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JW: Hello everybody, this is Jon White. I am the director of the Health IT portfolio at the Agency for Health Care Research and Quality, and I would like to thank you for taking the time to join us for today's teleconference on e-prescribing Standards conducted by the National Resource Center for Health IT. The Agency for Health Care Research and Quality is an agency within Health and Human Services, part of the U.S. Federal Government and we focus on our mission in improving the quality of health care for all Americans.

In particular, Congress has asked us to focus on Health IT as a means to improve the quality and safety of care that gets delivered, and of particular interest to us over the past couple of years has been electronic prescribing. In addition to our various programs, we work very closely with our federal partners, and in this particular case, we had worked with the Centers for Medicare and Medicaid Services, CMS, to conduct a series of pilot projects that focus on electronic prescribing standards that are required for the Medicare Modernization Act. I am not going to get into detail with those, as our presenters are going to be doing that today.

So instead, let me introduce you our outstanding panel, which we have with us today. At AHRQ we work with a great many talented individuals, but I will tell you, a nicer and smarter group I have not come across, so it is my great pleasure to introduce these folks to you today.

Speaking to you first will be Shelly Woolley, principal at Woolley & Associates. Shelly is an experienced health care strategist that has served in many of the industries most innovative and leading organizations, promoting the use of health information technology for improving the way care is delivered in this country. Shelly is currently the principal consultant for Woolley & Associates, an independent consulting organization focused on strategic business development. Prior to establishing her consulting company, Ms. Woolley was the senior vice president and communications officer for RxHub, the nationwide electronic prescription drug information exchange. Ms. Woolley has more than twenty years of leadership management experience in the healthcare industry. Ms. Woolley received a Masters of Science, a Masters in Public Health from the University of Minnesota, School of Public Health. She was an assistant professor at Towson State, University of Maryland in the Health Sciences division and continues to present and educate in national healthcare conferences.

Also presenting at today's conference is Douglass S. Bell, MD, PhD. Doug is a general internist and a researcher, focusing on the design and evaluation of health information technology. He is an assistant professor of medicine at UCLA and a research scientist at RAND. In addition to internal medicine training and a PhD in health services research, Dr. Bell completed a three-year medical Informatics' fellowship at the Harvard-MIT Division of Health Sciences and Technology program, funded by the National Library of Medicine. Dr. Bell's primary research has been in two areas, electronic prescribing systems and online physician education. In electronic prescribing, Dr. Bell led the development of expert panel recommendations for e-prescribing features and in a field study showed that these features varied substantially among commercial systems. This work helped set the stage for the work of the Certification Commission for Health Information Technology. Dr. Bell also led one of the pilot studies called for in the Medicare Modernization Act to evaluate advanced electronic prescribing standards.

And finally, we are also joined by Mike Bordelon. Mike is currently the executive vice president of product development for Talyst Incorporated, where he is developing technology systems that enable remote dispensing models for the long-term care and prison markets. Bordelon, who is based in Dallas, has helped key leadership roles in the advancement of technology to improve quality of care and efficiency for long-term care for over eight years. As vice president of research and development for Achieve Healthcare Technologies, he led the National Council of Prescription Drug Plans', NCPDPs, 50-member long-term care task group of Electronic Health Records and e-prescribing standards. He was the principle investigator on a \$1.5 million CMS and AHRQ grant to study long-term care e-prescribing and led development of the first standard space e-prescribing implementation. He previously led the firm's product development unit, which created web-based long-term care electronic health records and financial systems. And again, I just want to reiterate that working with these folks over the past years has



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Prior authorization standard offers a streamlined electronic process, communicate the need for prior authorization directly to the prescriber and allows the prescriber to send the requirement information along with the prescription for efficient fulfillment. The testing requirements were to determine the functionality of the new version of the ANCY [PH] X12 275 278 with the HL7 attachment. Structured and codified sig includes patient instructions for taking medications; for example take one to two tablets by mouth every three to four hours as needed. Currently there is no standardized format or vocabulary for sigs; and finally, RxNorm, which provides a standardized vocabulary for names, bills, and form of available drugs.

Today there's a multitude of databases for drug names, forms, and dosages, each using slightly different variations of these data elements. So the testing requirements were to determine whether the RxNorm terminology translates to NDC for new prescriptions, changes, and renewals. In addition to that, each of the five pilots were to determine overall which of the six initial standards are functional and which were not, and the extent to which these six were interoperable with the foundation standards and one another, and to document the benefits and challenges, the experience in implementing these standards in various settings. And you'll hear from two of the grantees that will tell you about the differences in the makeup of their pilots.

Besides the standards themselves, as I've said, the pilots were to report on other outcomes as a result of implementing these standards, and e-prescribing in general including, again, prescriber uptake and user satisfaction, workflow changes, impact on administrative efficiencies, impact on medication errors, these are some examples. These findings will be discussed a little bit today and also more thoroughly in part three of this series that will occur sometime in the very near future.

What was our methodology? Well, as a participant on the evaluation team I'm able to report to you that we did conduct a very thorough evaluation on each of the pilots testing activities in the form of first document review. This included each of the pilots original grant proposal so we could identify what the pilot said they were going to test and how they were going to test the standards. Then we had structured telephone calls that allowed us to determine the current status of their projects and discussions regarding any of the preliminary results.

We had one day, full day on-site visits, which allowed us to listen to some of the key participants present their approach and observations, as well as to collect information that would help assess their testing methods and their evaluation approaches. And finally, we did key informant interviews after the site visits were completed. That served to validate the information that was gathered during the site visits from industry experts that were already working on various aspects of these prescribing.

So, what did we find? Having analyzed the five pilot site findings and the context of their characteristics and testing methods we made the following recommendations on the initial standards. For medication history, the standard was relatively mature and widely adapted by the prescribing industry, and it was also shown to be useful in preventing medication errors, as well as understanding medication management and compliance. It was recommended that the standard is ready for implementation, however additional training and education must occur to make prescribers aware that this functionality exists and that multiple sources of medication history information must be reconciled and presented to the prescriber in an effective manner for it to see increased adoption.

