

ICD-10-CM Field Testing Project



Report on Findings

*Perceptions, Ideas and
Recommendations from Coding
Professionals Across the Nation*



September 23, 2003

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Accurate and precise reporting of clinical codes is extremely important in the health care industry today.

Clinical codes are the key to benchmarking, quality assessment, research, public health reporting and strategic planning in addition to accurate reimbursement. The current coding system, ICD-9-CM, has become outdated and obsolete, despite annual updates. ICD-9-CM has been unable to address the increasing pressure for more specific codes, especially codes that can keep up with new technology and advances in medical knowledge.

Due to these constraints, there has been increasing pressure to implement ICD-10, which provides greater specificity in reporting medical conditions and procedures. In the summer of 2003, the American Hospital Association (AHA) and the American Health Information Management Association (AHIMA) conducted field testing of ICD-10-CM (diagnosis coding) to assess the functionality and utility of its application to medical records in a variety of health care settings.

Project Overview

From June 30, 2003 through August 5, 2003, 169 participants volunteered in the testing of ICD-10-CM. Volunteers were required to listen to a two-hour audio seminar including a slide presentation, accessible via the Internet. Participants were also required to review the ICD-10-CM guidelines prior to starting the project, and were kept up-to-date via a virtual Community of Practice (CoP) that was accessible via the AHIMA Web site. This web site encouraged ongoing communication in the form of questions submitted by participants, with timely responses provided by the project coordinators. Participants were encouraged to randomly select and code 50 records. The entire medical record was to be reviewed when assigning both ICD-9-CM and ICD-10-CM codes. Data was submitted via a Web-based survey tool developed by Ohio State University (OSU). OSU health informatics and statistical staff cleaned the data, tabulated the results, and reported the results to AHA and AHIMA. Throughout the course of the study, participants were required to complete the following four surveys:

- *Demographic survey*—completed once by each participant
- *Record survey*—completed once for each record coded
- *Follow-up survey*—completed once by each participant at the conclusion of the project
- *Supplementary survey*—completed once by each participant a few weeks after the end of the project

All of the participants had a health information management (HIM) or coding credential, and most (85.8 percent) had one of two general HIM credentials (RHIA or RHIT). Despite the similarities in credentials, respondents indicated the amount of time they spend coding medical records ranged from 35-40 hours per week (25.5%) to 1-5 hours per week (13.8%).

Participant Feedback

- The clinical descriptions of the ICD-10-CM were thought to be better than ICD-9-CM by 71.7 percent of respondents;
- The notes, instructions, and guidelines in ICD-10-CM were thought to be clear and comprehensive by 64.5 percent of respondents;
- ICD-10-CM was felt to be an improvement over ICD-9-CM by 76.3 percent of respondents;
- Migration to ICD-10-CM was supported by 83.6 percent of the respondents;
- ICD-10-CM should be implemented in three years or less, according to 78.6 percent of respondents;
- A majority of respondents (60 percent) indicated that they would need 16 hours or less of training prior to implementation;
- Face-to-face ICD-10-CM training was the preferred method of training by 76.6 percent of respondents; and
- Training should be provided three months prior to ICD-10-CM implementation according to 58.6 percent of respondents.

Coding Records

A total of 6,177 medical records were coded as part of this project, with an average of 37 records per participant. Records were coded in the following settings:

- Short-term acute care inpatient (42.3 percent);
- Short-term acute care outpatient (38.8 percent);
- Post-acute settings (7.9 percent);
- Physician practices (6 percent);
- Clinics, community health centers, free-standing ambulatory surgery centers, and free-standing diagnostic facilities (approximately 2.9 percent);

- Behavioral health facility (1.6 percent); and
- Other (0.6 percent).

In over half of the coded records, participants indicated there was no time difference between ICD-9-CM and ICD-10-CM. The availability of much-improved coding tools, more training, and increased familiarity with ICD-10-CM will significantly reduce the amount of time needed to code records in ICD-10-CM, possibly to the point where the average time to code records may be less than with ICD-9-CM.

ICD-10-CM codes can be applied to today's medical records in a variety of health care settings, without having to change documentation practices, although improved documentation would result in higher coding specificity, and therefore higher data quality, in some cases.

Making ICD-10-CM Even Better

Participants were required to submit a problem identification form when they experienced difficulty assigning codes. Upon investigation, 151 diagnoses were identified that could not be coded, which fell into the following categories:

- Diagnosis was not indexed under the expected main term(s) or subterm(s);
- Insufficient documentation to assign a code;
- Error in Index or Tabular;
- Concept does not exist in ICD-10-CM;
- Code choices not applicable to diagnosis;
- Diagnosis is more specific than available code choices; and
- Unclear instructions.

A summary of the data compiled from the problem identification forms will be sent to the National Center for Health Statistics (NCHS) for review and evaluation in order to make the appropriate modifications prior to ICD-10-CM implementation.



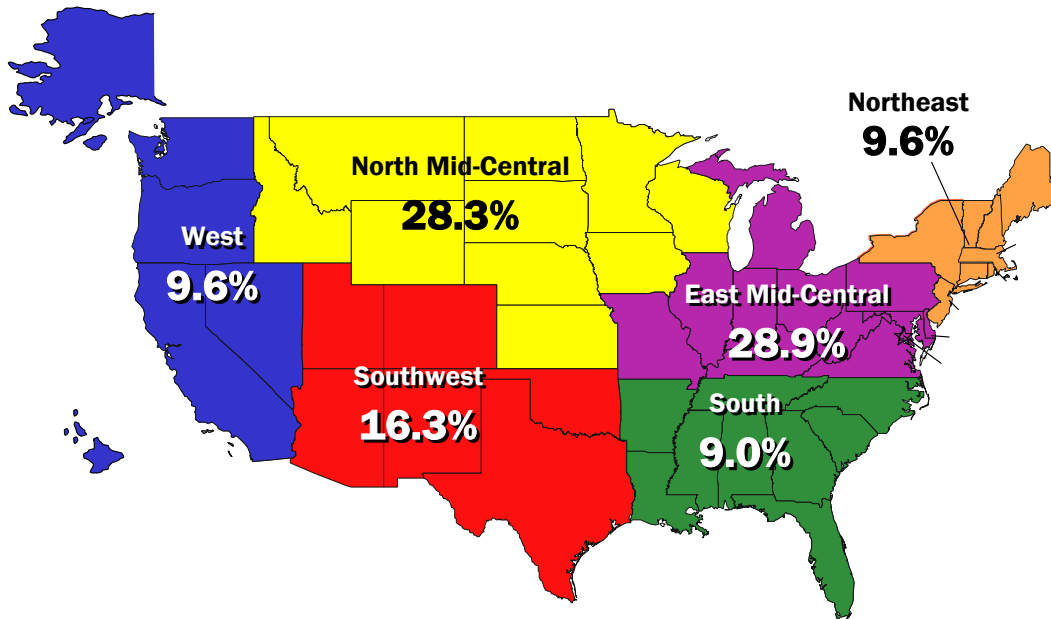
Accurate and precise reporting of clinical codes is extremely important because clinical codes are key to benchmarking, quality assessment, research, public health reporting and strategic planning, as well as accurate reimbursement from Third Party Payers. The International Classification of Diseases, Ninth Revision (ICD-9-CM) is the coding system used in the United States since 1979 to report diagnoses (volumes 1 and 2) and hospital inpatient procedures (volume 3). The diagnosis code component of ICD-9-CM is a United States modification of the World Health Organization's (WHO) ninth revision of the International Classification of Diseases (ICD). The WHO no longer supports ICD-9.

Despite annual updates, ICD-9-CM has become outdated and obsolete. In particular, ICD-9-CM is unable to address the increasing pressure to have more specific codes, especially codes that can keep up with new technology and advances in medical knowledge. In recent years, the health care industry has seen a shift in the delivery of care from hospital inpatient acute care to outpatient, home care, long term care and other delivery systems. ICD-9-CM codes are in many instances insufficient to provide detail for non-acute conditions. Over the years, many of the categories have become full, making it difficult to create new codes. Once a category is full, several types of similar procedures or diagnoses are combined under one code, or a place is found in another section of the classification for a new code. Differences in resources are not easily identified because distinct codes are not available. Coders find it difficult and confusing to squeeze current medical information into existing unspecified, or vague, ambiguous codes.

There has been increasing pressure on the U.S. Health and Human Services (HHS) Secretary to implement ICD-10, which is widely regarded as providing greater specificity to report medical conditions and procedures. Consequently, in the final transaction standards regulation, as part of the Health Insurance Portability and Accountability Act, the Secretary indicated that there might be changes to coding and classification standards after 2000. In particular, the ICD-10-CM may replace the ICD-9-CM as a standard for diagnosis coding, and ICD-10-PCS may replace the procedure coding section of ICD-9-CM. ICD-10-CM is a United States clinical modification of the WHO's ICD-10. Much of the rest of the world has already adopted ICD-10 or is in the process of doing so. ICD-10 has been used in the United States for mortality reporting since 1999.

As changing the diagnosis and procedure code sets will greatly affect health care providers and payers, these decisions are being carefully evaluated by the designated standard maintenance organizations and the National Committee for

Figure 1: Percentage of Survey Respondents from Each Region



Percentages total more than 100% due to rounding.

The primary purpose of the study, conducted during the summer of 2003, was to assess the functionality and utility of applying ICD-10-CM to actual medical records in a variety of health care settings and to assess the level of education and training required by professional credentialed coders to implement ICD-10-CM.

Vital and Health Statistics (NCVHS), with opportunity for public input.

Purpose of the Study

Although the Centers for Medicare & Medicaid Services (CMS) formally tested ICD-10-PCS in 1998, no formal testing of ICD-10-CM had been carried out in the United States. To reap the benefits of a more specific classification system, such a system must be applicable to actual medical record documentation, and be user-friendly and easy to learn by America's professional coders. That is why the American Hospital Association (AHA) and the American Health Information Management Association (AHIMA) conducted field-testing of ICD-10-CM.

The primary purpose of the study, conducted during the summer of 2003, was to assess the functionality and utility of applying ICD-10-CM to actual medical records in a variety of health care settings and to assess the level of education and training required by professional credentialed coders to implement ICD-10-CM.

There was no external source of funding for this project, which was conducted using existing resources of both associations with the generous support of Ohio State University Health Informatics and Information Systems staff. Participants received no remuneration for their participation.

Selection of Participants

The AHA and the AHIMA solicited health information management (HIM) professionals from across the country as volunteers via announcements in our publications and e-mail communications. We received approximately 400 responses. Participants did not have prior knowledge of ICD-10-CM and received only minimal training in ICD-10-CM coding at the start of the project. Because participation required certain computer capabilities, not available to all volunteers, a total of 169 volunteers participated in the testing, with some health care organizations having more than one person participating. Participants represented all geographic regions, including Alaska and Hawaii (see Figure 1, above).

Participants Express Support for ICD-10-CM Implementation

The clinical descriptions of the ICD-10-CM codes were thought to be better than ICD-9-CM by 71.7% of the participants (see figure 2, page 4); ICD-9-CM code descriptions were thought to be better by 11.2%; and 10.1% weren't sure if the clinical descriptions were better in one system than the other. Since several participants completed far fewer records than the originally anticipated 50 (the average was only 37 records per participant), the "unsure" responses may reflect the lack of experience in ICD-10-CM coding.

Guidelines Were Clear and Comprehensive

While there were some problems with index tools, 64.5% of the respondents still thought the notes, instructions, and guidelines in ICD-10-CM were clear and comprehensive, whereas 22.4% thought they weren't and 13.2% were unsure (see figure 3, page 4). The "unsure" responses seem to reflect a lack of ICD-10-CM experience, particularly by those who coded fewer records. In fact, 32.3% of the participants who coded 20 records or less responded they were unsure, while only 8.1% of those who coded more than 40 records did so. Sixty-seven percent of the participants who coded more than 40 records indicated the instructions were clear and comprehensive, and only 51.6% of those who coded 20 records or less felt that way. A summary of the problem identification forms, which collected specific information regarding conflicting or confusing notes, instructions, and guidelines, will be provided to the National Center for Health Statistics (NCHS) so that any needed modifications can be made prior to implementation.



Majority See ICD-10-CM as an Improvement

ICD-10-CM was felt to be an improvement over ICD-9-CM by 76.3% of the participants (see figure 4, page 5). The number of records coded by the participants as part of this project did have an impact on this response. Some 67.7% of the participants who coded 20 records or less felt that ICD-10-CM was an improvement, whereas 78.8% of those who coded more than 40 records felt it was an improvement. Of those coding 20 records or less, 19.4% were unsure whether ICD-10-CM was an improvement, but only 13.1% of those who coded more than 40 records were unsure. And 12.9% of those who coded 20 records or less did not feel ICD-10-CM was an improvement, whereas only 8.1% of those who coded more than 40 records felt that way.

Migration to ICD-10-CM was supported by 83.6% of the participants (see figure 5, page 5). The number of records the participants coded for this project did not significantly affect responses to this question.

Participants were asked for detailed comments if they indicated they did not support migration to ICD-10-CM or were unsure. The most common reason for not supporting migration to ICD-10-CM was that the index file format was too difficult and that it needed an overhaul, followed by concerns about cost and the availability of resources to assist coders. Although the problematic tool for using the index won't be a factor once ICD-10-CM is implemented, and we asked participants not to consider this issue when selecting their survey responses, it still did affect testing results and some participants' perceptions of the system.

