

**AHRQ Quality Indicator Software Version 4.1  
Present on Admission User Overview Webinar  
May 12, 2010**

**Transcript**

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**John Bott [AHRQ]:** Hello, welcome to this webinar related to the AHRQ quality indicators, the present version, Version 4.1. My name is John Bott. I work under contract onsite with AHRQ on the quality indicators. Today, we're also joined by Jeff Geppert who will be providing the primary content of the slides on present on admission.

Our next slide is just a quick review of the webinars in 2010. People may recall, some people on the call today may have been with us in January for a number of calls related to Version 4.1. The first two calls were a repeat from one session to the next to maximize participation, January 12th and 14th. That was to provide a rather high level, 50,000-foot overview of Version 4.1 and the refinements to that and changes from the prior version — essentially Version 3.2.

Then a couple of weeks later, January 25th and 27th, again we did a repeat where we repeated the agenda two times. Here was additional detail in regards to a number of the topics of changes, again from Version 3.2 to Version 4.1. These tended to be topics that were a bit more complex and took a bit longer to get through, and so we tried to dedicate a fair amount of time to discuss the additional detail on these more complex topics.

At that time we touched on present on admission. But realizing that it is highly desirable for people to understand that better, we've had questions about it and we wanted to be very transparent with our methodology in using the AHRQ quality indicators for users out there. We wanted to provide greater detail on present on admission.

Today is trying to hit that middle ground of present on admission, geared towards users. It is some detail that we will go into today as you'll hear, and May 14th would be a down-in-the-weeds and very technical conversation about present on admission.

In both opportunities we plan to leave a good amount of time at the end for questions. Any time leading up to that opportunity for questions you can go, I've been told, to the Q&A tab and type in a question that we'll get to at that point. Also, at that point when we call for questions, you'll have the opportunity to ask questions over the phone as well. The operator at that time will provide instructions.

Earlier this week or late last week, we developed a paper on present on admission, about a 12 or 14-page paper to serve as a complement to the session today, and for folks to refer to, of course, at any other time and for the listserv announcement that is now available on the website.

As we speak, somebody is visibly working to put today's slide on the website. So if you're somebody on the phone without access to the webinar capacity, but have access to the Internet, you can periodically check into the AHRQ QI website and try to pull up those slides. They should be there at any point.

One other comment on the webinars to date. This is currently our plan for webinars for 2010. We'll explore the potential to add additional webinars yet for 2010, but this is currently where we're at.

So moving on to the next slide to preface today's talk a little bit, the first portion of the call we want to make sure that people have a reasonable context of present on admission, so Jeff will provide that overview broadly about present on admission, the data element.

And then moving to more specifically how present on admission is employed in the AHRQ quality indicators, and then provide an example related to the patient safety indicators — how it's used and another example of how it's used — and the inpatient quality indicators with the hopes that this gives you a fairly good picture of what's occurring with the use of present on admission in the quality indicators.

As you can see, we plan to leave a healthy amount of time for discussion — almost half of the call. At this time, I'd like to turn it over to Jeff Geppert to present the balance of the slides to you.

**Jeff Geppert [Battelle]:** Thank you, John. Thank you, everyone, for joining us this afternoon or this morning, for those of us on the West Coast. *[SLIDE]*

Just by way of overview, we're going to talk a little bit about, obviously, what POA is and how it has informed the AHRQ QI development to date and some of the challenges that have presented and how we've gone about trying to address those challenges.

Just to begin, as we know present on admission has this particular definition: “present at the time the order for inpatient admission occurs. Conditions that develop during an outpatient encounter, including the emergency department,” AHRQ considered present on admission under the coding guidelines and the UB-04.

POA, the flag that applies both the principle and secondary diagnosis — although on the QI as we tend to just assume that the principal diagnosis is POA by definition. The benefit of POA is that it provides us with a determinative mechanism for distinguishing conditions that were preexisting prior to admission that we can treat as comorbidities for the purposes of defining the measures and risk adjustment — versus complications that occur during the hospital stay that we can treat as potential outcomes. *[SLIDE]*

So the POA has presented some particular challenges to the AHRQ quality indicators. We developed, as you know, the inpatient quality indicators which were released in 2002, and then the patient safety indicators which were released in 2003, and then the pediatric version of many of the patient safety indicators which was released in 2006.

Researchers began to look at these indicators and to evaluate them, taking advantage of the POA data where it existed, and there were several published studies that looked at the impact

of POA coding on the relative ranking, or the relative performance of hospitals, and in general found a material impact — both in terms of the definition of the comorbidities and other covariates that are used in the risk adjustment and in the identification of events.

