

LYNN FUCHS: Okay, so we are, how many people were here last in the morning? Okay. So we are going to talk about RTI map. I assume that I am talking to a relatively sophisticated audience that knows a fair amount and so I am going to move to certain sections of the presentation more quickly than others. And I actually thought that I might focus most of my attention on the 3<sup>rd</sup> tier with the idea that a lot of people have a pretty good idea of what they are doing to make sure that the primary prevention or tier 1 program is operating well and have a pretty good idea these days of what is working for your school and in terms of tier 2 or secondary prevention, but once children don't respond to that 2<sup>nd</sup> tier sometimes schools struggle with what they might do next in the name of greater intensity, so I thought that I would talk more about that than anything else.

My plan is to talk for about an hour and then open it up for about 10 minutes of questions and then I'm going to skip out on you to go catch a plane and I was told that, that is your break when I leave and you should take a break and then go to another session.

So, here's my outline and you have the full PowerPoint. I am going to emphasize some parts of this presentation more than others. So, I am going to move very quickly through my framework of an RTI prevention system and I hope that will be instructive to you, even though you already know a lot about RTI, because I think that RTI is that people speak about it differently, think about it differently, not only from state to state, but even within districts from school to school. We are going to talk a little bit about that. I am not going to talk about primary prevention very much, but I'm going to focus more on assessment and how I think about assessment within the context of an RTI framework and then about a 3<sup>rd</sup> tier or the tertiary prevention level and what that might be. Any comments or suggestions or reactions to that overall plan?

So, as you know, what we are trying to do with this RTI movement is to create a prevention system within schools that has multiple levels or tiers to it and the goal is to reduce the risk of students leaving school without the skills that they need to succeed in life and I think that there is some confusion about whether what we're trying to do with RTI is to prevent special education or whether we're trying to prevent school failure. The way I think about it is that we're trying to prevent school failure and that special education is one of the resources that can be brought to bear to reduce the chance that children will fail in school. So, that will be reflected in some of my comments whether you agree or disagree with that I still think that information that I'm presenting is helpful to you.

So, off course in primary prevention we are talking about all children receiving a universal core program on their systematic routine screening of children. The idea is that we would screen them, for example, early in the year, because there is a very high rate of error in screening when we used brief screens, very brief tests. I recommend to schools that they consider that universal brief screening test as a first level screen and with the idea that we need to follow that up with some more in-depth screening so the idea is that you cut, you set a cut point by which you eliminate children from

consideration that they might be at risk, because they score sufficiently high on the universal click test. You know, that they are not among the children you need to be thinking about secondary prevention for. Right? But then, among the children who failed the cut point on your screening tool, I recommend that you think about some second stage screener to take those children and weed out the truly at risk from the false positives. And the reason for that is, is that in all brief universal screens you get a high proportion of what we call false positives children who are designated of having risk, but who actually left in a regular classroom will thrive nicely and it's to send all those children to secondary prevention means that you're either watering down what you can deliver in the name of tier 2 or secondary prevention or you are spending lots of school resources at secondary prevention. In a way, one of the ways to do a 2<sup>nd</sup> layer of prevention is to do short-term weekly progress monitoring and you get a lot of information from that to verify, confirm the risk status of children or you can do a more in-depth longer test is another way to do 2<sup>nd</sup> stage screening. So there are a variety strategies that people talk about, but I think that one of the next big topics with an RTI will be strategies for improving the precision of screening. So that, we can be efficient and smart within our RTI Systems and only send children who truly need secondary prevention to have those resources. Okay? Any questions or comments about that?

AUDIENCE MEMBER: Does that have business false positive happen just a few times at the beginning of the year getting back into or does that have to follow through all through the year?

LYNN FUCHS: it depends on the a screening tool, but if you're using a brief screen in the winter or the spring you'll have the same false positive problem, because the screening cut points are set so that you don't miss, you tend not to miss truly at risk kids. So, that has to be set high enough and what that means is that creates a lot of error in terms of all the kids who are designated as at risk. So.

