Cyberseminar Transcript

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Session: When Cost-Effective Interventions are Unaffordable: Understanding why and moving forward

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Dr. Wei Yu: Welcome to HERC Cyberseminar. This is Wei Yu. I’m a health economist at HERC. Today’s topic is about cost-effectiveness and affordability. The decision of adopting a new technology in medical care, policymakers often face the dilemma that the new technology is cost-effective but not affordable. Several years ago the new drug that treat hepatitis C virus, the Sovaldi, brought this issue to the public’s attention.

Now Alyssa Biliniski’s research addresses this issue. Now Alyssa is a fourth year PhD student in health policy at Harvard University. Her concentration is in evaluative science and statistics. She is the first author in an article recently published in Journal of Public Library of Science in Medicine. The title is “When Cost-Effective Interventions are Unaffordable: Integrating Cost-Effectiveness and Budget Impact in Priority Setting for Global Health Programs.” Her work has also been published in proceedings of National Academy of Science and Health Affairs and cited by news outlets including the New York Times and [unintelligible 01:41]. Prior to beginning her PhD, she received a BA from Yale and MS in Medical Statistics from the London School of Hygiene and Tropical Medicine.

Today is HERC’s last Cyberseminar for this year and we are very happy to have Alyssa to give this talk on such an important topic. So let’s welcome Alyssa to present her research. Alyssa, it’s now your time now.

Dr. Alyssa Bilinski: Great. Can everyone hear me? Okay. So thank you so much for having me today. It’s an honor to be here. I really admire the work that the VA does in this area. And I’m really excited to share our work on how we deal with this tough situation of when cost-effective interventions are not affordable.

So as Wei mentioned, the drug that really brought this issue to the forefront, the place you’ve probably heard about this topic, if you’ve only heard about it in one place, is from this drug called Sovaldi. So Sovaldi was the medication for hepatitis C released in 2013. And it’s hard to overstate how much of a gamechanger it was. Compared to previous therapies it was both much more effective and had many fewer side effects. It was also much more expensive, costing about $84,000 for the list price per 12-week course. Even so, pretty much every cost-effectiveness analysis that looked at the value of Sovaldi found that it was very cost-effective. But pretty much universally governments and insurers struggled to pay for it. And today a lot of patients still lack access to this medication.

In the VA in particular, in December 2014 it had negotiated the price in half but still requested $1.3 billion from Congress to treat about a quarter of infected individuals. That situation has since evolved, and I’ll talk about that later in the presentation. But I want to use this to set the stage for where we’re starting. Generally, we know that there can be interventions, drugs, and programs that are cost-effective, meaning that they can provide a lot of benefit, a lot of help to an individual. And if they can do that to a lot of individuals they might not be affordable, even as they are generally great products that we really are very happy exist. So in our work we’ve sought to understand this situation. Understand what it looks like in the literature, understand how researchers are thinking about it, and try to provide some practical guidance for people grounded in where we are today.

So I want to start with a poll question learning where you guys are at. So how experienced are you with cost-effectiveness analysis? Is it that A, you’re an expert; B, you’ve performed CEA; you’ve read but not performed CEA; or not at all, but you’re eager to learn more or you needed somewhere to hang while your code was running. [Background noise.] Sorry, is there\_

Heidi: Rob, we’re getting some background noise from you. Sorry about that, Alyssa.

Dr. Alyssa Bilinski: No worries.

Heidi: The responses are coming in. We’ll give everyone just a few more moments to respond before we close the poll out and go through the results.

Dr. Alyssa Bilinski: Great.

Heidi: And it looks like we’ve slowed down here, so I’m going to close this out. What we’re seeing is 4% of the audience saying that they are an expert, 16% have performed CEA, 36% had read CEA but have not performed it, and 44% not at all but are eager to learn more. Thank you everyone.

Dr. Alyssa Bilinski: Great. Thank you so much. So with that in mind, I’m going to try to make sure that everybody can both understand what’s going on and get something out of the presentation. If you run into questions, please feel free to submit those and I’ll certainly try to address them throughout the presentation or later on when questions come up.

So I want to begin this talk with providing a little bit of background. And the first part of background I want to provide is contextualizing cost-effectiveness analysis and budget impact in terms of a broader economic evaluation. So I’m going to say when you’re sort of thinking about what process are we really going through here? I want you to think, okay, so maybe one question we might ask first is, is something cost-effective? Is it good value for money? Do we get a lot of health per dollar no matter how you’re defining health. And sometimes it is true that we will answer no to this question. It doesn't seem to be good value for money. And that doesn’t necessarily mean that we don’t proceed with an intervention. There are a lot of factors that we do consider beyond just economic factors in how we think about, how we think about allocating interventions. And there’s a lot to be said about distribution and equity. And so if this conclusion doesn’t seem right to us, sometimes we still do proceed with an intervention and want to proceed with an intervention even if it is not cost-effective. The piece that we’re looking at here is just one small piece in a boarder range of economic and policy evaluation.