We were presented and faced with thinking about how to respond to the research that had been done. At the same time, we were also going through the NQF process and submitting many of the AHRQ quality indicators for consideration for endorsement. POA was a frequent topic of conversation in the technical panels.

There were a couple of indicators where the use of POA was an explicit condition for endorsement — like foreign body and pediatric pressure ulcer, but there was always sort of an underlying recognition that the POA data was becoming more and more common and prevalent, and that it would be incorporated into the specifications and into the modeling as soon as it became available. *[SLIDE]*

So POA has always informed the quality indicators, informed how they were developed and how they have been used when the specifications were developed.

Particularly for the patient safety and the pediatric quality indicators there were specific exclusions that were implemented to remove cases where the outcome of interest was likely present on admission. An example of that is obviously of cases where the outcome of interest was actually the principal diagnosis. Those were excluded from the denominator. Also, the selection of conditions that were used in the risk adjustment, again particularly for the patient safety indicators where that selection was based in part upon an assessment of those conditions that were more likely to be present on admission, and less likely to be complications that occurred during the stay.

It informed the indicator development in a sort of probabilistic sense. With Version 3.1 of the QI software, we incorporated POA data into the actual calculation of the indicators, and into risk adjustment models. So users that had access to POA data could use sort of a different set

of covariate files and population parameters to calculate rates that took advantage of that POA data. *[SLIDE]*

**What to do?** We were faced with the recognition that POA was critically important, but we had some challenges to address, with the first challenge being that POA data are obviously not collected in all states. There are currently, in the reference file that's used in Version 4.1, nine states that provided POA data to AHRQ under the HCUP program. There are many additional states that are providing POA data in the current state inpatient databases that will be used in subsequent releases, but it's incomplete.

We know that there are some states that have POA, and there are some states that don't. Even within states there are some hospitals that have POA and some hospitals that don't. There are critical care access hospitals that don't necessarily report POA, and then even within a hospital there are some discharges that may have POA data and some that might not. We were faced with that sort of issue, of what can we do and what kind of methodology can we adopt that would apply in all of these different circumstances. *[SLIDE]*

The other recognition in addition to the degree of variability in availability was another recognition that was going to become much more common and prevalent over time, in particular because there were beginning to be imposed legislative mandates that required hospitals to set present on admission for Medicare discharges beginning with the DRA in 2005; January 1, 2008.

In addition to collecting the data, there was a growing recognition and awareness of the need for validating the POA data. CMS currently has plans in place to assess its accuracy. So not only will the data become more and more common, but it would become more and more accurate over time. *[SLIDE]*

**What was our goal in developing a POA model?** We wanted to be able to provide useful information about adverse events. We wanted to retain the ability to use models that were

based on readily available administrative data, but recognizing that we had this limitation with the available administrative data in terms of the inability to distinguish comorbidities and complications in the absence of a deterministic flag like POA. *[SLIDE]*

We wanted to develop an estimation approach that would be able to be improved over time. As additional states, additional payers and additional hospitals collected POA data, then obviously the models that incorporated that data would improve over time. We wanted to have an estimation approach that would be flexible in that regard. We also recognize that collecting POA data can be in some cases costly, and so we didn't want to require it. We didn't want to mandate that POA had to be used in order to be able to use the AHRQ quality indicators, and that individual hospitals could still get useful information from the QIs, even for whatever reason they elected not to collect POA for a particular patient population.

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We also wanted to develop a methodology that was generalizable enough that could apply to other types of enhanced administrative data, and so we currently have a development effort that's looking at using laboratory data to enhance the administrative data files. There have been also studies that AHRQ has sponsored that looked at key clinical findings and that others have done. We wanted sort of a common methodology that could be used for these other data elements which share a common characteristic where they're not always available for every hospital and in every time period. *[SLIDE]*

We wanted to develop a model and an estimation approach that would use the POA data where it was observed. For those states and those hospitals and those discharges where we had POA data, we would use the actual POA flag. We wanted the model to use all of the available data, so we wanted to use all of the states that participate in the multistate SID data files. Ultimately, we want the models to result in unbiased rates — unbiased with respect to POA availability using data, some of which had POA and some of which did not. *[SLIDE]*



We needed to develop two types of algorithms to incorporate the POA information. We wanted to develop one set of algorithms that estimated the outcomes, the response variables, and estimated the comorbidities — the covariates and the risk adjustment models — where POA data was available. We know that based on these prior studies and our own assessments that having POA data results in more accurate measures, but we also wanted to be able to estimate the outcome variables and estimate the comorbidities, covariates where POA data was not available.

