18] 493	183.19	291.35	0.6288	6.0
Hypertrophy of tonsils and adenoids 500	Chronic disease of tonsils and adenoids. . . . 474	701.89	698.53	1.0048	1.1
Other diseases of respiratory system 501–519	Deviated nasal septum, pleurisy, and other diseases of the respiratory system . . . 470–473, 475–478, 494–496, 500–519	736.45	762.34	0.9660	3.9
Deflected nasal septum. 504	Deviated nasal septum 470	91.97	92.56	0.9936	3.5
Pleurisy. 511	Pleurisy. 511	46.59	42.95	1.0847	4.9
Unspecified diseases of the respiratory system[19] 519.9	Chronic obstructive pulmonary diseases[19]. 496	223.93	131.15	1.7074	6.8
Chapter 9. Diseases of the digestive system 520–577	**Chapter 9. Diseases of the digestive system 520–579**	4,259.85	4,641.78	0.9177	2.5
Diseases of oral cavity, salivary gland, jaw, and esophagus 520–530	Disturbances of tooth eruption; other diseases of teeth, jaw, and mouth; and diseases of esophagus 520–530	413.78	421.69	0.9812	2.0
Disturbances of tooth eruption 520.6	Disturbances of tooth eruption 520.6	136.62	132.23	1.0332	2.5
Diseases of esophagus 530	Diseases of esophagus 530	83.68	86.61	0.9662	3.6
Other diseases of teeth, jaw, and mouth 520–520.5, 520.7–529	Other diseases of teeth, jaw, and mouth 520–520.5, 520.7–529	193.47	202.86	0.9537	2.2

NOTE: See footnotes at end of table.

Table 1. National Hospital Discharge Survey disease categories and codes—Con.

| Disease categories and codes | | Discharges | | Compa-rability ratio | Relative standard error |
ICDA–8	ICD–9–CM	ICDA–8	ICD–9–CM		
		Number in thousands			Percent
Chapter 9. Diseases of the digestive system—Con.	**Chapter 9. Diseases of the digestive system—Con.**				
Ulcer of stomach, duodenum, peptic ulcer of unspecified site, and gastrojejunal ulcer 531–534	Gastric ulcer, duodenal ulcer, and other unspecified peptic ulcer.......... 531–534	411.72	406.16	1.0137	1.9
Ulcer of stomach 531	Gastric ulcer...................... 531	101.47	99.02	1.0247	3.5
Ulcer of duodenum 532	Duodenal ulcer................... 532	224.10	221.35	1.0124	2.1
Peptic ulcer, site unspecified, and gastrojejunal ulcer 533–534	Other and unspecified peptic ulcer 533–534	86.15	85.79	1.0042	4.7
Gastritis and duodenitis 535	Gastritis and duodenitis 535	288.65	283.95	1.0166	2.5
Disorders of function and other diseases of stomach and duodenum.......... 536–537	Other diseases of stomach 536–537	71.58	100.51	0.7122	9.2
Appendicitis 540–543	Acute appendicitis without mention of peritonitis, and other appendicitis and diseases of the appendix......... 540–543	295.33	297.09	0.9941	1.1
Acute appendicitis without mention of peritonitis 540.9	Acute appendicitis without mention of peritonitis 540.9	188.21	192.32	0.9786	2.0
Other appendicitis and other diseases of the appendix.............. 540.0, 541–543	Other appendicitis and other diseases of the appendix....... 540.0–540.1, 541–543	107.12	107.77	0.9940	3.9
Inguinal hernia 550, 552	Inguinal hernia 550	513.43	513.30	1.0003	2.2
Other hernia of abdominal cavity.... 551, 553	Other hernia of abdominal cavity.... 551–553	328.94	325.33	1.0111	3.3
Intestinal obstruction without mention of hernia............................. 560	Intestinal obstruction without mention of hernia............................. 560	134.18	135.72	0.9887	3.5
Gastroenteritis and colitis, except ulcerative, of noninfectious origin[20]............. 561	Other noninfectious gastroenteritis and colitis[20].......................... 558	224.93	534.96	0.4205	7.5
Chronic enteritis and ulcerative colitis.... 563	Regional enteritis and idiopathic proctocolitis 555–556	60.95	53.58	1.1376	6.7
Functional disorders of intestines 564	Other functional digestive disorders of intestines.......................... 564	126.25	130.80	0.9652	4.2
Diverticula of intestine 562	Diverticula of intestine 562	193.42	191.55	1.0098	1.9
Cholelithiasis........................ 574	Cholelithiasis........................ 574	467.84	459.82	1.0174	1.3
Cholecystitis and cholangitis, without mention of calculus[21]................. 575	Cholecystitis plus cholangitis[21].......... 575.0–575.1, 576.1	137.03	139.70	0.9809	2.1
Other diseases of liver, gallbladder, biliary ducts and pancreas 570–573, 576–577	Chronic liver disease and cirrhosis, other diseases of the liver, other disorders of the gallbladder and biliary tract 570–573, 575.2–577	282.70	300.33	0.9413	3.2
Anal fissure, fistula, or abscess 565–566	Anal fissure, fistula, and abscess ... 565–566	90.65	95.02	0.9540	3.0
Peritonitis and other disorders of intestine and peritoneum 567–569	Other disorders of intestine and peritoneum................... 557, 567–569	218.47	149.85	1.5401	8.4
Cirrhosis of liver...................... 571	Chronic liver disease and cirrhosis....... 571	106.01	155.05	0.9214	3.5
Other diseases of liver........ 570, 572–573	Other diseases of liver........ 570, 572–573	45.77	45.03	1.0164	6.9
Other diseases of gallbladder and biliary ducts........................ 576	Other disorders of gallbladder and biliary tract................... 575.2–576	38.40	50.52	0.7601	9.9
Diseases of pancreas.................. 577	Diseases of the pancreas 577	92.52	89.72	1.0312	2.3
Other diseases of digestive system[22] 536–537, 565–569	Other diseases of stomach, anal fissure, fistula, and abscess, other disorders of intestine and peritoneum, gastrointestinal hemorrhage and certain types of intestinal malabsorption[22] 536–537, 557, 565–569, 578, 579.2–579.4	380.69	445.71	0.8541	5.3
Chapter 10. Diseases of the genitourinary system........................ 580–629	**Chapter 10. Diseases of the genitourinary system........................ 580–629**	3,479.89	3,645.90	0.9291	2.4
Nephritis and nephrosis.......... 580–584	Nephritis and nephrosis.......... 580–585	78.10	71.30	1.0954	6.9
Nephritis and nephrosis plus other renal disease 580–584, 593.2	Nephritis, nephrotic syndrome, and nephrosis 580–589	119.80	103.13	1.1616	8.1
Infections of kidney.................... 590	Infections of kidney.................... 590	118.88	118.63	1.0021	2.6
Calculus of kidney and ureter.......... 592	Calculus of kidney and ureter.......... 592	292.33	293.03	0.9976	2.6
Other diseases of kidney and ureter 591, 593–594	Renal failure unspecified and other disease of kidney and ureter 586, 591, 593–594	119.54	119.49	1.0004	8.2
Cystitis.............................. 595	Cystitis.............................. 595	145.58	140.59	1.0355	3.1
Urethral stricture 598	Urethral stricture 598	127.71	128.65	0.9927	2.9
Other diseases of urinary system ... 596–599	Other disorders of urinary system 591, 593–594, 596–597, 599	417.07	415.80	1.0031	6.9