ICD-10-CM was felt to be an improvement over ICD-9-CM by 76.3% of the participants.

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Figure 2: Comparison of Clinical Descriptions Between ICD-9-CM and ICD-10-CM

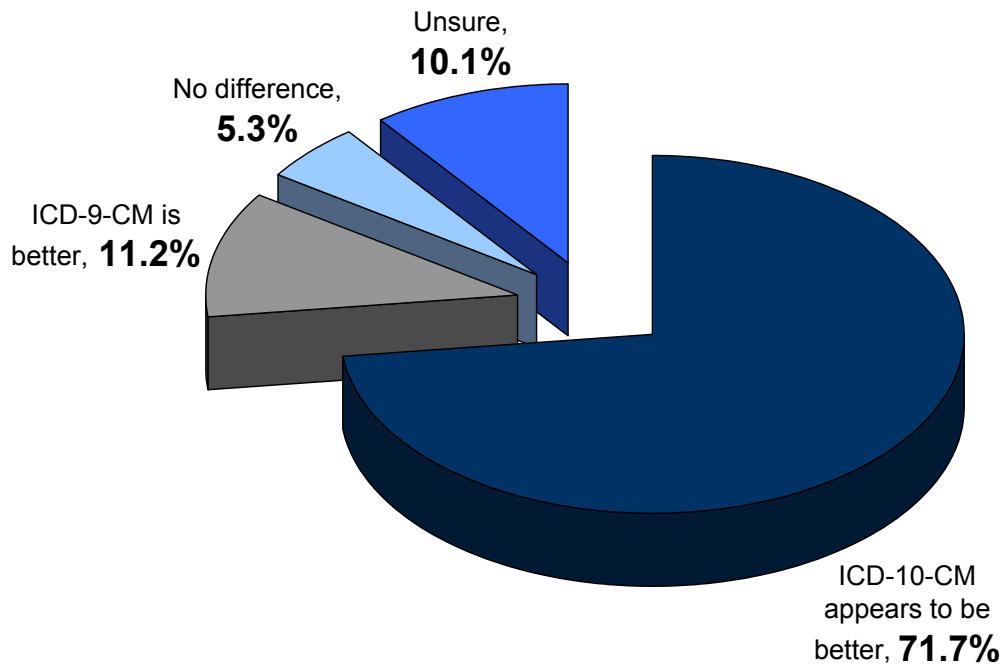


Figure 3: Were notes, instructions, guidelines in ICD-10-CM clear and comprehensive?

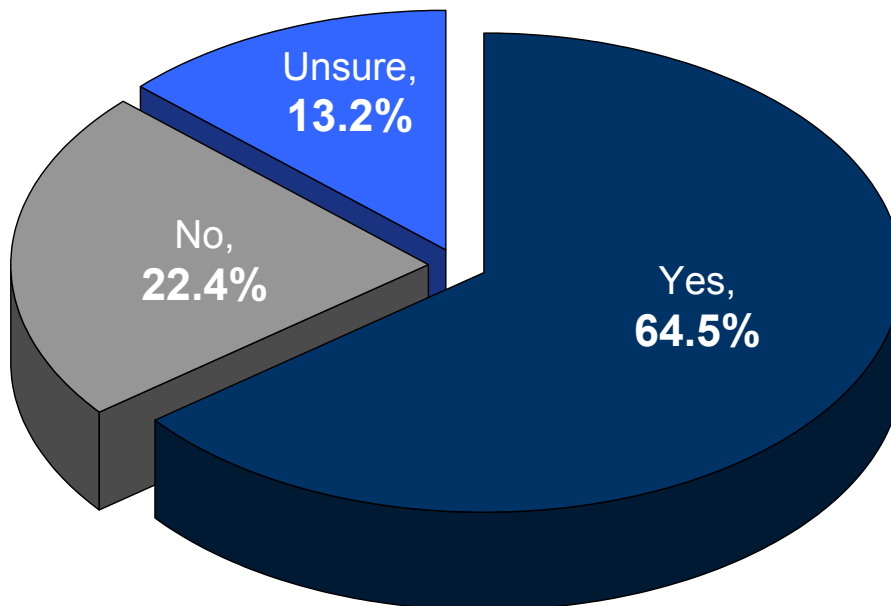


Figure 4: Does ICD-10-CM Appear to be an Improvement Over ICD-9-CM?

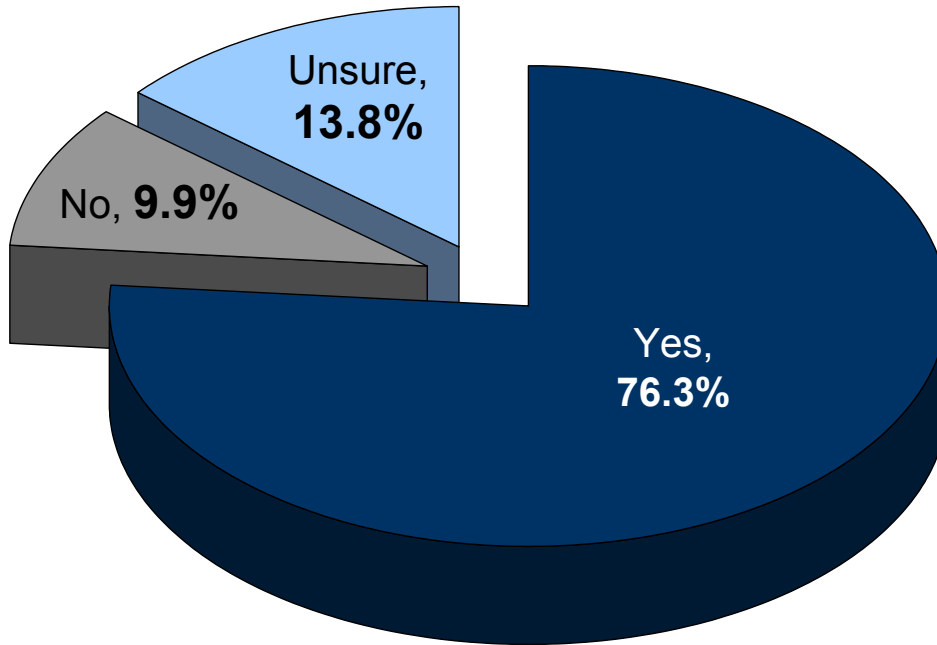
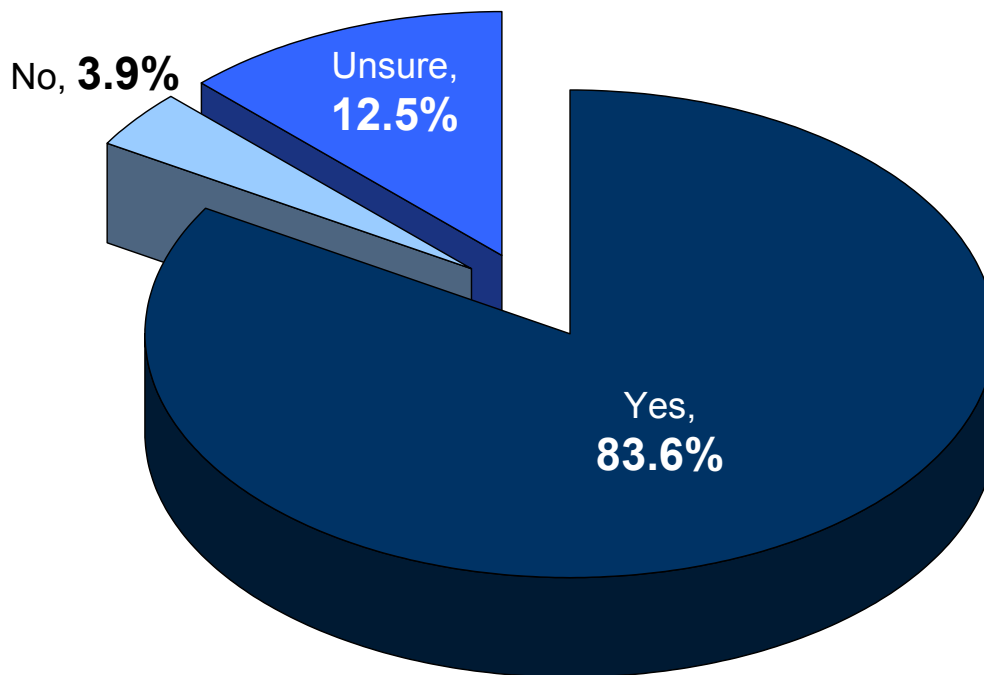


Figure 5: Participants Supporting Migration to ICD-10-CM



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Timing of implementation ... Do It!

ICD-10-CM should be implemented in three years or less, according to 78.6% of the respondents (see figure 6, page 7). Responses from the other 21.4% made apparent that some felt the need to implement "soon," but were unsure about a definitive time frame, noting the need to first improve the tools for using the coding system, and that implementation should take place as soon as vendors and payers can accommodate the change. Several individuals noted "ASAP!" and another indicated "did not answer 'yes,' but feel it is in the best interest of our profession to get on with this as soon as possible."

Sixteen Hours or Less of Training Needed

Respondents were asked how many hours of ICD-10-CM training they thought they would need prior to implementation. The majority (60.0%) indicated that they would need 16 hours or less. Twenty-four percent indicated they would need between 17-24 hours of training. There was no significant difference in the reported amount of estimated training time by job title or the amount of time per week that the participants typically spend coding. In all categories, the majority of participants reported 16 hours or less of training. For those who indicated an estimate of more than 24 hours of training, participants were asked to provide a rationale. These respondents indicated that they thought fewer errors would occur if coding professionals received more in-depth training. They also noted that ICD-10-CM is a very detailed, comprehensive system, and they felt there would be a lot of material for coding professionals to absorb. Those participants who indicated "other" for the amount of required training made some of the same comments as those who selected more than 24 hours, but did not recommend a specific amount of training time. Some of the participants noted that the index file format

would need to be improved, or else extensive training would be required on how to use the index.

A breakdown of the total number of participants and desired amount of training time prior to ICD-10-CM implementation is shown in figure 7, page 7.

The majority of respondents (76.6%) prefer face-to-face ICD-10-CM training, with Internet-based training as their second choice (47.6%). There was no significant difference in the preferred training methods by job title. Participants who selected "other" for the preferred training method indicated a combination of face-to-face training and also noted that "hands on" application would be very beneficial as part of any training program. Breakdown of first and second choices for an ICD-10-CM training method is shown in figures 8 and 9, page 8.

The majority of respondents (58.6%) thought that training should be provided three months prior to ICD-10-CM implementation (see figure 10, below). Twenty-nine percent suggested six months prior to implementation and 9% thought one year prior to implementation. It was generally felt that if training were provided

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Figure 10: How Long Before Implementation Should Training Be Provided?

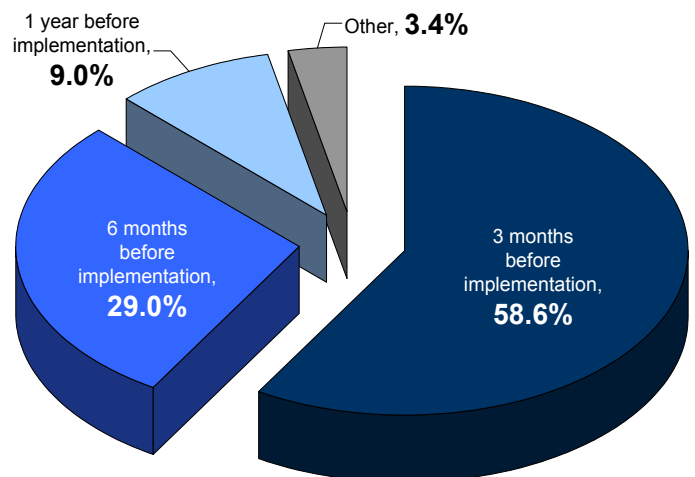


Figure 6: How Soon Should ICD-10-CM be Implemented?