The way that we do this is we use the POA data that we do observe to estimate the likelihood that a particular outcome or a particular comorbidity is POA or not, and then our modeling approach results in a risk-adjusted rate that in some sense is the most likely value — had that hospital actually collected POA data. That's our goal. *[SLIDE]*

So just to be clear in terms of how we're using the POA data, the POA data can be used in two respects. One, it can be used to identify numerator or denominator. That's what we call measure specification, and also exclusions.

Also, POA data can be used to identify the covariates and the risk adjustment model, because what we don't want to do is to include in the risk adjustment model conditions that occurred during the stay. We want to limit our risk adjustment model to those conditions that were present on admission. The POA model applies both to IQIs, which are inpatient mortality measures — *[SLIDE]* And to the PSIs, the patient safety indicators, where it's used both to identify the outcome of interest and in the risk adjustment both. *[SLIDE]*

Then obviously it's used in the pediatric version of the patient safety indicators, the pediatric quality indicators and the new indicators that are new for 4.0, the neonatal quality indicators, the NQI. *[SLIDE]*

So now we're going to walk through the modeling steps. There are six steps in the process. The first step is to determine whether or not the discharge record has POA data, and so this is

an important thing to understand is that the software does not assume that either all of the data has POA or that none of the data have POA.

In the earlier versions of the quality indicators there was a parameter that you would set, or in wiki it was whether or not POA data was included in the data load, but it was an all or nothing either/or determination. That's not the case here.

We don't assume that all of the data either does or does not. That might mean, again, that some hospitals and some don't — some discharges do and some don't — or if you're incorporating multiple years of data, some years do and some years don't.

**How is that determination made?** What we do is we look at all of the POA flags for a particular discharge record. If any of those flags have sort of valid POA coding — yes/no, 1/0, W, E, U — if it has valid POA coding, then we say that that particular discharge record has POA. If it doesn't, then we say that that particular discharge record does not have POA.

The second step in the process is to create our discharge flag. We do this, again, in two steps. One, we apply the criteria to identify the outcome of interest and the population at risk without regard to POA. Do they have the outcome of interest as the secondary diagnosis code? Are they in the population at risk?

Then we create a separate flag that is based on POA for whether this case ought to be excluded because that numerator event is of the numerator event itself as present on admission, or that particular discharge record has an excluding condition and those criteria for excluding conditions also use the POA information. We create our discharge level flags, so the user can use the information to see how many cases in their dataset would be excluded because of POA.

The third step in the process is to create the covariate flags, and we create two sets of flags. We create one set of covariate flags ignoring POA, and then where POA data are available,

we create a second set of covariate flags where we use POA and we don't count the conditions that are not present on admission.

The fourth step in the process then, once we've created our flags, is to basically fill in the gaps — fill in the holes — where the data are missing. We have our flag P, which tells us whether the outcome of interest should be excluded, a particular case should be excluded or not, and our covariates, our comorbidity X which are comorbidities that are defined with POA data.

We have a model where we calculate the most likely value of P and the most likely value of X based on the POA data that we have. Once we've calculated a predicted value for P and X, we apply our risk adjustment model and it's a familiar model to those of you who have used the QIs for many years. We calculate a predicted value for each discharge record. We're going to go through the calculation of that in our example, and then our process for calculating the observed, expected and risk-adjusted rate is essentially the same as it has been. We're still using our indirect standardization OE ratio methodology. *[SLIDE]*

We're going to walk through an example for a particular patient safety indicator, indicator number 13, which is our postoperative sepsis indicator. We're using for these examples our reference population for 4.1, which is the 2007 state inpatient database from the HCUP program. Based on that reference population data you can see that overall — and this is in the adult population that we're talking about — there are about 27 million observations, with about 9 million of those, about 30 percent or so that have POA data. About two-thirds, 60 percent or so do not have POA data, 67 percent.

In the postoperative sepsis of those cases that meet the denominator inclusion criteria for postoperative sepsis, it's about the same. About the same number of records have POA and don't have POA — about two-thirds, one-third. *[SLIDE]*

Now, in our second step we're creating our discharge level flags. In this particular example, P which is our flag for whether or not a case should be excluded because the outcome of interest is present on admission, or there is an excluding condition, is about 38 percent. You can see how this works in the data where POA data is not present and where POA data is present. In the data where POA is present — was not present — we have about 8,200 cases that are flagged in the numerator, which is a rate of about 1.47 percent.