On the other hand, sometimes we do say that yes, an intervention is cost-effective. And then we get into the territory that we’re interested in today. Is that intervention then affordable, the question of budget impact analysis. And if it is, usually we’re pretty happy and we say great, let’s do it. And if not, we end up back in this Sovaldi situation saying, well, this is a little bit awkward. We’re not really well set up with what to do here.

To explain exactly what I mean by cost-effectiveness analysis, we’re going to take a look at this slide. So on the X-axis here, you have quality-adjusted life-years gained by an intervention. I’m sure some people in here are very familiar with quality adjusted life years. If you’re not, you can think of it as just as measure of health, of how much health you get from an intervention. And on the Y-axis we have costs. The incremental cost-effectiveness ratio is the primary measure of something that we make in cost, in applied cost-effectiveness analysis. We abbreviate this ICER, and it’s a measure of the slope of the line that you see on this page. So we calculate the ICER as equal to the cost of a new intervention minus the cost of the old, prior intervention divided by the change in benefits. So it’s a measure of the cost per QALY gained, which is the abbreviation for quality adjusted life years.

We then compare this to a measure of what we call the willingness to pay threshold. You’ll hear a lot more about this later, but for right now we can think about the willingness to pay threshold as the highest ICER, the highest incremental cost-effectiveness ratio you can afford without having to give up something better in your budget. So we come up with a number when we do cost-effectiveness analysis saying I am willing to pay $50,000 for a quality adjusted life year. And then we look at our ICER, and if the ICER is less than the willingness to pay threshold, usually we say thumbs up, this is cost-effective. If not, we say thumbs down, we might be kind of concerned about doing this kind of intervention.

This other half of the equation that we’re interested in here is a measure of affordability, or budget impact analysis. So here we’re not really looking at the X-axis at all. We’re not looking at the value you gain from an intervention. We’re just interested in costs, and specifically the short-term costs and cost offsets for a payer of providing some interventions to a defined population. So what we care about when we are looking at budget impact, as I’m guessing many of you have thought about budgets and costs, is just does this seem reasonable? If so, great. If not, thumbs down. Of course defining what is reasonable here is tricky. Unlike willingness to pay, which may be hard to calculate, this doesn’t have a number. So we have, we calculate a number for willing to pay threshold. We don’t necessarily have a reasonableness threshold. But if a new intervention seems like it would be a high proportion of your budget, what we’re worried about is that it may displace other more valuable services. We worry about spending that gets in the way of services that would have more benefits for society.

I think last month you guys heard from Steve Pearson who is at the Institute for Clinical and Economic Review. They have a measure for unaffordability threshold, a GDP-based threshold of what would lead to healthcare spending growing faster that GDP plus 1%. That’s one approach. Other people use an "I know it when I see it" type situation. But generally we have a good, a general sense of what affordability is, and a lot of things we know are not affordable even if we don’t have a perfect measurement for it.

So now let’s get into our work where we first start by saying what do we already know and have in the literature and among experts, and then we’re going to move onto saying how does this connect to theory and how do we act knowing all of this?

The first thing we’re going to do is delve a little bit into the literature. So what we were initially curious about when we started this part of the project was asking what does the literature tell us about the affordability of cost-effectiveness interventions? And this work, as well as a lot of work that I’ll be presenting today, was published in this PLOS Medicine paper that Wei mentioned earlier. And what we were just curious about is if you were just reading the literature today what do you know about budget impact analysis?

So we started initially in our project using the global health cost-effectiveness registry, which includes all English language articles that have their outcome for cost-effectiveness analysis measured in something called disability adjusted life years. That’s basically like a QALY but measured a little bit differently. The big takeaway that we had from looking at the literature here was that budget impact analysis is not every common. Now we were looking specifically at articles from low- and middle-income countries. So that might be a little bit different from the context you’re interested in. But depending on how we measured budget impact analysis, we found it was really only performed in 3%, with a conservative definition, to 13% of articles. A lot of cost-effective articles were not looking at all at budget impact.

Because I know that this is a more U.S. focused audience, I was kind of curious about if I could find some information about how this looks in more U.S. based and developed country literatures. So I did a quick search that we haven't published in the general cost-effectiveness analysis registry, which is more focused on developed countries and on the U.S. and on this QALY outcome which is more common in the U.S. So I took all the articles, used EndNote to see which ones I could pull PDFs from and just looked to see if they mentioned budget impact. Not a perfect measure to say that budget impact was performed, but even so, we were only mentioning budget impact analysis in about 6% of the articles. So across the board it’s very common to be looking at cost-effectiveness analysis and not knowing anything about the context in which this is happening and whether a budget could absorb the intervention discussed.

