RECORD, Volume 27, No. 1*

Dallas Spring Meeting
May 30–June 1, 2001

Session 94PD
Large Medical Claims: Types, Trends, and Management

Track: Reinsurance

Moderator: STEVEN J. GASPAR

Panelists: DR. KENNETH J. KRAUSE†
DR. DARRYL LANDIS‡
KEVIN R. O'BRIEN§

Summary: Panelists discuss the various kinds of prevalent large medical claims and emerging trends. Panelists also discuss early identification of potential large claims and claim management alternatives.

MR. STEVEN J. GASPAR: I am an actuary and am currently director of underwriting at Lincoln Re Risk Management Services, which is the employer stop-loss line of business at Lincoln Re.

The topic, "Large Medical Claims," is a pretty broad subject, so we could have gone in a lot of directions in this session. I will first note that there is a large medical claims database that is based on '91 and '92 claims data available through the Society. However, we did not mine that database. The Society is currently working on an update to that study.

Large medical claims are a significant driver of financial results for medical carriers and for employers. Large claims get the attention of pretty much everyone: patients, providers, employers, and employees. This panel is here today to discuss some trends that we're seeing in medical claims from various views, and some things you can do to address them.

The first panel member is Dr. Ken Krause, the medical director for Lincoln Re Risk Management Services. Dr. Krause is involved in identifying and addressing medical trends for the employer stop-loss market. Next is Dr. Darryl Landis, the medical director at Ingenix. Dr. Landis will give an outline of a claim-based model that he

Copyright © 2001, Society of Actuaries

† Dr. Kenneth Krause, not a member of the Society, is medical director for Lincoln Re Risk Management Services in Ft. Wayne, IN.

‡ Dr. Darryl Landis, not a member of the Society, is medical director for Ingenix in Salt Lake City, UT.

§ Mr. Kevin O'Brien, not a member of the Society, is vice president of managed care and director of LifeTrac, the transplant network for Allianz Life in Minneapolis, MN.

has put together for his company that is used to identify high-risk individuals within a population. Last we have Kevin O'Brien, vice president of managed care and director of LifeTrac, the transplant network for Allianz Life. Kevin will talk about how to address one particular type of large claim—organ transplants.

DR. KENNETH J. KRAUSE: The goal of my segment is to describe my role as the medical director for Lincoln Re Risk Management Services and how I identify emerging medical trends. Before going too far, I wanted to just make it clear that when I use the term "medical trends" I am not referring to the inflation factor that the term trend usually refers to. What I'm referring to are developments in health care and medical practice that are likely to alter medical cost distributions and developments in medical practices that are likely to be new sources of medical costs. With that in mind, these are the four discussion points I'd like to address: (1) why is it important to identify medical trends, (2) how medical trends are identified, (3) understanding a medical trend once we do identify it, and (4) putting this knowledge about these identified trends to use.

First of all, why do we feel the identification of medical trends is important, especially in our market? The knowledge and understanding of these medical trends will help enable us to develop and implement cost control solutions. This refers to medical management activities, disease management activities, and network arrangements to manage costs for high care conditions, such as a transplant network that Kevin will talk to us about later. This knowledge and understanding also enables us to develop an expertise in risk assessment, which in turn enables us to develop expertise in our pricing processes.

How can medical trends be observed and detected? Individual case review refers to the day-to-day activities of people in our organizations—claim specialists case managers, medical directors—who, on a day-to-day basis, are reviewing cases. Through that process they can readily identify the appearance of a new development that has a high-cost impact. They can detect changes in volume and/or prices of existing services.

Another important way of identifying new medical trends is surveillance of new medical developments—the technology watch. This can be accomplished through surveillance of the medical literature and business and scientific news. We've even found it important to monitor medical product market research from the point of view of stock analysts. All of those sources are important sources to go to for information on emerging medical trends. A network of providers in key specialties can provide a reality check of firsthand knowledge of what's going on in medical practice. It can certainly give us, as medical directors, a front-line sense of what's going to explode versus what's not going to develop into a potential blockbuster treatment.