For formulary benefits, it was determined to successfully support the transfer of the required information and it was recommended as ready for prime time. But like medication history standard, there are several important implementation issues that still need to be addressed.

Prescriptions fill status notification does adequately supports the activities of the pharmacy sending messages to the prescriber regarding the status of a prescription and thus was recommended for implementation; however, the pilots found that there may be little prescriber demand for this capability at this time.

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The three of the six initial standards are not recommended for implementation as part of the MMA e-prescribing program, and they include prior authorization, structured and codified sig and RxNorms. All of them were found to have potential to create efficiencies and help streamline the process but there's still a need for an initial development and testing.

Implementation of e-prescribing has the potential to dramatically change prescriber and pharmacy workflow and you'll hear about some of those workflow in the upcoming session. Often with positive impacts, but some negative consequences may occur as well. Additional long-term successful adaption and acceptance of e-prescribing is going to require a commitment to upfront training and education of all stakeholders, and the traditional prescribing process includes a number of data transactions, both manual and automated among a number of entities. So striving for a streamlined, end-to-end, interoperable flow of information in real time requires careful coordination, collaboration, and on-going education among these stakeholders.

You'll hear next from two of the pilots about their unique experience just in testing these standards and the lessons learned. We're at a turning point yet not quite all the way where we need to be. CMS continues to have a critical role to play to ensure that we reach our final destination. The result will be a better patient care, improved efficiencies in both prescriber and pharmacy workflow, and reduce costs of healthcare delivery and healthier Americans, a set of goals I think is worthy of pursuing. And with that I will hand it over.

DB: Hi, this is Doug Bell. I led the e-prescribing pilots that we conducted through RAND and the New Jersey e-prescribing action coalition. And I'd like to thank AHRQ and CMS for funding us and giving us the opportunity to be involved with this important area. We felt from the start that there was a lot of industry activity in this area and it was important to actually evaluate what was already happening in industry to the extent we could and then also to build on what was happening in industry for some of the standards that weren't being implemented yet. We worked with Horizon Blue Cross/Blue Shield of New Jersey, which already had an e-prescribe program in place and was on the way to enrolling a thousand physicians. So they actually installed -- they paid for the installation of e-prescribing and they paid physicians an honorarium to actually use the system. It was a modest honorarium, but the intent was to stimulate use and there were three e-prescribing systems involved: Caremark's I-scribe, All Strip's Touchworks, and Instant DX's On-Call Data System. And those are all stand-alone hand-held e-prescribing systems.

Other partners in our coalition were RxHub and SureScripts, the major intermediary companies for passing e-prescribing transactions, and the consulting firm Point of Care Partners, UMDMJ, and then RAND; we were all involved in leading and evaluating the study.

We wanted work from a strong conceptual model because what we're trying to evaluate is the structure of a technical standard, but that's many steps removed from the ultimate effects that we really care about, which is changes in drug use and other effects on, say, the labor in the physician's office and other health services uses and whatnot. You have to think through the intermediate steps of how the standard actually changes something that the prescriber can see at the time of the visit and then that the work processes for prescribing to produce these effects.

We actually developed a workflow model to try to explicitly model some of this. But I'm actually going to talk more about that in the next talk. For this, we're going to focus mostly on the structure and the standard and some of the more technical level issues, and also what the prescribers perceived.

Just to elaborate on that a little bit, here is an example of how we thought about medication history and what the expected benefit of that would be. As Shelly mentioned, it is a way of getting the current and past medications that a patient has received from an external source that would theoretically be complete and that is usually the health-plan, although, I'm sure SureScripts is now providing it based on retail

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pharmacy receipts as well. But it's a way of downloading the complete listing of what has been filled in the past, and then theoretically that could be used for safety checking, for more complete drug interactions and therapeutic duplications, and just the physician could potentially manually to review what has been tried in the past by other physicians and then make more informed decisions.

We wanted to evaluate e-prescribing without medication history transaction and then compare that ideally to e-prescribing with the medication history transaction but we weren't able to structure that kind of a study. That's not really practical in a live environment where this is already working, but we still wanted to think through what would happen if you could only see the medication history you could only check drugs based on what you had prescribed electronically if you were the prescriber versus if you added medication history in, you'd be able to include other prescriptions in a more complete medication list. That's just sort of the theoretical framework that is important to interpret what we'll be seeing.

So here's an overview of all of the standards that we evaluated and the really panoply of methods that we used for each standard, and we're not gonna have time to go into all of these. I highlighted some that are particularly relevant and I'll try to touch on today. But just to show you, the two standards here, medication history and formulary benefit, as I mentioned, were already in place in the systems that we evaluated, whereas the others here were not and we needed to go beyond what existed to evaluate them.

We had a technical expert panel to really focus on the technical level of whether the fields were adequate and whether the data that was being delivered was usable. We had site visits to physician and pharmacy offices, interviewed physicians, and do observation of their work practices. We did an analysis of claims data before and after e-prescribing, but that I'm not going to talk about today. That's going to be in the next set of talk.

We surveyed physicians about their perceptions of e-prescribing, and as you'll see, that survey applied to multiple of these standards, and we will be going over those results. And then for RxNorm instruction codified sig we did more of a lab evaluation, which I'll go into a little bit more as we look at the results.

The technical expert panel consisted of representatives from companies. At RAND we've done many expert panel studies, and typically we try to recruit experts who represent their own expertise, but in this case we felt like the expertise needed to evaluate the technical side of these was really distributed among multiple people at each company, so we had a one point person from each company. That person was asked to talk to everyone within the company or any experts within the company who they needed to answer the questions that we were posing. But we had representatives from point-of-care software vendors, five of them actually, three that were in our coalition and two others so that we could get a good mix of both electronic health record and e-prescribing stand alone systems. And we also involved the content providers First DataBank, Walter Clure (PH), three intermediary companies, and a range of pharmacies including both mail order and a large chain and a software company, QS1, that works with independent pharmacies.