In the discharges that have POA data, we have 11,956 cases that are flagged in the numerator which is also about 1.49 percent. Again, about 40 percent of those cases are flagged as being POA. *[SLIDE]*

So now we have our flags. We have our indicator flags for the outcome of interest and the population at risk. Then we have as the subset our POA flag, and for this case it's in the numerator, but it should be excluded from both the numerator and the denominator because of our POA criteria. So now the third step is to create our discharge-level flags for our covariates. What we do is we use a table, and this table is included in the parameter files that are provided with the software. What this table does is it tells us what proportion of cases that are flagged as covariates enjoin POA, but still be flagged as covariates once we include POA.

The data that is without POA, that's what we call Z. We always refer to that as Z, covariates that ignore POA. Then the covariates that are defined with POA is what we refer to as X. In the software you'll see that there is a set of data elements that are prefaced with Z, and a set of data elements that are prefaced with an X. X always means with POA.

We've given some examples here of the different types of covariates that are used in the model. The first set of covariates are the demographics, and so female and age. Obviously, that's not impacted by POA; the proportions are the same.

The same with the covariates that are based on DRG. DRG again is defined based on conditions that existed at the time of the admission, and so DRG assignment is not affected by the presence of POA — at least the way it's currently defined.

*[00:30:00]*

But then there are a set of covariates that are explicitly labeled as comorbidities, and they are impacted by the presence of POA. In the discharges that have POA data, for CHF for example, about 0.037 percent of the discharges have a CHF diagnosis when we ignore POA data, and about 0.029 percent of them have a CHF diagnosis when we use POA data.

In this particular example, the proportions in the X column are always less than those in the Z column, and that applies down the board, and so we're going to use these proportions in our modeling in the cases where POA data is not present. *[SLIDE]*

**What do we do when we don't have POA data?** Well, we know the value of Z because we know the value of Z on everybody. We know what comorbidities are flagged with the secondary diagnosis codes, and so what we want to know is X. There are basically four possibilities, or sort of four logical possibilities. *[SLIDE]*

This is sort of the table that you would see in the software that show these proportions, and so just reading across the columns. How likely is it that X would be zero if Z is zero, and so there the comorbidity is not flagged in Z, how likely is it that it would be flagged in X. It's never the case. X is always zero if Z is zero. Similarly, X is never one if Z is zero. So if it's not flagged as a comorbidity in the Zs, it's never flagged in the Xs. However, if it is flagged as a comorbidity in the Zs, in some proportion of cases it would be still flagged in the X. That's 0.78, and in some proportion of cases it would not be flagged in the X, 0.219.

This tells us the proportion of times that a particular comorbidity is actually a complication, something that occurred during the hospital stay and was not present on admission. *[SLIDE]*

So now we have our kind of full set of comorbidities in our risk adjustment model. We have our actual values of Zs, our actual values of X and our predicted values of X. Then we can use these comorbidities to calculate predicted values for each discharge record. [SLIDE]

**What is it that we're predicting for each discharge record?** Well, we have a couple of different things. Here we're giving sort of an example for a particular discharge record. The first column shows the covariates, and this is just sort of a sample of a few covariates. We have our values of Z, and then we have a model that predicts our outcome Y based on our value of Z. That's our beta, the beta Y condition on Z. Then you multiply those two together and you add them up, and that's how you get a predicted value for each discharge record — from the column and then you apply a formula to convert it basically from a logged scale back to a rate.

Then we have a second model, which is based on our Xs, some of which we observe and some of which are based on a prediction. We calculate again a model for Y — our outcome based on our covariates X — and calculate a rate in the same way.

Then thirdly, we calculate P which is our probability that a particular case ought to be excluded because it's present on admission. Similarly, we predict P based on our values of X — either X as they're observed or X as they're predicted — and we come up with a likelihood that a particular case ought to be excluded because it's present on admission.

You can see that for this particular example the value of Y, the predicted value of Y is 0.0138, and the predicted value of P that Y ought to be excluded as 0.0117. There is a pretty high likelihood that this particular case would be excluded because it's present on admission. [SLIDE]

This gives you a little bit of a sense of the rate calculation based on these models. The Z, the Y of X, the P of X, and so just focusing on sort of the columns C and E where we looked at the two models that we just discussed, the Y given X and the P of X.

So for record one, for example, if you have a predicted value of Y 0.01478, a predicted value of P, 0.01176 and if you divide those two, it gives you 0.7957. That gives you essentially the likelihood that this particular case would be excluded, because of POA. It's a pretty high likelihood. If you take one minus that value, and so 0.2043 — that's the likelihood that the case if present would not be POA.

Then you'd multiply that by your predicted value for your outcome, and that gives you kind of your weighted value of Y — given the likelihood that Y was present on admission. That weighted value that you then used to calculate your expected rate and a similar calculation is used in the calculation of the observed rate, and you get your observed expected ratio.