Given all these sources of information, how do we prioritize and focus efforts on identifying those developments, those medical trends that are of most importance? First, importance needs to be based on the nature of the business that you're in. The impact of a new preventive treatment, like Tamoxifen for breast cancer, has a

much different impact than a new treatment for a rare, high-cost disease like hemophilia, depending on whether you're in first-dollar medical coverage, reinsurance, or stop-loss coverage as we are.

Where have the surprises been in terms of high-cost medical issues in the past? The example that's usually quoted in most organizations is the appearance of high-dose chemotherapy or bone marrow transplants for the treatment of breast cancer. The goal is to identify where those things may be coming from in the future.

In our experience, a systematic study of our claims data revealed some trends about which we were previously unaware. Looking back and analyzing claims history in a systematic manner is an important approach to identify what emerging trends may be important to you. Monitoring claims via automated tools, generally referred to as predictive modeling tools, can assist the detection of potential high-cost cases on a near or an actual real-time basis. A little later Dr. Landis will talk about developments at Ingenix in that regard.

What approach do we take in identifying medical trends? Because we are in the stop-loss business, our focus is on studying claims experience at the catastrophic level. This helps us to understand which conditions have had the highest impact on our claims experience and which conditions are most likely to have that continuing impact on our claims experience. We try to understand which sets of diagnoses and procedures have the greatest impact now, or will likely have such an impact in the future. We strive to identify the differences in the drivers of trend at the first dollar level and the catastrophic level. I'm using the word trend in its traditional sense, meaning cost or inflation factor. By taking all that we learn from these sources of data, our day-to-day case observations, our review of claims history, our technology watch, our current claims monitoring, and we strive to understand the current and future importance of the trend that we've identified.

Once we identify an important medical trend (a trend in a specific type of condition or a specific category of procedures), we try to understand what's happening and why by researching that trend in four drivers. One of the drivers is incidence and prevalence, which is the epidemiological sense of those terms and refers to changes in patterns of disease onset and prevalence that affect the overall cost of treating that disease. Severity is a driver that refers to changes in disease natural history. The time course of disease and the individual case complexity both have impact on the overall treatment of that disease. Technology and medical practice is a driver that reflects technological advances and changes in medical care delivery and practice. And finally, we evaluate the cost per unit treatment to take care of patients who have a disease in a certain category. We have found that geography is an important factor in variability of costs of treatment and care quality and epidemiology within specific diseases. We try to understand all these factors in regard to the medical trend, the condition, or procedure group that we've identified as being important.

To better illustrate what I've just described, I picked two examples from the work we've done at Lincoln in exploring the drivers of catastrophic trends in our

organization. For renal diseases, we've observed a sudden influx of high dollar dialysis claims through our day-to-day case review process. With respect to cardiac disease, we've observed that cardiac claims are a consistent high-cost claims leader. This we identified through evaluation of our past claims history.

The relatively large frequency of cardiac claims has been at a high level over the years, and there has been a recent upsurge in those claims. With respect to renal disease claims, for most of this period they've been at a relatively constant level. We've noted some upsurge in the frequency of claims in recent years. As a contrast, in the late '80s and early '90s, HIV disease was a worrisome source of high-cost claims. With treatment advances, the medical trend has led to a marked reduction of large cases of HIV-related diseases such that it's virtually disappeared from our radar screen for large cases.

Through our medical research, our main findings were these in regard to the four main drivers of, from the medical perspective, medical trend. With respect to incidence and prevalence in renal disease, a major finding is that there's a marked increase in the prevalence of end stage renal disease cases. Primarily I'm referring to end stage renal disease cases that require high-cost services, dialysis or transplants. This is a result of shifting population demographics and the aging of the United States population. It's also a result of increased prevalence of the diseases that are the primary causes of renal disease in this day and age—diabetes and hypertension.