Just to give you a little bit more about the other aspects or the methods that I'll be showing you for site visits, we went to 12 sites where e-prescribing was scheduled to be installed and conducted interviews before and then after the e-prescribing installation.

Then just to give you a really quick introduction out of those 12 sites where we conducted a pre-e-prescribing site visit, two of them actually wound up cancelling their installation, two wound up stopping their use. They did install but then they stopped using it entirely, and then two others the staff were using the system pretty much just for renewals and the prescribers had stopped using the system. But I'll be going into those results in a little bit more detail.

For the web survey we started with a 395 eligible physicians, 58% of those completed and online survey about their perceptions related to e-prescribing, and out of that there were 189 e-prescribers and 89 people who were actually recruited from the e-prescribing waiting list. We wanted to take a control group

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who would have equal levels of technophilia essentially. So, people who felt ready enough for e-prescribing to sign up for the program but they had been put on the waiting list, so that's our comparison group there.

Now moving into the results related to the specific standards. For medication history at the technical level -- this is results from our technical expert panel -- we found that the technical problems were really hindering the use that you would want from medication history, which is to basically reconcile automatically the data that's pulled into the point-of-care device with the prescriptions that were generated from the point-of-care device, and that really wasn't happening very much.

And the reason for that was that no data was available for many patients because for the medication transaction history to work there had to first be a successful eligibility transaction so that the patient could be identified, and that often didn't work just because some patients are uninsured and for other patients, there's identification problems.

The drug is often not identifiable and this is a particular problem because of NDC codes, and I just mentioned that there can be a hundred or more NDC codes for the same drug and with the NDC codes with the sort of mass-existing NDC codes and its pretty well documented. There was a GAO report on this last summer. It is very difficult to map NDC codes, especially across different drug database vendors. This made it difficult to identify the drugs and reconcile them.

Then many other fields in the medication history standard, although they existed, were optional, and they were often left empty. So things that could really be helpful for reconciliation like the prescribers, identifier, or the sig, or the quantity dispensed were not always provided. That meant that the vendors found it hard to reconcile medication history and so they really just drove alerts for the most part. Some did really attempt to reconcile and some did not, but in general, the vendors were driving alerts from a prescription that they originated. All of them enthusiastically supported RxNorm as a potential solution for solving problems with mapping NDC codes. We will talk more about that when I get to RxNorms.

Now at the level of prescribers for medication history we found that many prescribers were unfamiliar with the medication history feature. In general the systems did, even though they did not try to reconcile, the systems that we were working with in New Jersey did present the medication history, so physicians if they knew how to find it, could drill in and look at the prescriptions that had been filled outside. Not all prescribers knew about this, in fact, in our survey, only 37% said that they were familiar with how to access the outside medication history and then even of those, only 16% said that they used it often or very often.

Then we asked them more of a general question about whether the information they have about medication history is adequate, and we posed it this way, "Information I have about medication history enables me to identify clinically important drug interactions." Well here, we did find a statistically significant difference between e-prescribers and non e-prescribers. That is most likely because the drug-drug interaction alerts that existed were not being driven by the prescription they wrote. So it didn't really depend on medication history data.

The other things that might be more dependent on medication history data like identifying medications from other physicians, we really did not see a difference between E-prescribers and non E-prescribers. So overall, we felt like medication history was not really fulfilling the promise that it would have for automated reconciliation.

Now moving onto formulating benefits. At the technical level, again we found that the NDC codes were a poor drug identifier, which led to huge files and often mismatches between what a physician was prescribing and what was represented in the formulary benefit file.

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Another major problem was that the standard does not really represent the group level coverage, and it is arguable whether it is even possible to represent in the formulary benefit file the way it exists today. So typically, its plan level coverage, and the problem is that individual patients have group level contracts where the formulary benefit may vary slightly, so the plan level coverage may not be perfectly accurate.

Then out of the major components that exist within the formulary benefit standard, one, the formulary status list is widely used, but the other components that provide additional details like alternative suggestions, coverage limitations, co-pay information are not being used nearly as much. There is another file called a cross-reference file, another component that could be potentially helpful, and really, nobody was using that at this point.

Now moving on to prescriber perceptions: People had a range of opinions about the formulary benefit information they had. This is from the qualitative results. Some did perceive it as accurate, while others did not perceive the information as accurate. Overall, when we asked about the benefits of formulary and benefits people were fairly neutral on average. They did say there was a trend toward more agreement with the drug coverage information that they have helping them manage patient costs but not really much on the other things that we were hoping for like reducing the need to change prescriptions later, reducing calls because of coverage problems, saving time overall.

On average, the e-prescribers did not really perceive a lot of benefits from the e-prescribing formulary benefit information they received. And this is a little bit more on that. This is from the survey again asking non e-prescribers versus e-prescribers how many calls or messages they were getting per week and how much time they spent dealing with those calls. Overall, we did not see really a significant difference that would be attributable to e-prescribing. I'll just move on in the interest of time, we can come back to it if you want to dissect these results.

Moving on to fill status. Our technical expert panel found that -- well, the biggest thing is that they really did not think there was a marketplace demand for the fill-status transaction. A quote from a panelist is that, "Even if the physician wants it, who's going to pay for it?" They thought that there could be a lot of burden from handling "opt in and opt-out requests", and there's some potential privacy issues with the fill-status transaction because if the patient, let's say, severs their relationship with a physician they could conceivably still be getting fill-status transactions, and other patients might want to either opt-in or opt-out of their physicians getting that information. A panelist said the process of setting up and maintaining opt-in or opt-out indicator would be significant because it would need -- potentially that information, the opt-in or opt-out information would need to flow-back to the PVM, so that could get very complicated.