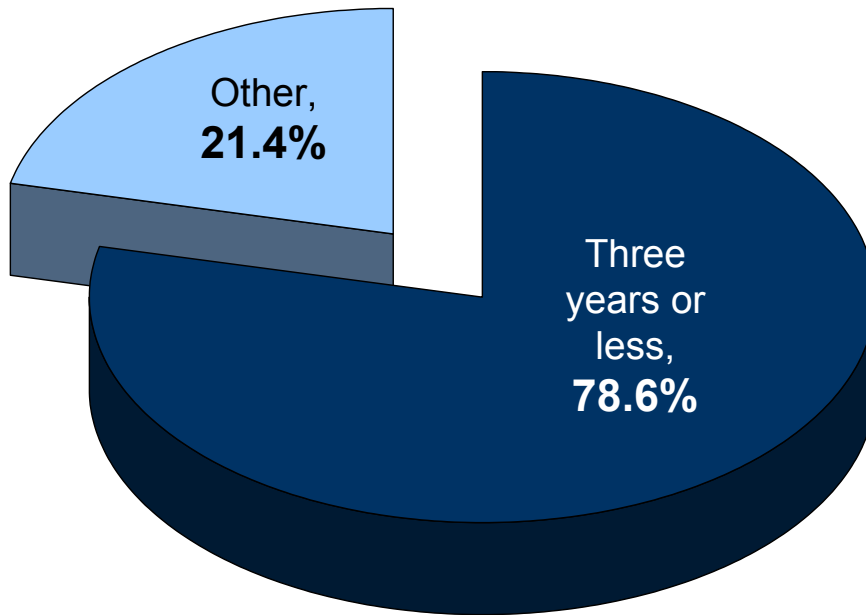


Figure 7: Hours Of Training Needed Prior to Implementation

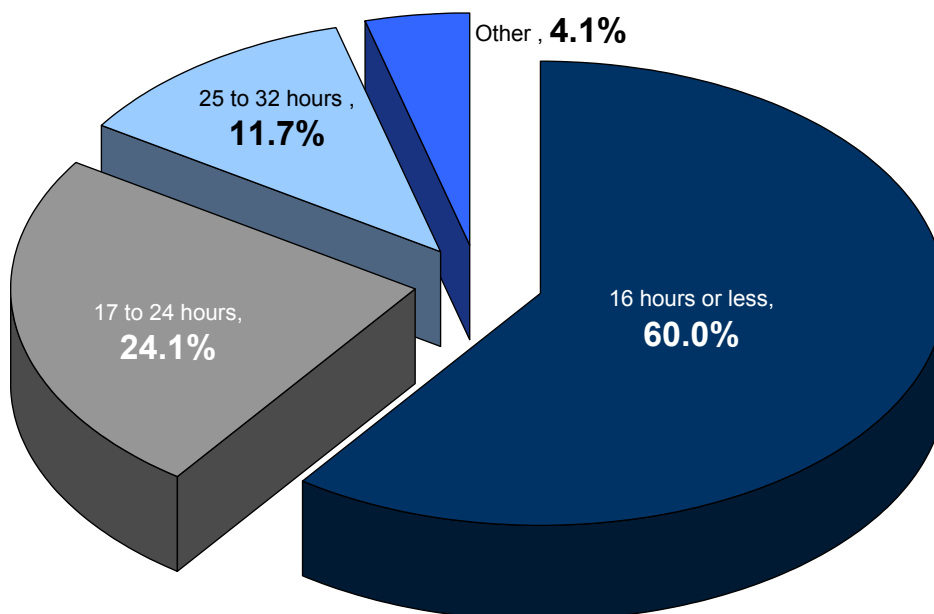


Figure 8: ICD-10-CM Training Method Preferred

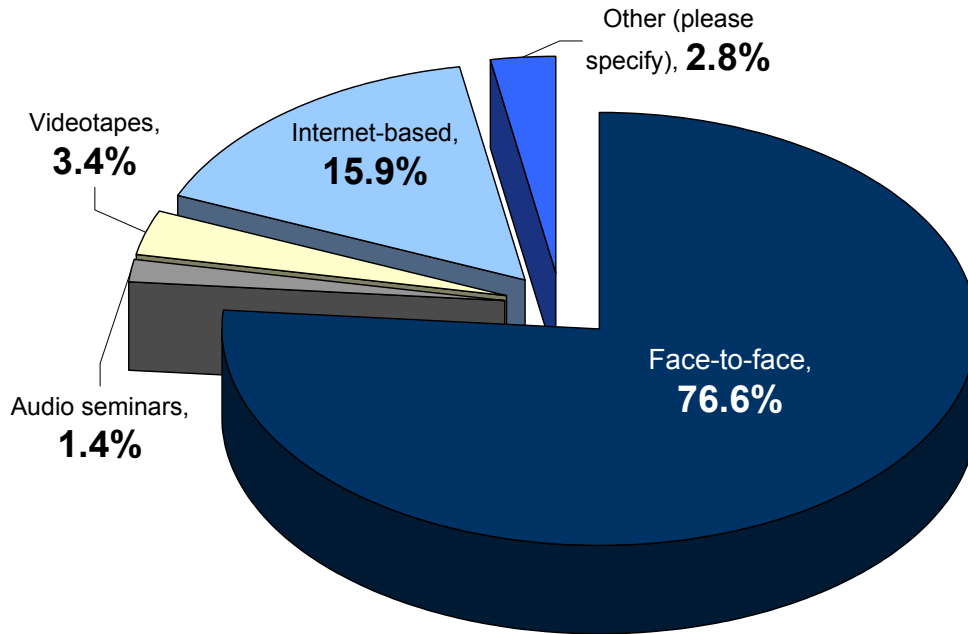
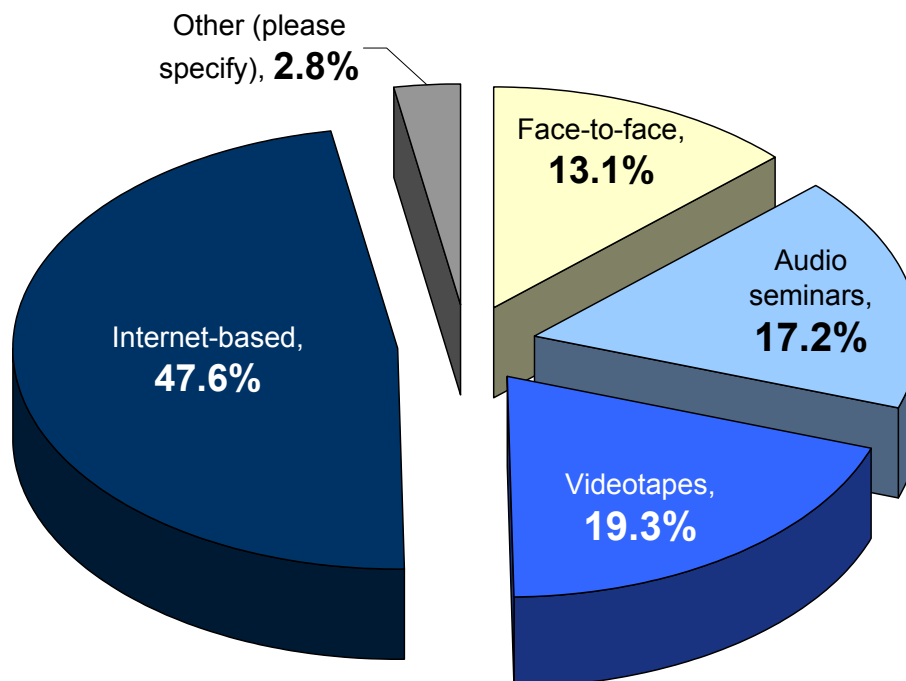


Figure 9: Second-Best Choice for ICD-10-CM Training

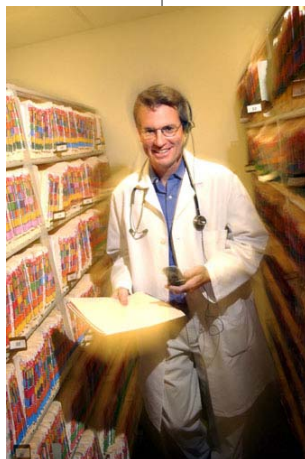


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too far in advance of implementation, the knowledge would not be retained and re-training would be necessary. Those who responded “other” indicated a range of time frames from one month to three years prior to implementation.

Next Steps

A summary of the data provided on the problem identification forms regarding problems assigning an ICD-10-CM code, errors or conflicts in ICD-10-CM instructions, and the use of non-specific codes will be provided to NCHS for review and evaluation so appropriate modifications to ICD-10-CM or the coding guidelines can be made prior to implementation.



Further review and analysis of the field-testing data will be conducted. This data will enable us to provide answers to questions raised by government agencies, healthcare industry representatives, our members and others as ICD-10-CM and its associated coding guidelines are finalized and plans for implementation get underway

General Conclusion

The coding professionals who participated in the ICD-10-CM field-testing favored migration to ICD-10-CM and thought the system should be implemented in three years or less. ICD-10-CM was seen to be an improvement over ICD-9-CM. Participants in some non-hospital settings indicated that they believed ICD-10-CM was much more applicable to these settings than ICD-9-CM. The participants who indicated they did not see ICD-10-CM as an improvement, or were unsure, also tended to be those participants who coded a smaller sample of records.

The average time to code a record was almost twice as long in ICD-10-CM as in ICD-9-CM, as expected. Such expectations were based on the minimal training participants were to receive prior to the initiation of the project, their unfamiliarity with the coding system, the lack of available user-friendly coding tools, and the potential that this activity would be added to their regular workload and commitments. In over half of the coded records, participants indicated there was no time difference between ICD-9-CM and ICD-10-CM. The availability of much-improved coding tools, more training, and increased familiarity with ICD-10-CM will significantly reduce the amount of time needed to code records in ICD-10-CM, possibly to the point where the average time to code records may be less than with ICD-9-CM.

ICD-10-CM codes can be applied to today's medical records in a variety of health care settings, without having to change documentation practices, although improved documentation would result in higher coding specificity, and therefore higher data quality, in some cases.

With minimal ICD-10-CM training, participants were able to appropriately assign ICD-10-CM in most cases, with only minimal ICD-10-CM training provided in preparation for coding records as part of this project. In response to being asked how many hours of ICD-10-CM training they felt they would need prior to implementation, participants generally felt that a maximum of 16 hours of training would be sufficient. This level of training is consistent with responses we have provided in the past regarding the amount of ICD-10-CM training needed by experienced coding professionals. Respondents preferred face-to-face training above other training methods, followed by Internet-based training as their

second choice. Participants suggested training should be provided relatively close to the implementation date (3-6 months prior). AHIMA and AHA have testified in the past that coding professionals will primarily need to be educated on changes in system structure, disease classification, definitions and guidelines. The hierarchical structure, organization, and many of the conventions are much the same in ICD-10-CM as in ICD-9-CM, and therefore would already be familiar to coding professionals. The feedback from our study participants supports this assertion.

The results of this field-testing project and independent data analysis by Ohio State University support that ICD-10-CM is an appropriate replacement for the ICD-9-CM

diagnosis coding system. ICD-10-CM represents an improvement over ICD-9-CM in that it reflects advances in medical care and knowledge that have occurred since the implementation of ICD-9-CM in 1979. It is sufficiently flexible to accommodate medical advances, it ensures that the systems will remain useful well into the future and, significantly, meets criteria established under the Health Insurance Portability and Accountability Act (HIPAA) for code set standards and NCVHS criteria for a procedural coding system. Thus, AHIMA and AHA recommend that ICD-10-CM replace ICD-9-CM as soon as possible.

Ongoing communication with the participants and access to resources necessary for participation in the project were provided through a virtual Community of Practice (CoP) accessible via the AHIMA Web site. The resources included training materials, coding guidelines, and a link to submit the survey forms. In addition, the CoP allowed communication between the participants and the project coordinators. Participants could post questions pertaining to the training materials, coding guidelines, data submission, or other aspects of the project on the CoP. Project coordinators posted responses within 24 hours. Only participants and the project coordinators had access to the CoP. Staff of the NCHS provided official answers to questions related to the training materials or coding guidelines. Any issues pertaining to ICD-10-CM or the coding guidelines or areas where more training would be needed were specifically identified as part of the data collection.

In addition to coding-related questions, the CoP served to address participant's problems related to the use of computer technology. These problems ranged from inability to access the Web-based audio seminar because of lack of media player software, to technical assistance with different browsers to properly view the drop-down boxes in the Web-based survey. An important lesson from these discussions is that, while it may be more cost effective and expeditious to use the Web to train a large number of coders quickly, some providers may not have access to the most up-to-date versions of software, or to state-of-the-art computer systems. There are also issues of software and browser standards that need to be considered when using Web training.

Training

All participants were required to listen to a two-hour archived audio seminar accessible via the Internet; this audio seminar included a slide presentation and was presented by NCHS staff. All participants were required to review a copy of the ICD-10-CM coding guidelines prior to starting the project. Due to technological issues related to organizational firewalls, browser incompatibility, lack of sound capability, and other computer problems, some participants had to drop out of the project because they were unable to access the Web-based audio seminar.

Research Methodology

The study was conducted using a descriptive survey research model. Researchers with doctoral degrees and professors from several academic institutions reviewed and advised on the research methodology, including the instructions on record sample selection, process for coding records, and the process for submitting data. The study required each participant to code medical records and submit a data collection form on each record coded. In addition, participants completed demographic and follow up surveys. All surveys were electronically administered and submitted. To code the medical records, participants were

required to use the ICD-10-CM version made available by NCHS in June 2003.

Record Selection

Participants were encouraged to code 50 medical records, if possible, and to randomly select their record sample from the discharges/visits of any month or months from 2003. The sample was to represent the variety of diagnoses treated by the facility whose records were being coded, and records were to be selected without regard to payer. For instance, if the organization provided both inpatient and outpatient services, then both inpatient and outpatient records were to be included in the sample. Multiple project participants from the same organization were allowed to divide the responsibility for coding different types of records. If the same individual was coding both inpatient and outpatient records as part of the project, half were randomly selected from a specific month's inpatient discharges, and half from the same month's outpatient encounters. Participants whose facilities have a low volume of discharges or visits per month were allowed to select records from more than one month. Participants were also instructed to coordinate the record selection process with other participants from the same facility to ensure that more than one participant did not select the same records. Participants were instructed not to cherry-pick easy or difficult records, or to select a particular diagnostic category. Only if the facility treated a limited number of diagnoses was it acceptable for the record sample to be limited to those types of cases.

Process for Coding Records

The data collection period was June 30 through August 5, 2003.

