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>> So what we'll be talking about in this first session is the type of economic evaluations in healthcare, the difference between a societal and an institutional perspective. So this is more on what should you be evaluating when you're looking at-- when you're doing some cost effectiveness analysis, talking a bit about the datasets and some measures of cost and effectiveness and then we'll be talking about Medicare data itself used in implications.

So for those health economists, this is probably old hat, but for the rest of you there are four approaches to really analyzing cost. The first is cost identification and analysis, the second is cost effectiveness analysis, the third, cost benefit analysis and the fourth, cost utility. And you see at the bottom that there is a reference to the Gold text book and that's still the gold standard, pardon the pun there because the author's name is Gold. So that's listed there for your reference.

Cost identification analysis, so what we're talking about is we want the goal with cost identification analysis is to minimize cost. So you're answering the question, what is the cost associated with the service or the program. So the goal is to select the least cost or identify the least cost option of providing care. So of course what you're assuming is that the two types of interventions are the same in terms of the programs themselves and so you're ignoring the benefits or the health outcomes and you're just focusing on the cost.

The second was the cost effectiveness analysis. So in this type of analysis you'll be looking at both cost as well as outcomes. In the numerator, that's where you're tallying up all the costs and the denominator reflects the change in outcomes. So for example lives saved, complications averted, cases of illness prevented. So what you're doing is you're trying to see if health outcomes are the same under the two interventions or strategies, and if one of them is cheaper and it's more effective, you're basically coming out saying all right, this type of intervention dominates the other. So if it's both cheaper and more effective, that's a no-brainer, right. That strategy wins out and dominates the other set of strategies that you're evaluating. If it's more expensive but yet it's more effective, now you need to put on your thinking cap and you need to figure out all right, is the extra benefit worth the extra cost, and there is where you need to refer to the literature and kind of look at, you know, how much extra does this cost and is it worth it. There are some rules of thumb in the literature and we can get into that if some of you have more questions about that.

So with cost effectiveness analysis, you're comparing interventions where you're assuming that the benefits are measured in the same units of effectiveness across the two strategies otherwise you're in trouble, right. You have to compare apples to apples. And so if you're comparing the benefits associated with, let's say morbidity, what were some of the-- complications averted, lives saved for example, you want to have measured that in the same way across both interventions. So the set of outcomes that you're going after, make sure that you're able to compare apples to apples, you have the same units of effectiveness across both of those

interventions or control versus experimental group, et cetera. So and with this type of analysis, you really are just comparing two interventions. You can't really say a whole lot about how much is spent on this type of intervention versus housing, food or education, mostly because you're not quantifying benefits in the same way across everything in the world so to speak. You're just looking at those two interventions.

So the next one, here's where we're actually trying to aggregate both benefits and cost in terms of dollar amounts. This gets a little tricky. So what you're doing is you're answer the question, is the benefit worth the extra cost? So I put at the bottom of the slide that this whole strategy can be somewhat controversial because you are asking consumers or patients what, for example, one way to do this is to ask them what they're willing to pay to avoid an injury or an illness. And so you know, you have to be careful. There's a whole set of literature regarding willingness to pay and how you craft those questions matters. So just be aware that it matters as to how you ask those questions in terms of the willingness to pay to avoid an injury or an illness. So with this, we're not providing a distinction between cost and effect input or outcome. So while that might be a con associated with your-- with the analysis, it has a much broader application than cost effectiveness and the reason being that now you can-- you've quantified everything, the benefits and the cost in terms of a dollar amount, and now you can start making or drawing some-- or making some decisions about how much to spend on housing, food or education relative to the type of care that you're considering implementing either in your provider system or within your own institution.