The second thing that we briefly looked at in this analysis that we did, the one that was focused on low-income countries, was just to say when an article does budget impact analysis, which admitted is not always that common, how do they interpret it? We looked at the discussion section and looked to see how authors talked about the intervention’s affordability. We found that in 53% of articles where there was budget impact analysis, they were mentioning budget impact concerns. So things like we really need to increase the budget or find an outside payer in order to make this particular intervention cost-effective. Of intervention, of the rest of the papers, only one in five of them, 18% found their intervention to be theoretically affordable, whereas the remaining third had already been implemented in some setting or they didn’t make an mention of the affordability.

So this just goes to support our intuition, that it’s not a crazy idea to say that even in articles that are finding interventions to be cost-effective, which pretty much every article we looked at said something was cost-effective, it’s not uncommon for something to be unaffordable. And while this was in a lower income setting where oftentimes there’s a much lower proportion of the budget being spent on health, in the United States I think we still have a strong intuition that we have no dearth of expensive things that are straining health budgets.

So I think it’s not, while the larger takeaway from this paper is that we don’t have always the information that we need about affordability when interpreting cost-effectiveness analysis, it certainly seems to support our intuition that we have things that are cost-effective but not affordable.

So the next thing that we wanted to say, knowing that the literature seemed to be sparse, was just to figure out how experts were thinking. These are preliminary results that have not yet been published and may change before publication, but basically what we wanted to get at here was we wanted to say if you give two people the same situation, one of these situations that we found in these prior papers, would they interpret it the same way in terms of what is affordable and how we should even be thinking about affordability in the context of cost-effectiveness analysis?

All of this work here was done with a U.S. setting specifically in mind. So what we did was we had a survey of 170 researchers. We reached out to contacts, 60 contacts at 35 institutions, a range of universities, a couple of government positions, and a couple of industry positions, and we included people in this analysis who had either taken a class in cost-effectiveness analysis or performed at least one cost-effectiveness analysis. In practice we found that about 80% of our sample had performed at last one cost-effectiveness analysis with more than a third performing more than five, so very experienced. And we had a very large representation of people from academia. In particular we were pleased to see that a very high proportion of that was in the PhD or post-PhD level.

And before I get into the results, I want to pose to you guys one of the more applied questions that we asked this group. So I know that not everyone in this group is very familiar with CEA, so feel free that to not respond to this if you don't feel like you have the background to do so. But we said you are a researcher conducting a cost-effectiveness analysis on a new drug, Drug X, in Massachusetts. You find the drug an incremental cost-effectiveness ratio, that’s that ICER, of $40,000 per QALY compared to what we usually say is our threshold of $50 to $100K per QALY. This is over a lifetime time horizon. To provide the drug to the entire eligible population would cost about 20% of the current Medicaid budget over the next three years. You’re asked to advise the Massachusetts Health Commission on whether and how to adopt Drug X in its Medicaid budget. Which of the following best summarizes how you would advise them? A, recommend funding Drug X for all eligible patients; B, refuse to fund it at its current price, wait for a lower price of competitors; C, only fund Drug X for half the eligible population chosen at random to reduce budget impact concerns. We also had an "other" option in our context, but for here we’re just giving those three options.

Heidi: And I have that poll open on your screen. So go ahead and click on the response that you would choose. I'll give everyone a few more moments to respond and then we’ll close the poll out and go through the results. We’re starting to slow down here. I’m going to close the poll out. What we see here is 18% of the audience saying recommend funding Drug X for all eligible patients; 41% saying refuse Drug X at its current price, wait for a lower price or competitors; and 41% saying to only fund Drug X for half of the eligible population. Thank you, everyone.

Dr. Alyssa Bilinski: Thank you guys so much. So I think it is telling of a really important divide between researchers and people who are more closely embedded in a particular context that you guys were much less willing to say yes, let’s go ahead and fund this drug. And I think that’s a divide that’s important to understand as we interpret the literature.

So we actually asked researchers first how they would evaluate drug X if they were writing an academic paper. A solid 40%, 37% said we should write in the discussion section that we should go ahead and fund this drug. And that's the interpretation that often gets, say, presented to the media when there’s a press release and the way that they’ll talk about it in conferences. Another 57% were unclear, and 6% were saying strongly that we shouldn’t fund it. When we asked them the same question that I just asked you about adopting Drug X in the Medicaid budget, we still had a very high proportion, much higher than the 18% here, saying that we should fund it for everyone. There was a solid 25% saying don’t fund it at all, 12% were saying fund it for some people, and another quarter were saying, had a range of other views from engaging stakeholders more to having, to doing more subgroup analysis. So we really just wanted to emphasize that. It is not the case that people are looking at the same situation and coming up with similar recommendations.

In fact, we found really broad underlying differences. So this is a graph whereon each of these heat maps on the X-axis we have a measure of cost-effectiveness, a QALY measure of cost-effectiveness. So this ranges from less than $50,000 per QALY on the far left, which is very cost-effective in the United States’ context in which we are situated, all the way up to $300,000 per QALY, which is really not considered cost-effective. On the Y-axis here we had different measures of cost. So a low cost, medium cost at the Institute for Clinical and Economic Reviews' alarm bell threshold and even higher than that threshold.

