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CLAIM PROCESSING TECHNOLOGY

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- o Medical expert systems
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DR. LESLIE LEVY: Thus far technology has had only a very specific impact on claim processing. The whole advent of large scale computers totally restructured the business. More recently the advent of inexpensive computing power in minis and micros has had another effect on restructuring the business. The two claim technologies, expert systems and scanning technology, may have a similar effect.

My first theme is that technology has great promise, but it also has dangers. Second, applying new technologies correctly and what their implications are may well vary with time. There are interactions between technologies. Achieving the benefits of one technology may require the use of another one, and it may induce new problems.

Expert systems are computer-operated systems that are knowledge driven rather than information driven. Recently significant writings have been published about the business uses of expert system technology. There are two books that might be of assistance. The first is called *The Rise of Expert Companies (How Visionary Companies are Using Artificial Intelligence to Achieve Higher Productivity and Profits)*. The second book is *Artificial Intelligence in Business*. An interesting fact is that neither of these books deals with applications like the benefits business and medical claims. All of the applications that are discussed have to do with productivity and in-house use. That's an important observation about what's going on in the expert system world.

What does an expert system look like? There's a knowledge base and an inference engine, which is the set of rules for using the knowledge base to come to conclusions.

There is not much reason to go any further with that topic. Now the subject is going to be changed from an academic pursuit, because that's what artificial intelligence has been, to a practical business question.

People have become increasingly aware of the current procedural terminal (CPT) coding problem. Here is a problem where an expert system is needed, otherwise it will not be solved. All sorts of techniques, devices and programs have been created to control medical costs over the last several years. Particularly in the last year or two, these things have all come together and created significant pressure on physician income. You're familiar with all of these things, but what you may not realize is that physicians have a reaction to them.

Physicians are taking advantage of a very big hole in the claim operations of virtually every organization in sight. There are a couple of Blue Shield plans that have had barriers to some of the coding activity that physicians have engaged in. There are a couple of organizations that we know of that have incredible manual review, but it's almost universally true that there's a big hole that physicians have found, and the culture of medicine has changed enough that people who five years ago wouldn't think of playing games with coding (it would be beneath them) are now very comfortable doing all sorts of things like that.

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There has been a substantial increase in spending on physician services. The change in volume of services that is being experienced in every health benefits plan is not just a change in real utilization, it's a combination of change in utilization with fragmentation unbundling of services. The change in intensity of service is not just the change in the kind of services that patients are getting. It's not just that patients are getting better, more expensive, and more technologically sophisticated services, but rather that they are getting those services, and at the same time, procedures that have been done all along are being coded differently.

Diagnostic related group (DRG) creep is a joke compared to the complexity of physician coding. In the CPT book published by the American Medical Association (AMA), there are seven thousand codes each of which are one to eight lines of medical terminology that half a million physicians have to play with, so the sheer complexity is tremendous.

Thus far there is only one published study. That study translates costs, if taken at face value, to roughly 2 or 3% of paid claims. The study was done on 1984, 1985, and 1986 claims, so it was done on claims before the period of time when all those forces on physicians were operative at once. Most people around the country think that the study is completely wrong. The results that we are getting with artificial intelligence indicate the same thing.

A lot of claim abuses are not trapped in existing claim systems by the software or the people who are paying claims. In fact, the incentives, in many places, on these people are such that they're better off not catching the abuses. One of the underlying phenomena is physician fee unbundling. It's something that has received some attention in the press recently, but it's something that most people who are not intimately familiar with the system don't understand.

Physician fee unbundling is very difficult to explain, because it's a game that's played in a foreign language. It is a game that can be played all over the body. For example, a hysterectomy with a particular urology procedure can have a bunch of steps that are all legitimately part of it. If the hysterectomy is a \$1,000 procedure, and the bill comes for all these other things and arrives at your favorite claim operation, the claim will be approved in most cases.

Claim operations were set up years ago on the assumption that physicians would be basically honest about submitting claims. Now that managed care is here and the physician are reacting to it, there are some new problems.

One of the responses that people have in some organizations is that nurses can review anything; they have medical knowledge. These problems are way beyond nurses; they are beyond most physicians. We could hire well-trained, experienced physicians who would take six to nine months before they got reasonably comfortable looking at claims. An internist would be very uncomfortable looking at 600 or 700 orthopedic surgery codes that he doesn't understand. So, nurses really don't have the knowledge and training needed. In most claim operations turnover rate is very high. Training is an investment that has to be made very carefully, and the training that is required is at too high a level.