From the dimension of severity with respect to end stage renal disease cases, we're already at the upper end of the severity spectrum—these are the most severe cases. At this point they require what's called renal replacement therapy—either dialysis or transplantation. With respect to technology and medical practice, there currently aren't any earth-shattering developments on the horizon in terms of new technology to treat these patients. But in recent years there's been an increase in the use of living donors for kidney transplants, and this has effected an increase in the number of renal transplants that are done on an annual basis. That's had some short-term impact on first-year costs, but long-term it may actually serve to reduce the overall costs for treating end stage renal disease, because it is the preferred treatment of these patients, both clinically and economically.

The other important finding with regard to technology and medical practice has to do with dialysis market forces. This refers to a consolidation within the hemodialysis provider market. At one point, perhaps five years ago, most hemodialysis was provided by small, local, hospital-based dialysis centers. Over the past five years there's been a marked consolidation of these centers into large national or international organizations that provide this service. As a result of that contraction there's been a dramatic increase in the price of hemodialysis services in many areas, which brings geography into play. The magnitude of those price increases has a great deal to do with geography and the level of managed care penetration into the markets in those areas. Regional differences are potentially driven by other factors, including ethnic makeup of the population and incidence of the causative problems.

The United States Renal Data System is funded by several federal agencies, and is one of many sources of data that's helpful for researching the drivers of trends in renal disease. Their web site address is www.usrds.org. There are numerous sources of data to provide input into this research process. If you go the web site, you will see an example that's helpful in illustrating how the prevalence of end stage renal disease has increased markedly to date, and how from here forward it's likely to increase much more dramatically. They forecast at least a doubling in the prevalence of end stage renal disease cases over the next decade.

As a second example, because it's a consistent large claims leader, we looked in detail at cardiac disease. Incidence and prevalence are expected to go up somewhat in the next 10 years toward 2010. Severity is an area of major driver of cardiac claims. Concerns include decreased mortality and an increase in the proportion of cardiac cases that are congestive heart failure, which is a more severe type of heart disease. Overall, a larger population of sicker patients appears to be a primary driver of the expansion and sustaining of cardiac cases.

Procedure utilization and new procedure development are both major issues with respect to cardiac disease. Procedures in use now, generally, have been developed to replace open-heart procedures. Utilization of those procedures is at an all-time high, and there is an ongoing increase in the development of more procedures with the same purpose in mind.

New drug development, especially bioengineered and genetically engineered drugs such as angiogenesis growth factors, is in its infancy. But with all the effort and resources being put in that direction, new drugs are likely to be a major cost driver in the near future. Even stem cell research procedures, the bone marrow transplant type procedures that have been used for cancer, are in early investigational stages and are being explored as a potential treatment for advanced cardiac failure or cardiac disease.

It's clear with respect to epidemiology and practices that there are a lot of variations based on geography that are driving cardiac care costs. Again, as a source, the American Heart Association web site is an excellent primary source for data on cardiac disease and its treatment. It has links to a number of other sites that have a wealth of data about cardiac disease.

Again, the summary of our cardiac disease research was that the primary drivers of high-cost claims in cardiac disease have been and will continue to be an expanding pool of sicker, more severe patients. The other primary driver will be technology—the continued research and exploration into new ways of treating and sustaining the sicker population of cardiac disease patients. The level of seriousness, the level of resources being diverted toward research along a number of lines, again, with respect to devices, with respect to procedures and drugs, could lead to a potential high-cost surprise in the arena of cardiac disease treatment. As I mentioned, things like stem cell treatments, transplant strategies like xenotransplants involving transplantation of organs from an animal source, angiogenesis factor drugs,

mechanical assist devices, mechanical hearts—all are potential sources of sudden spikes in medical cost for the treatment of cardiac disease.