We found that there were four distinct types of researchers that came up when we looked at this analysis. So there were, on the upper left here, the Hard ICER Hawks. So this was about a a quarter of our population that said if something is cost-effective you should just always do it, and if something is not cost-effective, never do it, with like some variation in the middle. Soft ICER Hawks weren’t quite as strong as Hard ICER Hawks, but they were never saying that something that was cost-effective was red, that they wouldn’t recommend it. And over here they were always saying you should be really, really wary if something is that cost ineffective.

Budget Hawks were kind of opposite of these Hard and Soft ICER Hawks combined. They were another quarter the population that was saying if it’s low-cost, go ahead and do it. And if it’s high cost, even if it’s really cost-effective, we don’t really think it’s a great buy. And then we last had this group of moderates where they really didn’t like things that were high cost and they also didn’t things that were cost-ineffective. So they don’t like the extremes.

If you take away one thing from looking at this plot, I want it to be taking a look at these boxes on the lower left-hand corner which are especially relevant to the question that we have at hand here. When you look across the top, you see about 60% of the researcher population having this prior that if something is cost-effective but very expensive, we should be thinking about doing it, about finding a way to cough up the money. And on the bottom, we see about 40% of the population having this completely different prior in the opposite direction saying that if something seems to be cost-effective but is really expensive, we should be hesitant about doing it.

So where does that come from? Well, we also asked some questions about the underlying theory. So one of them we asked was about that willingness to pay threshold that I mentioned earlier. We asked what should this reflect? And 42% of our respondents said that this should reflect the budget. So we should basically have a situation where pretty much everything that is cost-effective is affordable and the willingness to pay threshold reflects how much, the best we can do if we fit everything into our budget.

On the other hand, 41% of researchers said they thought the willingness to pay threshold that we’re using in the academic literature should reflect societal willingness to pay. So how much people say that they value health when you ask them, even if this means that you would have to massively increase the budget in order to pay for that, in order to pay for these interventions and include all these interventions in the budget. So these are two different choices for the willingness to pay threshold about which researchers are evenly split that lead to really significant differences in how we would interpret what something being "cost-effective" in fact means.

We also asked them if a program is cost-effective but it’s not affordable, like what do you generally think we should do? And some people are saying, well, if it’s cost-effective you increase the budget so that you can pay for it. That’s about 38% of people. On the other hand, 37% are saying my kind of prior is then, we need to decrease our willingness to pay and label that thing as not cost-effective. And so that’s a really different approach to have. And these differences couldn’t really be explained by anything like education or age or background. We see these divides really transcending the overall group to just really reflect underlying disagreements.

And the last thing I want to say about this is that this, these views that people have that are very different really inform our conversations. People feel really strongly of how, whatever viewpoint they have. So I’ve highlighted a couple of tweets here. I know they are nerdy health economics tweets, but on the top we have someone saying hey guys, something cannot be cost-effective and not affordable. And this led to a longer Twitter thread saying if that’s the case you just lower your threshold. On the other hand, on the bottom, we have a different Tweet that’s saying totally the opposite. It’s actually a tweet by one of the co-authors on this project, on the survey project, and what he is saying and what he believes is that Sovaldi is fine if you’re paying $1,000 per pill but getting a good QALY deal. We need to reward cost-effective products even if their prices are high. Only if they’re cost ineffective should we say this isn’t good.

So often we have very strong viewpoints that we’re presenting as the "correct" viewpoint, even though these viewpoints can lead in completely opposite directions depending on who you talk to. And I think that’s important to understand as you read the literature or have conversations with people about cost-effectiveness analysis and how we interpret this. Basically there are large ongoing disagreements about how to deal with cost-effective but unaffordable interventions.

So now we’re going to do a little bit of work to understand where these disagreements come from so that you can understand how this connects to the theory. Apologies if this is a repeat for anyone. And really, and then we’ll move into using that knowledge in order to create some practical suggestions. So cost-effectiveness analysis is assuming a specific underlying theoretical framework. When you do it, it’s assuming a shopping spree. So it says we have a fixed budget that we’re starting from. And this toy example that I provide you, it’s going to be $2.5 million. We also have a set of interventions. So here we have five interventions. Obviously this is a simplified setup, but hopefully it will still be informative of the points that we’re trying to make here.

The first thing that you do is you rank these interventions by ICER. So here we have cost, QALYs gained, and ICER. And we’ve now ranked these, the ICER goes from lowest to highest. And the way that we’re going to optimize the amount of health that we gain is we’re going to spend money until the budget is exhausted.

So we’re going to buy intervention B, intervention C, and intervention A, and then we’re done. In addition, the ICER of the last intervention that we pay for is the willingness to pay threshold. So in this case the threshold that we have is $50,000 per QALY.