Essentially what we're doing is we're calculating this weight, which tells us the likelihood that a particular case is present on admission, and using that weight to calculate a weighted expected and observed rate. *[SLIDE]*

Okay, this finally is to give people a little bit of a sense for how this model is applied in the context of the inpatient quality indicators. In the inpatient quality indicators our outcome is in-hospital death and in-hospital mortality. Obviously, we don't have the same issue with distinguishing between outcomes that occurred in-hospital or before the hospital stay, and so we don't estimate a P-value for the inpatient quality indicators.

We're still concerned about a potential bias associated with our covariates, and whether those covariates are some of which occurred during the hospital stay are actually complications. We still apply the same modeling framework for the IQIs with the difference being, however, our contingency table is a little bit different.

In the PSIs, you always know that if a particular covariate is flagged as a Z where however we ignore the POA data, the value of X will always be less. With IQI it's a little bit different because we're incorporating the POA data into the assignment of the APR-DRG, in particular in the risk of mortality subclass. What we're particularly interested in is how the subclass assignment changes with the use of the POA data.

In general, cases are assigned to a less severe risk of mortality subclass, and so 4 is reassigned to a 3; 3 is reassigned to a 2; 2 is reassigned to a 1. That's what happens in the vast majority of cases. In a very rare number of cases the assignment actually increases in severity. That's highly uncommon, but we use the same kind of 4x4 contingency table to come up with a predicted value of X, a comorbidity value with the POA data. Then that's when we use that X-value in our risk adjustment model. *[SLIDE]*

We're going to open it up for questions, but I just wanted to give you a little bit of a preview for those of you who are interested in attending the session Friday. We're going to go more into the actual estimation methods that are used to estimate the various models that I was discussing, and so that is going to be the topic for Friday. At this point, I'll turn it back over to John and we can address any questions that you might have.

**John Bott [AHRQ]:** Thank you very much, Jeff. *[SLIDE]* This just provides you some additional information for where the quality indicators are and the supporting documentation, the software, et cetera. At the top of the call we mentioned the Present on Admission White Paper and there's the link to that as well. At this point, we'd like to open it up for questions.

**[Operator]:** If you would like to ask a question, please press "\*1." To withdraw your question, please press "\*2."

**John Bott [AHRQ]:** There is also the option to click on the Q&A tab, if you would like to type in a question as opposed to asking your question over the phone. While we're giving



people an opportunity to queue up on the phone, we did get a question typed in. I'll read that off and turn it over to Jeff for a response.

As you have worked with the POA data, have you discovered any significant issues with the quality of the POA coding? If so, does it vary significantly from hospital to hospital or state to state? Additionally, if there are any quality issues with POA coding, how does the software deal with this or doesn't it? Thank you for that question. I'll turn it over to Jeff for a response.

**Jeff Geppert [Battelle]:** Yes, I think that the short answer is that the quality of the POA coding is in the area of active research. There certainly is some observable variability in the POA coding from state to state, and even from hospital to hospital. There are some simple metrics that we use to exclude those hospitals where there just doesn't seem to be any variability in the POA coding. Either it's always yes or it's always no, you know, where one might reasonably suspect that the data isn't providing any useful information.

There are active projects at CMS; there is an active project on the AHRQ QIs where we're looking at the POA coding, and we're collaborating with other organizations that have developed algorithms for assessing the quality of the POA coding. We're going to look at those algorithms and see what they tell us and see whether the patient safety results vary significantly depending upon the overall hospital quality of coding.

It's hard to say anything really definitive at this time. It's an area that there is a lot of interest in and a lot of ongoing activity. We will continue to monitor and continue to participate in it, but I have nothing really definitive to say about it.

[00:45:00]

**John Bott [AHRQ]:** *[Prompt operator for questions]*

**[Operator]:** The first question is from Colleen.

**[Panelist]:** We were curious. Could you first of all go back over the X equals zero; X equals one; Z equals zero and Z equals one? Then secondly, we were curious about exactly how this works if you have POA data for one diagnosis, but maybe have it missing for some of the comorbidities in other diagnoses, since we have quite a few diagnoses on one particular record.

**Jeff Geppert [Battelle]:** There are a couple of things to think about here. The first thing is that the determination of whether a discharge record has or does not have POA is sort of a global determination.

It's not based on an assessment of each diagnosis code where this diagnosis code has it and this one doesn't. It's just does this discharge record have it or does it not. If it has POA coding, then the POA codes themselves are used in the flagging of the covariates, the comorbidities. If the discharge record does not, then it uses these 4x4 contingency tables, the 2x2.