Others thought that it could be dealt with, a panelist said that that's something that can be designed for, and I think that having a patient opt-in or opt-out of this is probably something in which we would do more research on. So the results were a technical issue with the accuracy -- with how fill statuses implemented whether you're going to send information about whether the medication was either dispensed or are you also gonna send information if a medication is not dispensed and should it be one way or the other. Either one can be handled right now in the fill-status standard, but a panelist pointed out, "If a patient's are opting in or opting out then a physician doesn't get a filled response, what does the physician know, maybe I opted out." There are some ambiguities that could potentially need to be worked through.

We did also talk to prescribers. We connected focus groups to evaluate whether the information they could get from fill status would be potentially useful. We actually work just with All Scripts on this, and they created storyboard prototypes to illustrate what could be done with adherence alerting, but the prescribers expressed significant concerns. They said getting this kind of information implied that they would have to telephone the patients to follow-up and that creates new unpaid work for physicians and staff, and potentially medical legal liability. All of that is potentially arguable whether it would really be different from the medical legal liability they have today.

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They did point out some possible mitigating factors. If the prescriber could control which prescription would receive fill status alerts and what the time interval would be before an alert would kick off, that would be potentially helpful.

Now, for prior authorization we actually created a working prototype with All Scripts and with Caremark I-scribe and rolled it out to a group of users in New Jersey for each product. We also conducted a survey to ask -- actually, we asked all prescribers in our survey about prior authorization, and also we discussed in our site visits. First of all, there was a strong demand for electronic prior authorization. People did think that it improved the process, and there was a lot of frustration with prior authorization, the way that it exists today. Some choice quotes were, "I hate prior authorizations because of the time they take. Basically you have to say what the insurance people want to hear" and one prescriber said, "I frequently lie, yell, or scream." They did perceive this as taking inordinate amounts of time.

As I mentioned we developed prototype modules and rolled them out. We found in this development process that a few of the data elements that existed in the standard that we were supposed to evaluate, the HL7 prior authorization attachment, which is really the core element of the standard that carries the prior authorization data. Really few of the elements that had been prescribed for us to use in that standard really fit with Horizons prior authorization processes. The issue really came down to the fact that it's the wording of the question that are asked of the physician in the prior authorization process is really important to understanding what the meaning of the data is. The HL7PA attachment didn't really specify the wording, they specified sort of more abstract data fields that didn't really match that well with the data that Horizon really wanted to collect.

I think the other thing to mention is that even though we rolled this out and made it available for eight to ten weeks before the end of our pilot project, we found that there was very little use of the electronic prior authorization modules, and overall there wasn't that much prior authorization taking place. It had actually declined -- the prior authorization volume overall had declined from the previous year a decent amount.

So moving on to RxNorm: We conducted a lab evaluation to just look at the completeness and accuracy, essentially, of representing a large sample of prescriptions using Rx Norms. So we worked with First Data Bank and Medi-Span, and then we at RAND actually also did an independent match attempt. The idea was just to take the sample of prescriptions and see if we can match to an SCD, which is really the unique identifier in RxNorm for new prescriptions and renewal prescriptions.

I should just mention that the idea of RxNorm really is to have one unique identifier for a drug dosage and dose form combination. That's what the SCD is, it's a semantic clinical drug. So for a prescription of a Sinopril 10-milligram tablet there would be one and only one unique identifier for that concept, and all of the NDC codes that exist for different -- like Sinopril 10-milligram tablets from different manufacturers would map to that. We took a sample of 10,000 prescriptions and we found that there were 97 -- almost 9,800 non-device prescriptions, and we just focused on non-devices, and basically, 1.5% of those we found no matching SCD. So that means that 98.5% had a matching SCD in the RxNorm version we evaluated, which, by the way, was the one from November 2006.

Then we also looked at renewal requests and found that actually 99.5% of those had a matching SCD, so actually a higher percent. We also looked at mismatches, so in some cases, these different independent attempts wound up matching to different SCDs, and that basically happens in about 5% of the cases overall. In a way that is actually a bigger than the incompleteness. When we drilled in on the root causes of that, there was some synonymy that was previously unrecognized and that the RxNorm people actually corrected based on what we found. Actually that was about half of the cases overall. Then there were some errors that we made, the individual matching efforts. Probably the other half was basically errors in our setup to match the RxNorm codes. That's it for RxNorm.

Finally, structured and codified sig: Here we actually just did a purposeful sample of 42 prescriptions out of the -- actually starting from the same 10,000 samples that I just mentioned, and the reason we only



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used 42 is that this had to be a manual process, and the structuring codified sig standard had actually just been completed a few months earlier. We worked with three independent -- actually a total of five independent reviewers, but each sig was mapped by three separate, independent reviewers, and we tried to manually map it into the standard.

The thing about the sig standard is that it has a lot of fields. This is a listing of the segments within sig, and each segment contains multiple fields, so there's on the order of 100 separate fields in the sig standard. Then if the sig contains more than one repeat. If it contains more than one repeat, you're supposed to actually repeat this whole list of segments, and out of the 42 only 15 of them didn't use a repeat. It was harder to look at the agreement among these three independent reviewers if we had repeats. So first, we just looked at the 15 sig's where no one used a repeat to represent it, and we found very little agreement among the reviewers in how they represented the data, even within an individual segment.

For instance, for the dose segments, out of the 15 prescriptions that we represented this way, in only three cases did all three of the reviewers represent the data in the same way within the dose segment. In ten cases, only two out of three did it in the same way, and in two cases, none of the three reviewers used the same representation of the data. So overall, there was really poor agreement in applying this among our reviewers, and I'll just end with that.

In conclusion, we found that the medication history and formulary benefits standards were technically adequate but falling short, especially due to NDC code problems and other implementation problems. For fill status, there were significant concerns, both among the industry people and among prescribers about the functionality that it really delivers, but we did think it had some promise for focus uses.

For prior authorization, we really need more research on how to represent the data for prior authorization decision making. For RxNorm we found that there is really a strong need for it and that it does hold significant promise and just a little more work and more research is needed to figure out how to finish it and start using it. Then for sig we felt like the way it exists now makes it difficult to use consistently, and our suggestion was to try to simplify it.