What do we do when new interventions come along? Well, we just replace an intervention that’s less cost-effective with something that’s more cost-effective. So here intervention F came along. It had a cost of $200,000 and gained 10 QALYs. So it was more cost-effective than A, and so we got rid of A and now we do F, and our new willingness to pay threshold is now $20,000 per QALY because that’s the last thing that we had in there.

I want to emphasize here that F and A don’t have to be doing the same thing in this theoretical setup. So A could be a dental health intervention, F could be a maternal health intervention. But if F comes along, we’re saying we’re going to stop dental health and start focusing on maternal health.

So in this particular setup it’s easy to see that something that is cost-effective is affordable just by definition because we’ve said B, C, and F are cost-effective because they fit into our budget when we do this particular exercise.

There’s an open question as to whether it would be beneficial to generally do cost-effectiveness analysis in this way. There’s, I’ve here screen-shotted the title of a post in a health services research blog saying that doing this approach or trying to do this approach in real life is unwise. And when they tried to do a similar thing in Oregon, it often came up with odd sets of interventions being funded and not funded. But regardless of whether it’s a wise approach, it’s certainly not really a practical approach.

So instead, in practice what we do is we do estimate cost and QALYs gained, but in a given paper we’re only probably evaluating a few interventions. The willingness to pay threshold is set independently of the budget. In the survey that I mentioned that we did before, we found that about 85% of people said that in their last CEA they had used per capita GDP, and the idea of that is to have a sort of societal measure of cost-effectiveness saying you should be willing to pay for a year of health about what a person, on average, would contribute to society, at least in that year in an economic sense. And there’s often still a lot of waste in the system in practice. And it might not even be waste so much as like institutional memory or benefits, but the idea is that it’s not, the system isn’t nimble and flexible in the way where we could say, hey, we have this program that we’re doing. Tomorrow we’re going to dismantle it to do this slightly more cost-effective one that may be in a completely different area. So cost-effective in practice is not the same as affordable.

One response that people have to that is to say we should use a lower or empirical threshold, a threshold that we’ve made more closely based on the budget. Not exactly doing a shopping spree, but doing a similar type exercise. The first person to really try to do this is in practice was Karl Claxton’s group at the University of York. And what they basically did was they ended up looking at the UK budget trying to figure out the marginal cost of a quality adjusted life year. And they ended up arguing that about, they think that the empirical threshold is about $13,000 per pound. Or sorry, 13,000 pounds per QALY compared to the threshold that’s more commonly used by the National Institute for Healthcare Excellence, or NICE, there that sets the threshold that the government uses to be 20 to 30,000 pounds. So what they ended up arguing was that the NHS was paying too much for new drugs, and in fact losing QALYs from areas like mental health or respiratory illnesses because they were paying above the threshold in this way.

Some people really like this perspective, but it does come with a lot of challenges. So the first is that empirical thresholds are really hard to estimate and require a lot of updating and a lot of assumptions. I’ve included a couple of citations if you’re curious to see what these look like when you try. The second is that there’s this assumption of a fixed budget, which may or may not be particularly valid. So if you look at your department you may not have money in the budget but you may be able to ask for more money from the hospital, or in the case of the VA, from Congress. It’s also is just sort of a funny setup to have to be thinking in terms of a fixed budget because of general fungibility of money. So if a new cell phone comes out, for you, you’re not going to sit around deciding whether to pay for it based on your fixed cell phone budget. You’ll be looking at your larger spending. And opportunity cost really depends on where you sit, especially in U.S. budgets which can grow.

I note that there’s also a concern about fixed budgets in a developing world setting where people are really worried that we’re not spending enough on health and want to encourage more spending rather than think specifically in terms of their fixed budget. And then the third point is just the issue that I mentioned earlier. It’s not like we can always pick the least cost-effective thing to remove from our budget.

But I think that this is often where the conversations stop. And so in our paper what we were really trying to emphasize that there’s more than just the threshold to look at, that costs measured in cost-effectiveness analysis do not reflect budget impact. So there are fundamental analytic differences between cost-effectiveness analysis and budget impact analysis. CEA is happening from a societal perspective whereas budget impact analysis is looking at a particular payer. So it may be really good for society but expensive for the person who’s trying to pay it.

CEA is looking at a long enough time horizon for all benefits to accrue, whereas a budget is happening in the pretty near term. And CEA tends to discount, whereas budget impact analysis doesn’t discount cost and benefits. So basically if you’re thinking about these issues, we know that being cost-effective, even with an empirical threshold, does not equate to being affordable.

If you’re going to keep a picture of this in your head, I think it’s this one here where we see benefits are starting at year 20 and are very large, whereas the costs are all accrued in the first five years. So this is something like preventing cervical cancer with the HPV vaccine, or preventing liver transplants because you cured hepatitis C.

Overall, the big takeaway from this section is that translating from theory to real world scenarios is difficult at best.

