Thank you, everyone, for joining us today. This webinar is going to focus on how to measure antibiotic use in long-term care facilities. My name is Libby Dodds Ashley; I’m a pharmacist and I work with the Duke Antimicrobial Stewardship Outreach Network in North Carolina. I’ve been a stewardship pharmacist for a little over fifteen years and some of my recent work has focused on transitioning some of the inpatient measures we have for antibiotic use into the long-term care facility setting. So I hope to share some of those experiences with you today.

If you are someone who has been interested in examining how you measure antibiotics in your nursing homes, there is a great resource available to you. You may be aware of The Core Elements of Antibiotic Stewardship for Nursing Homes that was released by the CDC. There is an appendix for that document that talks specifically about some of these measures and I’ll use some of these materials in the presentation today. This is an excellent resource for you as you’re designing your stewardship program or deciding what the next steps are to document your antibiotic use and other measures that you might be doing as part of a nursing home stewardship program.

I think when you start determining how you are going to measure anything in your stewardship program, you need to start by looking at what data sources are available around you and there are lots that can provide you information on antibiotic data in nursing homes and I just want to spend a few moments going through the main sources for antibiotic data and the pros and cons of each.

The first and likely most readily available is purchasing data. So every [inaudible] facility, whether it be an inpatient or a nursing home, likely has some ability to track how they’re spending their money, and because of that, you can get reports out of the purchasing system in the pharmacy that tells you what has been bought. There are some caveats to this, though. One is “bought” does not necessarily mean “used”. There might be reasons why you would order in a large bulk of antibiotics at your individual facility and then end up returning them. Often, those returns are not well tracked by these software systems that are in place to look at purchases. So be wary of that.

Also, if you are a facility that gets their medication from some centralized system – whether it be locally owned or a large regional commercial system – you often can’t tell what happened to those drugs once they were purchased. So if you have a central pharmacy buying, for example, for ten facilities, you’ll know what was bought, but you don’t necessarily know what went out to each of those facilities and in that case, purchasing data is not that useful to you. Also, you have to do some adjustments to purchasing data – and I’ll talk about those in a moment – to make them correlate in some way to what might have been given to patients if you can even refine it down to the single facility level.
You can also look at dispensing data. The dispensing data would address that concern of where you have one central pharmacy buying medications for a whole host of different facilities because you would have some record of what went out to that facility and I think that that is something that certainly can address that issue. Dispensing data are also readily available from pharmacy systems. It’s a way we track what we gave to individual patients, but the problems here to be aware of is that this can get clouded when there’s a lot of floor stock being used – and we’ll show you some examples of that. Because there might be a large bottle or a large supply of a specific antibiotic sitting out there that actually hasn’t been given to patients yet, but it looks like it was dispensed for patient use. So be wary of that caveat if you decide to use dispensing data. The benefit of dispensing data is it’s one step closer to the patient than just purchasing data. So it might give you a little bit better idea of what is happening in your individual facilities.

In the inpatient acute care setting, we have largely transferred – transformed, excuse me – into electronic MAR data and what that means is we’re actually getting what was administered to the patients, and my understanding is many nursing homes are starting to use electronic MARs, but they lag behind what’s happening in acute care facilities.

I’ll tell you some of our experience with using EMAR data. One is it does take a lot of validation to be sure you’re pulling all the correct data and two, it takes time and resources to have someone that can actually glean that data out of the system for you. So just having the electronic MAR has not been a universal solution to our problem of tracking antibiotic use in the acute patient care setting.

And then lastly – and I put a smiley face here – is paper and pencil. I think that when people want to talk to us about what we’re doing with antibiotic use, they are always astounded by how often I pull out a paper data collection form or some sort of manual way to look at our data, and doing point prevalence surveys is one way you can get around this. You are likely not to have a resource – to have someone go out and record manually every antibiotic that was administered, but a way that people get around is if that’s the only source you have, they’ll do a snapshot, and that sort of point prevalence is. So they’ll take a specific day or maybe a week and capture all, perhaps, dispenses of antibiotics, or even all administrations of antibiotics for a certain targeted area, and do that manually, which can be done. It’s very labor-intensive, but sadly, stewardships still has a lot of manual data collection associated with it today. We’re working on novel ways to do this, but we aren’t as far as we’d like to be to have people able to electronically capture all the data points they need to adequately describe antibiotic use.