What happens when you have a discharge record where some of the secondary diagnosis codes have flags and some do not? In some sense, the secondary diagnosis codes that have a blank for the POA value, those will be treated the way that the software has always worked up until now where the secondary diagnosis code is presumed to be a complication for the determination of the outcome of interest, and assumed to be a comorbidity for the determination of the covariates. It uses kind of the same sort of probabilistic type of assessment that the QIs have always used.

The governing principle here essentially is to still use the basic framework that the QIs have always used for identifying the outcome of interest — not the outcome of interest and the comorbidities — but to take advantage of the additional data wherever we have it, wherever

the secondary diagnosis has a flag or whether it doesn't. That is how that particular case would be treated.

I wanted to be specific about the values that are used for the POA, because there is some variability. The values that are used as essentially a yes that a particular secondary diagnosis code is present on admission is going to be a Y, and it would be a W, which in the UB-04 is "clinically undetermined." The idea there is basically to give the benefit of a doubt in cases where it's impossible clinically to determine whether a condition is POA.

It's going to be those secondary diagnosis codes that are identified as being exempt, some sort of POA by definition or default. Then we still use the old POA coding, just the one for yes and the zero for no. What's going to count as a no is going to be an N or a U where the documentation is insufficient to determine, and so it's kind of the opposite incentive. You're trying to create the incentives for better documentation, and then the zero which was the old value for not present on admission. Then again blank is going to be treated according to the existing probabilistic logic.

So just to go over the contingency table again, these values are imputed using the reference population data — the state inpatient databases — where we have POA data for those discharges where we have POA data. It's just a 2x2 proportion.

So for the PSIs every secondary diagnosis is initially assumed to be a comorbidity, so if there is no secondary diagnosis code for CHF when you consider all of the diagnosis codes, then there won't be a comorbidity for CHF when you only consider a subset of the diagnosis codes.

That's why X is always zero when Z is zero, and then similarly X will never be one if Z is zero. So if that comorbidity is not flagged when you have all of the discharged secondary diagnosis codes, it won't be flagged ever if you look at only a subset of them.

Then when you do have a secondary diagnosis for CHF, for some share of cases we would not have counted that as a comorbidity if we had the POA data. So in about 22 percent of the time a comorbidity of CHF would not have been counted; it would have been counted as a complication and something that developed during the stay. About 80 percent of the time it's still a comorbidity and the proportions vary depending on the type of comorbidity considered.

So the way that this is done in the software is essentially you go diagnosis code by diagnosis code, and so if you have one diagnosis code for CHF, but is flagged as being not present on admission — and then the next one is a diagnosis code for CHF that is flagged as being present on admission — then that case will be identified as having CHF as a comorbidity.

**John Bott [AHRQ]:** We have a question typed in that maybe is a nice segue here. The person asks for the covariate CHF and why does without POA and with POA differ in percentages. Isn't CHF considered a chronic disease that is nearly always present on admission? So while you're on this slide, Jeff, if you could cover that.

**Jeff Geppert [Battelle]:** I mean, there are a set of diagnoses where that determination has been made, and that's part of the ICD-9 coordination and maintenance process where they've identified a set of diagnosis codes that are by default — or by definition — always thought to be present on admission and those are the codes that are exempt, but these are not on that list.

We're not going to make our own independent assessment of that. That's part of the coding rules. A clinician can tell you better than I about circumstances in which these types of conditions could potentially be considered to be not present on admission. Just to point out the fact that there is a defined list of conditions that meet that criteria, and those are considered to be present on admission by default.

**John Bott [AHRQ]:** Thank you. Jeff, after this question I'm going to need to move to another meeting, and so you'll need to field the Q&A after this. I hope you are aware of the Q&A tab where there are some questions there pending. *[Prompt operator for questions]*

**[Operator]:** The next question is from Dejan.

**[Panelist]:** Yes, I have a question related to the POA indicator. You mentioned seven values — Y, W, E, 1, N, U and 0 — what those stand for. Today, however, you'll see other values like 2, 4, 6, 7, A, T, X, E, Z and it goes on. My question is what do those stand for, and related to that, is this all assumed or considered missing in the model?

The second question related to POA is a political question. Say a hospital has *[unintelligible]* with no POA information at all; if they're in the model, can the model impute POA from a totally missing POA field? Thank you.

**Jeff Geppert [Battelle]:** So the first is in respect to the coding of the POA data element. The software does expect that sort of standard coding will be used, and so we're using the UB-04 definition of a POA data element, and especially as implemented in the HCUP data and in the CMS claims data. So if you have POA data that doesn't follow the standard coding, then you need to recode it before running the software.

