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Replacing ICD-9-CM with ICD-10-CM and ICD-10-PCS

Challenges, Estimated Costs and Potential Benefits

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I. Executive Summary

The Robert E. Nolan Management Consulting Company evaluated the costs and implications associated with replacing the ICD-9-CM diagnostic classification system with ICD-10-CM and ICD-10-PCS for key segments of the health care industry. Currently, the National Committee on Vital and Health Statistics (NCVHS) is considering such a proposal.

Key Findings:

Partial Industry Estimates Total $6-$14 Billion

Our estimate concludes that key segments of the health care industry would incur significant expenditure of between $6 to nearly $14 billion during a two- to three-year implementation period. The chart below summarizes the costs by health care organization and payer groups:

Chart 1: Summary of cost impacts for providers and payers (in billions)

Area of Impact	Providers (Physician & Facilities)	Health Plans	Medicaid/ Medicare	Cost Ranges
Systems implementation	$2.6 – 8.2 Billion	$.4 – 1.0 Billion	$.7 – 1.4 Billion	**$3.7 – 10.6 Billion**
Training	$1 – 1.4 Billion	$.06 – 0.1 Billion	Not estimated	**$1.1 – 1.5 Billion**
Productivity loss	$.3 – .4 Billion	Not estimated	Not estimated	**$.3 – .4 Billion**
Re-work	$.3 – .6 Billion		Not estimated	**$.3 – .6 Billion**
Contract renegotiation	$.1 – .4 Billion		Not estimated	**$.1 – .4 Billion**
			Cost range for implementation	**$5.5 – 13.5 Billion**
			Long-term loss of coding productivity (annual increase in operating costs)	**$.15 – .38 Billion**

It is important to note that this is a conservative study. It excludes many providers such as nursing homes, clinical labs and Durable Medical Equipment vendors. Similarly, a large number of payer organizations have been excluded such as third party administrators, clearinghouses and many small and medium insurers. These providers and payer entities were excluded because they were unable to develop initial cost estimates needed in the study.

The technical modifications alone would affect virtually every system providers and payers use, putting the effort on par with the effort required for Y2K. Among the tasks that would need to be completed are installing new code sets, re-mapping interfaces and recreating all reports used by providers and payers in clinical, financial, reimbursement and quality analysis.

Implementation will also require extensive education and outreach, as well as a wide-ranging effort to train coders, physicians, nurses, and other hospital and payer staff.

While a $6 to nearly $14 billion estimate in and of itself represents a major undertaking, its significance is magnified when viewed in the context of the tens of billions of dollars the industry has already devoted to Y2K, HIPAA privacy, transactions and codes sets, and security over the past four years. Many management and staff we interviewed – both providers and payers -- expressed concern about another massive implementation coming so soon on the heels of HIPAA.

Implications of Converting to ICD-10

- **Short-term "data fog":** Because of code disconnects between ICD-9-CM and ICD-10-CM and ICD-10-PCS, existing medical knowledge would be degraded significantly for a period of three to five years. While crosswalks have been or are being attempted between the current and proposed code sets, it is important to understand that, to date, they cannot address all of the comparability issues and thus do not solve the problem of data continuity.

  - The Canadian experience reveals the presence of a data fog around clinical, diagnostic and procedural trends until enough time passes for statisticians and analysts to understand data in the "new world" of ICD-10-CM or ICD-10-PCS.

  - Upon conversion to ICD-10 for mortality statistics, Florida reported an upsurge in AIDS-related deaths. Upon closer examination, this increase was found to be solely attributable to converting to ICD-10 codes.

- **Likely backlogs and payment delays:** During the initial transitional period, the time required for providers and their coding experts to code claims properly will increase significantly. This is a clear lesson learned from virtually every country's experience. An error by any player will affect not only its own transactions but also all others in the subsequent flow of clinical data and funds.

  - These coding backlogs are likely to result in major payment slowdowns, causing enormous cash flow problems and gaps in data for payers. Other consequences of such a slowdown are increased inquiries from patients and providers, short-term borrowing costs, and potential under and over payments.

- **Potential increase in fraud and abuse**: A change in the underlying claim code sets would necessitate the re-writing of all of the rules to determine fraud patterns. It would then take a period of years to refine these rules to bring them back to the level of sophistication and accuracy represented in the current software. It should be noted that with $1.5 trillion in overall health care expense, a very small percentage increase in fraud can produce significant excess costs.

Benefits of ICD-10-CM and ICD-10-PCS

Based on our research, it is our opinion that the vast majority of benefits asserted by proponents cannot be achieved by a conversion to ICD-10-CM or ICD-10-PCS without first implementing a standard clinical vocabulary. For instance, while proponents of ICD-10-CM and ICD-10-PCS assert that the classification system would improve the monitoring of outcomes in health care, we found that academic studies on classifications emphasize the need for standard clinical terminology if improvements to outcomes are to be achieved.

Other benefits ascribed to ICD-10-CM and ICD-10-PCS include improved trending abilities, reduced medical review of claims, improved fraud and abuse detection, and improved ability to negotiate contracts between providers and payers. Based on our research, benefits asserted by proponents are uncertain and unproven.

II. Systems Expense Impacts

Hospital Systems Cost Estimates

How extensive is the switch to ICD-10-CM and ICD-10-PCS likely to be for hospitals? While this question is difficult to answer with precision, we believe the following sample quotes accurately represent the scope of the implementation:

> "Diagnosis and procedure codes are integral to the treatment and payment process in today's health care industry. Although these codes change yearly, the changes are minor in nature to accommodate new medical conditions or treatment procedures… ICD-10 however, is a massive overhaul of the coding scheme and will require field size expansion, change to alphanumeric composition, and complete redefinition of code values and their interpretation. In effect, this will be the most significant overhaul of the medical coding system since the advent of computers."[1]

> "The move to ICD-10-CM is much bigger in the health care industry than Y2K ever was."[2]

Given these statements, we attempted to place the ICD-10 implementations in the context of recent large-scale regulatory changes requiring technology and process modifications. The two efforts that appeared most related were the transactions and code set aspects of HIPAA and Y2K. Several of the interviews we conducted compared ICD-10 to those projects as did some of the literature we reviewed.

Based on emerging information about HIPAA implementation, we believe a credible starting point for the amount of effort is 50-100 percent more than that required for HIPAA compliance (transactions and code sets only) for large facilities. However, we believe the actual effort required could easily climb to 3-4 times that number. The Department of Health and Human Services' (DHHS) original development estimate for hospital implementation of the transactions and code sets for HIPAA was $1.4 billion. In an earlier study[3], we found this estimate to be substantially understated, however we have used HHS' estimate in keeping with a conservative approach. The HIPAA work is relevant and instructive as it, like ICD-10, involved every hospital, was systems-related and involved both legacy and non-legacy systems remediation or

[1] Issues Surrounding the Proposed Implementation of ICD-10, Workgroup for Electronic Data Interchange Subcommittee on ICD-10
[2] "Implementing ICD-10" by Lori Becks, RHIA and Sheri Poe Bernard, CPC published by Ingenix, 2003
[3] "Cost/Benefit Analysis HIPAA Transactions and Code Sets," Robert E. Nolan Company, Inc., 2001

software upgrades. It also involved data sets and transmission standards, and while not the same as ICD-10-CM and ICD-10-PCS, has similar elements.

In a large scale regulatory change, organizations find that the planning, analysis and team formation often involve significant resources in their own right. Technology and process analyses performed to evaluate the effort for HIPAA ranged from a low of $25,000 in one interview we conducted to a high of $500,000 for state programs like Medicaid. While much of this also involved privacy and security, a substantial portion was directed at systems analysis.

In the table below, we captured from secondary literature some of the key planning and team formation steps involved in HIPAA and extrapolated these to ICD-10-CM and ICD-10-PCS. We found the description of the effort involved for implementing ICD-10-PCS by the 3M team especially useful in building an implementation model. The extent of this work was confirmed in our discussions with hospital leadership. The ranges reflect differences between the large and small facilities.