Only records of discharged patients were eligible for the study. All records had to be complete, which was defined as having available all ancillary test results and clinical documentation, including the discharge summary.

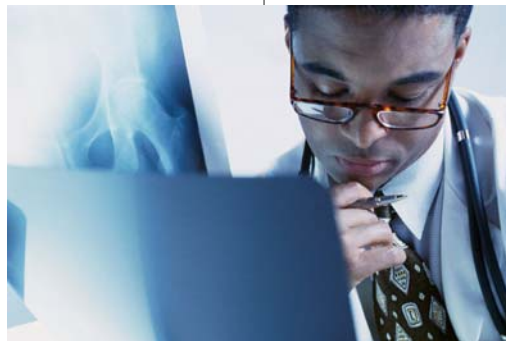
ICD-9-CM and ICD-10-CM diagnosis codes were assigned for each medical record. Since ICD-10-CM is not yet available in a user-friendly electronic format, printed copies of the index and the tabular list were provided to all participants. Participants were required to use hardcopy manuals for ICD-9-CM coding rather than encoding software in order for the coding process to be comparable for both coding systems.

If the record being coded for the project had previously been coded in ICD-9-CM, the participant was required to disregard the

original ICD-9-CM codes and re-code the record. Both ICD-9-CM and ICD-10-CM codes were to be assigned in accordance with the *Official Guidelines for Coding and Reporting* for each. No procedure codes were assigned.

The entire medical record was to be reviewed when assigning both ICD-9-CM and ICD-10-CM codes. Participants were instructed to assign codes as completely and accurately as possible, according to the existing medical record documentation. Participants were instructed not to query physicians for clarification of documentation regarding either ICD-9-CM or ICD-10-CM codes, in order to limit the variables in the coding process and to maximize the comparability of the data. The

Ongoing communication with the participants and access to resources necessary for participation in the project were provided through a virtual Community of Practice (CoP) accessible via the AHIMA Web site.



standard for current coding practice is to query the physician when medical record document is ambiguous or conflicting.

Data Collection

The data elements to be collected were determined by AHIMA and AHA staff, in consultation with researchers at several academic institutions.

The AHIMA ID number was used to identify individual participants. The internal tracking number was a unique number assigned by the participant to each medical record the participant coded. This number enabled us to contact a participant about a specific survey response in the event we needed clarification.

Due to resource constraints, we were not able to collect data at the code or category level, but only the chapter level. The collection of actual code numbers would have necessitated a more complex survey design and data analysis process and, thus, would have been more resource-intensive and expensive than the methodology adopted. Instead, we chose to collect data on the number of codes assigned. This allowed us to evaluate whether ICD-10-CM would result in fewer or greater codes assigned per record, as well as how well each of the ICD-10-CM chapters was represented in the record sample. Certain responses required participants to complete a separate “problem identification form,” which highlighted specific ICD-10-CM code numbers and included a description of problems encountered when attempting to assign a code, such as the inability to find an appropriate code, difficulty locating the appropriate code in the index, or the lack of sufficient medical record documentation to assign a more specific code. The problem identification forms required manual tabulation.

Survey Tools

Data was submitted via a Web-based survey tool developed by Ohio State University (OSU) and housed on the OSU server. OSU health informatics and statistical staff cleaned the data, and tabulated and reported the results to AHA and AHIMA.

Initially participants were required to complete three separate surveys and one supplementary survey:

Demographic Survey (completed once by each participant). The demographic survey collected data on:

- Health information management credentials
- Type of organization where the participant was employed
- Level and type of coding experience

Record survey (completed once for each record coded). Each record survey collected data on:

- AHIMA ID number
- Internal tracking number
- Type of medical record (e.g., short-term acute care hospital inpatient, short-term acute care hospital outpatient, home health/hospice, rehabilitation unit/facility, etc.)
- Number of minutes needed to code the record in ICD-9-CM and ICD-10-CM
- Reasons for taking more than 5 minutes longer to code the record in ICD-10-CM than in ICD-9-CM
- Number of ICD-9-CM and ICD-10-CM codes assigned
- Number of ICD-10-CM codes assigned per ICD-10-CM chapter
- Number of non-specific ICD-10-CM assigned per ICD-10-CM chapter (“non-

Data was submitted via a Web-based survey tool developed by Ohio State University (OSU) and housed on the OSU server. OSU health informatics and statistical staff cleaned the data, and tabulated and reported the results to AHA and AHIMA.

specific” was defined as any code that included the phrase “unspecified” or “not otherwise specified” in the code description)

- Number of diagnoses that the participant was unable to code in ICD-10-CM

Follow-up Survey (completed once by each participant at the conclusion of the project). At the conclusion of the coding phase of the project, participants were asked to complete a follow-up survey questionnaire. The follow-up survey collected data on:

- Where records were coded
- Degree of familiarity with ICD-10-CM prior to the start of the testing project
- References used when coding the records
- Amount of training needed by experienced coding professionals prior to implementation of ICD-10-CM
- Ease of assigning codes in ICD-10-CM as compared to ICD-9-CM
- Improvement in clinical descriptions in ICD-10-CM over ICD-9-CM
- Clarity and completeness of notes, instructions, and guidelines in ICD-10-CM
- Whether the participants believed ICD-10-CM to be an improvement over ICD-9-CM
- Whether the participants supported migration to ICD-10-CM
- Recommended implementation time frame

Supplemental Survey (completed once by each participant a few weeks after the end of the project). An additional survey was completed after the conclusion of the project to obtain information not included in the initial follow-up survey and to clarify responses to some questions in the initial follow-up survey.

Some of the questions included in this survey were inspired by suggestions made by members of the National Committee on Vital and Health Statistics Subcommittee on Standards and Security at their August 2003 meeting. This supplemental survey collected data on:

- Job title
- Amount of time spent coding medical records with ICD-9-CM per week
- Number of hours of ICD-10-CM training the participant felt he/she would need prior to implementation
- Training method most suited to participant’s learning style
- How long before implementation date training should be provided
- Location of computer used to complete the web-based surveys for the project

Validation

To validate the accuracy of ICD-10-CM coding, diagnostic information from every fifth record coded by one half of the participants was recoded by AHIMA and AHA staff. These participants were asked to submit a separate data form for the validation sample, in addition to completing the Web-based record survey. The additional data included diagnoses documented in the medical record and the corresponding ICD-10-CM code(s) assigned. This data was converted to a database, and then AHA and AHIMA professional coding staff re-coded the validation forms in ICD-10-CM, without knowledge of the codes assigned by the participant. Discrepancies in code assignment were then reviewed by other AHA and AHIMA staff to verify whether the code assignments were actually different.



All of the participants have an HIM or coding credential; 85.8% have one of the two general HIM credentials (RHIA or RHIT); and 14.9% have a specialized coding credential only (see figure 11, page 16).

Regarding job titles, 43.4% indicated they were a coder or coding professional (see figure 12, page 16). Other job titles included:

Manager/coordinator/supervisor/team leader (17.2%); Director (9.7%); Consultant (9.0%); Data quality analyst/case mix analyst (4.1%); Assistant director (2.1%); and Other (13.1%).

Where Participants Work

Over half (56.8%) of the participants work in a short-term acute care hospital (see figure 13, page 17). The next largest employment setting was integrated delivery system (17.8%). Other settings represented in our participant sample included: Consultant/vendor (5.9%); Physician office practice (3.0%); Nursing home (2.4%); Educational institution (3.0%); Government agency/contractor (2.4%); Other ambulatory setting (1.8%); Rehabilitation facility (1.8%); Long-term care hospital (1.2%); Home health/hospice (.6%); Behavioral health facility (.6%); and Other (3.0%).

The average bed size for the short-term acute care hospitals employing our participants was 358. Bed size ranged from fewer than 50 (12.5%) to greater than 400 (42.7%) (see figure 14, page 17).

Participants' Coding Experience

Judging by the reported years of coding experience, the participants were experienced coding professionals. Eighty-eight percent reported more than five years of coding experience; 68.5% reported more than 10 years. However, not all of the participants are seasoned coding professionals, as shown by their reported job titles. Less than half (43.4%) indicated that their current job title is coder or coding professional.

Thirty-seven (37) respondents, or 25.5%, indicated they spend 35-40 hours per week coding medical records with ICD-9-CM. And 13.8% indicated they spend one to five hours per week coding. Many of the "other" responses indicated that they never, or almost never, spend any time actually coding medical records. Therefore, if the "other" responses are combined with the responses for one to five hours per week, 30.3% of the participants spend less than six hours per week coding.

Thus, while the responses regarding coding experience indicated that the participants are

(Continued on page 18)