I know that there is some variability across states. The HCUP team has done the mapping between the coding as implemented in the state discharge data systems, and so the HCUP U.S. website has some information about how that mapping was done for those state data systems.

It's possible that an individual hospital might have its own coding system for POA, and so the important thing for users to note is that if that hospital does have nonstandard coding, then it needs to be mapped to standard coding. If there are some questions about how to do that, we can help on the user support line. That's [support@qualityindicators.ahrq.gov](mailto:support@qualityindicators.ahrq.gov).

*[01:00:00]*

And then the second question was with respect to a hospital that has no POA data at all. That hospital can use the AHRQ software and run the AHRQ software on its data, and the model will work as we've been discussing. It will define the outcome of interest, the T variable. Whether it's in the outcome of interest from the population at risk, it will set the P variable to missing because the POA data is not there. It will define all of the covariates so those P variables that we were talking about, and it will set all of the X variables to missing.

And then it will go through this contingency table process that we were just talking about where it will assign a value to each one of the X data elements in the data file for each discharge, and then it will run the models Y conditioned on X and the P conditioned on X to calculate a predicted value for each discharge, and it will compute the rates using that as a weight so it's the way that we've described.

The whole process is the same for a hospital that has no POA data at all. The difference with the hospital that had the POA data is that P would not be based on a model, P/X, but it would just be based on the P-value itself. Essentially, that means that the case has a weight of zero, because one minus one is zero. That case has a weight of zero and essentially is excluded from the rate. Similarly, a hospital that has POA data, all of the Xs would not be proportions; they would be just zeros or ones as they are normally. *[Prompt operator for questions]*

**[Operator]:** The next question is from Lance.

**[Panelist]:** Jeff, as a SAS user I want to get some more clarification on the output that I'm seeing, just to make sure that I understand what I'm looking at. Specifically, in the output file number one, of course, my current understanding is that the T-prefect variables are simply a zero or one flag of the event, and then what I'm interested in is that now this file one has to be two variables and those are also zeros and ones. I was wondering if you could comment and clarify what those zeros and ones are for that Q variable, and then follow up if those Q variables are the ones that are used in output two for calculating the observed rates. Thanks.

**Jeff Geppert [Battelle]:** So the software, right, it constructs two flags — the T which is the outcome of interest population at risk, and then the Q which is the POA flag.

If you did a crosstab of T and Q in the SAS output at the discharge level, that would tell you the share of discharges that were flagged in the numerator, but were flagged as being present on admission. That might be 10 percent of the cases, 20 percent of the cases, 30 percent of the cases, 70 percent of the cases. You can crosstab the T and the Q to tell you the share of the cases that are flagged for removal from the denominator.

Then in the second program, the P2 program, it computes an observed rate where it basically drops all of the cases where Q is set to one. It calculates an observed rate where all of the cases that were flagged as POA were removed from the denominator. That's what's reported as the observed rate.

Now, some of the people that have looked at the data have wanted some additional information about the computation of the risk-adjusted rate. Implicit in the calculation of the risk-adjusted rate is this OE ratio where the "O" essentially is a weighted version of the observed rate, and so in some sense there are two different versions of the observed rate. There is just the observed rate based on the flags, and then there is an observed rate based on the model and the weighting of each case based on its likelihood of being POA.

In the version of the software that we're working on now, it shows both of those observed rates and so you can better determine exactly how the risk-adjusted rate is calculated. You can calculate it yourself based on the data that's outputted by the P3 program. That will be a little more clear in the next version of the software. That was some useful feedback that we got. *[Prompt operator for questions]*

There are a couple of written questions. There is a specific question about sort of the logic of the patient safety indicators and whether the cases that are flagged, you know, really represent

adverse events or whether the outcomes are really an expected consequence of the care. The question is whether those kinds of issues are still going to be looked at, or are they sort of relying exclusively on the POA.

We are continuing to assess the validity of the indicators from that perspective. The POA is an important tool in the toolbox in terms of identifying adverse events, but it still doesn't address the clinical logic that's necessary to determine whether something is an expected consequence of care or whether it's a true adverse event.

We have ongoing validation pilots for several of the PSIs. We're actually currently in data collection where we're collecting medical record data, and we'll continue to report out on the sensitivity and the specificity of the PSI indicators. What we anticipate going forward is that with the availability of the POA, obviously our specificity will increase, but we don't necessarily assume that it's going to be 100 percent. There are still going to be issues that will need to be evaluated with respect to the validity of the measures.

Some of the work that has been published by the QI team does go into some discussion about this, but sort of how much does POA help in terms of improving the scientific acceptability of the measures. There are a lot of questions about the new version, the Version 4.1 of the Windows software and what we're calling the Version 4.2, which is the QI software that includes fiscal year 2010 coding.