Chart 2: Planning, Team Formation and Analysis of ICD-10-CM and ICD-10-PCS: Hospital Setting

Project Step	FTE* Range	HIPAA TCS	FTE Range	ICD-10	Source or Assumption
Assign project leadership	0.25–1	$25–70,000	0.25–1	$25–70,000	Professional Costing Approach**
Assemble project team and develop implementation plan	0.5–2	$50–140,000	0.5–4	$50–$280,000	Preparing for ICD-10-PCS***
Perform gap and systems analysis	0.25	$5–25,000	0.5–3	$50–210,000	Professional Costing Approach, others
Totals	**1–3.25 FTE**	**$80–$235,000**	**1.25–8 FTE**	**$125–$560,000**	

*FTE is full-time equivalent; project leadership is assumed at an annual cost of $100,000; project staff is estimated at $70,000
**D'Arcy Guerin Gue et al, Phoenix Health Systems, October 2002
***"Preparing for ICD-10-PCS," Thelma M. Grant, MBA, RHIA; Sharon R. Powell, RHIA; Barbara Steinbeck, RHIT; For the Record, Vol. 14 No. 25 December 16, 2002 (The authors are employees of the 3M Company, which develops coding software and other classification products.)

In essence, we believe these costs would apply to facilities even if vendors provided systems upgrades for little or no cost. While other studies may use this "no cost approach," we believe this assumption to be highly speculative at best. Many providers made similar assumptions about HIPAA compliance and have since learned that vendors cannot or would not provide "free" upgrades when extensive work or a complete overhaul of systems is required.

Our estimates for hospital implementation of transaction and code sets range from a low of $100,000 to a high of $5 million per hospital. Those estimates come from three sources: the California Healthcare Association, Tillinghast-Towers Perrin and the Phoenix Health Services provider HIPAA surveys (in the latter case, the costs include privacy and security, but we assumed that between 50–70 percent of the costs were for transactions only). While imprecise and varied, these estimates provide at least a context for estimating the costs associated with implementation of large scale regulatory changes that involve significant systems remediation, training and process change.

At the higher end of our model, we compared implementation costs for ICD-10-CM and ICD-10-PCS with Y2K. We believe such a comparison to be instructive because Y2K required a review of all systems, new coding or updates to software and testing of those systems and their related interfaces. ICD-10-CM and ICD-10-PCS would require less review since not all systems store or use diagnosis or procedure codes (human resources, payroll, direct deposit, scheduling), but unlike Y2K, the code sets involved are much more complex to convert and test than date fields and the impact on reporting and analytical systems that rely on these code sets would be significant. In simple terms, this effort would require installing new code sets, re-mapping interfaces and recreating every report used by hospital staff in clinical, financial, reimbursement and quality analysis.

A hospital CIO for a large system in Texas stated that the costs would exceed Y2K in the depth of the implementation.

As in Y2K, vendors would assist in the remediation of their software while IT staffs would have had to perform the updates to legacy systems and interfaces and would be heavily involved in testing. Unlike Y2K, ICD-10-CM and ICD-10-PCS would require little hardware review or purchase, nor would it require replacement of devices. For these reasons, we believe the upper end of the effort required for ICD-10 implementation to be 25 percent less than that required for Y2K implementation. The American Hospital Association estimated Y2K costs at $8 billion for hospitals.[4] (Some hospital systems like Catholic Healthcare West and UCSF Stanford Health Care reported spending in excess of $100 million for

[4] AHA President Dick Davidson, December 14, 2000, in a press statement on HIPAA privacy costs for hospitals

Y2K compliance, while Kaiser Hospitals reportedly spent more than twice that amount, confirming that the $8 billion appears reasonable.)[5]

Next, we compared the implementation in a large, complex facility to the effort required by software vendors to convert their own suite of products. Susan Seare of Medicode, a medical software vendor, estimated costs for her company in 1997 testimony to NCVHS on ICD-10 migration as follows: "A far greater challenge to time, human and monetary resources is the clinical decision-making which must take place to develop the editing/unbundling rules tables for both diagnostic and procedure codes as well as evaluating the mapping exercises from the old system to the new. Based on similar tasks, a rough estimate of programming and clinical costs would be $500,000 to $750,000 to update all databases and subsequently all products."[6] In a subsequent interview, she provided a new figure of $2 million to upgrade their suite of products.

One software vendor we spoke with said the ICD-10-CM and ICD-10-PCS implementation impacts every form and every table with a diagnosis or procedure code and would involve "unbelievable man hours." Another vendor said that upgrades such as these are "part of doing business," though in our discussions with vendors we found that many would recoup costs through upgrades that a client would pay for or through higher licensing or maintenance fees. In addition, these vendors would likely charge for redesigning and testing interfaces to hospital legacy systems.

For larger facilities with a mix of legacy and vendor-supported systems, the vendor estimate provides insights into their own unique system expense for the transition. This cost would include IT staff expense, software purchases or upgrades, operations and analysis staff, management and planning expense. Because of the large number of systems in those facilities, we place the range between $1.5 and $5 million, depending upon the age, complexity and kind of technology deployed. We believe that mid-sized and small institutions would have significantly less expense because of the nature of their system architecture, which is more highly vendor dependent.

In developing system expense estimates, one hospital IT executive estimated that the cost of a systems remediation for a 390-bed teaching hospital maintaining 50 interfaces could fall between $750,000 and $1.2 million. Those we spoke to in large or multi-site facilities confirmed that virtually every system in a hospital uses, stores and processes diagnosis and procedure codes and many of these systems are linked through interfaces to share information or to extract it for analysis.

[5] "RX for Y2K: Hospitals spending millions," Peter Delevett, Silicon Valley/San Jose Business Journal, February 1999
[6] Testimony to NCVHS, April 15-17, 1997

The numbers of systems can be very large. For instance, one hospital CIO we spoke with counted 145 systems, 45 of which were identified as critical. The hospital, a large facility in the upper Midwest, maintains 80 interfaces. Another IT executive at a large teaching hospital had a number of disparate systems, some vendor supported, others legacy, with "more than" 25 interfaces. Smaller hospitals we spoke with say they would most likely depend upon vendors to supply new versions of software at relatively little cost. It is also likely that some vendors would either assess clients for the upgrade or increase license or subscription fees to recoup costs.

The following diagram summarizes our estimates for these hospital systems.

Chart 3: Hospital Systems Cost Estimates

400 Beds Plus		100–400 Beds		Fewer Than 100 Beds		
Number Of Entities	Organizational Cost	Number Of Entities	Organizational Cost	Number Of Entities	Organizational Cost	Total Cost Range
440	$1.5–$5 million	2,201	$500,000–$1.5 million	2,267	$100–$250,000	$2–$6 Billion
Source for bed size: American Hospital Association Hospital Statistics, 2003 edition; community hospitals only						

Physician Offices And Solo Practitioner Cost Estimates

The implementation and use of ICD-10-CM would have systems impact for all physician practices. In large physician organizations, that include legacy and vendor-supported software, costs will be similar to larger hospital complexes.

Systems impacted for large practices include clinical, financial, analysis, scanning and billing software (the cost of ICD-10-CM upgrades might or might not be included in new releases). Overall, we put the range at between $500 million and $1.6 billion for total system expenses for provider organizations while independent physicians in small practices can expect to spend $181 million.

Here again, we found few provider organizations able to provide a specific estimate for system expenses. However, a high-level executive with a large, medical group practice estimated a minimum of 50,000 hours to convert and test systems. He added that it would likely cost his company $5 million or more, most of which would be staff expense and

would involve a "Y2K scale of effort" without the need for hardware purchases. Other large provider organizations expressed similar ranges and felt the effort would likely become a massive IT and process change initiative for the complex multi-specialty practices.