MB: Thank you, Doug. This is Mike Bordelon. I appreciate getting an opportunity this afternoon to talk about the long-term care e-prescribing pilot study that was performed last year. I was the principal investigator on this study, and it is really kind of an exciting study, I think, personally for me but also for the long-term care industry and, I think, the health-care industry in general.

If you step back and look at what we did here it is really as much a study about the standards as it was in the existing proof for us to show that e-prescribing really was even possible in a long-term care setting. When I say long-term care in this context, long-term care is actually a pretty broad segment of the health-care industry. It can include everything from independent living, assisted living, skilled nursing, hospice care, home health, all those kind of settings. Where we focused in is the more traditional long-term care setting, which is the skilled nursing facility, but typically a Medicare and a commercial and Medicaid mix of census in the facility.

So, if you look at the five studies that were done, our study was the only one that focused in on the long-term care setting. And this presented a pretty big challenge to us. The slide that is in front of you is about two years old and quite a few people, I think, have seen this at this point. But it's really been a good way for us to demonstrate some of the challenges that the long-term care industry faces, not with prescribing in general, but also with implementing e-prescribing.

One of the things we learned really early on is that you can't just drop in a traditional ambulatory e-prescribing software system and have it work in long-term care. The workflow is different. Just basic things like orders not having end dates and some of the signature rules and some of the workflow back

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between the nursing staff and the pharmacy and the physician creates some differences that aren't always applicable in the ambulatory world.

Some of those key differences are, again, the three-way communication between the prescriber, the nurse, and the pharmacy. There is less dependency on the physician using the system because you have a nurse that is kind of brokering the communication between the physician and the pharmacy. The nurse can act as an agent and offload some of the prescribing duties. There are also heavy uses of the nurse practitioners and physicians assistants in long-term care, which helps reduce some of the dependency on physician as options.

Most orders have no end-date, as I mentioned before, or quantity. Refill requests work a little bit different than in the ambulatory setting. What will happen is you get to the end of a cycle fill; for instance, you get to the end of a 30-day cycle and the nursing home through some mechanism, whether it is through fax or a phone call or something, notifies the pharmacy that their out and they need a refill, and the pharmacy sends over more medications. That is different than the renewal process and in the ambulatory setting. The way that Part D and Part A and even Medicaid is billed in the long-term care setting can often be a little different than what you'll see in other settings. What we found as we were getting into this is how little infrastructure or applicable infrastructure was in place at the pharmacies, at the facilities, for the doctors, for anybody in this mix.

So we were really faced into a very unique situation the beginning of last year when we finally came to terms with what we committed to CMS and AHRQ to do to actually pull together a full technology infrastructure to test long-term care for the first time.

What we decided was instead of going for a lot of volume and trying to get a whole bunch of doctors and a whole bunch of nursing home up and running, we decided to focus in and just focus on the standards that we thought were most relevant to long-term care, focus in on just two nursing homes. One that was a little bit more urban setting and one that was a little bit more rural that would give us kind of a mix and different acuity levels, that would give us a kind of a broad view without having to do many implementations. And we also had to carefully select the providers that were going to be involved to make sure that we had people that were going to really be able to push the envelope in this very compressed timeframe that we had last year to get this rolled out.

So when we took a careful look at the standards that were applicable to long-term care, it was very clear that we needed to process the script of communications, specifically with the new Rx but also to use the can-Rx for cancelling orders because remember, they don't have an end date. At some point a doctors gonna say, "we need this order ", so that it'll stop at the pharmacy.

Also, we wanted to get a message coming back from the pharmacy to the nursing home to tell the status of a medication. So we implemented fill status and we also implemented the change messaging, so if the, let's say the dosage or the frequency of administration for a medication was changed on an order, we implemented that change message so that that would be handled at the pharmacy as well. All those were really relevant, and I think we actually pushed the envelope pretty far beyond what you'll see even in the ambulatory world with just implementing the new and fill-status messages by doing the cancels and the changes.

We brought Blue Cross/Blue Shield into this project. Blue Cross, Blue Shield, and Client Therapeutics were involved in this project. And they had a pretty large presence in the Minnesota area where we were doing this study, and we were able to get our formulary and benefits coverage up, in some cases as high as 50%. So we were able to really effectively study the formulary and benefits. We got all the infrastructure in place. We were able to test. We built the technology so that we could test formulary and benefits inline and while the prescribing process was happening so we could really study how that worked.

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And then through some additional funding that we got from the American Society of Consulting Pharmacists Foundation we were able to also study a prior authorization, and this was a fully implemented technology infrastructure that had communications all the way back to Prime Therapeutics, bi-directional, so that we could get real-time information on prior authorization.

Some more of what Dr. Bell was talking about, unfortunately, we did not get a lot of volume there, and I'll talk to that in a minute. But we were excited that we were actually able to get the full technology infrastructure in place and do some real end-to-end transactions.

We also found that while we were doing e-prescribing we needed to test these things because at least the provider that we were involving, Benedictine Health Systems, felt that they were very relevant to any e-prescribing system in long-term care. If we didn't do them, would significantly degrade the value of the system, and so we had to implement a refill process because 80% of the ordering that goes back to the pharmacy are refills.

We also had to implement a DUR patient safety check on the front-end. We did that using a First DataBank database integrated in and so in real-time we're doing DUR checks, formulary benefits while we're placing the order and doing online substitutions and those kinds of things. So some pretty exciting and pretty advanced e-prescribing concepts were all implemented all in this integrated workflow.

We also needed to implement signatures. Because of the regulatory nature of long-term care and a lot of the signature requirements that are imposed on the nursing home, we needed to layer on top of some of this signature capture capabilities to make sure that we kept the LTC facility in regulatory compliance.

We did not look -- for a couple of reasons -- time, dollars, and then relevance. We did not get to do anything with codified sig, medication history, or RxNorms.