So the last one was the cost utility analysis, and this is basically a spinoff of cost effectiveness. In the numerator you're-- I'm sorry. In the denominator you measure outcomes in terms of life, years or survival. In the numerator, you're looking at costs but you can't typically perform cost utility analysis with claims data alone. You have to have done something, a lot of you had said you're linking observational data sets with the claims. So what I'm taking from that is all right, you've-- you have some kind of survey data that you've collected across the various types of approaches or interventions that you're trying to evaluate and now you're trying to compare apples to apples across those two interventions so you have some observational data, some survey data along with your claims data that you can-- that enables you to conduct either cost-effectiveness analysis or a cost utility analysis. So I went over those pretty quickly, but again the references are there for you. The Gold textbook is a very good reference. I don't want to bore those of you who are very well versed in these types of economic analysis, but I also wanted to just give you a heads up on the pros and cons and what is it that you're, you know, trying to do.

If you just have cost data alone, all right, now you're doing cost minimization and so, you know, that's kind of what you're left with if all you have are claims data by themselves. So from an economic perspective when you conduct these types of analysis, there are two types of perspectives that you can go after. The Gold standard is to go after this societal perspective, and the reason being is that if you just look at,

for example, Medicare reimbursement rates, you're just looking at this issue from Medicare's point of view, what's the cheapest way to go about doing something or how expensive is this particular procedure or treating a particular disease. So from an institutional perspective, that's what you're basically left with if you're just dealing with Medicare data by themselves, you're taking the perspective of a third-party payer. In this situation it would be Medicare. In the societal perspective, now you have to do some data collection and you are actually working with the patients or the caregivers or whoever is involved in your study and you're going after such things as we'll get to in the next slide, the indirect cost and travel time and et cetera. So what we start first with are the direct medical expenses. Those are, you know, from an institutional, I'll back up again, back up to the health care institution's perspective, the third-party payers, then you know, from the claims data you can glean these direct medical expenses, expenses associated with in-patient, out-patient prescriptions as well as supplies, labs, et cetera, that you can find in the claims data. The indirect medical expenses, now this is-- what I'm throwing out there is this accounting definition of indirect expenses, but those are the overhead, the utilities, facility and rent, what the institution has to pay in terms of their utilities as well as their-- the hospital building itself and whatever financing mechanisms they are using to make things go. But in addition to these direct and indirect medical expenses, you're also going after the patient's time, as in travel time, how often do they have to come back in for follow-ups. So if you're looking at two types of interventions, one requires a lot of time on the patient's part in terms of coming back and checking in with providers, the other one, a lot less hands-off, patient doesn't have to come in as often, that's a big difference from the patient's perspective and that's why the societal perspective is considered the gold standard is because you're not just looking at, you know, what are the pros and cons from an institutional perspective, but you're also taking into consideration the implications for the patient as well as if you're talking about Alzheimer's or dementia, for example, you also want to take into consideration the caregiver's time, so travel time in terms of bringing the patient back and forth to the provider, that's a real cost not just to the patient but to the caregiver as well. So the time spent caring for your patient is also something that should be included, when you're analyzing anyway interventions that involve caregivers.

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>> So again, the institutional perspective, I think we already talked about that. That involves direct medical expenses, so expenses incurred by the hospital or, and eventually paid or reimbursed by the third-party payer, in-patient/out-patient prescriptions, supplies, labs, tests, et cetera. You can also take into consideration indirect medical expenses if they're in there, if you have a way of accounting for indirect medical expenses, which we will get into a bit more when we talk about the cost and cost reports. Here's a diagram again, very basic. You'll find this in any standard health economics text book, but I think that it might be instructive for you in terms of recognizing the difference between charges and reimbursement, for example. So let's just start with this bottom, let's see if I can figure out the pointer here, the bottom, okay, this bottom set where we see the relationship between consumers or the patients and

then the providers. So the patient comes in and sees the provider, they receive medical services and in return they pay out-of-pocket fees, which is everything if you're uninsured. If you're insured, all right, your co-pays and deductibles, et cetera. So then the patients are, or those who have insurance coverage anyway, are sending their premiums off to these third-party payers, in this case it's Medicare, for those of you attending this workshop, so this on the left-hand side, this represents the financing aspects of the healthcare market, and on this side we see, all right, the provider is, you know, we're providing health services to these patients. So they submit their charges to Medicare or the third-party insurance company, and in return that insurance company then reimburses providers. And the difference between those charges and reimbursement really is a large part of our focus today. So in this next slide you see claims data up in the right, and that's what your-- most of you are working with here when you have the Medicare claims data and you're trying to figure out what are we doing with it. So when you're working with the claims data, what are the dollar amounts representing? Reimbursement or charges or cost?