AUDIENCE MEMBER: Have you recommended screening tools?

LYNN FUCHS: I don't, but in these slides, you go to, there is a website, it's called the RTI 4 success and 4 is a number. It's says [rti4success.org](http://rti4success.org). It's a national center on RTI; it's like US Department of Education website and they have vendors submit screening tools and they have a panel of experts who rate the evidence on those tools and you can get quite a lot of information about their recent false positives and false negatives. But I can tell you that virtually any brief initial screen will give you lots of false positives. And some of our own studies where we've done more thorough screening than a school would normally do we have found that as many as 50% of the kids that we identified at the beginning of 1st grade is at risk do nicely without any intervention. So, if you were sending all those children to secondary prevention you would be spending a lot of money on kids who will do fine without it.

AUDIENCE MEMBER: Do you ever recommended cut score for it?

LYNN FUCHS: You have to make sure that the tool that you are using as your screener comes with a cut score and all of the tools that are reviewed under the RTI 4 Success website have to have a cut point that they're using to do the research studies with. So, any other questions or comments?

AUDIENCE MEMBER: When you say brief are we talking 20 minutes or are we talking more than that?

LYNN FUCHS: No, I'm talking about brief universal screens. It kind of depends on the tool, but under 5 minutes generally. Those are the kinds of brief screens that I'm talking about, because it is hard to do that, to do anything more than that with everybody in the room.

So, at secondary prevention we're talking about at risk children and hopefully these are almost all children who really do have risk for poor outcomes. A second level of the prevention system is implemented; hopefully this school picks its secondary prevention program in a smart way so that the probability is that most children will respond nicely to the secondary prevention program. We, in our work, like to use what people call validated protocols so that we know that, at least in research studies, the majority of children can be expected to respond to the program that's being used at secondary prevention. We monitor progress over the course of the secondary prevention program and at the end of secondary prevention we do a little posttest and we used the combination of greater progress and the final score at the end of intervention to decide which children have responded to secondary prevention and which children have not. And students who respond well, go back to the tier 1 program, but we like to recommend that they go back to the tier 1 program with regular progress monitoring, because we know that there is a fair amount of recidivism, children responding well enough go back to the regular classroom and then they re-emerge with problems. So, we, in our work, like to recommend that once the children have gone through the second stage of screening and have been designated as at risk, regardless of how he responds over the course of the academic year, he is considered at risk and always monitored on a regular basis. So, we can catch that child if he, whenever he is experiencing difficulty. But, children who do not respond well to secondary prevention and then move onto tertiary and that's more intensive level of intervention and what I was trying to say earlier is that I think a lot of schools struggle with the idea of, "okay I've used the validated protocol, small group tutoring, what are my options for now intensifying services?" And I am going to try to address that in the next hour. So, I like to use this, I'm sorry, go ahead.

AUDIENCE MEMBER: Quick question, what would you recommend would be time spent on core and then secondary prevention and that's our instruction to supplement?

LYNN FUCHS: Time? You know from the child's time?

AUDIENCE MEMBER: A lot of this is part of the instructional day, in other words it's all about scheduling and I think we all work.

LYNN FUCHS: Right. Most of the tier 2 programs that I'm aware of that are validated typically run between 30 and 40 minutes a day. Is that what you mean?

AUDIENCE MEMBER: Everyday and every....