Click "high level" on our facilities we would have loved to have done this in 30 or 40 or even 100 nursing homes, but like I said, we didn't really have the time last year to really implement more than two. Now we had four total facilities our test. These two, this test facility A and test facility B were where we actually implemented the e-prescribing system, and those both talked to the same pharmacy. In fact, all four of these sites use the same pharmacy, so we were kind of normalized on the pharmacy, as far as the pharmacy providing the same services.

We had two other facilities that were also in the Minneapolis area, and were using traditional paper-based systems, faxing, phone calls, and those kinds of things that look very typical to what you will see in any other normal nursing setting that you will go to.

I think one thing that's interesting here was between our two test facilities is one was a very rural site that had a very traditional, pretty low, I think it was 15-20 percent Part A census, and then our suburban site actually was a much more acute setting. It almost looked like a sub-acute hospital. It had very high Part A census and that would tests different kinds of sites that had different admissions and discharge rates. At the suburban site, we would have much higher turnover rates in the facility, and we got to see the benefits of having an e-prescribing system that in saving the time in admission and sending all of these orders over and that kind of thing in a much more aggressive way than you see in a typical long-term care setting.

Without getting into the details, I want to just point out some of technology infrastructure that we had here. We used the Jeeves e-prescribing system. They are a computerized physician order-entry system that was tied with their electronic health-care system that was already implemented at both of the facilities. The nursing stations communicated back to that system, as well as the physicians and nurse practitioners that were participating. That all went to the RxHub switch to both the payers for formulary benefit information, as well as to the pharmacy system that was hosted by the pharmacy, and the pharmacists and the billing and the folks at the pharmacists at the pharmacy used that system.

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A unique thing that I talked about that we implemented is this refill request scanner. This is a proprietary system that we wanted to implement to demonstrate the use of an electronic refill capability. It was a handheld scanner that is on the med administration card at the facility, and it was used to basically scan medications that were low or about to run out to automatically queue up the refill process.

So let us jump into some of our findings. At the facility we, first of all noticed, especially at this facility where they were already using some basic electronic health record and order management capabilities, this was not a huge leap for them to make a transition from that to full blown e-prescribing. Now that said, they were using an electronic order management system at the facility already. So I think if you took a paper-based site and it had no technology infrastructure in place, you would obviously have a much greater transition to an electronic capability than these two sites that we implemented had.

We found that because they had that electronic health record in place, that integration back to the health record and all of the benefits you get from having the consolidation of all of your clinical information in one place, of having it accessible by so many people was a huge benefit to everybody that was involved.

We did find that in general the time it took to transmit the data to the pharmacy reduced the workload on the facility personnel, but that was mostly due to reductions in rework; phone calls, call backs, those kinds of things. There was less about the initial data entry, because in some cases we actually added more work to the nursing staff. In the past, they may have just taken a discharge sheet from the hospital where the resident was coming from and just faxed that on to the pharmacy, and now they are having to enter that into the CPOE system.

We did find in the cases where we could get nurse practitioners to get involved, that was a huge benefit. Not only to them because they had the formulary benefits and DUR information available at their fingertips, but we also found that it saves a lot of time for the nursing staff because now they're not in the middle of the processing at all. So that's really the ideal place for us to get to, and unfortunately we didn't have enough time to watch that full evolution to see all the prescribers in the facility participating in the electronic prescribing.

At the pharmacy, we saw some clear benefits almost right off the bat. When a new person was admitted, all their demographics came across, their data entry on handling new orders was a lot easier, discontinued orders, the workflow for that was streamlined in a real way, and readmissions, handling somebody that had left the facility and came back and we electronically tell the pharmacy that this persons been readmitted and all their orders come back and are available for dispensing were huge efficiency gains.

Ironically, we chose not to do the codified sig and we did find actually that that hurt us in many cases. Actually, the first day of prescribing we had a compound order -- it was a tapered dose of Prednisone -- and the system couldn't really handle it well. And in the old days, it would be just kind of handwritten over and the pharmacy kind of knew how to fill that and there were special rules on how to do that. Well when you make everything electronic, the systems have to handle all of the weirdo order cases, as well as the mainstream stuff, and certainly codified sig or something like it is going to be needed to make handling these combinational orders or complex orders successful.

We had another case where, now we're more dependent on the nurse at the facility to enter the correct data, and we had some cases where they had made some mistakes and we didn't necessarily remove all potential data entry errors. I think we just moved where they can happen to the nursing home instead of at the pharmacy. Although we do believe that, we saw a dramatic decrease in total errors.

And then finally when somebody gets admitted, like I said, in the old days someone would just turn around and just fax the discharge somewhere from the hospital, and now there's some data-entry time

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that needs to happen either by the physician or by the nursing staff and that can slow things down before the pharmacy gets their first round of orders.

What we did find is that the nurses in an agent model works for the process. It's a good way to introduce e-prescribing to a facility without having to leap all the way in and get all your doctors and nurse practitioners transitioned over, but as soon as that happens, we need to turn around and push really hard to get the prescribers actually using the system because that's what's going to get us down to the error rates where we need to be, and it's also going to help us really attain the efficiencies we need to get to.

The leadership at the facility, at the pharmacy and with the prescribers is absolutely critical for success. If you don't have everybody behind you the project will not be successful. We had amazing leadership at our provider and at our pharmacy, and we believe that was a huge element of us being able to get this implemented.

We believe formulary benefits technically worked unchanged, without any changes to the standards. We think that, again, prescriber adoption is gonna make it more valuable. The nurses don't really know what to do with that information if they get a formulary benefit flag that a drug is not on formulary. So it's important to get that in front of the prescribers.

We found that all that DUR work that we did, that's the drug utilization review work with First DataBank, was largely ignored by the nurses when they were acting as an agent. Again, we believe as more prescribers start using the system they'll see that it's more valuable.

And our electronic prior authorization implementation was technically successful. We did prove that it can work but we only had a handful of EPA requests to actually go through the system and, again, we felt like a greater physician adoption would be necessary to gain the full effect.