My final topic concerns putting large medical claims trend knowledge to use. I'm trying to tie this all back to the initial question: Why identify and research medical trends? How do we use the knowledge that we've learned from this process and put it into practice and make it valuable? First of all, by virtue of appropriately directed early case identification, we can match and apply specific medical services to manage the specific aspects of cardiac and renal disease that have the greatest impact on our claims experience. For end stage renal disease and cardiac disease, one strategy is to apply the services of a transplant network to try to manage the costs of that type of care.

With respect to risk assessment, this knowledge and understanding enables us to be fully aware of the significant risks that we face and why. By knowing the sources of the risks from cardiac and renal disease, we can project and plan knowingly, proactively and with the primary goal of not encountering a high-cost surprise down the line. At Lincoln we've learned that awareness and understanding of medical trends has made an important contribution to our own organization's ability to manage the catastrophic risk, the business that we're in.

DR. DARRYL LANDIS: I'm the medical director of Informatics for Ingenix. Informatics is the application of mathematics and statistics to health care problems. A few years back we started doing some work looking at the problem of figuring out who's going to cost you a lot of money next year, and what can we do about that. At the time that Ingenix started working on that particular problem, I was a medical director for a plan in North Carolina, and it was one of the pilot sites for some of these early analytic tools that were being developed back in 1998.

My objectives today are to describe some of the development and implementation processes we went through to get a claims-based predictive model to prospectively identify and case manage high-cost patients. Although it's not part of my presentation today, this same model can be and is used in an underwriting setting. We do use some of the same technology and modeling effort in underwriting situations, primarily in small group and middle market, where, of course, the law of large numbers doesn't help you out. When you have a high-cost member in those small groups, it's going to have a much bigger impact on the group experience.

Forester Research Group recently did a survey of health plan executives which showed that there is quite a bit of interest among health plans in refocusing on medical management strategies, looking for new information technologies to help identify high-risk members ahead of time and, also, for software tools, automated workflow systems to help manage those patients once you've identified them.

This problem can be simplified into two aspects: figuring out who's going to be high-cost next year, and having in place a program or a set of strategies to manage them. This is important because last year's high-cost patients are not, generally, going to be this year's high-cost patients. In a typical health plan we find

that 10% of the patients in a commercial health plan account for about 70% of the costs the plan experiences, 5% account for 40-50% of the costs, and 2% account for 30-35% of the costs. The idea is to find these folks and do something about it.

There have been some studies describing what happens to high-cost patients in a typical health plan. If you look at a given year and focus on the top five percent of members in that year and then take that exact same cohort of patients and look at their experience in the year prior and in the year following, we'll generally find there is a hump here, where something appears to have happened to bump that cohort into the high-cost category. Those folks are sick patients though, because if you look at their experience over a longer period of time, like three years prior and three years after their high-cost year, they have general health experience costs that run about three times the bottom 95% group. So these sick people need a lot of care, but there do appear to be some events that may be potentially avoidable that bump them into the high-cost tier in a given year.

Indeed, some studies have shown that anywhere from 35 to 50% of all inpatient admissions for selected diagnoses—things like diabetes, cardiovascular disorders, obstructive pulmonary disorders—are potentially avoidable. There's also a lot of literature that looks at various predictors or events that may indicate a risk situation that could also identify a management opportunity. These are things like polypharmacy, multiple physicians, and risky drug combinations, which point to a care coordination opportunity.

In the past, strategies such as traditional catastrophic case management, utilization review (UR), and concurrent review have beenattempted, some with more success than others. Those types of programs are often reactive and too late. They often depend on hit-or-miss triggers that are not systematically and consistently implemented across the whole population. They are sometimes dependent on a given region or how well one particular group of UR nurses or case managers is doing. Disease management programs are much more proactive, generally, and much more systematic. I guess I see one limitation—they're often optimized toward managing one condition. When you have a complex patient who has multiple conditions, sometimes the programs don't do as well in looking at all the other conditions, the interactions between them, and the social environment the patient's in.