LYNN FUCHS: No! No! Most of them are 3 sometimes 4 days a week. So, I find this healthcare analogy to be useful to my thinking, because the RTI prevention system is borrowed from the healthcare system and a lot of the language and concepts are derived from that and we all participate in that healthcare system so it's familiar to us and so if you think of something like high blood pressure, once a year or so we go to our primary care doctor and they screen us for high blood pressure, but if we fail that screening test so to speak, if our blood pressure looks high, the doctor does not immediately put us on high blood pressure medicine and why is that? Well it's because there are a lot of false positives when you go to the doctor's office and you can have a reading that suggests that you have high blood pressure when maybe you really don't and that's sort of like the 1st stage of screening in schools where we have a test and it works reasonably well, but like with all screeners and that's why they're called screeners, because we think of following them up with something else there is some imprecision. So, your doctor is not going to put you on medication immediately. What they're going to do is monitor you for awhile and they'll ask you to come back in a month or they might ask you to go to your pharmacy and get some high blood pressure readings in the interval between your visit and the next time you come back and if you have some data than on your return that verifies or confirm that you really do have high blood pressure, then what your doctor will do is use a relatively standard and an expensive form of medication on you; okay, because most people will respond to these standard and inexpensive ways of treating high blood pressure. So the 1st level of intervention, like secondary prevention, is probably for your doctor to use a diuretic, which doesn't cost very much money, it's a inexpensive medication, and..., but she won't just send you off assuming that you have been, your high blood pressure has been cured, fixed. Right? Because she knows that whereas most people respond to this secondary level of intervention, not everybody does. So, she will monitor your high blood pressure over some period of time to make sure that you are responding to that medication and that's similar to this tier 2 or secondary prevention whereas standard validated tutoring program is being used. It's not individual decision-making, which is labor-intensive and requires a high level of professional expertise. It's a standard tutoring program that you know a lot of people could probably implement pretty well. And that's like this relatively inexpensive diuretic. If that does not work. When you come back to your doctor, then your doctor has to really think hard and use her professional expertise to consider what the medication options are. What your individual characteristics might be. She's going to start using more expensive medication and she is actually going to experiment with dosages and alternative medications and take data how you respond and she's going to use that information to formulate an individualized treatment plan for treating your high blood pressure. And

that's the way I think of tertiary prevention. If we have a child who does not respond to a standard tutoring program that has been research validated then there's something different about that child that requires a more individualized database, sort of experimentation with an instructional components to see what will actually work for that child. So, that's how I have over many years come to the past decade come to think about RTI and wonder if people have questions or comments about that.

So, I just want to say you've noticed no doubt that I use, I like to use the terms primary, secondary and tertiary prevention instead of tiers, even though I know everybody talks about tiers, but I prefer that vocabulary for this reason - when I go out and talk to schools or states, districts. There are conversations that occur where people are talking about tiers and then nobody is ever quite sure what people mean when they say tier 2 or tier 3 and I think there's a lot of confusion, because schools generally have sort of sequence of interventions that they're implementing in their school and they ordered them like kids are going to get this up before they get that and so forth. But, often the sequence of those interventions, its not totally clear whether that's a systematic progression from less intense to more intense and it's not always clear what exactly intensity, increasing intensity means. So the way I think about primary prevention is that, primary prevention is a generalized education program and I'll talk more about what I mean by that. You can have more than one tier of intervention that occurs within the scope of the general education program and often we do. We have the core curriculum and before we might move a child into secondary prevention, we might do some differentiation in that regular classroom and think of that as our 2<sup>nd</sup> tier, but other people are using tier 2 to refer your 2 small group tutoring. So I think it's clearer to say, okay we'll think of all of that as part of the primary prevention program and we think of secondary prevention has more intense and I will explain what I mean by more intense and tertiary prevention as categorically most intense while within the framework of what we normally have available in the regular school. So, I'll talk more about that, but the idea is that. If we think about, if we're all clear about what you know primary, secondary, and tertiary prevention is in terms of intensity then we can talk about multiple tiers falling within those levels of the prevention system.

So, defining features of primary prevention. So, first of all we have a core program, you know, I can't think of any school I've been in where there isn't an adoption of some program that the general education teacher is using typically that is based on research principles; rarely is that exact program actually validated. Like, nobody's actually done a randomized controlled trial with that program. Occasionally, that occurs under the rubric, you know the funding of IEF, but mostly it's a program that's been put together based on what we know about sound instructional principles.