With regard to both of those versions, basically there is no specific release date scheduled. We're continuing to engage in testing with respect to the various versions of the software, and with respect to the version of wiki that's now called the version of the software that's incorporated into the MONAHRQ tool. Once that testing is complete, then we'll be releasing both versions, but there is no specific date yet that AHRQ has announced.



There is a question about PSI #4, death among surgical inpatient with serious treatable complications. The question is how is POA used in the definition of this measure. There is a change in the specification for this particular indicator.

In the earlier versions of the software where we had a version with and without POA data, where the POA data was present, POA data was used in the measure specification in the identification of the denominator. We excluded cases of the denominator-defining complications were present on admission. We didn't retain that definition in the new version, in 4.1.

In other words, we don't use POA in the identification of the denominator for the measure. We do use it in the risk adjustment of the measure, in the identification of the covariates and the comorbidities in the risk adjustment — but not in the denominator definition — with the rationale being that both complications and comorbidities conceptually could be in the denominator of the measure.

The conceptual basis of the measure will remain the same, with essentially the idea being that a mortality measure with a restricted denominator of complications and comorbidities was a more homogenous denominator definition — and a more reliable measure — than one that included cases without comorbidities or complications. Because of the conceptual basis of the measure, we didn't include POA in the identification of the denominator.

Just a question sort of about the states that have been collecting this data for a number of years. It's true that there are some states like California and New York that have been collecting POA data for many, many years.

Most of the research and analysis that's been done with respect to the QIs have relied on those data sources, and so one thing that is a point of interest for us going forward — now that we have a broader range of states that are collecting POA — is how sort of generalizable are the

results and whether there's any sort of state-level variability that's of interest. I think that will be a continuing area of research and exploration.

*[01:15:00]*

The trend of availability of POA data is rapid. We showed the slide earlier that showed how we were going from 9 states to 22 states that had POA data available. But even within those states, the percentage discharges that have POA has grown rapidly where in the data that we're using now, for some states, it could be maybe half of the discharges or 60 or 70 percent of the discharges that have POA data. It's close to 100 percent of the cases that have POA data in the more recent files.

There is just a tremendous growth in the availability of the POA, and so the impact on the QIs is going to be that as we go forward the models will be based on more data — and presumably better data — as we go forward and the impact of the prediction aspect of the model will decrease in importance. Then eventually when POA data is universal, the prediction aspect of the model will cease to be important at all, but then we'll move into other areas like lab values and key clinical findings.

There is also a question about the types of hospitals, rehab, psych and long-term care. So the QIs are still based on acute care facilities. The assumption is that the discharges that are being used are in acute care hospitals. They're not intended to apply to rehab, psych or long-term care facilities. I don't see that changing in the short-term. Most of our development activity at this point is focusing on an ED-setting primarily. *[Prompt operator for questions]*

**[Operator]:** The next question is from Heidi.

**[Panelist]:** Jeff, thank you for taking my call. I believe that you've already answered my question. I was wondering when a new release, the 4.1, would be out for QI Windows.

**Jeff Geppert [Battelle]:** Yes, there is no definitive date yet, but testing is nearing completion. It will be shortly.

**[Operator]:** The next question is from Ronald.

**[Panelist]:** Yes, we're using the Windows version of the AHRQ software. How does it recognize the POA indicators?

**Jeff Geppert [Battelle]:** The current version which is the 4.0 version, essentially what it does is it's based on the data load. When you go through the data load and if you do the mapping between the POA data element that's expected with the input data, it looks at that data to check to see if there are any non-null values.

It looks at those POA data elements if there are non-null values that fall into one of our standard values — the Ys and the Ns. It applies the same logic and designates that discharge record as having POA. If you do the data load and you don't map the POA data elements, then all of the POA data elements have a value of null. *[Prompt operator for questions]*

I've addressed all of the written questions. Could we just go to the last slide again? So just in terms of information and resources, the quality indicator website is where the QI documentation and software are and where the slides that we're looking at today will be posted — along with what we call a White Paper. It's basically just a paper that has some additional detail beyond what we were able to present today on the slides. Certainly, if you have any questions about any of the materials today or about the materials in that White Paper, please email us and let us know.

Again, as John stated at the beginning, the goal is really to try and make this as transparent as possible so that everything that's a point of confusion, please let us know and we'll try to address it. Mamatha Pancholi is our AHRQ QI Project Officer at the agency, and John is a

tremendous resource for us in his role as the contractor for AHRQ, and so we appreciate their participation. It's important. We will end there. Thank you very much for your participation.

*[WEBINAR CONCLUDES]*