Mid-sized provider organizations would also face significant costs, even if vendors provide software versions at little cost. One systems analyst felt that the practice management software upgrades would come in regular releases, but that installing, testing and rewriting interfaces would be an internal systems cost of more than 10,000 hours. She also thought that re-tooling forms would be a significant effort by internal and vendor staff.

Overall, our assessment is that the largest provider organizations (those with more than 100 physicians) would face systems conversion expense, report re-mapping and testing expenses of $2–$6 million. We placed the mid-sized groups (50–100 physicians) at between $400,000 and $1.2 million, while the smallest practices we estimated at just $2–$8,000. Individual physicians would bear some expense in conversion and testing expense of between $1,000 and $4,000.

Chart 4: Provider Organizations And Physician Practice System Expense Estimates

	Large or complex		Mid-sized		Small		
	Number	Organizational cost	Number	Organizational cost	Number	Organizational cost	Total Cost Range
Provider organizations (3 or more physicians)	200	$2 – 6 million	240	$400,000 – $1.2 million	19,560	$2 – 8,000	**$0.5 – 1.6 billion**
Independent physicians (solo or two)					145,000	$1 – 4,000	**$145 – 580 million**
						Total	**$645 million – $2.2 billion**

Ancillary providers also would bear system expense. These entities include nursing homes, home health companies, mental health and substance abuse facilities, physical therapists, and other providers. There are nearly 100,000

enterprises in these categories, each with billing systems of their own or those that depend upon a billing agent to submit claims to payers. Those billing companies would either charge more for services or levy a one-time compliance charge to their clients. In our estimation, expenditures for systems for these companies are less predictable, but the sheer number of providers and systems variations would mean a per installation cost of between $2,000 and $25,000. Our estimate for system costs for these ancillary providers ranges from $200 million to $400 million, though we have not included this cost in our overall cost figures.

Health Plan Cost Estimates

We surveyed a number of large health plans along with mid-sized and smaller plans. There was generally unanimous agreement that systems expenses would be significant and could reach the level of the Y2K implementation in the larger enterprises. Health plans, like hospitals, have multiple claims, managed care, optical scanning and analytical systems that all use ICD-9-CM today and would need to be revised for ICD-10-CM and ICD-10-PCS implementation. In addition, every interface used with vendor software, whether front-end or back-end processing would require updating and testing. Training on the new code set within IT, operations, medical management and other departments also would be required along with procedure and user manual revisions. Overall, we put the range at between $400 and $800 million for total health plan system costs.

Of particular concern among health plans was data comparability across periods. So much of what the modern health plan does is heavily dependent upon diagnostic and procedure codes, especially in back-end functions of clinical and claims analysis, underwriting, benefit plan development, actuarial analysis and other medical and operational reporting. Many large health plans, for example, have significant numbers of “power or super users” who assemble and query data in large data warehouses containing critical information. In the estimation of key IT executives in these plans, virtually every report that depends upon diagnosis and procedural data would have to be rewritten and tested, requiring enormous time and resource commitments. This effort alone was estimated at 100,000 hours in one plan that we interviewed.

In smaller operations, it is believed that vendor supported software should relieve a great deal of the burden, but there still would be back-end reports, claim edits, and interfaces that must be redesigned and tested. In the WEDI whitepaper referred to earlier in this report, the authors projected expense for a relatively minor upgrade of codes at 30,000 hours for one Midwestern health plan.

Chart 5: Health Plans Systems Cost Estimate

Health Plans (Number Of Plans)	Cost Range Per Entity	Total Category Costs
National and super regional (12)	$10–20 million	**$120–240 million**
Large (45)	$4–8 million	**$180–360 million**
Mid-sized (75)	$500,000–1.5 million	**$38-113 million**
Small (160)	$250–$750,000	**$40–120 million**
	Total	**$378–$833 million**

Assumptions include: National and super regional are companies such as United Health Care, Aetna, Kaiser Health Plans, Wellpoint, and Anthem. Large plans are single or multi-state Blue Cross and Blue Shield plans and other statewide or regional plans. Mid-sized plans are those with 100,000–200,000 members. Small plans are those with fewer than 100,000 members. All national plans were treated as a single entity for this study. Data from InterStudy Competitive Edge 13.1

III. Training Expense Impacts

Providers and Payers

All of the parties supporting the move to ICD-10-CM and ICD-10-PCS agree that training would be critical to successful implementation of the new coding systems; however, there is little consensus as to the extent of the training that needs to be done and who needs to be trained. All agree that coders would need significant training, and many believe that physicians would need to be trained on the new classification or coding systems. Overall, we estimate initial health care industry training costs at between $1–1.5 billion for coding and support staff, providers, hospital systems and payers. This includes necessary follow-up training.

3M coding authors said the following about education and training in hospitals for ICD-10-PCS alone**:**

> "Topping the list of the most important aspects of implementation is education. Four areas requiring extensive education are the HIM [Health Information Management] department, medical staff, quality management reviewers, and physicians. Education for all four should include the basic structure of ICD-10-PCS and the expanded requirements for assigning a procedure code. Each area would approach education from a different perspective. Coders need to increase their medical knowledge, physicians need to understand the requirements for documentation, and the medical staff needs to be aware of the challenges to the physicians and be supportive of processes that allow greater interaction between the coding staff and the physicians. Quality management needs to understand ICD-10-PCS and how it relates to its data collection, reporting, and JCAHO requirements."[7]

Coder Estimates

Estimates for training of coders range from a low of 16 hours to as much as 80 hours. Even these figures seem optimistic after interviews that were conducted with a Canadian hospital coding manager and a review of available literature in the U.S. and Canada. For example, many coding experts urge hospitals to begin training 6–9 months prior to implementation. A coding director in the U.S. also supported the need to begin training very early on the new code set. There is wide agreement that coders would need to understand aspects of anatomy and physiology not required by current classification schemes.

[7] "Preparing for ICD-10-PCS," IBID

On the high side of training costs, the United Kingdom provided its recommendations to the World Health Organization (WHO) as 10 days for basic training for coders. Noted experts in the U.S. tend to focus on the low range of the estimates, but the literature from Canada and Australia, as well as the UK would argue for more extensive training if hospitals want to ensure the lowest loss of productivity. In many respects, the transition period would likely come down to "pay me now or pay me later." With less training, we believe that productivity would suffer for more than six months and re-work would increase significantly with exception processing and claim rejections, adjustments and pends increasing dramatically during the first months of the transition period. At the very least, coders would direct an increasing number of queries to physicians, when chart documentation is inadequate to support a higher level of detail required for both ICD-10-CM and ICD-10-PCS.

The literature from the Canadian implementation also indicates a fairly dramatic increase in the backlog of coding after implementation because of the very different nature of the new code set and the need to automate coding. "We've had a learning curve, because even though the abstract and the CIHI (Canadian Institute for Health Information) dictionary and tables were familiar, our coding people had to unlearn the old ICD-9 codes and their structures," according to Evelyn Connors, the health records manager for clinical information at the Health Care Corp. of St. John's. In British Colombia, a project manager for a large facility called learning ICD-10-CA (CA refers to the clinical modification in Canada) "like learning to read Greek." Smaller hospitals might struggle even more.

In a rural facility in Kitimat, Canada, where just two coders work, it took more than six months to work through their backlog after implementation.[8] The Canadian experience notwithstanding, we have developed a model based on a review of the literature and discussions with facility coding managers in the U.S., who say training should probably be done over a longer period of time but would likely require a minimum of 4–5 full days for an experienced coder. We are using the five days as the beginning point for coders, with a one-day follow-up. We believe this estimate to be in keeping with the available literature, but we also believe that more training would ultimately be required if production is to be maintained. In fact, it seems obvious that additional coders would be needed to assist facilities through the transition period. Some have suggested a permanent loss of productivity in the range of 10 to 25 percent.