NOTE: See footnotes at end of table.

Table 1. National Hospital Discharge Survey disease categories and codes—Con.

Disease categories and codes		Discharges		Compa-	Relative
ICDA–8	ICD–9–CM	ICDA–8	ICD–9–CM	rability ratio	standard error
		Number in thousands			Percent

ICDA–8	ICD–9–CM	ICDA–8	ICD–9–CM	Comparability ratio	Relative standard error
Chapter 10. Diseases of the genitourinary system—Con.	**Chapter 10. Diseases of the genitourinary system—Con.**				
Hyperplasia of prostate 600	Hyperplasia of prostate 600	238.74	231.36	1.0319	1.8
Other diseases of male genital organs 601–607	Other diseases of male genital organs 601–608	239.59	226.76	1.0566	2.7
Diseases of breast (includes male breast) 610–611	Benign mammary dysplasia, plus inflammatory disease of breast 610–611	297.25	298.03	0.9974	1.6
Chronic cystic disease of breast[23] 610	Benign mammary dysplasia[23] 610	204.23	230.51	0.8860	3.2
Other disease of breast[23] 611	Inflammatory disease of breast[23] 611	93.02	67.52	1.3777	7.2
Other diseases of uterus, and other diseases of female genital organs[24] 612–616, 621–622, 624–625, 627–629	Other inflammatory diseases of female pelvic organs, endometriosis, menopausal and post-menopausal disorders, and other disruptions of the female genital tract[24] 614–615, 616.1–617, 619–625, 627–629	603.84	893.99	0.6754	5.1
Cervicitis 620	Cervicitis and endocervicitis 616.0	100.54	100.55	0.9999	3.9
Uterovaginal prolapse 623	Genital prolapse (female) 618	246.04	228.17	1.0783	3.0
Intermenstrual bleeding, plus other diseases of menstruation 626	Disorders of menstruation and other bleeding 626	582.14	467.19	1.2466	3.9
Chapter 11. Complications of pregnancy, childbirth, and the puerperium[25] . . . 630–678	**Chapter 11. Complications of pregnancy, childbirth, and the puerperium[25] . . . 630–676**	4,030.29	931.46	4.3269	7.6
Entire ICDA–8 chapter 630–678	Entire ICD–9–CM chapter, plus outcome of delivery[25] 630–676, V27	4,030.29	4,052.36	0.9946	1.3
Complications of pregnancy, plus other complications of pregnancy, childbirth, and the puerperium 630–639, 662–678	Ectopic pregnancy and complications of pregnancy, labor and delivery, and of puerperium 630–633, 640–648, 651–676	408.44	448.28	0.9111	3.7
Ectopic pregnancy 631	Ectopic pregnancy 633	27.34	27.17	1.0063	5.4
Abortion 640–645	Abortion 634–637	486.99	475.95	1.0232	1.6
False labor 634.7	False labor 644.1	144.45	134.78	1.0717	3.2
Delivery with mention of complication, plus delivery without complications 650–661	Outcome of delivery V27	3,134.86	3,122.02	1.0041	1.0
Chapter 12. Diseases of the skin and and subcutaneous tissue 680–709	**Chapter 12. Diseases of the skin and subcutaneous tissue 680–709**	548.50	539.15	1.0173	3.3
Infection of skin and subcutaneous tissue 680–686	Cellulitis and abscess, except of digit, plus pilonidal cyst, plus other infections of the skin and subcutaneous tissue 680–686	244.22	237.31	1.0291	3.1
Cellulitis and abscess except digit 682	Cellulitis and abscess except digit 682	124.24	123.57	1.0054	3.6
Pilonidal cyst 685	Pilonidal cyst 685	69.29	69.52	0.9967	2.0
Other infection of skin and subcutaneous tissue 680–681, 683–684, 686	Other infection of skin and subcutaneous tissue 680–681, 683–684, 686	50.69	44.22	1.1463	7.5
Other diseases of skin and subcutaneous tissue 690–709	Other diseases of skin and subcutaneous tissue 690–709	304.28	301.84	1.0081	4.4
Chapter 13. Diseases of the musculoskeletal system and connective tissue[26] . . . 710–738	**Chapter 13. Diseases of the musculoskeletal system and connective tissue[26] . . . 710–739**	1,704.14	1,838.28	0.9270	3.0
Displacement of intervertebral disc 725	Derangement and displacement of lumbar disc, plus derangement and displacement of other intervertebral disc 722	356.14	352.74	1.0096	2.3
Rheumatoid arthritis, except spine 712.0–712.3, 712.5	Rheumatoid arthritis, except spine 714	91.09	90.30	1.0087	3.1
Internal derangement of knee joint 724.4–724.5, 729.6–729.7	Internal derangement of knee joint 717	47.94	42.62	1.1248	9.7
Bunion and deformities of toe (acquired) 730, 737, 738.7	Bunion and deformity of toe 727.1, 735	103.38	101.48	1.0187	2.2
Chapter 14. Congenital anomalies 740–759	**Chapter 14. Congenital anomalies 740–759**	342.68	343.03	0.9990	4.1
Congenital anomalies of heart and circulatory system 746–747	Congenital anomalies of heart and circulatory system 745–747	55.51	57.71	0.9626	4.7
Other congenital anomalies 740–745, 748–759	Other congenital anomalies 740–744, 748–759	287.13	285.32	1.0063	4.5

NOTE: See footnotes at end of table.

Table 1. National Hospital Discharge Survey disease categories and codes—Con.