None of these things are solutions, so the next thing that comes to mind is the absurd notion of hiring physicians to look at all the claims that come in from physicians. Nobody in the insurance companies likes physicians that much. Having lots of physicians around is not going to be a workable solution for economic reasons as well.

Therein lies why you should care about expert systems. What you really need is the kind of knowledge of medical facts packaged in the right way, and that's where expert systems really begin to come into the world of benefits. Now there's a new problem. If you read the books that were suggested, you will find that most of the applications now for expert systems involve people building expertise and knowledge into computers in areas where the people doing the building really know something about the field. In this area you have to combine the medical knowledge and a lot of very practical business experience with the ability to create expert systems.

The expert system we have does just the kinds of things you would want in stopping the abuses. Besides the unbundling, it provides claim specific medical knowledge on handling a claim. That's something that's not out there now.

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The way we envision using an expert system in the claims world is as a decision support tool, not as a way to automate decision making. The reason for that is while expert systems are being used in the businesses for internal and production management purposes, in the benefits world you're dealing with claimants. You're into a whole host of public exposures, legal exposures, regulatory exposures, and the body of law has a lot left to be defined as to what happens to expert systems.

The potential problems with bad faith claim handling suits, such as punitive damages, and damages, can occupy enormous amounts of resources way beyond the dollar outlays that are involved in paying the claims and paying for the attorneys. Such suits can really cause tremendous distraction. There are all sorts of areas of the law that are undefined at this point.

In the December 1988 crash of a Boeing 737 in England, there was an expert system on board that detected the failure of an engine and put out a signal to turn off an engine. Unfortunately, the signal it put out was to turn off the good engine. The kinds of exposures in the benefits world are not as dramatic, but they are every bit as serious. The notion of automating fully, having an expert system at this point actually making claim decisions, has a lot of exposure. Our system is capable of being used in an automatic mode, but there are some serious exposures there that need to be looked at very carefully.

There is another issue that has to do with assuming too much about the capabilities of the new technology. We do something that sounds very trivial that I want to bring up and connect to electronic claims transmission and optical scanning.

When a physician submits a claim, what the physician is really doing is writing himself a check. All of what is done in the benefits world is what it takes to get that check written.

If you go into the wonderful world of technology of electronic claim transmission, you will receive codes with no cross check. If you have your own people key codes into your claim system and then automatically electronically act on those codes without a cross-check of the words, you're leaving yourself open to a great new form of physician abuse.

Claim studies that are done by benefits firms show that about 30% of the physician codes and words don't match. It's very easy to send out a bill to a patient that says that the physicians removed four warts and put a code next to it; the code doesn't mean a thing to the patient. When it gets to the claims, paying organization, they act on the code and ignore the word. They may be acting on a code for a liver biopsy that is sitting next to words which say removing warts. The warning here is that there is a need for double check because without that the physician has a defense of, "Oh gee, there was a coding mistake." If the physician writes in words he did procedure X and puts in the code for procedure Y, then you have a discrepancy, and if in fact there's a problem, the physician can be held responsible for it. Electronic claim transmission without the check is a problem. Expert systems can be fooled without the check, and until it's possible to have the wording for that check going into an optical scanning input, having fully automated claims adjudication may be more dangerous than you realize.

MR. CLIFFORD L. BATEMAN: At Dun and Bradstreet Plan Services, we have a mission, and that mission is quality. We're committed to providing the highest quality service we can to our customers. We're backing up that commitment to quality with substantial investments and technology, because we believe we have to be on the forefront of technological innovations if we're to provide the best value to our customers. In doing that, in 1987 we formed an advanced-development group specifically chartered with a focus on what technological innovations our organization would need three to five years into the future. After initial industry, market, and internal organizational evaluation, that group concluded that expert systems and electronic image processing were two of the most promising technologies of the future for the insurance industry, in general, and specifically for an organization such as ours involved in the administration of small group health insurance.

I would like to discuss image processing, the opportunities associated with it, what it is, why an organization might be interested in doing it, and some of the issues in the future associated with this technology. We feel strongly that the opportunities exist for image processing throughout our organization in many areas, and we feel it's probably true in most organizations in the insurance industry today. As an example, in our organization, we see opportunities in the mail service, claim processing, customer service, case administration, underwriting, and telemarketing, just to

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name a few. We have a pilot project underway, in which we're focusing on the claim processing and customer service area, because those particular functions are extremely important in an organization providing administrative services.