So the last thing we’re going to talk about is sort of using this theory to inform some practical suggestions. The first practical suggestion that I want to offer people is that I really think it would be beneficial if we changed the language. So it’s not uncommon to see both news articles and academic literature refer to things as being cost-effective. So on the top here we have an editorial from the L.A. Times saying that, is $100,000 hepatitis treatment worth the price? Yes. And pretty much any conclusion that you would look at in any article, I just picked one randomly, would say that something is cost-effective in some subgroup.

But I think that we should really not be thinking about cost-effectiveness as a binary, that it should be more versus less instead of yes versus no. And we need to do away with the presumption that all cost-effective interventions would fit into a budget. Relatedly, I think that budget-impact analysis should be a routine part of economic evaluation, that we really can’t be making decisions about cost-effectiveness and about whether or not an intervention is something you want to implement without having this information in there. And as a large part of the cost-effectiveness literature currently doesn’t, this is something to consider.

What does this mean for researcher and for implementers? Well, for researchers, kind of exactly what I just said. Perform this budget impact analysis and report undiscounted short-term payer costs and cost offsets and acknowledge how these compare to your cost-effectiveness analysis results. In particular, we think it’s beneficial to interpret these results in light of the threshold that you selected and in light of the current budget that is available to the policymaker.

The next set of recommendations I’m going to focus on are for implementers, but I want to recognize that I think this is an area of collaboration for implementers and researchers. So these are under implementers because right now it’s not particularly easy for researchers to do them, but I think the more interplay and discussion and sharing of roles there are here, the better.

So the first thing I just want to mention is that as we think about implementing cost-effective programs we should really check the costs. Everything that I’ve mentioned so far has assumed that we’re doing a really good job estimating the costs of implementing an intervention. But my advisor, Josh Salomon, who is at Stanford now, has a big line of work looking at a big problem that we have in cost-effectiveness of underestimating costs, particularly for things like behavior change interventions. So we have a habit of assuming that a behavior change intervention is just like a couple minutes of someone’s time rather than really estimating the costs correctly. I’ve linked to a YouTube video where he discusses this very eloquently. I just think it’s always an important thing to mention as we try to advise implementers.

But the second thing I think implementers need to do is check the threshold. If someone is using an empirical threshold, which presently is very rare, about 4% of people we’ve surveyed said they’ve used it in their last analysis, then we’re thinking that something cost-effective will likely, depending on some outside issues like time horizon, it will likely fit into the current budget. On the other hand, if we find that something is cost-effective from a societal perspective, that doesn’t necessarily tell you anything or tell you that much about whether it will fit into the current budget.

This brings me to another piece of, a suggestion for implementers is that there is a lot of beneficial, it is beneficial to look at what you’re giving up in your own particular context as you implement an intervention. So CEA tends to tell us the best we can do if we can move money around from the entire budget. But often we can’t, for practical reasons, for political reasons. So we can think about this as doing CEA on a lower level or we can think of it as something a little bit separate, but I think there’s a need to look at where you’re taking funding from. If we’re taking funding from a maternal health program or from a mental health program in order to fund a new drug, or if we’re asking for money for one thing rather than asking for money for another, what are we giving up? What is the ICER of the program from which we’re taking funding, and can we truthfully say that as we apply this "cost-effective" intervention that we’re not actually decreasing the value of what we’re obtaining in the system. So I think even as we think on a global picture of how well we could possible do in cost-effectiveness analysis, we should still try to be looking at the local decision that we’re making and see if we actually think that we’re improving value by making this decision.

The last point I want to emphasize under this is the need to get creative and to negotiate. The VA has a reputation for being really excellent at negotiating drug prices. But I think that it is worth mentioning the importance of negotiation here because there's a huge amount of difference across the U.S. in terms of which players can and do negotiate. So I was involved in another project looking at how much state prison systems pay for hepatitis C medication, and we found a $40,000 per patient difference in what systems were paying, largely depending on whether they negotiated. So I think even as we find an intervention to be cost-effective at a particular price, we know that we still might have to get creative in order to pay for it, especially because of those time horizon issues that I mentioned earlier.

And as we think about creativity and as we contextualize this in the world, I want to return to the example that I began this talk with, to go back to Sovaldi and look at a couple of different ways that people have and have thought about trying to pay for Sovaldi. So I’m sure some people here are even more familiar than I am with what the VA decided to do in order to pay for Sovaldi, but my understanding is that they initially funded this drug for a small group and then increased the funding as the price fell and more competitors entered onto the market. So they initially added it to the medications list in spring 2014, triaging to the sickest patients, and now have been spending about 750 million per year on the medication in 2017 and 2018, costing about $25,000 per individual, which I think is on par with what we pay annually for HIV medications, although for a smaller group of people. I think there’s an objective to basically get the number of Veterans living with hepatitis C from 146,000 to 20,000, which I just want to emphasize is a really amazing outcome to have even as funding has been challenging.

As a second example, I want to mention Australia because a lot of governments manage to negotiate the price down often to half of the list price, but Australia was a really interesting case where they delayed funding the drug at all in the public sector until a deal was negotiated in December 2015. And so that meant that people didn’t have access to the drug until longer, but they managed to get a much better funding deal than a lot of other countries and a lower price a lot sooner. And so this was another approach to really refuse to fund until they could get a lower price.