To reinforce this point, we summarize statistics provided by Michelle Bamford, Regional Coordinator Clinical Information Services with the Vancouver Island Health Authority, in the September 2002 newsletter of Utilization Managers Network of

[8] "Coding requires effort, but produces useful information," by Andy Shaw, Canadian Health Technology, January/February 2002

Ontario. Ms. Bamford reported shortly after implementation that average coding per record increased from 12–15 minutes to 33 minutes, that turnaround time increased from 69 to 139 days, and that the coding backlog increased from 64 to 139 days. Subsequent productivity improved, but it never returned to pre-ICD-10 levels. In addition, new tools had to be developed to improve coding productivity, including a query database and an educational program developed by two local hospitals.[9] The Australian experience appears to have been somewhat better than Canada, though productivity has been a real issue there as well. At St. Andrew's Hospital in Queensland, productivity declined 32 percent in the first phase of training, improving over time, but leveling off at an 18 percent loss of production after three months.[10]

The National Centre for Classification of Health in Australia asserted: "Introduction of the new classification will have major implications for the clinical coder workforce. They will not only need to become familiar with ICD-10-AM coding, but will also need an understanding of anatomy and the surgical procedures required by the specificity of the MBS-E (Medicare Benefit Schedule). ICD-10-AM coding is expected to take longer initially, although no allowances have been made in the deadlines for reporting hospital morbidity data in the States and Territories adopting the new classification in 1998. Health facility managers are becoming more aware of the need for resources for clinical coders to reflect the complexity of casemix through accurate and timely clinical coding."[11]

During the summer of 2003, the American Health Information Management Association (AHIMA) and AHA conducted a simulation of coding under ICD-10-CM.[12] This simulation, which is reported at the AHIMA web site, developed results and productivity numbers that are quite similar to the Australian and Canadian experience. The simulation showed that it took roughly twice as long for a coder to code under ICD-10, or approximately a 50% initial productivity reduction. The authors of this study suggested that coder productivity was reduced due to inadequate training and difficulties with reference materials used in the coding process. In light of the international experience with coder productivity post-implementation, the results of the simulation are not surprising but they are troubling. These findings are suggestive that without substantial efforts to avoid this problem, American health entities can anticipate increased backlogs of coding and increased staff costs.

[9] UMNO News, September 27, 2002 edition
[10] "ICD-10-A Strategy for Hospital Implementation," Nicole Mair, St. Andrew's War Memorial Hospital, Brisbane, Australia, Casemix Quarterly, Vol. 1, No. 2, 30th June 1999
[11] "Introducing ICD-10-AM in Australian hospitals", Rosemary F Roberts, Kerry C Innes and Susan M Walker, Medical Directory of Australia, 1998
[12] "ICD-10-CM Field Testing Project", AHA and AHIMA, September 23, 2003

Non-coder Estimates

This is an area of little agreement among the proponents of the change. While a review of the literature indicates many believe physicians and other clinical professionals and non-clinical staff would need to be trained, there is no consensus on the number who need training and the length of that training. But it would seem apparent that if the advantages of the new coding system are to be realized, physicians would need to document care differently than they do today, otherwise the greater level of detail found in ICD-10-CM and ICD-10-PCS would not be realized. The 3M authors emphasize physician training, along with other clinical staff, to support the change in coding. The authors of "Implementing ICD-10" write:

> "The level of detail required in medical documentation for assignment of ICD-10-CM codes emphasizes physician participation. The patient chart MUST specify terminology and provide complete documentation according to new standards. For example: For osteoporosis with pathological fracture, the origin of osteoporosis as either postmenopausal or other type, such as disuse, drug-induced, idiopathic, or, post surgical, must be identified together with the specific site of the current fracture."[13]

"Physician documentation is a problem now," according to a health information manager at a South Bend, Indiana hospital. She doesn't feel ICD-10-CM would fix that; in fact, it could make it worse. She gave this example: Congestive Heart Failure (CHF) codes were changed adding extra digits for specificity such as acute, chronic, diastolic and systolic. In ICD-9-CM, she says the hospital is still using unspecified codes most of the time since the doctor's documentation does not specify and reimbursement is not affected. She stated doctors would need one or two days of training for ICD-10-CM and ICD-10-PCS and that their buy-in and participation is critical if "we are to achieve the gains of better statistics/analysis promised by ICD-10-CM or ICD-10-PCS."

Professional coding managers interviewed for this study agreed with this assessment, but were, we believe, more realistic about physician training, suggesting that four to eight hours would be about the most that could be expected, and that this might not be enough to change documentation patterns. We settled on more training for surgeons, because they perform more inpatient procedures, and less training for office-based physicians as they would need to understand primarily the changes to ICD-10-CM.

[13] "Implementing ICD-10" by Lori Becks, RHIA and Sheri Poe Bernard, CPC published by Ingenix, 2003

Again, the Canadian experience might be instructive here. One coding manager for a large, acute care facility stated flatly that physicians had not changed their documentation practices as a result of ICD-10-CM implementation.

Non-hospital Office Staff

Office staff in primary care, specialty offices and large provider organizations would also have training needs. Thousands of office staff in physician practices assist in the coding process, but might need only limited training on the new code set, assuming they have access to ICD-10-CM and ICD-10-PCS on-line support (this would be much more difficult with ICD-10-PCS because of the size of the files). Billing office staff in both large physician practices and billing companies would also require 4–8 hours of training in our estimation, based both on interviews and a review of the literature.

Health Plans and Insurers

Health plans would need to train a number of positions, including claim payers, customer service representatives, utilization management nurses, provider contracting and information technology. Some of the training requirements would be extensive while others would require only a few hours.

Chart 6: Estimated Training Cost Ranges For Providers And Payers

Category	Estimated Staff Requiring Training	Range Of Hours	Total Cost, Including Follow-Up
Coders, medical records	142,170	24–40	**$94–141 million**
Physicians (Surgeons, anesthesia at higher end)	754,636	4–12	**$332–499 million**
Other clinical (including nurses and physician assistants)	1,455,015	4–8	**$456–684 million**
Other hospital	44,207	4–40	**$30–45 million**
Total, provider			**$900 million–$1.4 billion (rounded)**
Health plans, insurers	117,020	4–80	**$54–80 million**
Total training range			**$950 million to $1.5 billion (rounded)**

IV. Reimbursement Impacts

Cash Flow Effect on Providers

If coding slows by 10–25 percent after ICD-10-CM and ICD-10-PCS implementation in facilities and/or physician offices, cash flow could be affected in significant ways. Such problems are not new to the facility community, which had serious billing issues following implementation of Ambulatory Payment Classifications (APC) in 2000. While APC implementation is not completely analogous to the contemplated classification changes, it provides an example of how large scale reimbursement changes can have significant impacts on cash flow.[14]

With hospitals receiving $500 billion in payments in 2003 from payers of all types, a relatively minor delay can have material financial consequences to the health care system as a whole. "It's going to be a protracted reimbursement cycle" immediately after implementation, according to Sherri Bernard, Director of Essential Regulatory Products for Ingenix in a recent audio seminar she presented to coders. Because of the complex and somewhat unpredictable nature of these issues, we have not attempted to quantify the potential economic impact of slower payments for 3–6 months, but this is an issue that would need attention before, during and after any implementation.

Contract Negotiations

In changing the underlying diagnostic and procedural coding, many, if not all, contracts based on code definitions and their associated reimbursement rates would require development, negotiation, review and ultimately agreement. This would prove to be an expensive and time-consuming exercise shared by payers and providers alike. The WEDI white paper speaks to several million contracts, and we would agree that literally millions of contracts would likely require review and renegotiation. The number of contracts we have used for our estimate is much smaller than the total number of contracts the white paper estimates because we assume that many contracts for physicians in provider groups would be common and would be negotiated by contracting staff rather than by physicians themselves. Still, the sheer number of contracts and staff involvement would be a significant effort.

[14] Straight Talk, Modern Healthcare, April 28, 2003

The following chart summarizes the results of our findings in this area. We provided no estimates for health plans as these were assumed in the health plan costs discussed earlier.