Research conducted by the Association for Information and Image Management recently concluded that, in the typical organization today, 95% of the information that exists in an administrative services organization is in paper form. Approximately 4% of that information is in some micrographic form, such as microfilm or microfiche, and typically only 1% of that information exists in an electronic format. We've taken a lot of pride at Plan Services, for a number of years, as being a very innovative third party administrator, particularly in the application of automation. Yet when we looked at our organization, these numbers are pretty accurate. It's surprising because most organizations tend to think they're very automated, with the advent of traditional data processing. And yet if you really look at the information that exists in your organization, I think the numbers are somewhat surprising.

That information leads us to opportunities that exist within image processing to substantially increase the productivity of our associates, while giving us methods by which we can significantly improve the quality of service we provide our customers. In addition to that, it provides opportunities for cost reduction in a number of areas, while enriching the jobs we ask our associates to perform. All of these benefits, and many others tied together, provide tremendous opportunities for cooperative advantage in the marketplace.

Image processing goes well beyond what we have traditionally thought of as data processing, which captured some small portions of the information that flowed through our organization, in capturing the entire image of the document in an electronic format. To do that requires a number of components. Some of the primary components consist of scanners, which can scan the documents coming into the organization and translate those into an electronic image; storage devices, which can store and retrieve that information; and image workstations, which can present the information to our employees when they need it to perform their particular functions.

In our particular pilot project at Plan Services, we happen to be using a configuration that's based around a WANG minicomputer system with the WANG integrated image system software. It involves a scanner; image work stations for the claim processing area and our customer service representatives; both magnetic and optical disk storage, as well as a laser printer for those situations in which we have to print out a hard copy of a document for an external customer who may not have access to this technology. In addition to that, the configuration provides a fax gateway that allows us to transmit to and receive images from carriers, agents and health care providers. This system is also linked to our existing mainframe on which we have our claim and adjudication system.

Let's look at why we would want to use image processing. There are many benefits associated with this technology. Customer service is a significant area. One of the points that merit discussion in that area, is that the technology provides the customer service representatives with immediate access to a claim: file while they've got a customer on the phone. This improves the quality of service we can provide to that customer and substantially reduces the number of call backs that we historically had to make to customers. In addition to that, the technology allows for concurrent access by multiple people in the organization. A lot of times the workflow was hindered by the fact that one person needed access to a file of paper documents at a time when someone else happened to be using that file. This technology provides concurrent access.

A variety of paper handling issues comes up with image processing, providing the elimination of creating, storing, and retrieving paper files. If the system is designed appropriately, it certainly eliminates the problem of missing file folders, as well as the more obvious things like reduced file space, when we can eliminate paper, and other miscellaneous costs that go along with a paper intensive process.

Another area of benefits is improvements in the management control of the flow of documents through the organization. An example of that is much more accurate backlog information for managing that flow on automatic document routing, the ability to dynamically allocate documents to the appropriate personnel in the organization as the resources call for it. Reporting on that process is much easier when the flow of those documents is in an electronic form. Communication is in another area. So is electronic document submission by customers using fax documents.

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Image processing systems traditionally utilize fax standards that have existed for some time now and therefore make the integration of fax transmission with an image system very easy from a technological standpoint; transmitting image files outbound to customers. They would have to print it if they don't have an image document. However, one of the examples in our case that we anticipate significant benefits from is with the carriers that we work with. Many times claim may exceed some authorization limit that the carrier has extended to our organization. Therefore we have to submit that claim file to the carrier for further review. That means packaging up a bundle of information in a claim and somehow transmitting that to a home office of the carrier. When we can have an image workstation in that carrier's home office where the people there can have immediate access to that file, this can substantially impact our ability to process that claim in a cost effective and efficient manner.

I think image processing technology is a fabulous business transformation vehicle. If you look at the way your organizations are structured today, oftentimes the structure of the organization was not designed necessarily in the best manner to serve the customer, but may have been designed around the limitations in which we can move paper documents through our organization. Electronic image processing gives us tremendous flexibility at looking at alternative organizational structures that may provide very enhanced service to our external customer.