Disease categories and codes		Discharges		Compa-rability ratio	Relative standard error
ICDA–8	ICD–9–CM	ICDA–8	ICD–9–CM		
		Number in thousands			Percent
Chapter 15. Certain causes of perinatal morbidity and mortality[27] 760–779	Chapter 15. Certain conditions originating in the perinatal period[27] 760–779	38.74	112.47	0.3444	15.5
Chapter 16. Symptoms and ill-defined conditions 780–792, 794–796	Chapter 16. Symptoms, signs, and ill-defined conditions 780–799	602.63	519.34	1.1604	5.4
Symptoms referable to respiratory system 783	Symptoms referable to respiratory system 786	89.21	83.72	1.0656	8.5
Convulsions 780.2	Convulsions 780.3	48.03	51.00	0.9418	6.4
Symptoms referable to abdominal and gastrointestinal system 784–785	Symptoms referable to abdominal and gastrointestinal system 787, 789	138.92	122.74	1.1318	6.1
Abdominal pain 785.5	Abdominal pain 789.0	104.00	105.41	0.9866	3.8
Chest pain......................... 783.7	Chest pain......................... 786.5	49.44	66.44	0.7441	7.4
Chapter 17. Accidents, poisonings, and violence (nature of injury)[28] 800–999	Chapter 17. Injury and poisoning[28] 800–999	3,559.56	3,389.08	1.0503	2.7
Fracture of skull and face bones 800–804	Fracture of skull and face bones 800–803	148.65	145.39	1.0224	4.4
Fracture of upper limb 810–819	Fracture of upper limb 810–819	291.75	277.64	1.0508	2.9
Fracture of radius and ulna 813	Fracture of radius and ulna 813	128.09	127.63	1.0036	3.4
Fracture of vertebral column 805–806	Fracture of vertebral column 805–806	92.80	90.10	1.0300	3.6
Fracture of neck of femur 820	Fracture of neck of femur 820	184.00	171.51	1.0728	3.4
Other fractures of lower limb....... 821–829	Other fractures of lower limb....... 821–829	326.79	300.67	1.0869	3.3
Fractures of other and multiple sites......................... 805–809	Fracture of neck and trunk........ 805–809	204.05	198.32	1.0289	3.1
Other fractures 804, 807–812, 814–816, 821–829	Other fractures 804, 807–812, 814–819, 821–829	601.14	559.93	1.0736	3.2
Dislocation without fractures....... 830–839	Dislocation without fractures....... 830–839	194.99	193.59	1.0072	2.7
Sprains and strains of back (and neck)..................... 846–847	Sprains and strains of back (and neck)..................... 846–847	317.88	310.31	1.0244	2.5
Intracranial injury (excluding skull fracture)....................... 850–854	Concussion and intracranial injury (excluding those with skull fracture) 850–854	353.13	317.81	1.1111	3.1
Concussion (excluding skull fracture) ... 850	Concussion (excluding skull fracture)..... 850	253.49	222.41	1.1397	3.4
Intracranial injury, except concussion................... 851–854	Intracranial injury, except concussion 851–854	99.64	95.40	1.0444	6.3
Internal injury of chest, abdomen, and pelvis......................... 860–869	Internal injury of chest, abdomen, and pelvis......................... 860–869	80.96	78.32	1.0337	6.5
Laceration and open wound of eye, ear, and head 870–873	Laceration and open wound of eye, ear, and head 870–873	123.38	123.92	0.9956	4.7
Laceration and open wound of other and multiple sites............... 874–907	Laceration and open wound of other and multiple sites............... 874–907	223.55	222.37	1.0053	4.9
Burns........................... 940–949	Burns........................... 940–949	94.38	87.97	1.0729	5.1
Other injuries[29] 840–845, 848, 910–939, 950–959, 996	Other injuries[29] 840–845, 848, 910–939, 950–959	375.35	427.75	0.8775	4.7
Toxic effects of substances, chiefly nonmedicinal as to source........ 980–989	Toxic effects of substances, chiefly nonmedicinal as to source........ 980–989	66.73	55.17	1.2095	7.4
Complications of surgery and medical care 997–999	Complications of surgery and medical care 996–999	299.96	235.43	1.2741	5.2
Special conditions and examinations without sickness or tests with negative findings[30] 793, Y00–Y13	Supplementary classification[30] V01–V82	396.33	6,784.15	. . .	. . .
Observation without need for further medical care........................ 793	Observation and evaluation for suspected conditions V71	40.12	52.06	0.7706	11.8
Admitted for sterilization............. Y09.0	Persons admitted for sterilization V25.2	177.14	269.73	0.6567	5.5
Females with delivery 650–661	Females with delivery V27	3,134.86	3,122.01	1.0041	1.0

[1] Under ICDA–8, all infections and unspecified diarrheal diseases were coded to 009. When the National Hospital Discharge Survey (NHDS) records were coded in ICD–9–CM, about 90 percent of the previous 009 codes were coded to 558.9, other and unspecified noninfectious gastroenteritis and colitis, which contains gastroenteritis; enteritis; and diarrhea, not otherwise specified. A comparability ratio of 1.089 is computed if those 009.2 ICDA–8 coded records that were recoded to ICD–9–CM 558.9 are added to the other ICD–9–CM 009 category records.

[2] If all of the records in ICD–9–CM coded to 558.9 are added to those coded 009, the number is much larger than for the ICDA–8 category 009. This is because approximately half of the ICD–9–CM 558.9 records were previously coded to 561–569 in ICDA–8.

[3] The ICDA–8 NHDS category thoracic organs differs from the ICD–9–CM category trachea, bronchus, and lung, covering codes 162, 197.0, and 197.3, by excluding the other and unspecified respiratory organs represented by ICDA–8 code 163.

[4] The ICD–9–CM category excludes carcinoma-in-situ (233.1–233.3), but this condition is included in the ICDA–8 category. By adding the estimates for carcinoma-in-situ to the ICD–9–CM category, the number increases to 186,425 and the comparability ratio decreases from 1.3580 to 1.0003.

[5] The ICDA–8 category of lymphatic and hematopoietic tissues was not used in ICD–9–CM NHDS reports. Instead, leukemia (ICD–9–CM codes 204–208) and other malignant neoplasm of hematopoietic tissue (codes 196 and 200–203) were used. These two ICD–9–CM categories combined are comparable to the single ICDA–8 category. In the table, approximately equivalent ICDA–8 categories of codes have been identified for the two new ICD–9–CM groups.

[6] The large decrease in ICD–9–CM estimates for benign neoplasms of uterus and other female genital organs was due to the inclusion of cysts and polyps in the ICDA–8 coded categories. Most of these were coded to 620–624 in ICD–9–CM.