>> Depends on who you're talking about.

>> Well you've got your claims data in front of you. You see a dollar amount. Is that what the providers submitted in terms of a charge to the insurance company or does it represent reimbursement? Reimbursement, right? It represents what they paid to the healthcare institution or the provider. All right, but for the most part when we talk about what do we see in terms of what was paid out, that's the reimbursement, and the difference between these two then is the focus of this-- of the workshop. So the claims data I have representing the reimbursement. So we'll be working or talking about CMS files, for example the MedPAR and the standard analytic files. You will find reimbursement as well as charges in the claims data. The charges represent institutional direct costs and overhead, including indirects as well as profits. So you're going to see direct medical cost as well as indirect within those charges. Okay, well so from a societal perspective, you want to incorporate costs, which you'll find in the Medicare claims and you'll be working with the cost reports, and you're going to need to use the cost to charge ratio, which is the focus in the next couple of days. If your QALYs don't account for the value of patient's time lost from work, et cetera, travel costs and the value of caregiver time, what you want to do, and it very much depends on how you collected your outcome's data. If it's not in there, if there hasn't been a direct account for a patient's time lost from work, et cetera, then you want to try and enumerate the time spent on the patient's behalf in the numerator as well. So how do you do that? Well, you can go after, you know, Bureau of Labor Statistics has, you know, wage rates or the value of time and whatever you think you can justify in terms of your future publication, right, that's kind of the game we all play, that's what you should use. So in terms of the time spent traveling, you do have the patient zip code in the Master Beneficiary Summary Files and in the Medicare claims you will have, you know, you have a sense of how far they will have traveled by calculating the distance traveled to see these providers, so that's one way to go about it. If you don't have a direct question pertaining to this in the survey data set for example or in a survey data set, so this is what we as health economists typically do is calculate the distance traveled. The provider of service files do contain the institution zip codes or you'll

see them in the cost report and if you go on their website, you'll be able to obtain more information about that. So again what you will not find in the CMS files is the time lost from work or the caregiver's time. All right, so in terms of QALYs, what do you have in the Medicare data? Well in terms of mortality, you do have deaths. You can find that in the Master Beneficiary Summary File, which used to be called the denominator file. In terms of morbidity measures, you could go after length of stay in the hospital, which you'll find in the claims data or length of stay in the ICU and you can also go after defining reinterventions and complications using the Medicare claims data. So a list of chronic conditions is available in the Master Beneficiary Summary Files. They're our indicator variables for these chronic conditions. So if you request that file you can merge that in. You can also calculate risk adjustment scores using Medicare claims data. For example, the Charleson [phonetic] or the ACGs, and that requires just writing code in a program to identify the diagnosis codes and, you know, and then you can still get after-- go after what chronic conditions these folks have. If you do go after diagnosis codes, you may want to include all the standard analytic files, at least for out-patient analysis so that you don't miss anything. If you don't have access to all those files in your particular study, you'll just have to acknowledge that as a limitation in your publication. There are some data sets that do contain health and functional status. They are not in the claims data, but I have some examples coming up of what datasets do contain activities of daily living and independent activities of daily living. So for example, yup, please.

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[Pause]

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>> I'm wondering if you use chronic conditions from the Master Beneficiary Summary, like, what is the timing? Like, how does that correlate? Is that every condition they've ever been diagnosed with up to that date or if there's, you know, does it cover multiple years or if someone gets diagnosed in that particular year does it apply over the whole year?

>> That's a good question. In terms of the methodology, how far back do they go?