The final thing that I want to mention, just that came up in this context and that comes up as we think about cures for very common diseases is that some people have proposed more creative measures, like having the government acquire Gilead, the company that produces Sovaldi. So one sort of the back of the envelope analysis argued that if the government had just bought the company and gotten rid of parts of the company that they didn’t really need that we could have ultimately been treating hepatitis C for about $16,000 per patient, which I think is an example of an interesting and creative way that people are proposing to look differently at high-value interventions.

So I just wanted to ground all of this discussion in terms of just what is actually happening on the ground and really acknowledging that there are pros and cons to different ways of dealing with these types of interventions, that we don’t necessarily want to be penalizing really amazing interventions and we want to have more Sovaldis in the world. But at the same time figuring out how to fund them and how to fund them fairly is truly a very challenging situation.

So with that in mind, I’m curious what idea resonated most with you from this presentation, what was most interesting or relevant to your situation? A, that cost-effectiveness should not be discussed as a binary; B, that we should differentiate clearly between when we are using empirical thresholds and when we are using societal thresholds; C, that we should look at the ICER of our funding source to see if we are making a good trade-off when we make a local decision; D, that even with an empirical threshold we may need to be creative about funding high-cost, high-value programs; or if you have something else, I’d invite you to type of that in and we’ll ideally get that information from Wei and Heidi later on.

Heidi: And I wasn’t able to type the full responses out here in the poll. So I left that up a little bit longer, hopefully you guys were able to pick your choice here and we have them up on the screen here. Responses are coming in. I’ll give everyone a few more moments to respond before we close the poll out and go through the results. Please use that questions box if you’re using option five and we can read through those when we get, when we’re finishing up those poll questions.

[Pause 44:50 to 45:00]

It looks like we’re slowing down here, so I’m going to close this out and take a look at the results. What we’re seeing is 25% of the audience saying cost-effectiveness should not be discussed as binary; 13% saying we should use [inaudible 45:22], we should differentiate clearly between when we are using empirical versus societal thresholds; 25% saying we should look at the ICER of our funding source to see if we are making a good tradeoff; 31% saying even with an empirical threshold we may need to be creative about funding high-cost, high-value programs; and 6% saying other. And in that other, we have two responses here, one saying all of the above and the other saying frankly, all of these seem to play on each other. Thank you everyone for participating.

Dr. Alyssa Bilinski: Great. Thank you guys so much for that. So with that I just want to acknowledge that I have many fantastic collaborators that have been instrumental in this work. I invite you to reach out to me via email or Twitter say that I’ll take any questions that people have now.

Dr. Wei Yu: Okay, very good presentation. I have a couple questions, very good questions on, they bring up, I think, by mention McNeil [phonetic 46:30], the first question is the, have you also considered costs associated with the de-implementation? That is, the cost to stop doing one thing maybe that is not cost-effective in order to start another that may be cost-effective.

Dr. Alyssa Bilinski: Yeah, I mean I think that that is a really great point to bring up and one that is often neglected in cost-effectiveness analysis, and so would definitely say yes in that, in everything I’ve been trying to say about looking at the local opportunity costs that you’re dealing with, really thinking about what does it actually look like in terms of the real world value tradeoff. And if you have to spend a ton of money to stop doing something, that’s a great point and a great amount of cost that we should be considering just like we consider where can we actually get this money from? So totally agree with that.

Dr. Wei Yu: Okay, good. The second question is that can you discuss the ethics around funding for small group of qualifying patients and also explain that of policy healthcare you want to service all you need, but how do healthcare systems define the sickest patient when medication costs prohibit treatment.

Dr. Alyssa Bilinski: I think that that is an incredibly difficult situation and has been really challenging. I think that sometimes we are, I don't want to say lucky, but there is a situation in like hepatitis C where the disease takes a very long time to progress, and we can easily identify which patients are sickest and we know that those patients will benefit from the medication based on the degree of liver cirrhosis and other medical factors. And so we can say we’re not really going to hurt one population if we, if one part of the population if we start here and assume that the prices will come down. But I think that these are very challenging and real situations and think it’s important to acknowledge that even as I sit here giving a presentation, not like in a medical setting that these are real patients' lives, so being someone who is dealing with complications as you, and for whom this isn’t an academic exercise might feel really differently. So I think that sometimes we have criteria where we can say, like we are minimizing harm by doing it in this way. But I think it’s incredibly challenging and speaks to a larger need to think about, especially as new drugs come out, how we go about that process. Sorry, that’s not a very complete answer, but I agree it’s an important issue.

Dr. Wei Yu: Okay. Another question is when you discuss the difference between the budget impact and CEA and CEA is a lifetime, it’s a long-term and societal perspective and budget impact is short term. Like drug like Sovaldi and then they would have very high-cost impact in the short term but save money in the long term. Is there any financial tool can help this? Like borrow money and pay off.