Figure 11: HIM Credentials

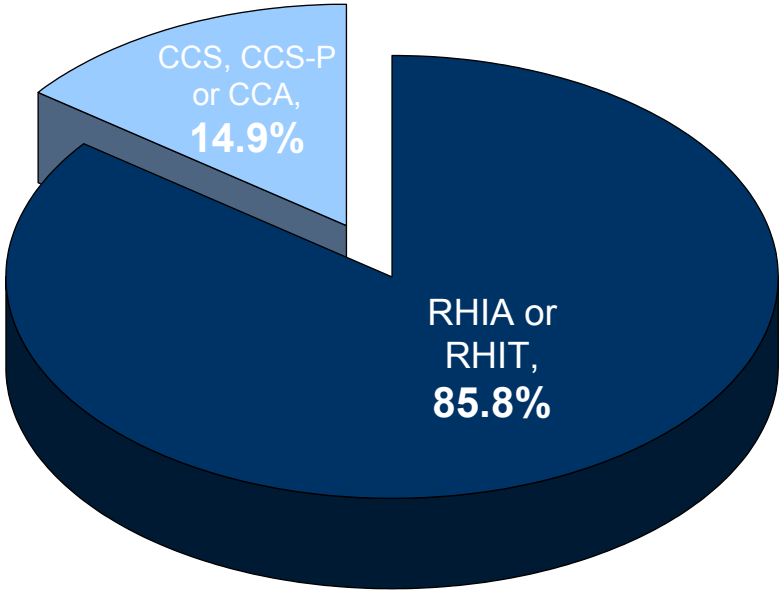


Figure 12: Participants' Job Title

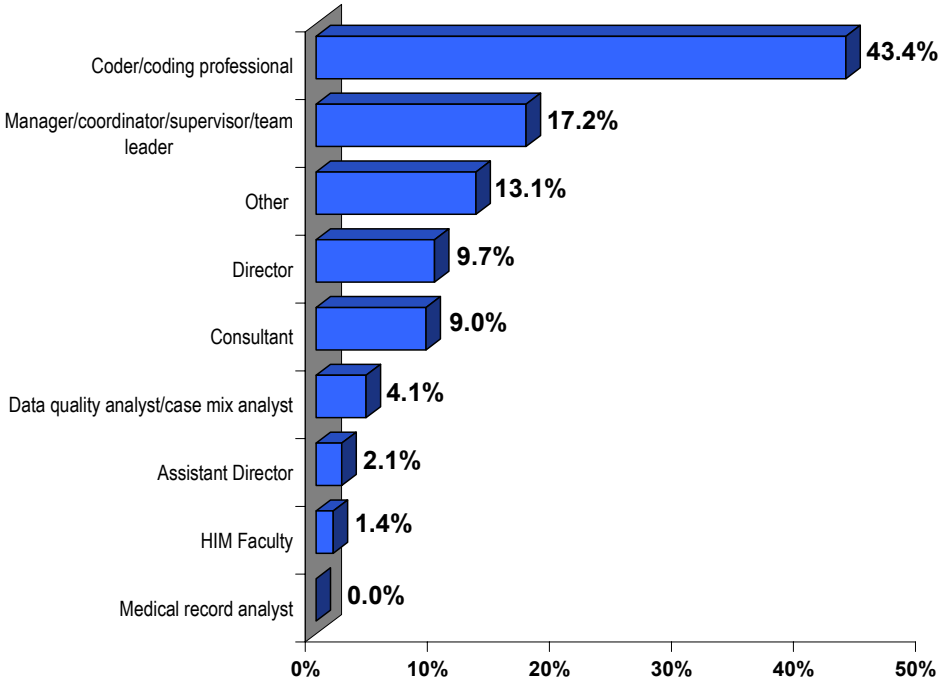


Figure 13: Participants' Place of Employment

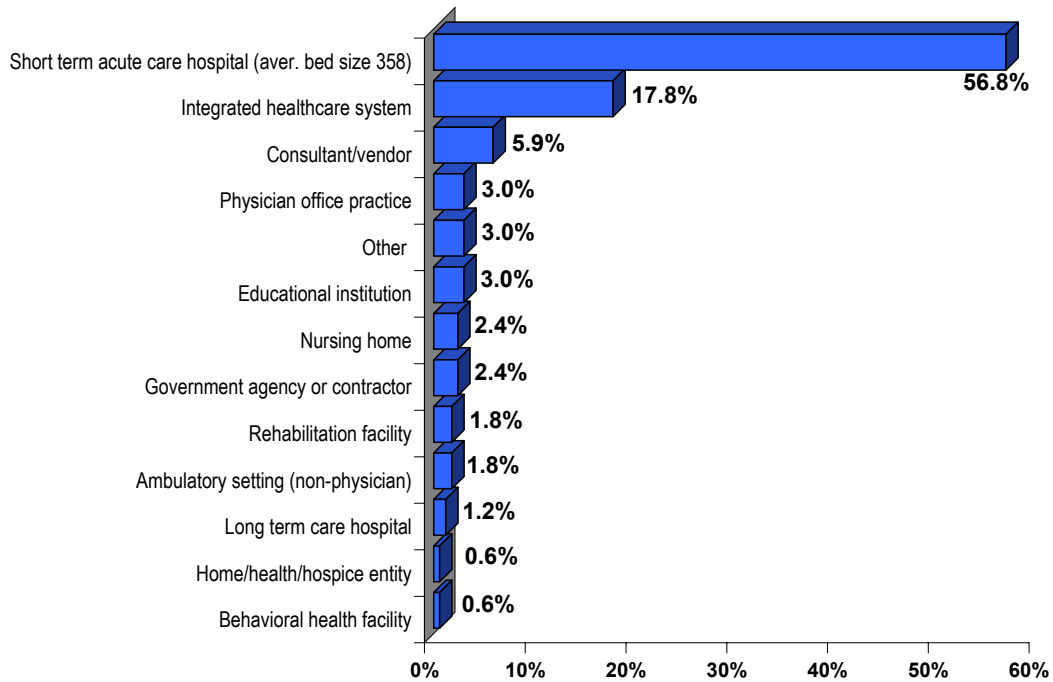
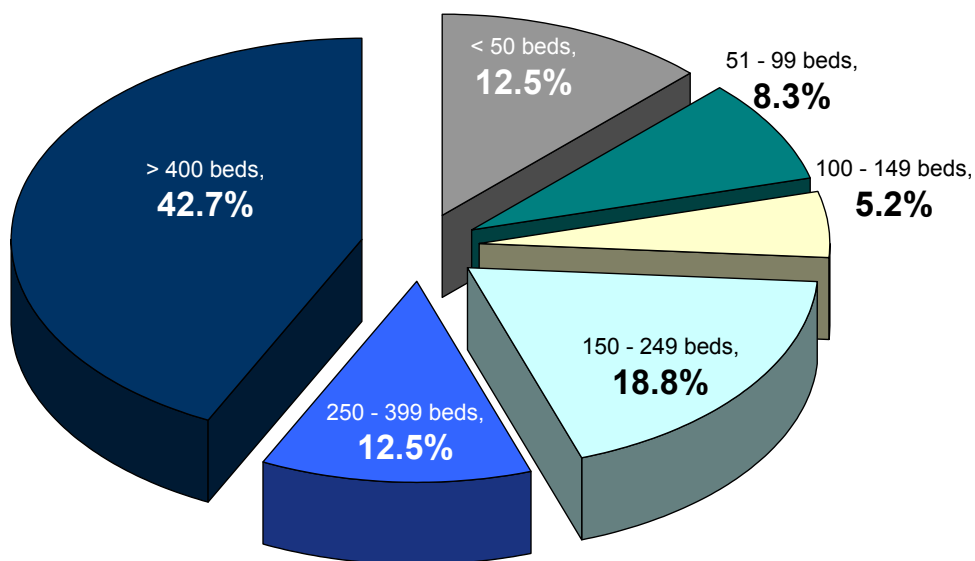


Figure 14: Short-Term Acute Care Hospitals by Bed Size



(Continued from page 15)

generally seasoned coding professionals (88% reported 5 years or more of coding experience and 62% reported more than 10 years of experience), many of them are not currently coding records extensively on a regular basis.

A breakdown for the amount of time spent coding medical records with ICD-9-CM coding each week is shown in figure 15, page 19.

The breakdown of the participants' areas of coding experience is (see figure 16, page 19):

- Hospital inpatient – 31.9%
- Hospital outpatient – 31.7%
- Physician practice – 10.2%
- Other ambulatory setting – 10.9%
- Post-acute care – 12.3%
- Other – 3.1%
 - Correctional facility
 - Education
 - Hospital transitional care
 - Psychiatric/mental health
 - Quality improvement organization
 - Subacute
 - Utilization review company
 - Veterans Administration Medical Center
 - Veterinary hospital

The total response was greater than the number of participants because each was allowed to select multiple options.

Familiarity with ICD-10-CM at Start of Project

The majority of respondents (63.8%) indicated being at least somewhat familiar with ICD-10-CM prior to the start of the project. Participants may have gained some familiarity through exposure to the differences between ICD-9-CM

and ICD-10-CM provided by seminars and other products, as well as through review of a previous draft of ICD-10-CM that was available on the NCHS Web site.

Location of Computer for Survey Submission

The majority of respondents (67.6%) indicated that they used a computer at their place of employment to complete the Web-based surveys used for this project. Breakdown of responses is shown in figure 17, page 20.

Further analysis of the responses indicated that while the majority of coding professionals (66.7%) used only a computer at their place of employment to complete the Web-based surveys, 19% used both a computer at work and at home and 9.5% used only a computer at home.

Coding Records in ICD-10-CM vs. ICD-9-CM

A total of 6,177 medical records, representing a variety of record types, were coded as part of this project. On average, 37 records were coded per participant. Almost half (42.3%) of the records represented short-term acute care hospital inpatient records (see figure 18, page 20). Another third (38.8%) represented short-term acute care hospital outpatient records. Almost 10 percent (7.9%) were records from post-acute settings, which encompassed home health or hospice, nursing homes, long term care hospitals, and rehabilitation units or facilities. Six percent (6%) of the coded records were from physician practices, with a small percentage of records from clinics, community health centers, freestanding ambulatory surgery centers, and freestanding diagnostic facilities (2.9%). Records representing both inpatient and outpatient encounters in a behavioral health facility comprised 1.6% of the sample. Only

(Continued on page 21)



Figure 15: Time Participants Spend Each Week Coding with ICD-9-CM

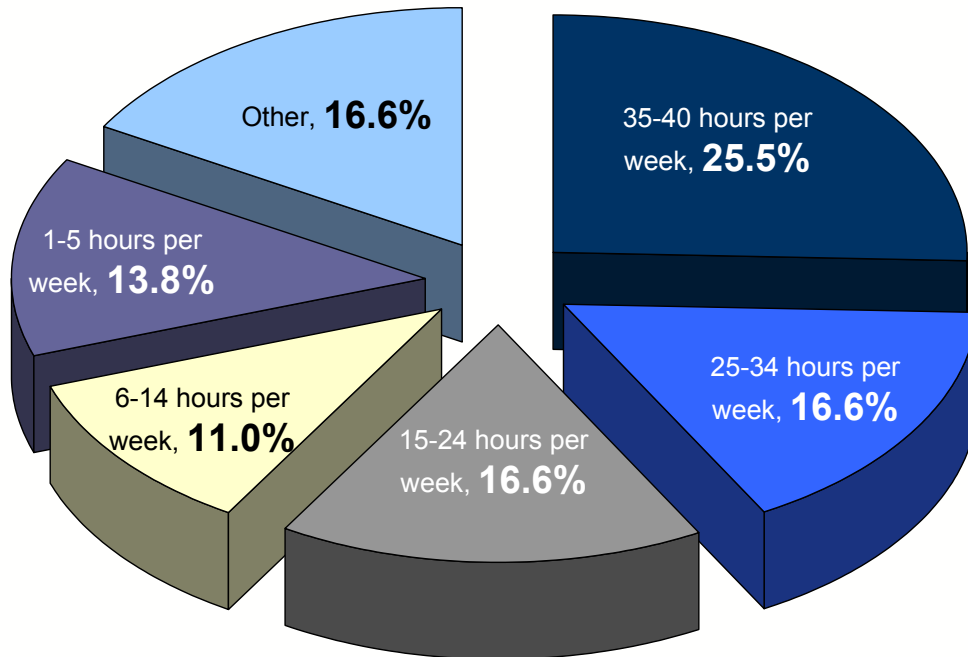


Figure 16: Type of Coding Experience

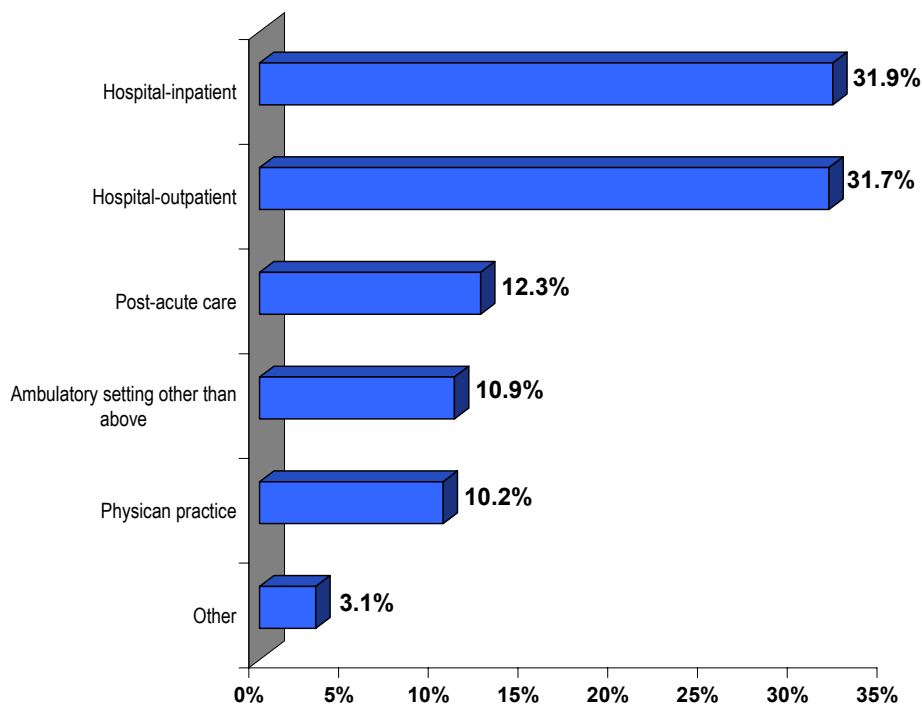


Figure 17: Location of Computer Used to Complete Surveys

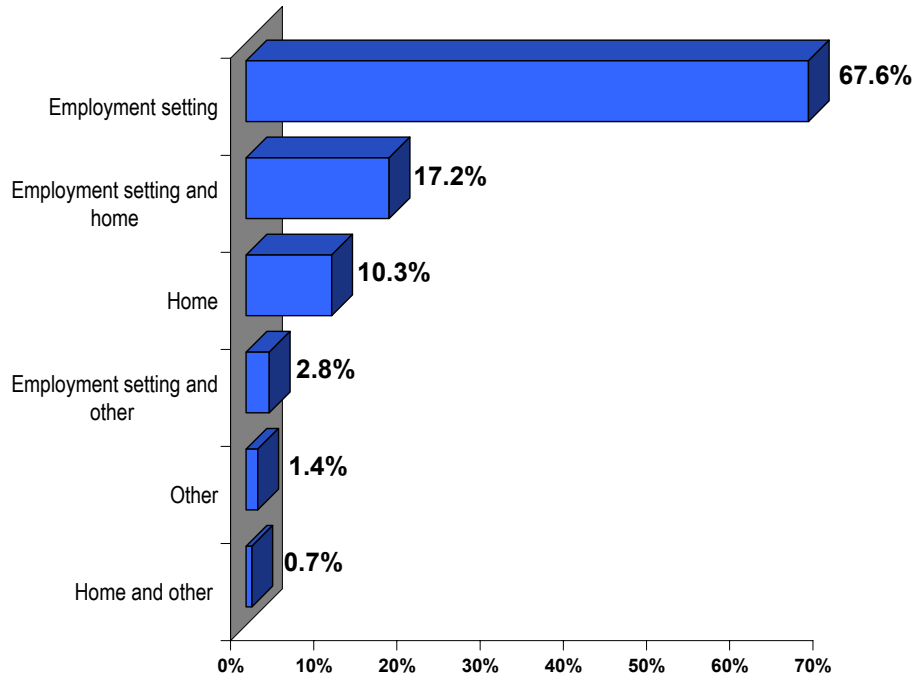
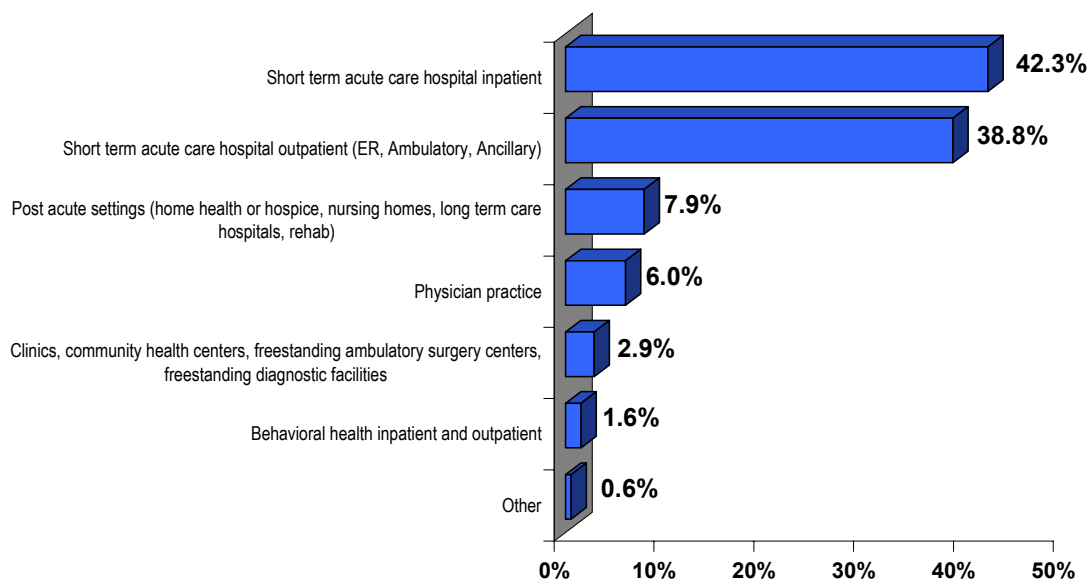


Figure 18: Type of Medical Records Coded



(Continued from page 18)

0.6% of the records were classified to the “other” category, confirming that the vast majority of records fell into one of the specific categories.