What about the future of image processing? One of the most significant is Optical Character Recognition (OCR). As character recognition advances it will substantially impact the benefit that image processing brings to our organization. We've made a lot of progress with character recognition in the last few years, but today it's pretty much limited to predefined fonts in a environment that is very tightly controlled in terms of the preparation of that document. As that technology matures, we can see the technology allowing us to recognize handwritten characters, in particular, because many of the documents coming into our organization today are in handwritten form. We will see a much tighter integration between image processing systems and our data processing systems. The benefits will multiply significantly as that takes place. As we integrate voice technology in various forms in our organization, voice technology will also be integrated into the image processing project. Artificial intelligence, particularly in the form of expert systems, I think of as a cooperative technology with image processing. Those two complement one another in so many ways, and as each of those technologies matures, they will add value to each other. One of the most significant benefits of image processing is when it gives us technology-driven business transformation in our organizations.

DR. KENNETH LAPENSEE*: I take it that there is some connection in the ability to process the textual descriptions of procedures and maybe medical records and to help the claim people adjudicate claims?

DR. LEVY: I think there has been discussion of that connection. There are people who have wanted to do that for twenty-five years. I know one man whose dream it was twenty-five years ago to computerize medical records totally, and that dream is very far from realized. A number of organizations have an ability to do very limited interpretation of text to the point of being able to assign a code to a textual expression.

Great promise is held in the ability to analyze medical documents with a natural language technology that is claimed to be in existence. I personally spent several days with a person whose dream it is to do that, Elmer Gabrielli, the founder of a company. I suggested to his people years ago that if the technology existed to do what they thought it might do that there were innumerable products to use and suggested some of them. Some further investigation was done, and it was discovered that the technology did not exist for interpreting medical documents, such as a discharge summary from a hospital or an operative report from a surgery, which are documents of interest for claims adjudication. In fact, the investigation demonstrated that some medical discharge summaries could be "analyzed and reorganized" by the computer, but in order to do that, Dr. Gabrielli taught the computer how to analyze fifteen new documents a day.

Do not interpret this the wrong way, but there are many medical practitioners whose English is not what it might be. We have in this country a number of physicians who are graduates of foreign medical schools, and the ability to interpret an operative report or discharge diagnosis

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when it is dictated by a such a foreign graduate is not there. A discharge summary may come from a graduate who is a competent medical practitioner but whose dictation makes complications for the computer to handle that are way beyond the technology at this point. There is potential for this technology in the future, but there are very few people who are working in the field who believe that we are anywhere near reaching it.

A medical school classmate of mine is head of the medical expert system laboratory at the University of Pittsburgh, which is the leader in clinical applications. I think he does not believe that we are anywhere near reaching that point, precisely because of the imprecision in language that physicians use.

DR. LAPENSEE: The other part of my question was about the mismatch between CPT code numbers and the actual description of the code. It seems to me that it might be possible to design a system that could at least scan the code descriptions and match them against the code numbers. Is your artificial intelligence (AI) system, the one you design, a mainframe system or is it a PC system; what are the relative advantages and disadvantages of a mainframe system versus a PC system?

DR. LEVY: The knowledge base system that we have is designed for use both in a mainframe and a PC environment. To insert the knowledge base in any one mainframe system will take a little time. We're actually offering the knowledge base for insertion in a mainframe; it's set up in a standard sequentially indexed file. We have not built in one of these obscure artificial intelligence languages. It's in a traditional database, and it is easily accessible and transferable in any language because it's a simple database and there are very simple rules for asking it questions. That is available for any mainframe installation. The advantage to the PC is it works instantly and it can save money right away. The order of magnitude of savings is so great we think that people ought to be looking at the PC as a starting point and then trying to plan on whenever it suits them to get the system up in a mainframe application because obviously there are advantages to the mainframe application. In the mainframe application you have access to a history file, which you don't have in a PC.

MR. BATEMAN: There were really two questions there and one was centered around the PC versus the mainframe issue. That issue depends on so many circumstances that there are certainly situations in which PCs are significantly more effective than a mainframe and in many cases provide us with more computing power and substantially better price performance. However, there are still lot of applications that are either better performed in a mainframe environment or that most of our organizations have substantial investments in that we are going to continue to work in that form for some period of time. Another significant issue is the extent to which you can integrate that expert system into your existing claim adjudication process. The fact that most of you have a claim adjudication process on a mainframe architecture today means that your most cost-effective alternative in the future is going to be tying the expert system into that environment as well, but certainly the system is a stand-alone process that could have benefit in the short term.

MR. LOUIS A. KENT: Is there any problem with cutting back the reimbursement level if you crunch through your system and you discover that somebody is unbundling and throwing all sorts of additional codes in when one procedure could have been taken care of in one appropriate CPT code? Are you finding a lot of problems with the cutbacks?