Dr. Alyssa Bilinski: Yes. So I think that that’s a really interesting and challenging situation for cost-effectiveness analysis currently. The technical answer is that yes, as we are in a situation where we know that something will have big benefits down the road, it makes sense to borrow money to pay for a really cost-effective intervention up front and get that money and get those benefits down the line. We can also think of a similar type of situation in developing settings where we say we can often find external payers to help support important interventions. But I think that what is challenging right now in the cost-effectiveness literature is that we tend to find that a lot of interventions are very cost-effective, and we also have a notion that we’ll be producing more and more cures into the future. So there is some degree of nervousness in saying that we should leverage and mortgage ourselves heavily now because we’ll get benefits in the future. But because we don’t always have the best way to discriminate between which cost-effective interventions are the ones that we should be going for and we have a large number of them because the information that we have, cost-effectiveness on now is very focused on certain types of interventions like drugs rather than other types of interventions and because we think we're going to get more good ones in the future and need to really balance that borrowing and paying off in the future setup.

Dr. Wei Yu: Okay. This one is not a direct question, but I think it’s very interesting, a comment, and I also have similar thinking is that this is brought up by Elizabeth Bass [phonetic 51:58]. She is talking, she is asking that, and it’s, okay, when looking at the price of a drug it is necessary to consider what is reasonable and what is pure profit-seeking behavior. Now the U.S. pays way more than any other nation for drugs, mainly because we view profit seeking to be as legitimate as the expensive ingredients or complicated processing methods. Many Americans have different values about drugs and healthcare in general. Now I also notice that like Sovaldi and that we pay, at the beginning we paid 84,000 per treatment, right? The 12-week treatment, and the UK is about $600, something like that per pill, and we paid $1,000 per pill. And if you look at India and Egypt, that’s only $10 or $9 or something. Which, what’s your thinking about this?

Dr. Alyssa Bilinski: Yeah, I mean I think that that is a really interesting and challenging discussion. I think right now we have a lot of lack of nuance in discussions about pricing and what is fair pricing and a lot of lack of nuance and discussions about innovation. So people will say, oh, well, if you charge less you’re going to get less innovation. So a couple of things that just come to mind that I think are common misconceptions or things that I like to emphasize in those kinds of conversations is that, first of all, I think that a lot of times people say, oh, the U.S. is paying for innovation and European countries are just kind of benefiting from the U.S. And I think that when you look into the arguments that European countries are making, they believe that are, in fact, pricing to support innovation. They often are doing pricing based on this societal willingness to pay. So I think that oftentimes people say, oh, the U.S. is just supporting innovation, which is the reason why we are okay with this profit-seeking behavior because we want more innovation. And I think that that is not necessarily clearly true.

I think there’s also a lot of concerns where people say more money leads to more innovation, and I think there are some studies to support this but also that the nature of innovation is really hard to measure. And it’s not always clear how much more value we’re getting, so innovation can be really socially wasteful business dealing of more people kind of jumping in. It can occur at stages that we aren’t really interested in. And I think there’s not a lot of empirical evidence to show that we’re getting more of the kind of innovation that we want because we are paying these really high prices. And just from anecdotal conversations with people in pharma, I haven’t necessarily heard a lot about prices being set in a way that is trying to reflect value and specifically in the ways that we are trying to maximize as a society.

I also love a statistic that the U.S. paid $116 billion in markups while R and D from public filings cost about 76 billion. So those are a couple of different scattered thoughts, but I just really want to emphasize that I’m not sure that the argument is that we love profit-seeking behaviors in the United States and that’s why we’re willing to pay more. I think it’s often that we want to have innovation and we want to have innovative drugs, and I think that the evidence for that and the discussion around that really needs to be more developed and more nuanced than it currently is.

Dr. Wei Yu: All right. I think that that’s all the questions. We’re also approaching to the end of the hour seminar time. Is there any other questions? If not we can just close at this moment. I really appreciate your discussion. And I think this is a very important issue and also very complicated. Now I think recently people will also discuss the, another issue as part of the innovations, right? And at the earliest stages the basic science was funded by the public, then the pricing of the product is really, which including those public fundings, so where is the public value being realized. All this discussion is very, I think it lead us to more discussions on this topic. Again, I thank you so much for bringing up this discussion, and I hope we can, when your research move forward, maybe we can invite you to come back and give another talk.

Dr. Alyssa Bilinski: Thank you so much.

Dr. Wei Yu: All right. Heidi?

Heidi: Thank you, Wei. Alyssa, I also want to thank you so much for preparing and presenting today. We really do appreciate the time that you put into this. For the audience, when I close the meeting out in a moment you will be prompted with a feedback form. Please do take a few moments to fill that out. We really do appreciate all of your feedback. Thank you everyone for joining us for today’s HSR&D Cyberseminar and we look forward to seeing you at a future session. Thank you.

[ END OF AUDIO ]