A total of 18,747 ICD-10-CM codes were reported as being assigned across the entire record sample. The responses to this question were also limited to “five or more,” so the actual total is probably higher. As discussed below, the codes reported per ICD-10-CM chapter totaled 23,122, but this figure may also be low.

Organization of ICD-10-CM Chapters

Participants were asked to report the total number of ICD-10-CM codes assigned per chapter to determine if the coded records represented a broad cross-section of the ICD-10-CM coding system. Chapters of ICD-10-CM are primarily organized by body system, with other chapters devoted to infectious/parasitic diseases, symptoms, signs, and abnormal clinical findings, injury, poisoning, other consequences, external causes of morbidity, and factors influencing health services (see table on page 22). The responses indicated a possible total of 23,122 ICD-10-CM codes assigned for the record sample; however, since some participants experienced difficulty in using the dropdown boxes for reporting the number of ICD-10-CM codes per chapter, it is possible that some codes were inadvertently omitted from the response to this survey question. The results indicated that all chapters were represented in the project. The highest number of reported codes represented diseases of the circulatory system (3,885), followed by factors influencing health services (2,441) and then endocrine, nutritional and

metabolic diseases (2,230). The lowest number of codes was in the chapter for perinatal conditions (213). It is important to keep in mind that the reported numbers of codes do not necessarily represent unique codes, but rather the number of times respondents reported a code in one of these chapters. For example, if multiple participants assigned the same code, or a single participant assigned the same code on multiple records, the code would show up in the respective chapter multiple times.



Non-Specific Codes

Of the total number of reported ICD-10-CM codes per chapter, participants were asked to indicate the number that were non-specific in nature, defined as codes with the words “unspecified” or “not otherwise specified” in the code title. For each of these codes, they were asked to note the reason they were unable to assign a more specific code number. They were also required to provide additional information about the non-specific codes on a separate form referred to as a “problem identification form.” This additional information included the ICD-10-CM code assigned and the reason a more specific ICD-10-CM code could not be assigned. Although participants reported 5,718 non-specific codes, a review of the additional information they provided reduced the final number of non-specific codes in the sample to 2,847. As mentioned earlier, these codes are not necessarily unique ICD-10-CM codes, since the same code might be reported for multiple records. Reasons for eliminating non-specific codes included failure to meet the criteria for a non-specific code and the use of incorrect or

(Continued on page 23)

Total Number of ICD-10-CM Diagnosis Codes Reported by Chapter

Chapters		Number of Codes Reported
A00-B99	Certain infectious/parasitic diseases	455
C00-D48	Neoplasms	622
D50-D89	Diseases of blood and blood-forming organs	696
E00-E90	Endocrine, nutritional and metabolic diseases	2,230
F01-F99	Mental and behavioral disorders	1,163
G00-G99	Diseases of the nervous system	792
H00-H59	Diseases of the eye and adnexa	296
H60-H95	Diseases of the ear and mastoid process	214
I00-I99	Diseases of the circulatory system	3,885
J00-J99	Diseases of the respiratory system	1,439
K00-K93	Diseases of the digestive system	1,560
L00-L99	Diseases of the skin and subcut. tissue	322
M00-M99	Diseases of the musculoskeletal system	1,374
N00-N99	Diseases of the genitourinary system	1,046
O00-O99	Pregnancy, childbirth, and puerperium	600
P00-P96	Perinatal conditions	213
Q00-Q99	Congenital malformations, deformations	240
R00-R99	Symptoms, signs and abnormal clinical findings, not elsewhere classified	1,585
S00-T88	Injury, poisoning, other consequences	1,235
V01-Y98	External causes of morbidity	714
Z00-Z99	Factors influencing health, health services	2,441
Total		23,122

(Continued from page 21)

invalid codes. The incorrect or invalid codes may have been data entry errors, but since we were unable to determine which non-specific code had been assigned, these instances were eliminated from our “non-specific” category.

The 2,847 non-specific codes represent 12.3% of the 23,122 total number of codes reported. The small percentage of reported codes that were non-specific in nature seems to indicate that the medical record documentation necessary to support coding specificity was present in the majority of cases.

In the final group of 2,847 non-specific codes, the highest percentage of non-specific codes (54.0%) was reported on short-term acute care hospital inpatient records. However, this record type also constituted the largest group of records in our study sample. The second highest percentage of non-specific codes (31.6%) was reported for short-term acute care hospital outpatient records, which was also the second largest group of records in our study sample. The third-highest percentage of non-specific codes (4.2%) was reported for physician practices, and physician practice records only represented 6% of our study sample. However, it can be assumed that physician practice records often lack the necessary documentation to report a more specific code. See the table below for a

breakdown of non-specific codes by record type.

Note that this breakdown indicates the number of records per record type, not the total number of codes reported. We plan to calculate the total number of codes reported for all records in our study sample by record type to determine the percentage of codes per record type that were non-specific codes. This will allow us to better determine whether certain record types have a proportionately greater problem with lack of specificity, and if targeted educational efforts to improve documentation in these health care settings would be beneficial. It is important to note that all of the diagnoses resulting in a non-specific code assignment could be coded in ICD-10-CM. Therefore, while improved documentation would result in higher data quality, changes in documentation practices would not be absolutely necessary to implement ICD-10-CM.

The majority of the non-specific codes reported were due to lack of insufficient medical record documentation to assign a more specific code (70.5%).

Coding Time in ICD-10-CM Not a Barrier

The time it took to code each record in ICD-9-CM and ICD-10-CM was collected, and

Record Type	Number of Records in Study Sample	Number of Non-Specific Codes	Percentage of Non-Specific Codes
Short-term acute care hospital inpatient	2,614	1,537	54.0%
Short-term acute care hospital outpatient	2,399	901	31.6%
Physician practice	372	120	4.2%
Nursing home	231	91	3.2%
Rehabilitation unit/facility	168	67	2.4%
Long term care hospital inpatient	37	51	1.8%
Other (free-standing ambulatory surgery center, free-standing diagnostic facility, behavioral health inpatient, behavioral health outpatient)	273	80	2.8%

included reviewing the record to identify the diagnoses to be coded, the process of locating the diagnoses in the index, and verifying the codes in the tabular list. Time was measured by noting the time when review of the record began and the time when all relevant diagnosis codes had been assigned. Record review time was included in both the ICD-9-CM and ICD-10-CM coding times. Data submission time was not included.

Participants reported that there was no time difference between ICD-9-CM and ICD-10-CM for 3,616 records, or 58.6% of the sample. On average, across all record types, 6.37 minutes were required to code a record in ICD-9-CM and 12.14 minutes were required for ICD-10-CM coding. While the difference in time varied slightly by record type, the average time to code a record in ICD-10-CM was greater than in ICD-9-CM across all types of records.

A total of 2,555 records were reported as taking more than five minutes longer to code with ICD-10-CM than with ICD-9-CM. As expected, the vast majority, 2,348 (91.9%), were due at least in part to difficulty in using the index file format and/or difficulty locating a diagnostic term in the index, which is primarily related to the problematic file format as well as the fact that sometimes different main terms or subterms must be looked up in ICD-10-CM than the ones coding professionals are accustomed to in the ICD-9-CM index.

Of course, the number of codes assigned affected the length of time required for coding. In 1,970 records, or 31.9%, five or more ICD-10-CM codes were assigned. Of these 1,970 records, 1,152 records, or 18.6% of the entire record sample, required more than 15 minutes for ICD-10-CM coding. Three hundred fifty-five (355) (5.7% of the total record sample) of these records required more than 30 minutes for ICD-10-CM coding.

In 252 records (9.9%) the need to consult a reference was reported as a reason for requiring

significantly more time to code in ICD-10-CM than in ICD-9-CM.

For 331 records (13.0%), participants selected the “other” category when asked why a record took significantly longer to code in ICD-10-CM than ICD-9-CM. Reasons provided in this category included:

- Much less familiar with ICD-10-CM than ICD-9-CM;
- Additional time was spent reviewing medical record documentation for a more specific code than would typically be spent with ICD-9-CM; and
- Less time spent reviewing ICD-9-CM codes and instructions because participants were very familiar with them, and in many cases, ICD-9-CM codes were committed to memory.

A number of participants commented that they expected coding in ICD-10-CM to take much longer than ICD-9-CM. They had to review ICD-10-CM index entries, instructions, and coding guidelines much more carefully because they were not familiar with them. Participants noted that they often had to review the medical record to find information needed for ICD-10-CM code assignment that is not needed for ICD-9-CM code assignment (such as laterality), whereas they are very familiar with the clinical information needed to assign an ICD-9-CM code. Also, although participants were asked to follow the same process for locating an ICD-9-CM code during this project as they did for ICD-10-CM, even if the ICD-9-CM code was committed to memory, it may have been difficult to completely disregard their extensive ICD-9-CM knowledge.

Participants reported that there was no time difference between ICD-9-CM and ICD-10-CM for 3,616 records, or 58.6% of the sample.



There were several factors increasing the amount of time spent assigning ICD-10-CM codes. One of these factors was the 380 diagnoses for which the appropriate code could not be determined. Another factor was the 761 instances when an error, conflicting instruction, or other problem was encountered during the coding process.

Coding Productivity Levels May Be Enhanced

The additional time needed to code records in ICD-10-CM as opposed to ICD-9-CM is not particularly problematic or indicative of any long-range implications for productivity after ICD-10-CM implementation. Taking longer to code with ICD-10-CM would be expected, given that participants received minimal training, were basically unfamiliar with the coding system and lacked user-friendly coding tools. The greatest number of records any individual coded as part of this project was 55 and a number of participants coded far fewer, so no one had the opportunity to gain significant ICD-10-CM coding proficiency. Also impacting the time comparison was that not all participants code on a regular basis. Sixty-one (61), 22.7%, participants spend at least 25 hours per week coding medical records in ICD-9-CM. Also, the lack of familiarity with ICD-10-CM and the fact that these records were being coded as part of a field-testing project may have resulted in participants taking more time to ensure they had selected the most appropriate code than they normally would when coding records.

Considering the barriers to coding productivity that the participants dealt with as part of this project, it is particularly surprising that the time required to code records in ICD-10-CM was not greater. The availability of much-improved coding tools, more training, and increased familiarity with ICD-10-CM will significantly reduce the amount of time needed to code records in ICD-10-CM, possibly to the point

whereby ICD-10-CM actually may require less coding time than ICD-9-CM.

The following is a breakdown of the time comparison by record type:

Record Type	ICD-9-CM (minutes)	ICD-10-CM (minutes)
Short term acute care inpatient	8.99	15.99
Short term acute care outpatient	4.18	9.03
Clinic/Community health center	2.42	5.05
Physician practice	3.04	6.70
Free standing ambulatory surgery center	2.22	4.62
Home health/hospice	10.76	13.31
Nursing home	6.71	12.99
Long term care hospital inpatient	18.22	28.74
Rehabilitation/facility	4.97	10.94
Behavioral health inpatient	6.33	12.89
Behavioral health outpatient	3.08	9.71

Long term care hospital inpatients took the longest to code in both ICD-9-CM and ICD-10-CM, possibly because the complexity of cases admitted to these facilities usually results in numerous diagnoses to be coded. The largest relative discrepancy between ICD-9-CM and ICD-10-CM coding times was in behavioral health outpatient records. It was apparent that participants may have been trying to locate ICD-10-CM codes for attributes of behavioral health encounters that are primarily social in nature (for example, financial problems) and not codable in ICD-9-CM or ICD-10-CM; there were only 51 records in this category. The smallest relative discrepancy between ICD-9-CM and ICD-10-CM coding times was in home health/hospice records. However, these records required quite a bit of time to code in both ICD-9-CM and ICD-10-CM, possibly because the limited medical record documentation in home health records makes them difficult to code using any system.

The additional time needed to code records in ICD-10-CM as in ICD-9-CM is not particularly problematic or indicative of any long-range implications for productivity after ICD-10-CM implementation.