[7]The residual category for NHDS reports using ICD–9–CM consists of codes 212, 216, 223–239, because 3 new categories were added in the 210–217 range. The number of discharges in this diminished residual category is 273,040, and the comparability ratio with the undiminished ICDA–8 residual is 1.6175. For purposes of comparability, this table includes comparable residual groups for both the original ICDA–8 and ICD–9–CM defined residual categories.

[8]The ICDA–8 codes for diabetes mellitus did not separately identify the various manifestations that are coded separately in ICD–9–CM. Thus, there are no truly comparable groupings of ICDA–8 codes for the with or without complications recodes in ICD–9–CM.

[9]In ICD–9–CM, alcohol dependence syndrome is coded separately from alcohol abuse and is therefore not truly comparable to the ICDA–8 category of alcoholism. However, the two ICD–9–CM categories together correspond to alcoholism.

[10]Because ICD–9–CM separates the dependent use of drugs from nondependent abuse, the categories represented by codes 304 in ICDA–8 and ICD–9–CM are not comparable. If ICD–9–CM code 305, which represents nondependent use of drugs, is added to code 304, the estimate increases from 24,360 to 30,290 and the comparability ratio decreases from 1.3814 to 1.1109.

[11]Chapter 7 of ICD–9–CM was substantially revised from that in ICDA–8. Not only were the codes and their contents changed, but NHDS also changed the manner of grouping codes for reporting of national estimates. The separate categories were increased from 12 to 25 with the addition of a major grouping of the 11 categories for heart disease into a separate class. The ICDA–8 category of chronic ischemic heart disease, which contained more than 25 percent of the discharges, has been distributed among a number of ICD–9–CM categories, particularly coronary atherosclerosis (414.0) and other chronic ischemic heart disease (412, 414.1–414.9). These ICD–9–CM groups have no equivalent ICDA–8 groups but can be recombined for an imperfect comparison with the ICDA–8 category chronic ischemic heart disease.

[12]ICDA–8 code 395, diseases of aortic valve, represented more than 25 percent of the rheumatic fever and chronic rheumatic heart disease category. Most of these cases are coded to 424, other diseases of endocardium, in ICD–9–CM. Correcting for the shifts from ICDA–8 codes 394 and 395 to ICD–9–CM 424 would drop the comparability ratio from 1.4463 to 1.0507.

[13]The ICD–9–CM categories of essential hypertension and hypertensive heart disease include many more cases than were in the ICDA–8 category of hypertensive disease. This is primarily due to the shift from ICDA–8 code 412, chronic ischemic heart disease, of 112,000 cases to ICD–9–CM code 402 and nearly 30,000 cases to code 401. Major changes as to what conditions are classified to hypertensive heart disease codes render meaningless the comparison of estimates based on similarly titled codes. ICD–9–CM code 402 contains 112,000 cases previously coded to 412 in ICDA–8 and about 10,000 previously coded to 427, symptomatic heart disease. At the same time, ICDA–8 code 402 includes about 10,000 cases coded to 428, heart failure, in ICD–9–CM.

[14]Almost the entire difference between ICDA–8 code 412 and ICD–9–CM codes 412 plus 414 is due to the coding of these ICDA–8 cases to ICD–9–CM 401–403 (148,000 cases) and 427–429 (136,000 cases). Cases previously coded to ICDA–8 code 411, other acute and subacute ischemic heart disease, are now also distributed among ICD–9–CM codes 410, 413, and 401–402. At the same time, ICD–9–CM code 413, angina pectoris, received about 50,000 cases previously coded to 410–412.

[15]The large increase in ICD–9–CM coded cases considered to represent the other heart disease ICDA–8 group is due to the shift of about 80,000 cases from ICDA–8 code 450, pulmonary embolism and infarction, to ICD–9–CM code 415.1, also entitled pulmonary embolism and infarction. The groupings of categories indicate even larger discrepancies when the ICD–9–CM group entitled other heart disease is added to the denominator while rheumatic fever and chronic rheumatic heart disease is added to the numerator. This is due to the shift of pulmonary embolism and infarction (80,000 cases) and to the shift of 114,000 cases from ICDA–8 code 412 to ICD–9–CM code 429.

[16]The large increase in ICD–9–CM code 435, transient cerebral ischemia, is due to the reclassification of cases representing 46,000 discharges from ICDA–8 code 458.9 (other and unspecified circulatory diseases, which includes rupture of blood vessel, not otherwise specified). Similarly, the decrease in the ICD–9–CM groups that are compared with the ICDA–8 group other diseases of veins, lymphatics, and circulatory system is due to the shift from ICDA–8 codes 450 and 458 to ICD–9–CM codes 415 and 435, respectively, of 126,000 discharges.

[17]About one-third of the cases previously coded 490, bronchitis, unqualified, in ICDA–8 are now coded to 493.9, asthma, unspecified, in ICD–9–CM because of the shift in indexing of the term asthmatic bronchitis.