So I think these are the four primary ways that we look to get our data on antibiotic consumption. There are a few other more creative ones, but it stills remains a science of underdevelopment. So stay tuned and hopefully, there will be more refinements in the future.

So when we look at how we talk about antibiotic use, I think for a long time, especially in nursing homes, we have done a very manual process that relies on looking at the antibiotic logger [inaudible] section log that’s maintained by administration at the facility and so some people have published kind of some
interesting ways to think differently about antibiotic use, and I’m going to start with perhaps some more simple ones and then go into more involved and complex complete pictures of antibiotic use in a facility.

And this one I really like. It’s courses of antibiotics or starts of antibiotics per thousand resident days. So the administrative office at your facility knows your resident day tally. You need to find the person who has that piece of information and they can be very helpful to you in getting the denominator that you need, and then you simply look at new prescriptions started. And this is pretty interesting. This was an aggregate set of data that looked at percentages of a large number of facilities and then the pooled facility average antibiotic courses per thousand resident days. And you can see that it seems to be about five on average for the majority of these hospitals that were responding, but it’s just one way for you to look at how your antibiotic exposure is across the facility. Are you giving a lot of patients courses? But remember, this doesn’t really give you a great picture of overall antibiotic exposure because if you have a patient or a resident who started on a single course of chronic prophylaxis that’s going to go for a whole year, that only counts as a single course of antibiotics despite the fact that that resident will get 365 days of antibiotics as a result of that single start. So this is a good way to look at new prescription patterns, but it doesn’t answer the whole question of, “What is my antibiotic exposure across my facility?”

This shows another way to think of a very similar question. So instead of just new starts where one patient may account for many of those starts, this tries to look at the percentage or number of residents who receive antimicrobials, and this is another different, interesting way to do it. They looked at the incidents, they looked at a ratio of antibiotic use, they looked at the cost for this as well as the cost per antibiotic day. So you can think about this. It can help you target education. So are you giving a lot of antibiotics to a very small number of patients – and maybe you should talk about differences in practice of duration of therapy or avoiding chronic prophylaxis for a lot of urinary tract infections – or are you giving a ton of your residents antibiotics? And they may be long or short courses, and in that case, perhaps we need to have educational interventions that target appropriate empiric therapy or other measures to decrease the use of antibiotics in the empiric setting because that seems to be high there, just as an example.

This, as many of the other summative measures, can underestimate or not adequately describe some key prescribing processes. So maybe what’s happening here is patients – a small a number of patients are getting antibiotics, but what you don’t see is that every time they’re writing for antibiotics for a patient, they’re pulling everything off the shelf and giving all residents two to three antibiotics at a time. That would not be reflected in this measure that just looks at how many patients get any antibacterials.

Now let’s talk a little bit about some of the different measures we have that looked at overall antibiotic consumption for the facility. One of the first is defined daily dose. This is really nice because it’s a standard external metric for looking at antibiotic use. It is developed and endorsed by the World Health Organization. So there’s actually a website that you can go to that defines and publishes all of the correction factors.
So what you do is for your facility, you choose whatever data source you are using to measure overall antibiotic use. You can do this with purchasing data, you can do this with dispensing data; you can actually even do this with administration data, although that data is so much more granular than this method. I don't know why you would convert back, but it is nice because everyone who calculates defined daily doses uses these same correction factors. So you get your antibiotic data source, you sum the total quantity of drugs, the gram of drugs that you purchased or dispensed to that facility or that unit, and then you divide it by the correction factor. And the correction factor is meant to estimate a traditional day of therapy in a patient with normal renal and/or hepatic functions, and that gives you some idea of how many estimated days of therapy you may have had in your facility. And the nice thing – because everyone is using the same correction factor – you can then compare with other facilities. So everyone is using the same correction; everyone should have comparable data if they’re using denominator to normalize it by.

Some problems with this – I think it’s important to talk about the pros and the cons too. The pro is that this is easy to do; you can download spreadsheets that give you all the calculations pre-programmed into it and it’s something you can do off of purchasing data, and you don’t have to get very granular if you don’t have an electronic MAR at your site, but because the correction factor is based on patients with normal renal functions, this number may not really reflect anything close to what actual days of therapy is at your facility because of those reductions for renal toxicity. So the two patient populations where DDD – which is the abbreviation that we used for defined daily dose – are known to not be useful for facilities that have a lot of renal impairment, and then pediatric patients, which is probably not as relevant to this discussion. But this can be done, and it is a way to give you some comparable data for other facilities so that you can compare because that is one challenge whenever we get to finally measuring antibiotic uses, well, what is everybody else doing and is this the right amount? So defined daily dose is certainly a tool out there.