Input Solicited on Opportunities for Making ICD-10-CM Even Better

Data on the number of errors or conflicts in instructions, index entries, and tabular notes were collected, as well as the number of instances when an appropriate ICD-10-CM code could not be assigned. For each error, conflicting instruction, entry, note, or other problem experienced when trying to assign an ICD-9-CM code, participants were required to submit a “problem identification form.” These forms identified the specific ICD-9-CM codes assigned, and, if possible, the ICD-10-CM codes assigned, as well as an explanation of the problem encountered. A total of 761 errors or conflicts in the instructions in ICD-10-CM were reported. After eliminating the duplications and problems we were unable to confirm (such as a reported inability to find an index entry, but the index entry exists), a total of 305 issues remained. Many of the reported problems that were ultimately eliminated were due to confusion caused by the index file format or misreading of the index entries or instructions. Other issues were eliminated because the participants misused the problem identification form, such as using the form to ask a coding question rather than report a perceived problem with ICD-10-CM. Also, in some cases, participants were looking for clinical factors that are currently in ICD-9-CM, but are not relevant to ICD-10-CM coding. Of the final list of identified problems, difficulty in locating a diagnostic term in the index was by far the most commonly reported problem. Twenty-five of the reported problems pertained to the codes for external causes of morbidity. Since not all facilities currently report external cause codes, many coding professionals are less familiar with the process for assigning these codes, even in ICD-9-CM. The reported problems generally fall into one or more of the following categories:

- Diagnosis was not indexed under the expected main term or subterm;
- Index led to appropriate code category or subcategory, but the specific code was not listed in the Index;
- Multiple cross-references contributed to difficulty in locating the appropriate code in the index and sometimes resulted in erroneous code assignment;
- Lack of a clear “default” code when sufficient information was not available to determine a specific code or uncertainty as to whether “default” code was appropriate;
 - Examples:* codes exist for “morbid obesity due to excess calories” and “morbid obesity with alveolar hypoventilation,” but the code assignment was unclear when “morbid obesity” was documented, but not excess calories or alveolar hypoventilation; “depression,” with no further information, defaults to code F32.9, but the code description is “major depressive disorder, single episode, unspecified,” which seems more specific than the documented diagnosis
- Error in index or tabular;
- Coding guidelines or coding system instructions are unclear or confusing;
- Index led to a code, but code description did not seem to be accurate description of patient’s clinical situation;
 - Example:* patient has never attempted to harm himself but currently has suicidal ideations - “suicide, risk or tendencies” is classified to code Z91.5, but the code description indicates “personal history of self-harm”
- Code categories appear to overlap (i.e., participants perceived that diagnosis could be classified to more than one code);
- Diagnosis is more specific than available codes; and

Example: hernia codes do not indicate recurrence or laterality

- Documentation issue (medical record documentation was too vague to determine the correct code or terminology used by the physician did not correspond to diagnostic terms used in index).

Participants also reported the number of diagnostic statements that they were unable to code in ICD-10-CM and completed a problem identification form for each (see figure 19, below). They were unable to find an ICD-10-CM code for a total of 380 diagnoses. Seventy-four, or 19.5%, were due to insufficient medical record documentation. For 14 diagnoses (3.7%), the physician documentation was insufficient to determine a code assignment, but other medical record documentation was present that would have allowed the assignment of a code. For 250 diagnoses (65.8%), the reason no code could be found was attributed to an “other” reason. For 42 diagnoses, no reason for being unable to determine a code was given.

Upon review of the problem identification forms, we were able to eliminate some of the

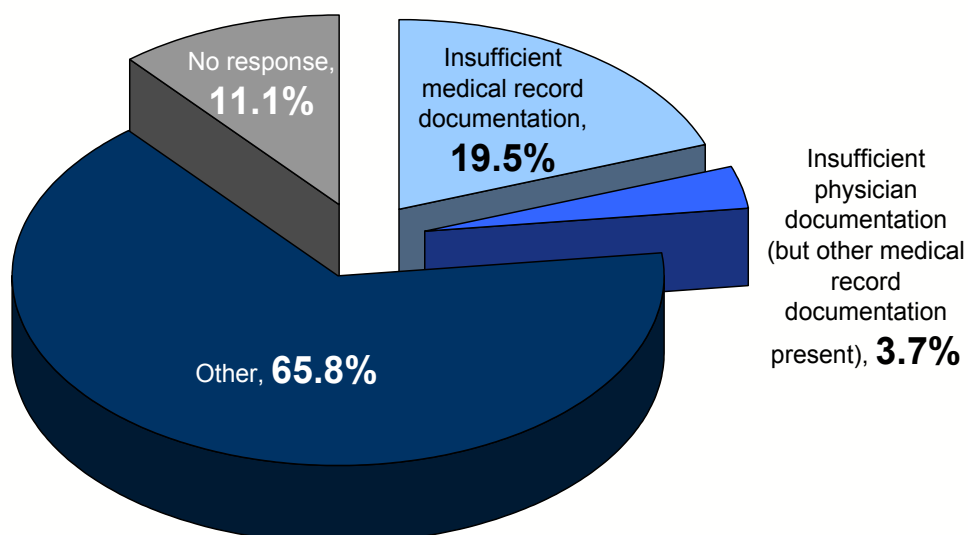
diagnoses that could not be coded. The eliminated diagnoses primarily fell into one of these categories:

- Duplication (more than one participant reported the same issue);
- Diagnosis is listed in Index, but file format probably made it difficult for participant to find it;
- “Diagnosis” is not really a medical diagnosis, but rather an attribute of a healthcare encounter that is not included in either ICD-9-CM or ICD-10-CM; and
- Misinterpretation of instructions.

The remaining 151 diagnoses that could not be coded fall into the following general categories:

- Diagnosis was not indexed under the expected main terms or subterms;
- Insufficient documentation to assign a code (clarification with the physician would be necessary);
- Error in Index or Tabular;
- Concept does not exist in ICD-10-CM;

Figure 19: Reasons Why Participants Were Unable to Find an ICD-10-CM Code



- Code choices not applicable to diagnosis (i.e., either a clear “default” code that is broad enough to cover the diagnosis should be provided or additional codes should be made available);
- Diagnosis is more specific than available code choices; and
- Unclear instructions.

The reported problems will be submitted to NCHS for review, correction of errors in the coding system, consideration of changes or additions to index entries to facilitate location of diagnostic terms, and any other modifications that may be appropriate based on the feedback from our field-testing participants. Clearly, additional index entries would facilitate the coding process for a number of diagnoses; limiting the number of cross-references for a single diagnostic term would also be helpful. To address the instances when there is not a clear “default” code, NCHS will need to decide whether to create an “unspecified” code or delineate an existing code as the “default” code when more detailed information is not available.

Many of the identified issues will not require any modification to ICD-10-CM, as they represent misunderstanding of the instructions or proper code application, and therefore can be addressed in training programs or by including them in the *ICD-10-CM Official Guidelines for Coding and Reporting*. The transition period after implementation can be eased by identifying areas for improvement in ICD-10-CM to facilitate efficient and accurate coding, and making these modifications prior to system implementation. Due to our

relatively large record sample size, the fact that our field testing included a broad range of health care settings, and the fact that a number of the identified problems were reported multiple times, we are confident that many, if not all, of the most common problems coding professionals would face when using ICD-10-CM have been identified. Therefore, coding professionals can look forward to a much-improved coding system by the time of implementation and an improved degree of coding proficiency at the outset.

Clearly, additional index entries would facilitate the coding process for a number of diagnoses; limiting the number of cross-references for a single diagnostic term would also be helpful.

Validation Processes for Coding Accuracy



A total of 360 validation forms were submitted, 5.8% of the total number of records coded for the project. The codes assigned by the coder and validator were compared, discrepancies identified, and reasons for the discrepancies determined. In 154 records, all of the participant’s and validator’s codes matched, totaling 384 codes. In the

206 records that contained code discrepancies between the participant and validator, 638 codes matched, bringing the total of matching codes to 1,022. Some of the variability in code assignment was due to the use of a more specific code by the participant, most likely because complete medical record documentation was available. These cases have been considered to be comparable code assignments for the purpose of this project and have not been included in the number of code discrepancies. Thus, 79.2% of the ICD-10-CM codes assigned by the participant and validator to the 360 records in the validation sample were considered a match. The remaining 269 codes that did not match were

due to the following reasons described in the table below.

The participants and validators had about the same number of coding errors. The reasons for participant or validator errors typically fell into one of the following categories:

- New feature in ICD-10-CM
- Diagnosis more specific than available code choices
- Insufficient information in narrative description provided and coder makes an assumption
- Index difficult to use and an indentation is missed resulting in a related code, but not an exact match

By far, the most common error occurred with a new feature in ICD-10-CM that requires a seventh character extension to identify whether the encounter is related to an injury’s initial encounter, subsequent encounter or sequelae. Participants’ codes were missing digits, typically the seventh character extensions, more often than validators’ codes.

The extension character must always be the seventh character in the data field. Both the guidelines and the training described adding dummy placeholder “x’s” to fill in the empty characters if a code is not a full six characters. However, no instruction regarding the placeholder “x” appeared in the tabular list. In some instances, the seventh character extension was missing from the participants’

response, while in others it was in the wrong position. This is an error easily addressed through more comprehensive training.

In a few instances, the validator neglected to add the seventh character extension. It is unclear whether the omission was due to a simple coding error, or because specific information wasn’t available since validators did not have access to the medical record, and no “unspecified” option was available for the seventh character. It is expected that when working with real records, information regarding whether the case is for an initial or subsequent encounter or sequelae would be readily available in the documentation.

Discrepancies were commonly found in the assignment of external cause of injury codes. This was felt to be primarily due to validators not having access to the medical record, and participants not providing sufficiently detailed information to allow the validator to select the same code. It may also have been due to either the participant or the validator making certain assumptions regarding a case. For example, with the a narrative description of “pedestrian hit by a motor vehicle,” the validator assigned code V03.00a, while the participant assigned V03.90. Both codes refer to a pedestrian injured in collision with a car, pick-up truck or van—but one selected the code for “in nontraffic accident” and the other for “unspecified whether traffic or nontraffic accident.” Given the lack of specific information, it is possible that a third coder may have even selected a third code assuming

Number of Codes	Reasons for Variance
97	Coding error by participant
100	Coding error by validator
25	Missing digit(s) in code assigned by participant
13	Missing digit(s) in code assigned by validator
14	Conflicting coding system instructions
20	Other reason

that the case was the result of a traffic accident. Participants and validators were instructed to assign external cause of injury codes as part of the project. Today, not all facilities assign external cause of injury (E codes) even under ICD-9-CM, and it is unclear how familiar participants may have been with using these codes. Lack of familiarity with the use of external cause codes may have also contributed to the errors.

Mismatches were also noted in areas where there was no specific index entry and a coder needed to make a judgment call on code selection. For example, if the narrative description was “history of heart surgery”—would that be Z98.89, Other postprocedural states, or Z92.4, Personal history of major surgery NEC? Similar questions surfaced in the problem identification forms when coders tried to assign codes for “status post coronary artery bypass graft”—indexed under ICD-9-CM, but not easily found under ICD-10-CM.

Response Rate

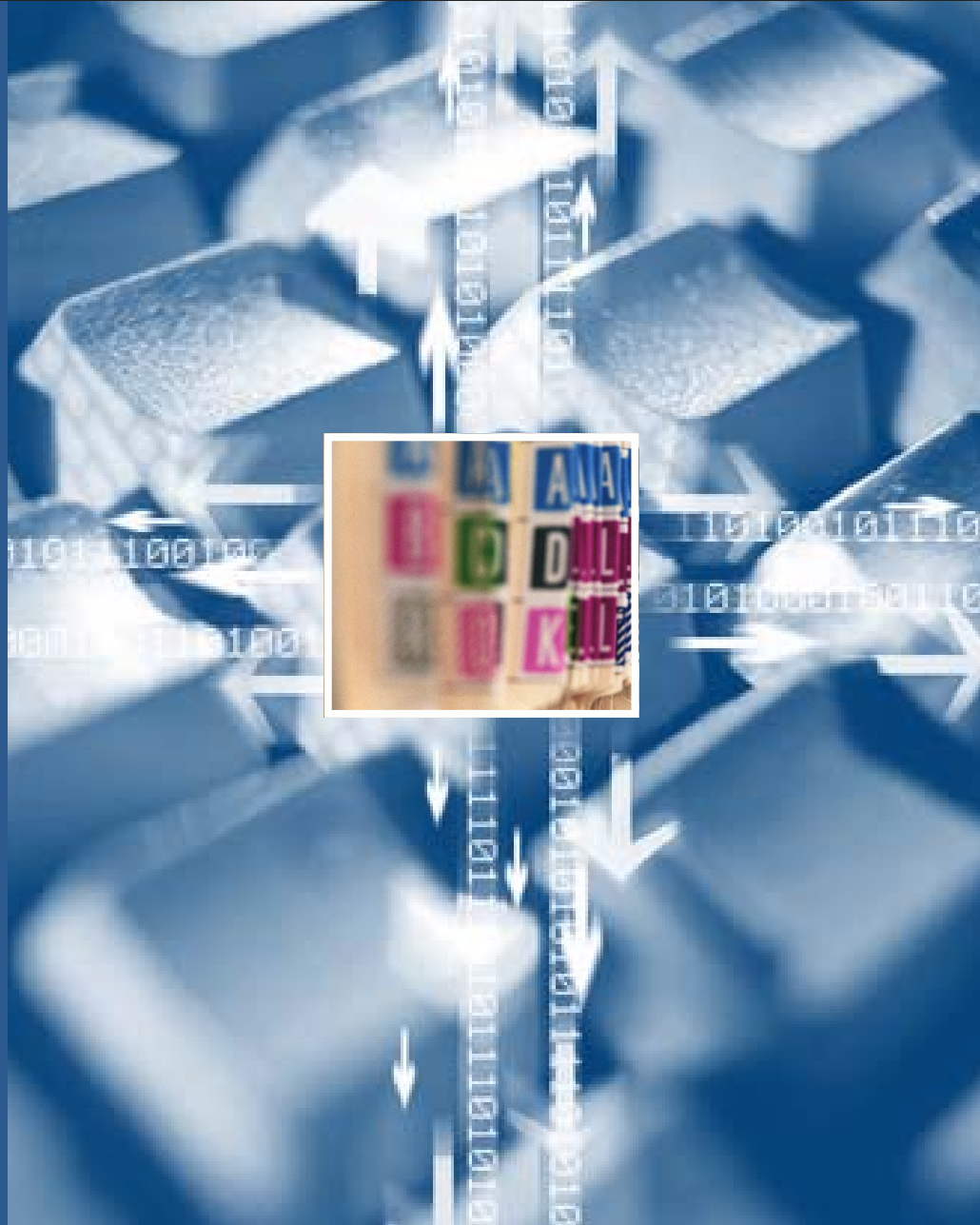
Of the 169 participants, all of them completed the demographic and record surveys, 152 respondents completed the follow-up survey, and 145 respondents completed the supplemental survey.