Chart 7: Contract Renegotiation Model Cost Ranges

Entity	Entities	Contracts per entity	Range of total contracts in category	Hours per contract by payer and provider	Total hours	Average salary/hour*	Total cost of negotiation
Hospitals	5,000	10 – 20	50 – 100,000	10 – 20	500,000 – 2 million	$40	$20 – 80 million
Provider organizations	20,000	7 – 15	140 – 300,000	4 – 8	560,000 – 2.4 million	$30	$17 – 72 million
Individual physicians	145,000	5 – 15	725,000 – 2.2 million	2 – 4	1.5 – 8.8 million	$30	$45 – 264 million
Totals	**170,000**	**5 – 20**	**915,000 – 2.6 million**	**2 – 20**	**2.6 – 13.2 million**		**$82 – 416 million**

* Represents blended salary estimates of contracting, support, hospital and physician office staff, weighted with physician, legal and management.

V. Re-Work and Productivity Loss Impacts

Coding managers we spoke with who are familiar with ICD-10-CM and ICD-10-PCS expressed the fear that productivity would indeed suffer a permanent decline after the implementation forcing them to hire additional coders, outsource coding overflow or find alternate solutions, especially given the labor shortages for hospitals generally and coders specifically.[15] In an audio workshop for coders, an Ingenix presenter told the program participants to expect a 25 percent decline in coder productivity and to begin making provisions 6–9 months in advance for the coding changes.[16] Overall, we put the range at between $600 million and $1 billion for short-term re-work and productivity loss impacts. Permanent production loss could add an additional $380 million annually to overall operating costs for inpatient facilities.

Chart 8: Rework and short-term production impacts cost ranges

Issue	Volume estimates	Impact estimate	Dollar impact range
Payer and provider rework (rejections, pends, adjustments inquiries)	2 billion plus claims filed annually for physician and facility	Claim rejections, adjustments and inquiries are likely to increase 10–25% in the year after implementation	**$300–$600 million in first year**
Productivity loss (three months)	A loss in productivity among coders could be as high as 25%; among other health care practitioners, the loss in productivity will be in the 5–10% range	A loss of 20% productivity among coders is assumed for a period of three months; other productivity losses are assumed at between 5–10% for a period of 4–5 weeks	**$300–$440 million**
		Total range of re-work and productivity costs, short term	**$600 million–$1 billion**

[15] "A Looming Crisis in Care", AHA Commission on Workforce for Hospitals and Health Systems, 2002
[16] "ICD-10 CM Update," Sheri Poe Bernard, Director of Essential Regulatory Products, Ingenix

Re-work and Short Term Productivity Impacts

During the transition period, there seems to be little doubt that providers and health plans would face increased levels of re-work, particularly in the first 3–6 months after implementation. That re-work would develop in a number of key areas: facility coding queries to clarify documentation in patient records, increased billing inquiries by payers and providers and increased number of pended claims and adjustments.

Assuming a relatively modest increase in all of these transaction volumes, the hiring of additional staff or paying overtime to customer service and claim representatives in payer organizations and to billing and coding staff among providers would be required. Physicians would also be drawn increasingly into coding issues and would spend additional hours reviewing charts and encounter forms in order to comply with the new documentation requirements.

Productivity Loss Impacts

Information from the international experience is just now beginning to become available. Some experts including those from inside the U.S assert that a permanent loss of inpatient coder productivity would result from the migration from ICD-9-CM to ICD-10-CM and ICD-10-PCS. In an interview with the Humber River Hospital in Ontario, a 600-bed facility, Kerry Johnson (Decision Support and Coding Manager) said that his hospital had a 10 percent decline in productivity for a year prior to and a year following implementation. We spoke with several representatives of the CIHI in Canada. They reported that the loss of production prior to and after the implementation was significant but that productivity rebounded to pre-ICD-10-CA levels in six months in most locations. The increased level of complexity in ICD-10-PCS especially leads to our conclusion that there would indeed be a permanent productivity loss after implementation.

Chart 9: Cost Range For Permanent Loss Of Productivity For Inpatient Coders

Issue	Volume Estimates	Impact Estimate	Dollar Impact Range
Production loss (permanent)	A loss of productivity between 10–25% will be seen, according to the literature and international experience	Estimated impact based on hiring between 10–25% additional coders	**$152–$380 million**

VI. Government Programs and Public Health Impacts

Medicaid and Medicare would share in the transition costs to ICD-10-CM and ICD-10-PCS, as they did in the implementation of HIPAA transactions and code set changes. In fact, HIPAA implementation is instructive as a point of comparison for government-funded and sponsored health programs, particularly in regard to the systems impacts. Overall, we put the range at between $700 million to $1.4 billion for government programs.

Impact on Medicaid

The impact would be greater for Medicaid because there are 50 payers, with each state using its own version of the MMIS (Medicaid Management Information System) system. These systems are high integrated integrating claims processing, managed care functions, decision support, utilization management, and other functions around a hub of eligibility, provider, rendered services, and reference databases. These clusters of functions in today's MMIS applications continue to act as a whole through interfaces and integrated data repositories."[17]

The implications of federal regulatory change on Medicaid systems and programs would likely be dramatic because of the age and complexity of many of the systems and the number of interfaces maintained. One executive at a large Medicaid operations service provider called ICD-10 "a profound change – perhaps greater than HIPAA overall." He believes history conversion costs would be particularly high.

As described earlier in this report, ICD-10-CM and ICD-10-PCS deployment could have a significantly greater impact on payers than HIPAA's transactions and code set compliance because it forces them to analyze, redesign and test all claim processing rules, medical management rules, interfaces and backend reporting and analysis used for trends and reimbursement. The literature on state expenditures for HIPAA would indicate that just to comply with the transaction and code requirements, states would spend well in excess of $1 billion. South Carolina recently announced spending more than $27 million to upgrade its MMIS system for HIPAA,[18] while a Michigan Medicaid official said the state spent $20 million for transaction compliance. North Carolina reported in September 2000 that it had budgeted $49 million for HIPAA

[17] "The Private Sector View of Challenges and Opportunities for the 21st Century," Private Sector Technical Group (PS-TG), October 15, 1997
[18] "EDS wins South Carolina Medicaid system upgrade," William Welsh, Staff Writer, Washington Technology, March 31, 2003

transaction compliance activities[19] while Iowa estimated in 2001 needing $10 million.[20] Overall, it is clear that states spent in excess of $1 billion to comply with HIPAA's transactions and code sets.

Other state agencies would also be forced to invest in system upgrades if they use diagnostic and procedure coding, including prison clinics, community mental health agencies, state funded medical schools and/or state employee health benefit programs.

While the Medicaid expenses are borne principally by the federal government (approximately 90 percent), many of the other expenses are either fully paid by the state or are reimbursed at the 50 percent level.

Impact on Medicare

Medicare spending would likely be significantly less than that for Medicaid because of the limited number of systems deployed to pay claims. This would result in a concentration of effort among just a handful of vendors, who would be able to amortize those costs over the base of the durable medical equipment payers, Part A intermediaries and Part B carriers. While it might be that ICD-10-CM and ICD-10-PCS implementation would be more significant than HIPAA remediation, an earlier study conducted by the Robert E. Nolan Company concluded that Medicare processors faced less than $100 million in system expenses to meet compliance guidelines for HIPAA's transactions and code sets. Even if ICD-10-CM and ICD-10-PCS costs are twice those of HIPAA, the system related expense would likely be under $200 million, principally for system upgrade costs not provided by software vendors, training of staff, report analysis and revision and testing with providers.