In the acute care setting, what we have moved to are measures that look more specifically at how many days patients are getting antibiotics and there are two ways to measure this. One is days of therapy and one is antibiotic days, and I have this graphic here to try to help explain this and demonstrate this for you. So let’s start first with days of therapy or DOT.

DOT is calculated by drug. So in this example here, you’ll see that we had a patient or a resident who received piperacillin and tazobactam on days 1, 2, 3 and 4 of the antibiotic course. They also received vancomycin because there was a presumed a [inaudible] infection and they got those on days 1, 2, 3 and 4, and piperacillin and tazobactam on days 1 and 2. As a result, there are two days of therapy for piperacillin/tazobactam, and four days of therapy for vancomycin in this patient. What you see here is this measure allows us to categorize use on the drug level, which is great; we can get very specific. It does, however, inflate your total days of therapy if combination regimens are used.

So what we see in the acute care setting is that when more broad spectrum agents are used, your days of therapy goes down overall because if you use an agent that covers, for example, Gram-negative and MRSA, you’ll only have to give one agent compared to this two that are given in this example regimen.
So we have had people tell us, “This doesn't promote using streamlined therapy because you could overestimate your days of therapy or rise – raise your days of therapy when you have combination regimens in place,” and the numbers looks lower even though you’re using more broad spectrum agents that might be inappropriate. So be wary of that.

Antibiotic days is similar but different. They sound almost alike, but what this tries to look at is how many calendar days, at the patient level, is that patient or resident exposed to antibacterials? So in the same example, the overall antibiotic days would be four. So you don’t capture the differences because of combination therapy and some people like it for that very reason. It doesn’t penalize people for using two drugs because you know you might want to streamline and drop one off, but it looks at the overall exposure at the individual receiving the antibiotics. Each has pros and cons in the inpatient acute care setting. We have gone with the days of therapy measure as what is moving forward as the national standard, but again, in most of our facilities, we use both of these to describe data because they each have advantages and each have a niche where they can help.

Equally as important to measuring how much antibiotic is being used is determining what the appropriate denominator is for describing these data and there are [inaudible] to use in the inpatient setting. So these overall admissions I don’t think are as relevant in nursing homes and other long-term care facilities because there’s a low number of admissions per the long stay that residents have. There’s also patient days, which translates to resident days in a long-term care facility.

And this is a daily count, and it – we use a lot of terminology that sounds similar here as well. Resident days are a daily count at very specific time each day. So it may be midnight, it may be 2:00 AM and wherever the resident is at that time is where they are. In the acute care setting where we have a lot of transfers, this doesn’t always give us a great picture of really what patient distribution is throughout the day. So for the inpatient setting, we’ve gone with a different denominator that’s called days present and this is actually the total number of patients that cross through a unit in any day. So if you get transferred to the ICU for eight hours and then transferred back out in an acute care setting, that you would get a day present on the general ward, one in the ICU and one wherever you may have gone next. This is not as useful in a long-term care setting, we feel because patients don’t transfer quite as much and we really feel that resident days is a great denominator, and that is what we have been using in all of the nursing home work that I have been associated with, but I really think resident days is likely the way to go.

Just to drive this all home, these are some example data that we have collected through a collaborative I work with in Rochester, New York that describes dispenses of data to residents for their antibiotics. So we know that the way we dispense medications in the nursing home setting is different than in the acute care hospital, where we have individual orders and each dose is dispensed specifically. In long-term care settings, it’s much more similar to an outpatient pharmacy where a course is dispensed at a single time.
So these are data that you can pull out of a typical pharmacy dispensing system and it comes at the patient level. And so what we have done here is calculated – and this is a little bit of an estimate because these are data – we don’t have actual administration data, but you can see there on the first line we have doxycycline, 100 mg capsules that are to be taken one capsule twice a day, daily for seven days, and we have a fourteen day quantity authorized, and fourteen capsules authorized and fourteen dispensed. So what we then go in and do – and you see this depicted in the bottom of the slide – is we go in and estimate days of therapy from that. So that would be seven days of therapy. Pretty easy; that’s actually in the administration instructions.