DR. LEVY: To try to address the question in a general way first, the experiences with doing cutbacks for the most part are based upon finding a certain amount of this unbundling manually. In most insurance and benefits operations the experienced claim processors have a nose for catching a limited amount of abuses and have referred them in the past to a medical review where the unbundling has been untangled. It's particularly notable historically in podiatry. The podiatrists have been at this game long before the physicians ever thought of it. Most insurance company people that I've talked to, physicians and claims management people, express a clear consensus that what happens in most cases, when the physician is caught and there is a cutback is that it is simply ignored. When the physician is confronted with a phone call or letter, usually there is an, "Oh gee, I'm sorry; that does look like a mistake." There is a tiny residue of physicians who say, "I don't care, I can do what I want, and I'll sue." Usually it turns out those physicians have some sort of personal issue or emotional problem and they can represent an annoyance and a

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time cost. Potentially you have the need to reassure the patients, or the claimants, that they are not going to be left holding the bag. In general I think there is no problem with cutbacks at all.

MR. SCOTT R. BEHLING: I had an observation on this. This is both related to what you presented and other efforts in provider profiling trying to crunch through the data and identify other specific patterns of providers. It seems like what's really happening is we have a war of different computer systems where the third party payer has computer systems to identify things and they are fighting against the computer systems the doctors have which are intended to do this. Do you see significant long term saving from this, or is it just one more step in the battle where you attain a short-term savings for one or two or three years until the other side catch up and finds more sophisticated ways to gain a system?

DR. LEVY: I believe that there are long-term savings, but that the effect in terms of how savings are measured will be seen most visibly in the short-term. The reason I think that it is long term is that the pressures on the physicians to do this sort of thing are only going to grow. The younger physicians who are doing this are growing in number. The mentality of people entering medicine has changed somewhat in recent years. There is every reason to believe that there will be more of this if people don't catch it. My wife and I are both physicians, so we are on a lot of specific junk mail lists. In the ten years previous to this summer, we received together one invitation to a conference on how to code. Over the summer we received five or six invitations from five or six national organizations sponsoring conferences all over the country on how to code better. Since last summer we've gotten six or seven more invitations like that. One we received actually says, "Come to our conference and get a 10% increase in practice revenue in six months." The whole activity is just beginning, so in terms of whether it is long term, if you don't do anything about it, it's long-term. In answer to your last question, "Will the physicians find new ways to gain on the system?" Sure, I think they will, but that doesn't mean we should throw in the towel. I think it means more sophisticated tools are needed to deal with abuses. I think that there are some things coming on the horizon like various kinds of pattern analysis that will be helpful in new games that can be played.

MR. BATEMAN: I think an analogy to this centers around computer systems in general. Over the years I've had a number of people in business who said, "I'm thinking about getting a computer, but if I wait a year they are going to be more powerful and less expensive." Yes, they will be, but by the same token you have to look at that situation today and ask whether the computer system will benefit your organization cost effectively today, and move forward with that decision.

MR. MARK F. HOWLAND: I first want to comment on 95% of storage being of the paper variety. It is sort of a parallel with the session on technology where one of the panelists mentioned that, with the magnetic resonance imaging (MRI) scanners that came out, many physicians were at first using them but not confident in them and would also do the CAT scan. In companies that I have worked for and seen we have a parallel there with the paper; we often would reduce a lot of paper to microfilm and microfiche and then get a little nervous and save the paper, too.

I had a question on duplication mismatch between the code and the description that was on the claim forms. Did the survey or studies try to identify how much of the mismatch was intentional versus unintentional and how much of it resulted in fraudulently higher claim reimbursements?

DR. LEVY: I don't think that it is a good study, and we hope to have a better one before too long. I'm not really able to give you a good answer to that part of the question. I think the mismatch is both intentional and unintentional. There are lot of physicians who don't know how to code make honest mistakes and in some cases get less money than they should get. But most important, unless there is a cross-check, those physicians who wish to game the system in this way will do so. It's not a static thing. For us to say, "Well the study of three years ago showed thus and so, therefore we can ignore this problem, is a big mistake. In fact the whole history of group medical benefits and individual medical benefits is one in which people went into it applying the basic motto that used to be published in all of our actuarial publications: you use the past to predict the future. This motto applies very well when you're dealing with mortality tables, but in fact it has very serious problems in the medical area. The whole notion of covering hospitalization first and not outpatient services because people don't go to the hospital when they don't need to changed the whole way medicine is practiced. People started going to the hospital to get covered.