So at a high level kind of summarize here, we believe that data entry errors can still happen. We also found that the script standard needed some enhancements. We worked the process at NCPDP and got those enhancements made for all the different workflow models, and we believe the standard is now in line with the needs of LTC.

We did find that there is a need for demographic messaging, a specific message set to handle moving demographic data back and forth. That has been in process at NCPDP and will be available to support this setting. We think that codified sig or something like it is going to be needed to really make the e-prescribing processing support all the different kind of orders that are out there.

A couple other data points here, so multi-system communications worked, technically. The e-prescribing will continue to evolve as the standard as far as design, but we believe that the core concepts are valid. We did identify some new challenges created by an e-prescribing process that are going to require some resolution. And the standard still needed some revision for long-term care, but most of those changes have been approved by NCPDP or are in the process. Now I'm gonna go ahead and stop there, Andrew.

Mike, this is Brian. I see you're done with your part. Do you want to transition to questions?

Okay. Let me bring the other presenters back on line here, and we'll move to the end.

BD: So, good afternoon, this is Brian Dixon from the AHRQ National Resource Center for Health Information Technology. We're now gonna segue into questions and answers with our panel. Jon White, unfortunately, did have to drop off of the call, so I'll be moderating this afternoon. We do have Drew Morgan from Centers for Medicare and Medicaid Services online with us to help in answering questions.

So there are two methods that you can use this afternoon to ask questions. The first one is you can raise your hand, and if you look in the participants' box where you see your name there's a little hand icon

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down below your name, and you can press that once and raise your hand; pressing that a second time will lower your hand. The other method would be to type into the chat box your questions. I ask, though, that if you use the chat feature that you make sure in that drop-down box where it says "send to" that the value for that is all panelists, that way Drew and Mike and Doug and Shelly can all see your question at the same time. And I'll help parse out questions, but it looks like we have one person who has raised their hand, so let me go ahead and call on E.

E: Yes, I am. I'm with the New York State Department of Health Patient Safety Center, and we've been looking at the issue of e-prescribing and I'm glad that you brought up the issue of RxNorm in terms of a unique identifier. We're looking at the issue in terms of e-prescribing, in terms of when the prescription is filled by the prescriber it goes to the pharmacy, and unfortunately it goes either as an electronic email or a fax. And often times someone at the pharmacy then needs to data enter that information.

The question is did either one of your studies look at the use of RxNorm to help populate the pharmacy system with the electronic prescription rather than requiring data entry? And if the answer to that is "No," are there any research studies proposed to do that?

DB: Well, I guess I could fill that or Shelly could conceivably if you want to go across them. But what I'll say is that we did do some pharmacy site visits and we didn't specifically look at RxNorm. But some pharmacy systems -- and I think more and more -- are doing some automatic population even without RxNorm. RxNorm is not really being used extensively yet in the industry. I think they're still hanging back a little bit, is my impression, to see what happens and to wait for it to become even more accurate and complete.

But regardless of that, the systems are doing some automatic population but there still does need to be a pharmacist sort of judgment in the loop as well, and often there is a second data entry step that does introduce the potential for errors as you say. So hopefully that's helpful a little bit. But more research is needed. On the RxNorm piece I think a little bit more research is needed and more awareness needs to be raised, as well, within the industry.

DM: This is DM from CMS. We realize that RxNorm has a capability of doing some great things, and from this pilot we have been in dialogue with the National Library of Medicine to see what we can do to move Rx Norm along so it can be used in prescribing. Thank you.

BD: Thank you for your questions. Again, if you want to raise your hand, you can do that and ask your question verbally or you can type in your question to the chat feature. It looks like there are a couple questions here that have come through the chat. So one panel -- and I'll direct this toward Doug because I think you talked a little bit about this. But he asks, "Will you be able to discuss what level of honorarium or incentive might be required to initiate and sustain prescriber use of e-prescribing, assuming the software and hardware needs are already provided for?" I think you had mentioned you did use such an honorarium for participation at least in your surveys.

DB: Right. Well, okay, the survey is a different thing but, just for use of e-prescribing Horizon, this didn't come out of our grant. This was already being done and it's still being done by Horizon. The range is 150 to 500 dollars per quarter is what Horizon is using based on how much you use it, what percentage of all of your claims seem to be coming through the e-prescribing system. And 100% of course is not necessarily achievable because DEA Schedule-2 drugs can't be electronically prescribed.

But with that said, use is a really important area to do more research on, and we hope to have the chance to do more research on that, in fact. We'll be talking more about the results that we have in terms of what predicted levels of use and what were the levels of use really in the next presentation.

BD: Great. Thanks, Doug. I know one question I had too is if you could maybe elaborate on some of the activities, you might be involved with now in terms of moving forward. I know several times during your

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presentation you talked about the need for more research in certain areas, and I didn't know if you were personally working on any of those areas to move them forward.

DB: We're trying to, but so far we haven't had a lot of success in getting funding. So I'll just leave it at that. We don't have anything active at the moment. We've written proposals. And we think there's hope. For instance, you may have heard that SureScripts is setting up a Center for Medication Management along with a coalition of other companies, and they plan to fund some research, but that will be a competitive process as well and they're just getting that going.

BD: I'm reading some of the questions that have come in here. One question for the panel is how folks are handling classes of drugs that cannot be e-prescribed today. I don't know, Shelly, if you want to weigh in here and, Doug, you certainly can.

On what classes of drugs?

BD: It just says the classes of drugs that cannot be prescribed today. The person was not specific in what classes.

DM: This is Drew Morgan. I think what they're asking about is the controlled substances that right now are not able to be prescribed. Last year, HHS and DEA held a public meeting that discussed this over two days, and we are currently still working with DEA to try to help them along with maybe revising the law that oversees the Controlled Substances Act. So we are in communication with DEA, and hopefully something can change in the near future.

BD: Thanks Drew. Another question from the group is, "What are the prospects for an update to the structured sig plan that would work better?"