But the same was applied to the next example that has ciprofloxacin 500mg tablets, to take one tablet orally, twice daily. This is nice because this order actually includes an indication and I’ll talk about that in a little bit, and this was – seventy were authorized and only fifty-five were dispensed, but we used the – we used the actual dispense on that here to say that this resulted in twenty-eight days of therapy because there would be an additional dispense record for the remaining tablets once they were acquired or if they were ever dispensed.

So you can see here how we use the data from a typical nursing home dispensing record and attribute those to days of therapy. So it’s a little bit different methodology. You don’t necessarily have to have EMAR data to do it, but this is how we have been doing it in one example collaborative where we capture a lot of different antibiotic use and try to describe it across facilities.

What you get when you capture these data is the ability to look at different use in different ways and now I want to show you some examples of how we use these various metrics. When we first started our Rochester based nursing home collaborative, we could only capture purchasing data and so we used defined daily doses as our metrics, and as a denominator, we used per 10,000 resident days. And you can see here that there were differences between the different facilities because a lot of people ask me, “So what do I do when I have these data?”

When you look and you note differences, there can be lots of reasons for it that allows you to ask very specific questions. Why was use higher at Facility 5 than it was at Facility 1 or 2 or even 3, which was the lowest of them all? It allows you to look at this, but when we started talking to leadership and providers at these different nursing homes, what we found was there was some disagreement or questions about why the data looked the way they did. It didn’t seem to reflect what they were seeing on their infection logs and it was looking like there was a lot more antibiotic use than may have been warranted based on those infections logs.

So what we did is we actually went and got the dispensing data, the examples that I just showed you and started capturing and calculating them for each of the facilities, and we found some interesting things. This slide here compares, for a single facility, the days of therapy – calculated using the method I just showed you – compared with the defined daily doses for the same facility based on purchasing data for the same time period.
And there are some vast differences, and we’ve spent a lot of time drilling down into what was causing these differences. So when we looked at the difference in days of therapy versus defined daily dose, for example, for vancomycin – which is the drug all the way to the right on the graph – there was a huge discrepancy and this had to do with the fact that the World Health Organization defines a DDD correction factor of vancomycin of 2 grams, and this particular facility had some larger patients who require higher doses. So they weren’t getting as many days of therapy, but they were getting much higher than 2 grams on a day where they were receiving therapy.

We also found it very interesting that there was such a big discrepancy, moving the left side of the graph, in amoxicillin with days of therapy compared to defined daily doses. Now this was interesting and this had to do with purchasing practices, and also one of the pitfalls of using purchasing data as your source of tracking antibiotic use. What this facility did is they bought a bottle of a thousand amoxicillin capsules and these data depicted here, actually a six month snapshot. Now a bottle of a thousand capsules would last a facility about six months and what we did is they – we started in July, and they happened to buy a bottle on July 2nd, getting ready for the holiday weekend. So in our data for purchases, we had a bottle of a thousand amoxicillin capsules on the beginning of the study period. They were again getting ready for the New Years’ holiday and our data went through December of that year, and they bought another bottle of a thousand amoxicillin capsules around December 30th.

Now I know for a fact that they did not use all thousand of those capsules in this time period. So based on the purchasing data, it all gets put into the same time period. So there’s a lot of inflation of drug use that can be seen just because of purchasing practices that might be in place. Drug shortages can greatly impact this as well as things that may be done to have bulk purchases for – to take advantage of various contracting measures. So again, purchasing data, not quite as specific. And after talking with leadership at the nursing homes and seeing the great differences are or what’s between facilities when we use aggregate purchasing data, we decided to go forward and use the day of therapy correction factor.

Now what’s nice is that you can then drill down a lot based on the dispensing data and start to track use through time, and because it’s dispensing data, you know where within the facility this was seen. So we were able to back this up and this was for a nursing home, and we calculated those days of therapy, and we normalized it to 1,000 resident days, and you can see this time – and you will see some seasonal variations, but saw some differences between the units, and we were able to break it down and look at transitional care patients, who seem to be getting a lot of the antibiotics at this facility, and just tracking the time, again, looking at dispensing data. And this allows you to look at what you’re doing, follow before and after your interventions, and really great – give you some great guidance on where you might want to target future work or drill down and ask more specific questions about the use.