For our development effort we relied primarily on administrative data sets and we looked at the common culprits for source data. Our interest there was to get an efficient model, recognizing the value of knowing more about a patient, like medical record data, patient survey data, etc. It's difficult to get that data for your whole population in a cost effective manner. So, again, you would be stuck with a hit-or-miss situation, where if you have it, it would be great. If we don't have it, it can be a problem. So we're stuck working with source data that is an administrative data set.

The model is tuned to take a look at a base period of claims, process them, and then spit out an output file that includes a relative risk score at the member level.

Each patient gets a score that predicts his or her risk in the next 12 months. Time and delay is the enemy of accurate predictions, so we do not build in any claims run out in our model. If there are two weeks of claims for a given member, the model will generate a score for that member. However, the processing period here is just to remind us that in a real life setting there is typically some delay which runs about a month or so in the plan setting for the health plan to get the source data, run it through the model, get it back out to the case managers, and get it implemented. But there's no claims run out time that's required to be built in there.

There are a number of different ways to build models. A rules-based model, basically, allows a lot of clinical precision. You can write finely tuned clinical rules to identify patients. The big problem, however, is that if we're looking at all conditions of all patients, it quickly gets very complex. Alternatively, equation-based models can struggle with the complexity. The limitation primarily is just understanding what a particular coefficient or variable is telling you, so you lose some of the clinical interpretability, perhaps.

Three common types of equation-based models are neural nets, logistic regression, and multiple regression. Neural net models are nothing more than sets of mathematical equations and algorithms. The problem with neural net models is that while they generally do better in terms of their predictive power and accuracy, it's often hard to understand how they got the results that they did. There are a lot of intervening nodes between the input and the output; sometimes what you get seems counterintuitive. Logistic regression is difficult to translate back into dollars. What we found in our modeling development is that we ended up settling on a combination of rules-based methods and mathematical equations—multiple regression equations. I will show you how those two approaches interact in our final effort.

Let me define the term "burden of illness" as the contribution of chronic disease for that patient's risk. It takes a look at what conditions the patient has, how the various conditions interact, and it quantifies that into one number. Basically, the emergency department visit, the x-ray, the offices, and the antibiotics are all grouped together by this methodology into a single episode of care. Because we also have to write rules to identify relationships in terms of co-morbidities and complications, this allows us to tap into that in terms of the burden of illness calculation. But as you'll also see when we go to implement this, it gives us a lot of interpretability.

The final model includes other types of variables, such as age and gender. If there is no claims history whatsoever, what comes out the other end is patient age and gender-based prediction. There are also indirect factors in the model that relate to patient accessing preferences, the behaviors they exhibit by how they access the system. It also touches on practice patterns of the physicians that they access. It gets at the factors outside of the conditions that they have, which may be driving some of their costs in the future. We also have a trend factor built into the model. If you have two patients who have the exact same conditions, drugs, and physicians, then the patient who has incurred most of the services in the last

quarter in an accelerating fashion will have a higher risk score than the one who seems to be in a steady level of service.

To summarize here, the process takes claims from multiple data sources from a data warehouse, runs it through the grouper, calculates this burden of illness, and applies the equations to come out with a relative risk score for each individual patient that was in the input file. The model then ranks that population according to those risk scores. It also normalizes the output, so that would be the average expected experience next year.

The question always comes up, “How well does this thing work?” Our total model at this point is getting an R-squared on the order of 18%. There’s been some literature that suggests that using claims data and administrative data sets alone, the theoretical upper limit is about 20% or so. We think the limit is a little higher than 20%. We’re hoping that by the stuff we’re working on now, in which we’ll be bringing in some clinical lab result data, as well as making some fine tuning improvements, we should be able to approach an R-squared level of 20% and maybe exceed it.