An added cost to CMS includes the development of new diagnosis-related groups (DRGs) or the reorganization of existing DRGs based on ICD-10-CM and ICD-10-PCS codes. This exercise might prove to be much more complex and cumbersome than many realize. It might also lead to changes in reimbursements by medical supply companies, drug manufacturers and others who want to be paid for a device or drug. The international literature from Australia and other countries indicates significant work on payment groupers and associated problems with them. These issues are not as serious in a single-payer system since reimbursement continues to flow to facilities regardless of any data continuity

[19] DHHS minutes, September 7, 2000
[20] State of Iowa – Enterprise HIPAA Compliance Project Management Charter, Tom Shepherd, Information Technology Department, Des Moines, IA 50309-4611, November 19, 2001

issues regarding payment or classification changes. This issue would prove to be much more complex in the multi-payer system in the U.S.

Chart 10: Medicaid, Medicare System Cost Estimates

Program	Per State Range	Total
Medicaid	$10–24 million	$500 million–$1.2 billion
Other state programs	$1–3 million	$50–150 million
Medicare	NA	$150–$200 million
Total state and federal cost range outlay for Medicaid/care		**$700 million to $1.4 billion**

Impact on Public Health Programs

Essential to many aspects of the public health system is the collection of diagnosis data from clinical providers. Collection of diagnostic data is critical to the successful identification of epidemics or new disease outbreaks. That data is most often collected from clinicians in the normal course of patient encounters and is reported to a variety of agencies at the local, state and federal levels.

Certainly the implementation of ICD-10-CM would have a dramatic impact on the tracking of diseases across the transition period. This would affect the identification and treatment of new outbreaks as epidemiologists work to understand the differences in diagnostic coding after implementation occurs. By one estimate, there are more than 900 epidemiologists and nearly 1,200 biostatisticians working in public health agencies today.[21] It is believed that diverting their attention to data analysis and normalization issues post-implementation would affect their work for a period of 6–12 months. These effects might be minimized if significant mapping is in place at the time of cutover or if records are double coded in ICD-9-CM and ICD-10-CM for a period of tie prior to implementation to gain an understanding of the differences.

To provide just one example of how coding can affect data analysis, we cite the change in AIDS/HIV reporting that occurred when Florida implemented ICD-10-CM mortality coding in place of ICD-9-CM. In a study later published in the

[21] "The Public Health Workforce," Kristine Gebbie, Jacqueline Merrill, Hugh H. Tilson, Health Affairs, November/December 2002, Volume 21, Number 6

Journal of the American Medical Association (JAMA), Becky Grigg, Ph.D., et al writes that "the effect of the new ICD-10 coding rules was an 'artificial' increase of 14 percent in the number of HIV deaths in 1999" over 1998. When records were re-coded using ICD-9-CM, there was an actual decrease in deaths due to AIDS.[22]

A separate impact would be felt by public health agencies that deliver service to the poor and uninsured and who use diagnostic coding to bill Medicaid or Medicare. In some of these agencies, services are actually provided and billed for, which means systems would need to be converted and tested. That same impact would be felt by community health centers that serve a similar population, many of whom are uninsured but some of whom have Medicaid, Medicare, or in some cases, commercial coverage. In both of these settings, ICD-9-CM is currently deployed and used in coding any claim to a payer and training would need to be provided and systems would need to be converted. These centers service an estimated 11 million patients according to a recent study performed by the National Association of Community Health Centers, Inc., in Washington, DC.[23]

Even a relatively modest need for investment in systems, training or process changes at these centers would have significant impact on administrative costs for these providers. Our estimate would be between $10 and $40 million, depending upon sophistication and deployment of billing systems.

[22] "Coding Changes and Apparent HIV/AIDS Mortality Trends in Florida, 1999," Becky Grigg, PhD; Robert Brooks, MD; Spencer Lieb, MPH; Meade Grigg, MA, JAMA, Oct. 17, 2001, Volume 286, Number 15

[23] "Exploring Health care Quality and Effectiveness at Federally-Funded Community Health Centers: Results from the Patient Experience Evaluation Report System (1993-2001)", © National Association of Community Health Centers, Inc., Washington, DC, March 2003

VII. Benefits Discussion

Proponents of replacing ICD-9-CM with ICD-10-CM and ICD-10-PCS point to several potential benefits:

- Improved outcome studies
- Improved ability to analyze trend data
- Improved fraud and abuse detection
- Improved ability to negotiate provider contract

Outcomes

While verifying benefits from implementation in early adopter nations like the UK, France and others, we found very little in the literature to support some of the proponents' claims of improved clinical data and thus improved surveillance and outcomes. In fact, in three citations from the U.K., there was evidence that physician documentation and training were far more important than coding in assessing outcomes and improving epidemiology.

In the U.S., academics and physicians have for years stressed the importance of adopting standard clinical terminology as the most important precedent to improving outcome studies and thus providing meaningful direction to physicians and other clinicians. In this view, three separate terminologies must be managed together in order to produce outcomes improvement. Rose et al describe those terminologies as:

1. Application terminology, also called interface terminology, refers to those terms seen in (and used in) documenting or facilitating care.
2. Reference terminology, more academic term classification, is often represented in a complex knowledge base and is rich with rigorously controlled rules and relationships (used predominantly for data analysis).
3. Administrative terminology, also called code sets, is a collection of coded expressions used for financial or ancillary system communications.[24]

[24] "Common Medical Terminology Comes of Age, Part One: Standard Language Improves Health care Quality," Jeffrey S. Rose, MD; Bruce J. Fisch, MD; William R. Hogan, MD; Brian Levy, MD; Philip Marsh, MD, MPH; David R. Thomas, MD; Debra Kirkley, PhD, RN; Journal of Health care Information Management, vol. 15, no. 3, Fall 2001

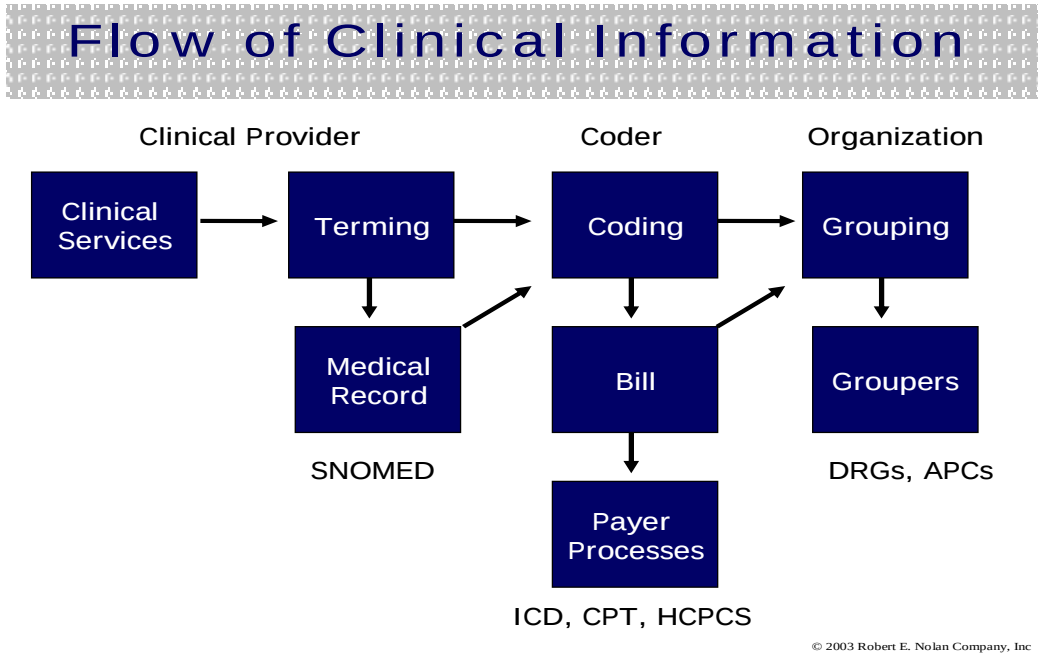
This same study quotes Dr. Christopher Chute of the Mayo Clinic, who suggests that "improvement of medical knowledge about the best practice depends upon the ability to study practice outcomes and apply them to the patients we see. This implies that we can generate data about our patients that is comparable, so that it can be used in aggregate analysis, and so clinical decision support resources can be linked to patient data in real time. The single greatest obstacle to comparable data remains medical terminology. Failure to adopt and embrace a common terminology would doom outcomes research and data-driven clinical guideline development."[25]

In India, where technology deployment is far less extensive than in the U.S., one physician writing in Express Health Care Management makes the case clearly for clinical terminology as the most important element of improving health outcomes: "ICD-10 and CPT-4 are designed for coding diseases and recording medical services and procedures but they lack the necessary terms for assessing the quality of patient outcomes." [26]

[25] Ibid.
[26] "CPR is the backbone of an integrated HIS," P Ravisankar, Express Health care Management (India's First Newspaper for the Health care Business); issue dated 1st to 15th April

The Terming – Coding – Grouping Sequence

Discussions about changing to ICD-10 can be improved by understanding and using a simple concept model that shows the sequence of events that creates and moves clinical information from providers to payers. The best description of the flow of information is a sequence of 'terming – coding – grouping" developed by H.C. Mullins, M.D. Professor, Family Practice University of South Alabama in Mobile.