Because we have this many individual agents, we can slice and dice this data in many different ways that I haven’t necessarily shown you. You can look at the data, again, by the unit, but you can also look at it by agent. So we were able to look and say, “Oh.” Some of the most common drugs that are being used actually surprised us. There was a lot of nitrofurantoin usage, which we didn’t realize was going to be happening. There was a lot of ciprofloxacin use and we were trying to avoid quinolones for treatment of
infections because we didn’t drive the risk of c.difficile as an example. So once you have these data, you’re able to display them in many different formats to answer questions and then what we would do is we would get to a point where we ultimately have to get a look into some chart review, but that chart review is much more refined and focused because we have the aggregate antibiotic use data to drive those decisions, and I think that’s a huge step forward in moving the stewardship program to actually having a meaningful impact based on intervention.

I think it’s also important to not just know that we are using antibiotics, but we have to understand why antibiotics are being used and others have looked at this. This is a further drilldown of some of the previous data I showed you that looked at overall antibiotic prescribing power and so it’s really to look at what antibiotics are being used to treat what infections, and this can help further refine the stewardship and interventions that I already mentioned. Some of the most common we tend to see in nursing homes are respiratory tract infections and urinary tract infections, and that is something where we may not change the number of infections that we’re seeing as part of the stewardship program, but we certainly can change the drugs that we’re using. As you note here, there’s a lot of fluoroquinolones for both of those infection types and we certainly want to try to drive that down, where possible, to alternate agents to eliminate or reduce the risk of c.difficile.

This comes directly from the appendix to the CDC Core Elements of Antibiotic Stewardship in Nursing Homes and this really gives you the justification for point prevalence. So as I’ve already alluded to, sometimes we reach a point with our antibiotic data where the broad data just is not specific enough and we need to get out that pen and paper and do some point prevalence surveying. Point prevalence is nice because it really is limited and it’s meant to be a snapshot, and we typically do single day point prevalence surveys. So don’t let them scare you; they’re not that bad to do.

We’ve done them in the nursing homes and we’ve also done them in the acute care setting where we take a single day, we use trainees, if we have them available — it’s a great opportunity for them to learn more about the overall disease state — and we go in and capture some very targeted data. We try to keep it to two pages or less, and it can really inform your stewardship intervention. This, in some cases, is the only way we can get the data about why antibiotics are being used.

What we have done at some of our nursing homes is started requiring an indication in the antibiotic ordering and this is very useful, and I’ll show you some of that here. This was based on our dispensing data. When the providers did indicate their reason a particular agent was being used, we recorded it and you can see there the number of courses that for each of these common indications, and it doesn’t surprise many that in the nursing homes a lot of this is for urinary tract infections. So you now know that you can start focus a lot of your intervention and educational efforts on urinary tract infections, and maybe it’s not just treating them, maybe you need help on diagnostics. And so that gives you a great opportunity to further expand, but I think it’s very important to also consider capturing the indication for antibiotic use, whether it has to be through point prevalence or you can implement a system in your facility to look at that in the ordering process. That is a very valuable tool that gives you some rapid data to get to action more quickly.
I think it’s also important to look beyond just how much drug is being given and what it’s being given for. You need to have ways – and usually, the systems are chart review and point prevalence that look at the completeness of diagnosis and documenting that in the chart. We know through a lot of our stewardship interventions, we – before we saw antibiotic use go down, the first change we saw was more documentation of symptoms of urinary tract infection in one of our pilot projects. So it’s really important you’re also looking at the resident specifically because it’s not just about less antibiotic use it’s doing the right thing for the people we’re taking care of.

I think it’s also important that – especially because of the prescribing processes in many of our long-term care facilities where a lot of is done over the telephone, that there is complete documentation. So anyone doing follow-ups the next day that may not have been the one called knows why the antibiotic was started so they feel empowered to stop it. That’s very important and the only way you’re going to really move the needle in getting that done is auditing it. So having that data is an important piece of measurement of stewardship in the nursing home setting.

And then also to look at what agents are being used compared to either local or national guidelines as a way – that’s important data to show. I think when you can talk to people and say, “When we treat a urinary tract infection, 60% of the time, it’s the quinolones.” That gets people’s attention because everyone feels that in their individual practices, they may not use a lot of quinolones, but you look at it in aggregate and that really helps drive changing overall practice of a group of providers. So lots of other things that you can look at and measure as part of your stewardship program.