One of the other things we can look at in terms of how well the model works is positive predictive value. In one study of 63,000 commercial patients, we took a base year and ran them through the model. We took the top five percent of the risk scores, and then we followed that same group of patients through the next year to see what actually happened to them in terms of their actual costs. What we found is that the top five percent of the relative risk scores from the model captured 23% of the actual costs in the subsequent year. If you compare that to other methods, it is significantly better. It didn’t capture 40-50% of the costs, which is what the actual experience is, but it’s better than looking in the rearview mirror. This is really half the battle, perhaps. Finding the high risks is an important part, but if you find them and don’t know what to do with them exactly, or you have a weak effector arm in terms of making an intervention, then you still will not capture the value out of this exercise.

I want to go through a few things on how we can use some of the output of the model to really impact on the high-risk patients. This is done by providing some focus on the cost drivers in the model. Some of our clients have implemented very similar types of interventions, where the management staff sets the high level priorities and divides up the high-risk patients that the model identifies. Then case managers use the output from the model, which includes the details from the critical care grouper. The grouper reorganizes all the claims data from that patient’s history into almost an electronic medical record type format, and allows the case manager to better answer these types of questions, which, as we saw earlier, were questions that were identified in the literature as being correlated with high-cost experience.

In a pilot program, this was well received. Nurses, generally, felt that two-thirds of the patients they contacted they were able to identify an intervention that would make a difference. Again, case managers felt that there was a lot of clinical

actionability to this. In a health plan setting you can imagine, with the press a lot of HMOs get, members were quite amazed that someone from the HMO was actually calling them proactively to see if they could provide any more care for them as opposed to arguing with them about why something would not be covered. This enables a more proactive approach: Are you taking the right medicines? Are you seeing the right doctors? Can I help you get an appointment with your cardiologist?

So to wrap this part up, the model works by identifying. It's really a matter of focus. It takes into account the whole patient, but it provides focus by enabling medical managers to really focus in on who out of the whole population should have the intervention and, specifically, what that intervention, potentially, could be.

The last thing I want to address is the question of return on investment, which sometimes comes up. We know, again, from published literature that targeted case management programs are cost effective. That's been looked at in a number of different settings. And, of course, the more accurate the targeting (in other words, the higher the positive predictive value of your case finding methodology), the more cost effective the program can be. So, using these facts and our pilot experience in the field, we can build a simple cost savings opportunity model that takes into account the identification of the increased positive predictive value of the model, and how many members are contacted and successively intervened on. This model shows that for a typical health plan of 100,000 members, an incremental savings over whatever they're doing now based on a prior year cost methodology, would be between $100,000 and $250,000. This has been verified in some of our field studies.

MR. KEVIN R. O'BRIEN: I'm a vice president with Allianz Life. I'm the Director of LifeTrac, which is Allianz Life's proprietary, JCAHO-accredited, National Centers of Excellence Network for solid organ and bone marrow transplantation.

Dr. Krause and Dr. Landis did a nice job of discussing how to identify and manage large medical claims from a broad perspective. I will focus my comments on transplants—both solid organ and bone marrow transplants—and a Centers of Excellence process to help manage that type of large medical claim.

I will focus on transplants for four reasons: they are high-cost, they are relatively infrequent, they form a definable episode of care, and typically they are nonemergent. Transplants can be effectively managed through many of the basic managed health care techniques that we use today. Essentially, it is the low-hanging fruit.

High cost indicates it's worth your time and your attention. Relative infrequency means that the patient number is small enough that you can manage that population. Definable episode of care lends itself to definable contracts with facilities. Being typically nonemergent allows for patient education and directing. Now there are other very high-cost care claims—trauma, accidents, burns—but in those cases picking up the phone book of providers to evaluate who's the most appropriate, who's the closest, and so on, is not practical.