In this model, "terming" follows the actual delivery of clinical services. Terming means describing in precise – but currently non-standardized ways – the exact clinical situation and actions taken. Terming is done in some settings by simple handwritten notes, ticking off forms, inputting to an electronic medical record or in many inpatient services dictating operative notes. Terming is used for clinical coordination with staff and other providers, risk management, and reimbursement.

"Coding" occurs when the "termed record" is reviewed and coded to a classification within a coding scheme such as ICD-9-CM. This is generally done by staff that is less well trained than the clinical staff that did the terming, and it may involve the use of reference materials and judgment about the actual code used. Coding is done to report health services statistics and to drive other administrative processes such as billing and reimbursement, utilization reporting and quality assurance.

"Grouping" occurs when the coded information is further mapped and classified to broader groupings of services and conditions. Grouping is done most frequently for reimbursement and claim payment. Grouping can also be done for other reasons such as disease management, where the disease management application or algorithm functions as the "grouper".

With this sequence or model in mind several implications of changing "coding" are apparent:

- Changing coding, without first standardizing inputs to coding, cannot bring about critical benefits like improvements in outcomes of health care. It also does nothing, without other efforts, to improve care documentation by physicians and other clinical staff. This situation represents the old saying "Garbage in…"

- Changing "coding" means "grouping" must also change. The codes are the inputs to the various grouping processes and if we change the inputs the groupers must be amended as well. This implies that the cost and confusion of changing the groupers must ultimately be considered to be a part of making changes to the codes. This sequence is exactly the experience in Canada, where coding changes resulted in the need to make a series of changes to groupers used for health care budgeting.

- Multiple parts of the sequence cannot be changed at the same time. For example, it is important to have substantial post-implementation experience with any new codes before groupers can be mapped accurately. Again the Canadian experience is instructive on that point. (The CIHI estimated in June 2003 that 36 percent of Canada's Case Mix Groups were impacted by coding changes after ICD-10-CA implementation.[27])

[27] CIHI Case Mix Update, March 18, 2003

- Given that there are other national initiatives planned for this sequence such as SNOMED[28], it is important to understand how the sequence of changes to "terming – coding –grouping" will impact the cost of implementation. Changes made to coding prior to terming may necessitate revisiting coding again.

Trend Data

While proponents of replacing ICD-9-CM speak to improvements in the analysis and trending of data in health care and payer organizations, we believe that for a period of 3–5 years, the impact to existing medical knowledge would be degraded significantly. The implementation in Canada speaks to this issue fairly clearly. While these impacts were predicted, they nonetheless create a data fog around diagnostic and procedural trends until enough time passes for statisticians and analysts to understand data in the "new world" of ICD-10-CM or ICD-10-PCS. Discontinuity in data can be seen fairly clearly in the U.S. by considering ICD-10 implementation for mortality coding and the subsequent changes in causes of death that occurred after the coding change.

In a major study of the impacts in implementing ICD-10 for mortality coding in the U.S. the numbers for causes of death were altered either up or down when the coding change was made. As a result, the top 10 causes of death changed when records were coded in ICD-10 versus ICD-9. The authors of the study concluded:

"With the implementation of ICD–10, a set of mortality trends and patterns would emerge that are discontinuous with those produced under ICD–9. Trends for many causes of death and the ranking of leading causes of death would be substantially affected."[29]

R.B. Rothenberg and R.E. Aubert, writing for the Center for Chronic Disease Prevention and Health Promotion of the Centers for Disease Control (CDC), noted impacts on ischemic heart disease and hypertension rates after implementation of ICD-9 for epidemiologic studies. The authors caution that "as preparations are made for ICD-10, special attention should be given to the preservation of epidemiologic continuity to provide better assessment of trends in population subgroups."[30] The results of their study, in the words of the authors, "point to a non-uniform impact of the coding change

[28] SNOMED stands for Systematized Nomenclature of Medicine and was developed as a standard clinical terminology by the College of American Pathologists (CAP)

[29] Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM, National Vital Statistics Reports; vol. 49 no. 2, Hyattsville, Maryland: National Center for Health Statistics. 2001.

[30] "Ischemic heart disease and hypertension: effect of disease coding on epidemiologic assessment," R.B. Rothenberg and R.E. Aubert, Public Health Rep., 1990

on individual ICD codes, which in turn, might alter the ability to define disease trends. Since there is no *a priori* reason for a differential change in the rates of decline after 1979, coding might play a role…"[31]

Finally, in a study termed "The Interpretation of Time Trends," authors C.S. Muir et al point out that while trend data can still be useful across different versions of ICD classifications, "precise time trend analysis for [an] important group of neoplasms is impossible unless data at the four digit level are available for the periods covered by the 7th and 8th revisions."[32] In addition, because "successive revisions of the ICD have tended to be more detailed than their predecessors…comparison of subsite data over time can be impossible as the subsite of interest might be 'buried' in a larger grouping of the previous revision."

Fraud and Abuse Detection

Detection of fraudulently submitted claims is a significant effort among the payer community and it has invested enormous resources in business rules in existing systems to detect patterns of fraud. A change in the underlying claim code sets would necessitate the re-writing of all of the rules that now exist to determine fraud patterns. It would then take a period of years to refine these rules to bring them back to the level of sophistication and accuracy represented in the current software. We have included in our payer cost estimates some of the cost of rewriting these rules, but estimating how much fraudulent billing might increase in the meantime is beyond our ability to predict. However, it should be noted that with $1.5 trillion in overall health care expense, a very small percentage increase in fraud can produce significant excess costs.

Improved Ability to Negotiate Reimbursement Terms

Using the WEDI white paper referenced above we have attempted to define the costs and time associated with renegotiating the millions of contracts that either depend upon or reference diagnosis or procedure codes. As those who have negotiated provider contracts realize, changes can mean confusion, misunderstanding and ill will. The chances that both providers and payers would come to easy or quick solutions on the new code sets are unrealistic. The migration process would likely be a protracted and difficult one involving both front-line provider contracting staff, systems staff and management levels to settle disputes. Providers would have the same issue on their side forcing contracting and billing staff, physicians and others to spend significant time re-contracting with all of their payers. If, over time, greater specificity does become a reality, it is conceivable that this would bring a greater degree of clarity and specificity to contracts, but this is

[31] Ibid
[32] "The Interpretation of Time Trends," C.S. Muir, J.F. Fraumeni Jr., R. Doll; Cancer Surveys Volume 19/20; Trends in Cancer Incidence and Mortality, 1994 Imperial Cancer Research Fund

highly speculative.

Implications

Implementing ICD-10 CM in a cost neutral manner may be impossible.

The proponents of moving from the current ICD-9 system assert that such a change can be made in a cost neutral manner. (By "cost neutral" we mean without significant impact on medical reimbursements. Clearly there is a major impact on administrative costs, as we have outlined above.)

There are two ways to examine the medical cost problem.