A lot of questions I often get are “So we have data. Where do we go from here?” I think we spend so much time we couldn’t have data on antibiotic use then we finally got it and everyone paused and said, “Well, now what do we do?” And that same appendix of the Core Elements for Nursing Homes gives you some ideas.

So important to start looking at antibiotic resistance and comparing your antibiotic use trends to the resistance rates. I know that in one facility i’ve worked with, they used a lot of quinolones to treat their urinary tract infections, but they had less than 40% susceptibility of E. coli to the quinolones. So start looking at that and driving change based on that if that just didn’t make sense. Start thinking about what harm is happening to our patients. We spend a lot of time focused on c.difficile in acute care and in long-term care, and we know that they’re interrelated between those types of facilities. Start tracking patients who develop c.diff and look for opportunities for improvement. Track other adverse events related to antibiotic use. Are you seeing allergies? Are you seeing problems of [inaudible] as patients are receiving IV antibiotics? That’s very important and then often, stewardship programs are asked to track costs in order to justify ongoing efforts, and that’s also something that you can equally do and those facilities do already.

We also get asked, “What is our target?” and I think this gets very difficult to put an exact number on. So infection prevention and antibiotic stewardship are very closely tied, and our infection prevention

9 | Page
colleagues are well ahead of us in terms of working the data and showing providers data and talking to administrators about targets. It is a little easier, though, in infection prevention where every infection we would like to prevent is possible and the campaign slogan of, “Target Zero,” is well adopted, and it’s greatly deployed in infection prevention.

In antibiotic stewardship, though, our target isn’t zero and we’re still looking for what our target is, and right now, all we know is that less is better. We know that in facilities that are categorized – these are nursing homes that were given either low, medium or high antibiotic use – so the lower [inaudible] use, the less c.diff, the less diarrhea that was reported, slightly lower rates of antibiotic-resistant organisms, lower allergies, lower adverse events overall related to antibiotics. So we know that lower use is better for our patients and some of these differences look small, but they’re real. Any patient who avoids an allergic reaction is important; any patient who – or resident who avoids an unwanted complication is important. So lower is better for our residents and we need to keep that in mind, and I think as we work together to measure antibiotic usage – it’s really in its infancy in the nursing home setting – we’ll be better able to come up with targets for our various facilities, but right now, we just have to start with measuring it, comparing it with others and trying to improve upon it.

I also wanted to end with a few comments on how to make the data that you’re capturing actionable. So first and foremost is the data you’re capturing alone will not answer all the questions you have about appropriate antibiotic use in your nursing home, but it does allow you focus your efforts and maybe get to an actionable point much more quickly. So we find it helpful to look at the important questions; the who, what, where, when and why of antibiotic use.

So who’s writing for the antibiotics? In nursing homes, in addition to doing unit-specific dispensing, we actually do time of day for antibiotic starts and that can be greatly telling about where you might want to intervene. Is it all in the overnight hours? Does it happen more on weekends? Does it happen more on certain days of the week when culture results are more likely to come back? Think about those things and those will help you crack smart stewardship interventions to address the overuse.

What are the most frequently used antibiotics? Are there units that tend to use more and then why are they using the antibiotics so frequently? We find that when we have answers to some of those questions, you have a much more productive conversation about changing antibiotic use patterns than when you start it off by just saying, “We think we overuse antibiotics.”

From knowing a little bit about your antibiotic use, you can create guidelines that are smart. One example I always like to give is that if you are designing a stewardship intervention – and it might involve reviewing all new antibiotic starts at four days. If you know that your average lines of therapy is only three days for antibiotics, that stewardship intervention isn’t going to get you the goal that you’re hoping. So using data can help you design smarter interventions that really tackle the problem. So be thoughtful of that and you can then move forward more quickly to something that’s actually going to get to your desired goal.
And then remember, always keep asking why. Whenever I go in and talk to any facility, there are always some strong feelings about where antibiotic overuse is happening, and sometimes they’re right, and sometimes where it’s actually happening is a complete surprise, and in every facility, there’s at least one complete surprise. So never stop asking why in investigating further what might be going on with your data and with your antibiotic use in your facility.

So that has been a brief update in what the current status is of measuring overall antibiotic use in the nursing home setting. I hope you found this helpful and I really want to thank you for listening.