DM: This is Drew again. Currently, the NCPDP work group that works on the codified sig has submitted a ballot initiative to NCPDP, and I believe it's under ballot right now. So they have made some changes to it, changed the way that the standard works, and so what happens after it gets balloted is hopefully there will be some pilot testing on it to see if it works or what needs to be done to tweak it.

BD: Thanks, Drew. Another question is there -- and if any of the panelists can provide an approximate timeframe for when these initial standards will all be finalized. It sounds like there's several things in process and ready for release.

DB: Well, this is Doug. Shelly, you might be able to comment. I believe that the initial standards are supposed to be issued by the secretary middle of next year, right? Or Drew, you probably know.

DM: From the findings of the pilots, we are to take the recommendations from the piloters, and we are to form another NPRM that lists what standards we're taking forward as a six. And that NPRM will be out later this fall, and there will be a 60-day comment period from those who want to comment on the NPRM. And by April 1st of next year, Doug, the final rule will be released, and that's the timeline on it right now.

Have there been any major shifts, Drew, since you all received the reports from these guys in terms of policies or some discussions in the works about changes or funding for additional research that these guys identified?

DM: Our office doesn't have any tight funding, but we've been talking to folks, trying to leverage certain pilots that are already ongoing. We've been working with AHRQ to try to move some of this work forward. So, yes, we have been trying to move some of this stuff forward that needed -- that needs work. But other than that, not currently, right now. We're just kind of in the planning phases.

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BD: Thanks. Another question for the group is -- I know Doug, you talked this, about prescriber satisfaction with the process, which was somewhat indecisive. I'm wondering if you also talked to pharmacists and kind of what they're response was.

DB: We did, just qualitatively, and we only did two pharmacy site visits, but they were generally enthusiastic about e-prescribing and about the potential efficiencies. Some of the things that we were concerned about, like there might be a higher rate of no-shows essentially, like people whose prescriptions would be sent over and then they would never show up which would generate -- potentially generate some work, it wasn't really materializing. People do tend to show up when their prescription is sent and there's some thoughts that it might even be a higher rate than the people who get a paper prescription and then never fill it anyway. In other words that the process of actually having the prescription sent might actually make people feel sort of more obliged to fill their prescription.

So pharmacists tended to like it. And also just in terms of prescriber satisfaction, I should mention that, overall, prescribers were pretty satisfied with the e-prescribing systems at least those who hadn't quit using it. But what I was showing here was just more focus on specifically medication history and formulary benefits, and in those areas people did feel like it was still falling short.

BD: Great. For those of you who are online with us, thank you again for sticking around for the Q&A section. We've got a couple more questions to get to, but we are getting closer to the time. I'm gonna start in the background, a post-session questionnaire, if you could just fill that out before you log off today, the AHRQ Resource Center would really appreciate that. We really look at this feedback and use it for improving these sessions going forward. So I'll fire that off in a second. So just please be sure you fill that out before you log off today.

Let me unmute my feedback with us. Two questions really. One is for Drew, and that is one of the listeners kind of had a hard time catching all the dates for the plan moving forward, so is there a URL or some information on the CMS website that people could find to follow along the path of the plan moving forward with ease?

DM: Are you talking in the aspect of the NPRM and the final rule?

BD: Yes.

DM: On the CMS website, there is an e-prescribing page, and I don't have the URL quite handy. But if you go under Medicare and under electronic prescribing on the CMS page, there's a section on e-prescribing. It outlines what we're charged to do through the MMA, and then we also we also provide links to all the pilot reports and to the evaluation reports as well. And at any time that when the NPRM will be posted as federal register, there will be a link provided there as well.

BD: Great. Maybe if you can send that to me offline I'll include it with the follow-up email that goes out to the attendees.

DM: I sure will. I'll send that right to you.

BD: Great. And also from the resource center's end, we'll also send out some information that's available on AHRQ's website with a particular emphasis on sort of prescriber use and adoption. There was a study that AHRQ funded also last year, and the results of that have been posted through Health Affairs, and there's a free link to get the AHRQ website. So I'll make sure everyone gets a link to that in the follow-up email.

Just quickly, if the folks can comment, especially Doug and Mike, one attendee asked about sort of the history of the Health Information Technology Standards panel has presented the use case for medication



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management and how these findings --how the findings from your studies and the others in the e-prescribing pilot might be included in that 2006 use case.

Well, if that's directed at me, I guess we're gonna have to look at that more carefully. I'm not up-to-date on the use case, so unfortunately I don't have an answer.

Bd: All right. Thanks guys. Well, I think that's about it. I do have a URL that we can actually push out now to all the participants from someone else from CMS who's on the line with us today that's just not part of our panel. So I just pushed that out to everyone so you can use that, but we'll also include that in the follow-up email. And those are all the questions that I see on my screen. Is there any final comments from the panel before we wrap up today?

I thank everyone for attending.

DB: I did see there was one last comment that just came up there asking why half of our site dropped out. It wasn't quite half. I just wanted to say overall I think e-prescribing was successful. I probably am giving you a little bit more of a negative opinion than I want people to take away. And we were focused today more on medication -- on these specific standards, and this will be a plug for the next one because we'll go into the overall successes and failures in the next call.

BD: Great. Thanks, Doug. And just to remind people, that call will probably be scheduled towards the end of October. We're still trying to finalize a date with all the presenters for that. But as soon as we get one, you'll receive an email with information on how you can register to attend that event. Any other thoughts? Final comments?

Well, thank you very, very much to our panel for your time this afternoon for both your presentations and for answering questions. Thank you to everyone on the line for attending this afternoon. Please fill out the post-questionnaire poll so we can get feedback from you on how today's session went. We will utilize those comments in our quality-improvement process for these events, and look for a follow-up email with links to download both the slides from today's presentation and sort of a full-screen mode as opposed to the handout that was available before the session, as well as a recording of the audio and presentation form today. And now all of that will be available via the AHRQ Health Information and Technology website. So thank you again, and have a wonderful afternoon.