- The first scenario assumes that total medical costs are allowed to increase. In this example providers bill increased charges for advanced services and materials resulting in an increase in overall health care costs.
- In the second scenario overall medical costs are "held constant." But because large or specialized medical centers perform higher level or more complex services that can now be billed in a new coding schema, their revenue will increase relative to that of smaller, community and rural hospitals that provide general care.

At a national level a theoretical economist might say that the latter change (known as "the constant pie") has been made in a cost neutral manner, but at the level of hundreds of small local hospitals the implementation has been any thing but "cost neutral." In other words, coding changes creates "winners" and "losers."

The Canadian experience provides a good example of how coding changes can alter data comparability between regions or institutions. Following implementation of the Canadian version of ICD-10 and a new procedure coding scheme, health information authorities noticed clinical data changes that could not be explained by changes in the underlying health or utilization statistics. Changes in how care was coded created what appeared to be increases in the number and severity of diagnoses in Ontario and has led the Canadian Institute of Health Information (CIHI) to examine coding practices and standards and other issues to determine how to address the new data picture.[33,34]

33 Coding Variations in the Discharge Abstract Database, May 2003, Canadian Institute of Health Information

34 Data Quality Initiatives and the Impact on Health Record Professionals, Gail Crook, CHE, Canadian Health Record Association, 2003

Because Canada is close to the "constant pie" scenario, overall reimbursement will not change there. However, there is real concern about data comparability and validity going forward. In the U.S., there is no "single" payer to ensure that the pie remains constant, and thus changes in coding practices may indeed lead to increases in reimbursement or to a shift in payments to larger, urban facilities.

Moreover, changing coding will directly cause a change in reimbursement groupers, requiring revisions in the composition and weighting of DRGs and other payment types. Recalculation of groupers will involve re-weighting based on complexity and case mix and in effect gives yet another opportunity for revenue shifting from small institutions to larger facilities.

The potential for unintended consequences is high.

Some consequences of implementation can be easily anticipated. For example considering the experience with coding backlogs that occurred in Australia and Canada and the recent coding experiment conducted by AHIMA, we can anticipate that coding backlogs are likely following implementation. It is more difficult to anticipate the consequences of backlogs, but surely reimbursement to providers will likely be slowed, creating ripple effects through the health care provider and payer communities.

Why are unintended consequences likely? The chief reasons to expect the unexpected during ICD-10 CM implementation include:

- Making an important change in the *middle* of a complex process. The key sequence is "terming – coding – grouping" (refer to diagram above). Making a change to coding will still require restructuring parts of the upstream and downstream processes, namely terming and grouping.

- The scale of the change is enormous. Diagnosis and procedure codes are used in billions of transactions per year by hundreds of thousands of providers and hundreds of payers. The odds of flawless implementation by this complex web of players are virtually zero. (Consider the delays and problems attending HIPAA transaction standards implementation.) Error by any player will affect its own transactions and in most cases impact others in the flow of clinical data and funds.

- Coding backlogs are likely to slow payment to providers creating enormous cash flow problems and gaps in data for payers. The consequences of such a slow down are increased inquiries among all parties, including patients, providers and health plan members, short term borrowing costs and potential under and over

payments. Uncertainty regarding reimbursement or the data that flows from payments will likely be reflected in additional premium increases to employers and consumers.

VIII. Methods for Studying the Change

In assembling this study we relied primarily on secondary sources. Our findings were supplemented with interviews with management and staff in payer organizations, hospitals, provider offices and software vendors. We also examined recent classification changes in Canada and Australia as well as the United Kingdom (U.K.) and spoke to a limited number of Canadian sources. In reference to hospital system changes, we looked to two recent large-scale system initiatives as reference points—the implementation of transactions and code sets for the Health Insurance Portability and Accountability Act or HIPAA (excluding security and privacy) and remediation for the year 2000 preparations (Y2K). Here, both the government and the American Hospital Association have developed estimates that provide useful order of magnitude comparisons (not transactions and code sets). Several sources put the costs for the provider and payer community at "Y2K levels" or greater while others suggested HIPAA's transaction and code set implementation as a useful comparison.

A limited number of payer organizations were able to provide implementation estimates based on a relatively quick but comprehensive analysis of the potential burden. Most providers we spoke to have not developed cost estimates nor talked to their software vendors mainly because of the lack of awareness among stakeholders. However, all agreed the implementation was a tremendous undertaking.

In developing cost estimates, we used a "process consulting approach" that includes internal staff and management costs deployed for implementation, the cost of overtime and lost time for training, along with any direct costs that sources identified. In all cases involving salary information we relied on the Bureau of Labor Statistics for information.

It should be noted that we have estimated costs only in areas where we could either collect or derive sufficient information to do so. Among providers we included community hospitals, provider groups and individual physicians. We did not include Federal hospitals or the Veterans Administration, nursing homes, surgery centers, home health companies, clinical laboratories and other providers who use diagnostic and procedure coding. Among payers, we included health plans, but could not estimate third party administrators, clearinghouses and other insurers that use diagnosis and procedure codes for health claim transactions, such as workers compensation and auto liability.

Additionally, many in the health care and payer community are still heavily involved in HIPAA transaction compliance activities and had limited time to devote to this subject.

The scope of a cost analysis is large and complex. The following diagrams may be helpful in seeing what topical items are impacted by a migration to ICD-10-CM and ICD-10-PCS and which items were considered within the scope of the study.

Key Constituents and Major Functions Impacted*			
Physicians	**Hospitals**	**Health Plans and HMOs**	**Government Programs**
Electronic Heath Records Practice Management Systems Billing Accounts Receivable Net Productivity Loss	ADT Lab Radiology Pharmacology Physician Order Entry Image Management Supplies & Inventory Management Bar Coding Billing	Claims Fraud & Abuse Customer Service Reimbursement EOBs/EOPs Network Contract Actuarial Rating Underwriting Enrollment Utilization Review Benefits Contracts EDI Editing OCR/Imaging ERA/EFT Reporting Data Warehousing	Medicare (Same as Health Plans, less network/rating) Medicaid (Same as Health Plans, less network/rating)
Specialty Providers	**Supplemental Health Industry Organizations**	**Health Care Tools & Decision Support**	**Major State Government Programs**
Veterans Hospitals Federal Hospitals Nursing Homes HHAs	TPAs Workers Comp Auto Liability Self Admin. Employers	Predictive Modeling Health Coaching Personal Financial Tools (e.g., FSA, MSA, HRA, etc.)	University Medical Centers Children's' Health Insurance Programs Student Health Programs Department of Corrections Minority and Rural Health Programs State Health Information Databases State Public Health Programs

* Partial list

Major Functional Uses of ICD-9-CM*			
In Study Scope			
Physicians	**Hospitals**	**Health Plans and HMOs**	**Government Programs**
Electronic Heath Records Practice Management Systems Billing Accounts Receivable Net Productivity Loss	ADT Lab Radiology Pharmacology Physician Order Entry Image Management Supplies & Inventory Management Bar Coding Billing	Claims Fraud & Abuse Customer Service Reimbursement EOBs/EOPs Network Contract Actuarial Rating Underwriting Enrollment Utilization Review Benefits Contracts EDI Editing OCR/Imaging ERA/EFT Reporting Data Warehousing	Medicare (Same as Health Plans, less network/rating) Medicaid (Same as Health Plans, less network/rating)
Out of Study Scope			
Specialty Providers	**Supplemental Health Industry Organizations**	**Health Care Tools & Decision Support**	**Major State Government Programs**
Veterans Hospitals Federal Hospitals Nursing Homes HHAs	TPAs Workers Comp Auto Liability Self Admin. Employers	Predictive Modeling Health Coaching Personal Financial Tools (e.g., FSA, MSA, HRA, etc.)	University Medical Centers Children's' Health Insurance Programs Student Health Programs Department of Corrections Minority and Rural Health Programs State Health Information Databases State Public Health Programs

* Partial list