[18]The large increase in asthma, ICD–9–CM code 493, is due to the shift of 57,000 discharges from ICDA–8 code 490, bronchitis, not otherwise specified, and 31,000 from code 466, acute bronchitis.

[19]A major change in chapter 8 was the addition of ICD–9–CM code 496 representing chronic airway obstruction, which includes the chronic obstructive pulmonary disease, not elsewhere classified, nomenclature. Most of the cases coded to 496 were previously classified in ICDA–8 code 519, other diseases of the respiratory system.

[20]The 9th revision code of 558.9, other and unspecified noninfectious gastroenteritis and colitis, also includes diarrhea; enteritis; gastroenteritis; and colitis, not otherwise specified, conditions frequently coded to 009 in the 8th revision. As a result, the cases coded to 561 in ICDA–8 are not truly comparable to those in the similarly entitled category coded to ICD–9–CM 558 because 305,000 discharges included in 558 were previously coded to 009.

[21]In the 8th revision, there were no 4th digit subclasses to code 575. However, ICD–9–CM distributes cases formerly coded to this category into 575.0 (acute cholecystitis without mention of calculus), 575.1 (other cholecystitis without mention of calculus), and 576.1 (cholangitis), as well as providing a number of other detailed 4th digit codes dealing with the gallbladder. Because of these differences, NHDS now publishes recode data just for cholecystitis (575.0–575.1), which is not comparable to any ICDA–8 code or category.

[22]There is no well-defined ICDA–8 category comparable to the ICD–9–CM codes 578–579 for gastrointestinal hemorrhage and intestinal malabsorption. This is because certain of the malabsorption conditions were coded to 269.0–269.1 in chapter 3 of the 8th revision, whereas the gastrointestinal hemorrhage and other malabsorption disorders appear in 569.2 and 569.9.

[23]The shift of about 25,000 discharges coded to ICDA–8 code 611.9, other diseases of breast, to various subcategories of 610, benign mammary dysplasia, in ICD–9–CM accounts for the lack of comparability.

[24]Sections of the coding classifications dealing with female genital organs and the uterus were extensively reorganized in ICD–9–CM. As a result there are no good comparison groups for ICDA–8 NHDS categories entitled other diseases of uterus and other diseases of female genital organs. However, the ICD–9–CM NHDS categories of other inflammatory diseases of female pelvic organs (codes 614–615 and 616.1–616.9), endometriosis (code 617), menopausal and postmenopausal disorders (code 627), and other disruptions of the female genital tract (codes 619–625 and 628–629) taken in the aggregate are roughly equivalent to the aggregate for the two ICDA–8 code categories.

[25]Because of the major changes between ICD–9–CM and ICDA–8 for coding complications of pregnancy, childbirth, and the puerperium, there are very few comparable categories within chapter 11. Perhaps the most dramatic change deals with the requirement for NHDS coders to use the supplementary classification code V27 instead of the 650–659 code as the principal diagnosis for all admissions during which a delivery occurred. The ICD–9–CM instructions for NHDS coders are very specific: "When delivery occurred this admission and is reported with other conditions, always enter the code for outcome of delivery (V27) first." Thus, complications of labor and delivery (codes 651–659) can never appear as the principal diagnosis for NHDS records coded in ICD–9–CM unless the patient did not deliver. Moreover, code 650 (normal delivery) can never be used as principal diagnosis for NHDS. These precautions do not apply for "other" diagnoses. If the 3.12 million code V27 estimates are added to the cases coded to chapter 11 in ICD–9–CM, the weighted national estimate becomes 4.052 million, and the entire chapter comparability ratio decreases from 4.3269 to a respectable 0.9946. Because all NHDS abstracts for hospital stays involving deliveries will not be coded in ICD–9–CM to chapter 11 for the principal diagnosis, meaningful comparisons with ICDA–8 categories in chapter 11 can only be made for those diagnoses that are not usually associated with deliveries.

[26]The ICD–9–CM codes for chapter 13 have been greatly reorganized from those in ICDA–8. In particular, ICD–9–CM codes for musculoskeletal disorders of the back and spine are broken out into a separate group, dorsopathies (codes 720–724), rather than being distributed among the various conditions and diseases. Some ICDA–8 codes have been combined, whereas others were divided into 2 codes in the ICD–9–CM. For example, ICDA–8 codes lumbago (717.0) and lumbalgia (728.7) are now coded to ICD–9–CM code 724.2 (which includes lumbago, lumbalgia, and low back pain). Because of the major changes in chapter 13, it is difficult to construct comparable groupings of codes between NHDS reports using the two different coding revisions.

[27]The ICDA–8 chapter entitled "Certain causes of perinatal morbidity and mortality" was expanded in the 9th revision.