>> That depends on the chronic condition itself. There is a list of the-- the look back period. So for instance, depression, dementia, those have a three year look back period to determine it. It also runs against different claims files, so it depends on the chronic condition. Something like AMI is just a one year look back period, hip fracture, one year, same with cataracts, so it all depends on the chronic condition. And as far as the flags themselves in the beneficiary summary file, they have an ever flag that would say here's the first date that we would see this condition or that we identified the condition, the claims file, so you could use that ever flag if you wanted to look back in time, and they also have the annual flag, made year flag. So there's several types of flags within those chronic condition flags itself. But as far as the chronic conditions, you need to look at the algorithms that were used to determine what the look back period was for it.

>> And does that come with the file or where would that documentation be?

>> As far as the information, as the look back and the algorithms that they used, those are actually on the ResDAC website and you can-- and look for

those.

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>> So thank you. That was a good question. So some of the assessment datasets that are available, the minimum dataset has-- it contains clinical assessment data for nursing home residents. The outcome and assessment information set or the OASIS, has assessment data for homecare patients, for rehab there's an inpatient rehabilitation, I can't say that word, facilities, which is a patient-- also a patient assessment instrument so IRF and then PAI is the abbreviation or the acronym and the one that I, I guess have the most experience using would be the Medicare current beneficiary survey, which is the MCBS and the Access to Care Files contain numerous health and functional status measures. So if you're curious, I would check out those-- the documentation on the ResDAC website regarding those access to care files.

>> What kind of example is that survey? I've [inaudible].

>> Yeah, it's a nationally representative sample of Medicare beneficiaries across both institutions as well as community living, community dwelling Medicare recipients.

>> And about how big do they get?

>> Every year, yeah, the sample size, now I want to say it's 15,000 is what you can find in every year. It's a panel dataset so they follow cohorts of folks for four years. If you're looking at assessment data, you can-- there's a trajectory associated with that four year, you know, it's not a true longitudinal dataset from the point of view that you're not following from the moment, you know, they become eligible for Medicare throughout their entire lifetime, you know, as a Medicare enrollee, but you do have four year's worth of data.

>> And do you get a picture of the benefit, you like that--

>> The Medicare claims data come with it.

>> Okay.

>> It is already, the link is already there. There is a base ID, and that's an encoded ID. But it's-- the link has already been-- that work has been done for you so it comes with that data and it goes back to 1992 so there's a wealth of information there. All right, so the focus of the workshop today, again, payment or reimbursement, what you see in the claims data, charges vary by institutions of course, and cost is what we're really trying to measure and so it's kind of a slippery little guy as to what is the actual cost associated with the provision of care and so we have to do a little, you know, a little manipulation and work with the cost to charge ratios. Again the payment or reimbursement information is in the claims data. It may or may not cover a specific institution's costs or charges but it does offer a standardized way to go after costs because those reimbursement rates, they do vary across regions but-- and we'll talk about that a little bit later today. But again, it does-- it's a standardized methodology in terms of coming up with those reimbursement rates and that's the advantage of using Medicare data. The charges, lots of variation across the hospitals in terms of charges. So, and within hospitals there's variation across the departments even in terms of the cost to charge ratios. So you also need to be aware that accounting systems allow for cross subsidizing across the departments and in theory, there's no upper limit to the-- whatever you submit to Medicare, right.

>> So the question was, is that true for all providers or are there some

providers that are limited to what they can charge? Yes and no. Physicians themselves or individuals that you would find in the carrier file are limited, even their submitted charge. It doesn't matter, I mean that's limited to what CMS says you can submit for the most part. As far as the institutions, for the most part they can really charge what they want and Faith will talk more about charges tomorrow as well.

>> Thank you, Barb. So again, costs are what we're really trying to measure and we derive it using these cost to charge ratios or the CCR. And here's a little bit of math for you. CCR is the cost divided by the charge. So if you want to get after the cost, you take charges times this CCR. Again, there is lots of variation across the hospitals and overall cost to charge ratios and there's lots of variation across the departments within those hospitals in terms of the CCR's. So I think this is my last slide. It serves more of an introduction to this idea that if cost is less than charge, obviously I'm probably preaching to the choir, right. All right, so you're making money then and if the cost is greater than the charge, of course then you're losing money. And again, what the qualification that accounting systems allow for cross subsidizing across the departments, so is that loss or the gain real, that's also a bit tricky.

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