The table (Table 1) shows average transplant costs by organ. I've checked with the actuaries and underwriters at Allianz and they've assured me that anything that has an average cost of $111,000 to $475,000 qualifies as a large claim. The actual individual unit cost for transplantation, though it's quite high, has remained relatively flat. That's due to counteracting forces out in the marketplace. We're seeing an increase in cost due to technologies, health care inflation, drugs and so on. We're also seeing a downward pressure on cost based on improved clinical outcomes, reduced length of stays, outpatient protocols, drugs and so on.

Table 1

Transplant Cost Trend by Organ

Transplant unit cost remain relatively flat

Category	1996 National Average Cost*	1999 National Average Cost*
BMT (auto)	$ 175,000	$ 165,000
BMT (allo-related)	$ 275,000	$ 285,000
BMT (allo-unrelated)	$ 311,000	$ 326,000
Heart	$ 255,000	$ 328,000
Kidney	$ 116,000	$ 111,000
Kidney/Pancreas	$ 142,000	$ 153,000
Liver (CAD)	$ 314,000	$ 278,000
Lung (Single/Double)	$ 270,000	$ 295,000
Heart/Lung	$ 275,000	$ 325,000
Pancreas (CAD)	$ 125,000	$ 115,000
Intestine (Small/Large)	$ 475,000	$ 475,000

* Combination of Milliman & Robertson and Allianz Claims Data

When we look at transplant trends and frequency, it's quite a different story. We're seeing a very significant increase in the frequency of transplants, particularly on the single and multi-organs—an increase over 40% over the last decade. Bone marrow transplants, where we don't have some of the limitations of organ availability, where you can actually donate your own marrow to yourself, has seen an increase of over 300%. As a result, we're seeing well over 75,000 people currently on the national transplant waiting list. The bone marrow transplant area is increasing very dramatically.

Factors that are increasing transplant frequencies are new technologies and drugs. The ALVAD, (left ventricular assist device) is a bridge to transplant for many heart transplant patients who would have expired in prior years. This device now allows them to receive a transplant as well as drugs. Societal expectations, where people

believe that doctors, hospitals, and modern medicine can actually perform cures of any and all types, affect frequency.

Over the last decade we have had a very strong economy. As a result, the competition for quality employees has been very great. Where historically transplantation would have been considered experimental or very costly and just carved out of the benefit plan, the desire by employers to attract good, quality employees requires that they pay for these services.

Government intervention has affected frequency. Medicare actually certifies additional types of transplants, most recently, intestinal transplants. Once the government steps in and starts certifying certain transplants as non-exploratory or non-experimental, the commercial side of the market has to follow step as well, and we're seeing that.

Finally, there is the legal system. Health plans and payers do not want to end up with a black eye in their local marketplace for having denied a patient a transplant for whatever reason, even though it may have no clinical efficacy. This has happened even when the transplant procedure is specifically excluded by the medical plan. We've seen a number of these in the last few years, multi-million dollar judgments going against health plans for denying a transplant. That, as well, is contributing to the increase in frequency.

Now if you look at the overall transplant claims exposure, it's simply the unit value times the frequency. The unit cost is relatively flat due to the counteracting forces, but the frequency is increasing dramatically. As a result, transplant claim exposure is very large and it's growing rapidly. I propose managing these transplants or these patients through a Centers of Excellence Program. By this I mean managing the patients to four very specific goals: (1) improved clinical outcomes, (2) cost avoidance, (3) savings, and (4) price predictability.

The three basic managed health care components of a transplant program include credentialing, educational consulting, and provider contracting. Credentialing is statisticians, physicians, and nurse clinicians who evaluate various transplant programs around the country with the goal of selecting the most appropriate institution for providing these types of services. This is in alignment with one of the basic tenets of managed health care: if you provide the appropriate, effective care at the appropriate time, it will be very cost effective. A payer would much prefer to pay in full for a bill charged on a $100,000 heart transplant than pay 50% of charges on a $1,000,000 heart transplant. The goal is to find out which institutions are more technically competent at performing the heart transplant. Educational consulting is providing information and educational support to the patient, the patient's family and the personal physician, so that they can make an informed decision as to the most appropriate institution for them. The provider contracting process overlays the selection of the most appropriate clinical institution by providing access to the best providers at fixed rates.