[28]Chapter 17 was renamed "Injury and poisoning" in ICD–9–CM and was reorganized. For example, late effects, included within code groupings for many injuries when using ICDA–8 codes, were broken out into a separate category in ICD–9–CM. Other major changes included the restructuring of what was included under adverse effects of medicinal agents in ICDA–8 versus poisonings by drugs, medicinal agents, and biological substances (codes 960–979) in ICD–9–CM, and changes to the contents of code 995, certain early complications of trauma in ICDA–8 versus certain adverse effects not elsewhere classified in ICD–9–CM. As a result, certain of the NHDS categories are not at all comparable, and the user must be constantly alert to whether late effects were included with the 8th revision codes, but not for the 9th revision codes.

[29]Other injuries in ICDA–8 does not include a code comparable to the ICD–9–CM code 958 (certain early complications of trauma), but the most important contribution to the low comparability ratio was the change in NHDS coding instructions for handling contusions. ICDA–8 contusions codes 920 and 922–929 were not used by NHDS; these conditions were instead coded to 996 (other injury by site). The instructions for ICDA–8 code 996, however, state that "when used, 996 will be the only injury code on the abstract" because only the "specified" injury is to be coded when 2 or more are reported. Thus, nearly 40,000 discharges were coded in ICD–9–CM to contusion (codes 920–924), which had been coded to other listed injuries in ICDA–8.

[30]In the supplemental classifications, there are many differences between ICDA–8 and ICD–9–CM categories. For a number of the ICD–9–CM categories, there either are no comparable categories (such as V10–V19 and V30–V39), or the V codes are comparable to ICDA–8 codes in other chapters.