Study Limitations

The only index file format available for use during this project was extremely unwieldy, cumbersome, and difficult to use. For example, the formatting for multiple indentation levels was confusing and text that wrapped around to the next line added to the confusion. For those main terms that have entries on multiple pages, the subsequent pages did not identify the main term. This issue will be resolved when ICD-10-CM is implemented in a variety of user-friendly, easily navigable formats in both electronic and paper products. However, the lack of an easy to use index file format had a detrimental effect on this project, particularly in terms of time comparisons for coding records in ICD-9-CM and ICD-10-CM and the ability to find diagnostic terms in the index. Less measurable, but equally significant, is the impact the index file format likely had on the participants’ overall perception of ICD-10-CM. Although we assured participants during the course of the project that the index to be used by coding professionals after the system is implemented would be much more user-friendly, their frustration with the current index was expressed in a number of follow-up comments. See the Appendix for examples of pages from the Index of a typical ICD-9-CM book and the ICD-10-CM Index.



APPENDIX



Sample Page from ICD-9-CM Index

calcium

Injury to Digestive

Burnett's syndrome (milk-alkali) 999.9

Burnier's syndrome (hypophyseal d...
253.3

Burning
feet s...
sensation (see also L...
782.0
... 529.0

Burns' disease ...
732.3

pharynx 478.29

Bursitis NEC 727.0

Achilles tendon 726.11
adhesive 726.90
 shoulder 726.00
 ankle 726.79
 buttock 726.1
 calcaneal 726.13
 collateral ligament,
 fibular 726.63
 tibial 726.62
 display's 726.2
 elbow 726.33
 finger 726.8
 foot 726.79
 gonococcal 726.06
 hand 726.4
 hip 726.5
 infrapatellar 726.00
 ischiofemoral 726.5
 knee 726.60
 occupational 726.11
 olecranon 726.33
 pes anserinus 726.00
 pharyngeal 478.29
 popliteal 727.51
 prepatellar 726.00
 radiohumeral 727.0
 scapulohumeral 726.13
 adhesive 726.0
 shoulder 726.10
 adhesive 726.0
 subacromial 726.13
 adhesive 726.0
 acromioid 726.10
 subdeltoid 726.19
 adhesive 726.0
 subpatellar 726.60
 syphilitic 095.7
 Thornwaldt's, 726.11
 toe 726.79
 trochanteric 726.00
 wrist 726.4

First stitch ...
surgery) ▶(external) ◀ 998.32
 ... 998.31

Frail ulcer 031.1

Bury's disease (ery...
695.89

Buschke's disease ...
710.1

Burkitt's disease (osteomyelitis) ...
Osteomyelitis) 730.1

Burkitt-Buschke disease (crypt...
Buttock — see condition

Button
Bisk...
Delhi 085.1
oriental 085.1

Buttonhole hand ...
(occupational) 504

Bwamba fever (encephalitis) 066.3

Byssinosis ...
syndrome 958.5

Cachexia — continued
dehydration 276.5
with
 hyponatremia 276.0
 hyponatremia 276.1
due to malnutrition 261
exophthalmic 242.0
heart — see Disease, heart
hypophyseal 253.2
hypopituitary 253.2
lead 984.9
 specified type of lead — see Table of Drugs
 and Chemicals
malaria 084.9
malignant (M8000/3) 199.1
marsh 084.9
nervous 300.5
old age 797
pachydermic — see Hypothyroidism
paludal 084.9
pituitary (postpartum) 253.2
renal (see also Disease, renal) 593.9
saturnine 984.9
 specified type of lead — see Table of Drugs
 and Chemicals
senile 797
Simmonds' (pituitary cachexia) 253.2
splenic 289.59
strumipriva (see also Hypothyroidism) 244.9
tuberculous NEC (see also Tuberculosis)
 011.9

Café au lait spots 709.09

Caffey's disease or syndrome (infantile cortical
hyperostosis) 756.59

Caisson disease 993.3

Caked breast (puerperal, postpartum) 676.2

Cake kidney 753.3

Calabar swelling 125.2

Calcaneal spur 726.73

Calcaneopophysis 732.5

Calcaneonavicular bar 755.67

Calcareous — see condition

Calcosis (occupational) 502

Calciferol (vitamin D) deficiency 268.9
with
 osteomalacia 268.2
 rickets (see also Rickets) 268.0

Calcification
adrenal (capsule) (gland) 255.4
 tuberculous (see also Tuberculosis)
 017.6
aorta 440.0
artery (annular) — see Arteriosclerosis
auricle (ear) 380.89
bladder 596.8
 due to S. hematobium 120.0
brain (cortex) — see Calcification, cerebral
bronchus 519.1
bursa 727.82
cardiac (see also Degeneration, myocardial)
 429.1
cartilage (postinfectious) 733.99
cerebral (cortex) 348.8
 artery 437.0
 cervix (uteri) 622.8
 choroid plexus 349.2
 conjunctiva 372.54
 corpora cavernosa (penis) 607.89
 cortex (brain) — see Calcification, cerebral
 dental pulp (nodular) 522.2
 dental papilla 520.4
 disc, intervertebral 722.90
 cervical, cervicothoracic 722.91
 lumbar, lumbosacral 722.93
 thoracic, thoracolumbar 722.92
fallopian tube 620.8
falx cerebri — see Calcification, cerebral
fascia 728.89
gallbladder 575.8
general 275.40
heart (see also Degeneration, myocardial) 429.1
 valve — see Endocarditis
intervertebral cartilage or disc (postinfectious)
 722.90
 cervical, cervicothoracic 722.91

Calcification — continued
intervertebral cartilage or disc — continued
 lumbar, lumbosacral 722.93
 thoracic, thoracolumbar 722.92
intracranial — see Calcification, cerebral
intraspinous ligament 728.89
joint 719.80
 ankle 719.87
 elbow 719.82
 foot 719.87
 hand 719.84
 hip 719.85
 knee 719.86
 multiple sites 719.89
 pelvic region 719.85
 shoulder (region) 719.81
 specified site NEC 719.88
 wrist 719.83
kidney 593.89
 tuberculous (see also Tuberculosis)
 016.0
larynx (senile) 478.79
lens 366.8
ligament 728.89
 intraspinous 728.89
 knee (medial collateral) 717.89
lung 518.89
 active 518.89
 postinfectious 518.89
 tuberculous (see also Tuberculosis,
 pulmonary) 011.9
lymph gland or node (postinfectious) 289.3
 tuberculous (see also Tuberculosis, lymph
 gland) 017.2
massive (paraplegic) 728.10
medial NEC (see also Arteriosclerosis,
 extremities) 440.20
meninges (cerebral) 349.2
metastatic 275.40
Mönckeberg's — see Arteriosclerosis
muscle 728.10
 heterotopic, postoperative 728.13
myocardium, myocardial (see also
 Degeneration, myocardial) 429.1
ovary 620.8
pancreas 577.8
penis 607.89
periarticular 728.89
pericardium (see also Pericarditis) 423.8
pineal gland 259.8
pleura 511.0
 postinfectious 518.89
 tuberculous (see also Tuberculosis, pleura)
 012.0
pulp (dental) (nodular) 522.2
renal 593.89
Rider's bone 733.99
sclera 379.16
semilunar cartilage 717.89
spleen 289.59
subcutaneous 709.3
suprarenal (capsule) (gland) 255.4
tendon (sheath) 727.82
 with bursitis, synovitis or tenosynovitis
 727.82
trachea 519.1
ureter 593.89
uterus 621.8
vitreous 379.29

Calcified — see also Calcification
hematoma NEC 959.9

Calcosis (generalized) (interstitial) (tumoral)
(universalis) 275.49
 circumscripta 709.3
 cutis 709.3
 intervertebralis 275.49 [722.90]
 Raynaud's
 phenomenon sclerodactyltelangiectasis
 (CRST) 710.1

Calcium
blood
 high (see also Hypercalcemia) 275.42
 low (see also Hypocalcemia) 275.41
deposits — see also Calcification, by site
 in bursa 727.82

Burnett's syndrome — Calcium

Sample Page from ICD-10-CM Index Used in Project

C

Cachexia R64
 - cancerous (M8000/3) C80
 - cardiac - see Disease, heart
 - dehydration E86.0
 - - with
 - - - hypernatremia E87.0
 - - - hyponatremia E87.1
 - due to malnutrition E41
 - exophthalmic - see Hyperthyroidism
 - heart - see Disease, heart
 - hypophyseal E23.0
 - hypopituitary E23.0
 - lead - see Poisoning, lead
 - malignant (M8000/3) C80
 - marsh - see Malaria
 - nervous F48.8
 - old age R54
 - paludal - see Malaria
 - pituitary E23.0
 - renal N28.9
 - saturnine - see Poisoning, lead
 - senile R54
 - Simmonds' E23.0
 - splenica D73.0
 - strumipriva E03.4
 - tuberculous NEC - see Tuberculosis
Café, au lait spots L81.3
Caffey's syndrome Q78.8
Caisson disease T70.3
Cake kidney Q63.1
Caked breast (puerperal, postpartum) O92.7
Calabar swelling B74.3
Calcaneal spur - see Spur, bone, calcaneal
Calcaneo-apophysitis M92.8
Calcareous - see condition
Calcosis J62.8
Calciferol (vitamin D) deficiency E55.9
 - with rickets E55.0
Calcification
 - adrenal (capsule) (gland) E27.4
 - - tuberculous B90.8 [E35]

- aorta I70.0
 - artery (annular) - see Arteriosclerosis
 - auricle (ear) - see Disorder, pinna, specified type NEC
 - basal ganglia G23.8
 - bladder N32.89
 - - due to Schistosoma hematobium B65.0
 - brain (cortex) - see Calcification, cerebral
 - bronchus J98.0
 - bursa M71.40
 - - ankle M71.479
 - - - left M71.472
 - - - right M71.471
 - - elbow M71.429
 - - - left M71.422
 - - - right M71.421
 - - foot M71.479
 - - - left M71.472
 - - - right M71.471
 - - hand M71.449
 - - - left M71.442
 - - - right M71.441
 - - hip M71.459
 - - - left M71.452
 - - - right M71.451
 - - knee M71.469
 - - - left M71.462
 - - - right M71.461
 - - multiple sites M71.49
 - - shoulder M75.30
 - - - left M75.32
 - - - right M75.31
 - - specified site NEC M71.48
 - - wrist M71.439
 - - - left M71.432
 - - - right M71.431
 - cardiac - see Degeneration, myocardial
 - cerebral (cortex) G93.8
 - - artery I67.2
 - cervix (uteri) N88.8
 - choroid plexus G93.8
 - conjunctiva - see Concretion, conjunctiva
 - corpora cavernosa (penis) N48.89
 - cortex (brain) - see Calcification, cerebral
 - dental pulp (nodular) K04.2
 - dental papilla K00.4

- fallopian tube N83.8
 - falx cerebri G96.1
 - gallbladder K82.8
 - general E83.59
 - heart - see also Degeneration, myocardial
 - - valve - see Endocarditis
 - intervertebral cartilage or disc (postinfective) - see Disorder, disc, specified NEC
 - intracranial - see Calcification, cerebral
 - joint - see Disorder, joint, specified type NEC
 - kidney N28.89
 - - tuberculous B90.8 [N29]
 - larynx (senile) J38.7
 - lens - see Cataract, specified NEC
 - lung (active) (postinfectious) J98.4
 - - tuberculous B90.9
 - lymph gland or node (postinfectious) I89.8
 - - tuberculous (see also Tuberculosis, lymph gland) B90.8
 - massive (paraplegic) - see Myositis, ossificans, in, quadriplegia
 - medial - see Arteriosclerosis, extremities
 - meninges (cerebral) (spinal) G96.1
 - metastatic E83.59
 - Mönckeberg's - see Arteriosclerosis, extremities
 - muscle M61.9
 - - due to burns - see Myositis, ossificans, in, burns
 - - paralytic - see Myositis, ossificans, in, quadriplegia
 - - specified type NEC M61.40
 - - - ankle M61.479
 - - - - left M61.472
 - - - - right M61.471
 - - - foot M61.479
 - - - - left M61.472
 - - - - right M61.471
 - - - forearm M61.439
 - - - - left M61.432
 - - - - right M61.431
 - - - hand M61.449

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