In selecting a transplant program, look at statistical outcomes, clinical outcomes (including patient survival rates), retransplant rates, complication rates, and disease-free survival rates. Compare and contrast these statistics between competitive institutions across the nation. Look at the education and the experience of the staff that's performing the services of that institution. Look at how they select patients, their quality assurance programs, how they communicate with the families and the patients downstream as well as with the local physicians that have forwarded that patient to them. Finally, there should be an annual review process to look at all these issues to ensure that new technologies are implemented appropriately. Ensure that on an ongoing basis you to have the most appropriate providers in your panel.

One could argue that all the providers are accredited, so why bother with evaluating them? These are all highly educated, well-intentioned individuals, but the outcomes are vastly different at different programs. There were 69 heart transplant programs in the country in 1999. The one-year patient survival rate varied from about 95% down to the 30-50% range. Of course, there may be mix differences such as adult versus pediatric, accounting for some of this.

Still, it's important to steer your patient population to those institutions that are having better outcomes, because there's a very strong correlation between clinical outcome and economic outcome. A $1 million heart transplant claim indicates that the patient is probably no longer with us. You have $1 million in bill charges because there were some problems. Conversely, if you have a $75,000 heart transplant, that means that that patient has done very well. All institutions and all programs are not equal.

The contract is only addressed after the appropriate institutions are selected. You should be looking for true managed care contracts, which require providers to accept risk. You're looking for contracts that are either truly global, or case rates that have fixed per diems that wrap around them. In no case should you be interested in percentage of discount arrangements, or in contracts that start out with a case rate or a global rate that then reverts to a fixed guaranteed payment to the institution. From the payer's standpoint, we're looking to put a significant portion of economic pressure on the side of the provider. Fixed rates will also provide price predictability.

A fixed contracting methodology takes this economic corridor and compresses it from about $150,000 to $1.2 million down to a very tight corridor of about $140,000 to about $225,000. That allows you to be much more aggressive in performing your own internal exposure calculations.

FROM THE FLOOR: Dr. Krause, I was intrigued by these increases in renal disease and cardiac disease numbers that you showed. Do you have any insight into what those causative problems are that would drive that kind of increase?

DR. KRAUSE: For both renal disease and heart disease the major causative factors, the underlying disorders that contribute to both, are hypertension and

diabetes. There's been a lot of concern about an increase in the incidence and prevalence of diabetes, especially in younger age groups. I think a lot of that information and those predictions have appeared in the news, as well as appearing in the medical literature. Because of lifestyle changes—increases in obesity and decreases in activity—the incidence of diabetes in the 30-to-50 age group is another trend that's thought to be one that will take off in the next decade. That will contribute to the prevalence of the conditions. Hypertension is another condition these lifestyle changes will lead to, which will affect heart and renal disease. So I think what we're seeing now is in large part due to the aging of the population. But I think as time goes on, the increase in prevalence of these more severe cases is going to drop down into the younger age groups.

FROM THE FLOOR: So you think it's more lifestyle? People think, generally, the population is becoming healthier in terms of lifestyle, but you're saying that's really not true?

DR. KRAUSE: Correct. In a large part that has been true the past couple of decades and that's why right now we're seeing a leveling at least of the rate of increase in cardiac disease. There are concerns that there's been some reversal in lifestyle improvement in the population. Obesity is one issue. Smoking in young adults is another. A balancing force for cardiac disease could be the more widespread use of cholesterol-controlling drugs. But that's a reflection of not putting enough effort into lifestyle changes, substituting a drug for what might be a more appropriate measure controlling diet and those lifestyle changes. So that trend back upward might be controlled somewhat by those new drugs, but underlying that may be a trend toward deteriorating lifestyles.