Table 2. National Ambulatory Medical Care Survey disease categories and codes

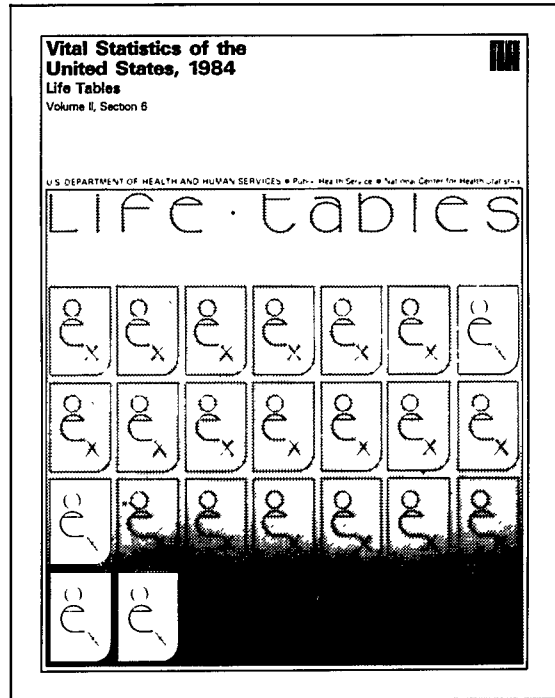| As described for ICDA–8	As described for ICD–9–CM	Estimated visits		Comparability ratio[1]	Relative standard error
		ICDA–8	ICD–9–CM		
		Number in thousands			Percent
Infective and parasitic diseases 001–136	Infectious and parasitic diseases 001–139	21,954	18,637	1.1780	2.9
Diarrheal diseases. 009		3,988	[1]. . .	[1]. . .	. . .
Streptococcal sore throat and scarlet fever. 034	Streptococcal sore throat and scarlet fever. 034	1,537	1,821	0.8440	7.1
Neoplasms. 140–239	Neoplasms. 140–239	15,655	14,364	1.0899	3.2
Benign neoplasm of skin 216	Benign neoplasm of skin 216	1,005	1,547	0.6496	21.0
Endocrine, nutritional, and metabolic diseases. 240–279	Endocrine, nutritional, and metabolic diseases, and immunity disorders. . . 240–279	24,413	24,140	1.0113	1.5
Diabetes mellitus 250	Diabetes mellitus 250	8,398	8,491	0.9890	1.8
Obesity 277	Obesity 278	6,105	6,110	0.9992	1.6
Myxedema. 244	Myxedema. 244	1,600	1,670	0.9581	5.1
Mental disorders 290–315	Mental disorders 290–319	22,352	23,874	0.9362	2.0
Neuroses. 300	Neurotic disorders 300	11,293	11,440	0.9872	1.6
Personality disorders 301	Personality disorders 301	2,210	2,329	0.9489	4.2
Schizophrenia. 295	Schizophrenic disorders. 295	2,032	2,000	1.0160	2.1
Diseases of nervous system and sense organs. 320–389	Diseases of nervous system and sense organs. 320–389	52,135	51,805	1.0064	1.4
Otitis media. 381	Otitis media 381–382	12,256	12,510	0.9797	1.7
Refractive errors 370	Disorders of refraction and accommodation 367	10,088	9,968	1.0120	1.0
Conjunctivitis and ophthalmia 360	Conjunctivitis. 372.0–372.3	2,381	2,409	0.9884	2.4
Cataract. 374	Cataract. 366	3,362	3,308	1.0163	2.0
Glaucoma 375	Glaucoma 365	2,691	2,683	1.0030	1.9
Diseases of circulatory system 390–458	Diseases of circulatory system 390–459	53,093	52,624	1.0089	0.9
Essential benign hypertension. 401	Essential hypertension. 401	23,112	24,770	0.9331	1.6
Chronic ischemic heart disease. 412	Chronic ischemic heart disease . . . 412, 414	11,027	8,207	1.3436	4.4
Symptomatic heart disease 427	Symptomatic heart disease. 426–428	3,243	3,364	0.9640	4.2
Angina pectoris. 413	Angina pectoris. 413	1,570	1,351	1.1621	5.6
Diseases of respiratory system 460–519	Diseases of respiratory system 460–519	77,910	78,207	0.9962	0.8
Acute respiratory infections (except influenza) 460–466	Acute respiratory infections (except influenza) 460–466	35,493	35,075	1.0119	0.9
Influenza. 470–474	Influenza 487	3,985	4,093	0.9736	2.4
Hay fever. 507	Allergic rhinitis[2] 477	10,529	10,423	1.0102	2.7
Bronchitis, unqualified 490	Bronchitis, unqualified 490	7,785	6,342	1.2275	3.6
Asthma 493	Asthma 493	5,040	6,954	0.7248	4.8
Emphysema. 492	Emphysema. 492	1,028	889	1.1564	8.2
Diseases of digestive system 520–577	Diseases of digestive system 520–579	19,272	23,541	0.8187	2.8
Gastritis and duodenitis. 535	Gastritis and duodenitis. 535	1,960	2,029	0.9660	2.5
	Noninfectious enteritis and colitis. . . 555–558	[3]. . .	4,294	[3]. . .	. . .
Diseases of genitourinary system. . . . 580–629	Diseases of genitourinary system. . . . 580–629	33,855	35,465	0.9546	1.9
Diseases of male genital organs. . . 600–607	Diseases of male genital organs. . . 600–608	4,281	4,302	0.9951	1.8
Diseases of female genital organs. . . 610–629	Diseases of female genital organs. . . 614–629	17,608	16,408	1.0731	3.3
Diseases of skin and subcutaneous tissue 680–709	Diseases of skin and subcutaneous tissue 680–709	36,171	32,080	1.1275	2.4
Other eczema and dermatitis. 692	Contact dermatitis and other eczema . . . 692	10,310	5,385	1.9146	6.3
Diseases of sebaceous glands. 706	Diseases of sebaceous glands. 706	8,531	8,784	0.9712	1.8
Diseases of musculoskeletal system 710–738	Diseases of musculoskeletal system and connective tissue. 710–739	30,698	33,900	0.9055	2.1
Arthritis and rheumatism 710–718	Arthropathies and related disorders 710–719	14,816	11,873	1.2479	4.6
Symptoms and ill-defined conditions 780–796	Symptoms, signs, and ill-defined conditions 780–799	25,122	15,974	1.5727	4.8
Accidents, poisoning, and violence . . . 800–999	Injury and poisoning 800–999	45,131	48,500	0.9305	2.0
Fractures. 800–829	Fractures. 800–829	9,404	8,866	1.0607	2.0
Dislocations. 830–839	Dislocations. 830–839	1,606	1,675	0.9588	5.8
Sprains and strains 840–848	Sprains and strains 840–848	14,323	14,199	1.0087	1.4
Special conditions and examinations without sickness Y00–Y13	Supplemental classifications V01–V82	81,901	87,485	0.9362	1.8
Medical or special examination. Y00	Medical or special examination or screening. V70–V82	39,663	28,090	1.4120	4.4
Prenatal care. Y06	Prenatal care V22–V23	21,826	20,661	1.0564	1.6
Medical and surgical aftercare. Y10	Medical and surgical aftercare V50–V59	10,403	10,166	1.0233	4.2

[1]The shift of diarrheal diseases not stated as to whether of infectious origin from ICDA–8 code 009 to ICD–9–CM code 558 (other noninfectious gastroenteritis and colitis) resulted in 291 of the 316 cases coded to 009 in ICDA–8 going to 558 when ICD–9–CM was used. Thus, codes 009 are not comparable (the ratio would be 21.9215) across the 2 revisions; but if ICD–9–CM code 558 is added to 009, a ratio of 1.0181 is computed.

[2]The change in terminology from hay fever with ICDA–8 (code 507) to allergic rhinitis in ICD–9–CM (code 477) produced no important changes because hay fever and allergic rhinitis are listed under the same code in the index to each code system revision.

[3]NAMCS publications of diagnoses coded in ICD–9–CM have an added category within the chapter on digestive diseases. This group, entitled noninfectious gastroenteritis and colitis (codes 555–558) has no counterpart in ICDA–8. However, codes 009, 561, and 563 in ICDA–8 include most of the cases coded to 555–558 in ICD–9–CM. (Also see note 1.)

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