The primary prevention program as far as the way I think of it also includes routines that provide opportunities for the teacher to differentiate her instruction. So, are people familiar with Pals? So, Pals is something that we've created for the purpose. It's meaning purpose is to create a routine that the children know and the teacher knows that provides opportunities for the teacher to differentiate what pairs in the classroom are doing. What level of material they're working on. How they might be working on

that material. That's the over arching liaison blank for Pals. There're other ways of creating classroom routines. Pals is not the only one, but is an example and so I think of the core curriculum classroom routines that facilitate a teacher differentiating her instruction accommodations that permit all children access to the instructional program as well as strategies to address children's motivational problems. As there are children who can do, but won't do; you know what I mean by that? I think those kinds of problems should be conceptualized as belonging in the general education program and that we should be able to do, have assistance designing motivational programs that will help those children use the competence that they possess. Okay?

So, I'm not going to talk about Pals, because several people have come up to me and mentioned Pals so, and I know there's a lot of Pals training that has already gone on in Pennsylvania, so I'm not, you have the slides and you can look through them and if you're interested in learning about Pals I know that Patton has the capacity to hook you up with people who can help you learn more about Pals, but I just wanted to emphasize that it is a good example of a program that provides regular classroom teachers with an overall structure for differentiating and if you had been in a regular classroom. I at one point was a regular classroom teacher. It's very hard to have effective instructional meaningful differentiation occurring unless you have some kind of overarching structure that's within the children know how to operate. So that you can have different children doing meaningful and different things and Pals is just one way to accomplish that.

So you actually have a fair amount of information about Pals on the slides, but as I said I'm not going to spend time on that.

So, secondary prevention, the way I think of secondary is it is the best bet that I think schools have of doing efficiently delivered secondary prevention is to use a validated tutoring protocol and in reading and math there are choices about what you can select for your school. Some schools have 2 protocols, and they well sometimes use reading tutoring program A with certain types of children and reading tutoring program B with different kinds of children. Some schools will use A first and if A doesn't work then they will go to B. Okay? Some schools have just one tier of secondary prevention. One small group tutoring program that they use in the name of efficiency and affordability. Okay, so really what you can do in the name of secondary prevention has to be driven in part with what resources you have to fuel secondary prevention. Generally, these validated tutoring programs have very highly specified instructional procedures. Some of them are scripted; some of them are highly outlined. They typically last between 10 and 15 weeks usually 20 to 40 minutes of instruction, procession, and usually 2 to 4 times a week in terms of frequency and if you go to [rti4success.org](http://rti4success.org) the same website. Within, I believe by June, they're going to have great tools chart on tutoring programs. Okay, where they evaluate the quality of the evidence on tutoring programs.

So what's the difference between secondary and primary prevention? Well, here's how I think about it. Primary prevention we had empirically validated rather than

research principles and instruction going on. Okay, for secondary prevention tutoring programs I think it's reasonable to expect that program to have pretty high quality randomized controlled trials looking to see whether the program promotes better outcomes for what proportion of children. And secondary prevention, we have entirely told lead small group tutoring that's going on. Whereas in primary prevention we are relying in large part on whole class instruction. That's a big level. That's a big difference. That makes secondary prevention more intensive than primary prevention. And I think it's also the case more and more schools are going to model where for secondary prevention when you're using highly specified tutoring programs they are using support staff. That are supervised and trained by somebody in the building to deliver those interventions. Again, in the name of affordability. And one of the things we're hearing a lot of about in terms of the healthcare system is affordability. And they prevention system in public schools also has to be designed to deliver the best services you can't afford. Okay. Any questions about the differences between secondary and primary prevention?

So, I was going to, for people who are here in the morning I was referring periodically to a tutoring program that we have been working on at 1st grade, we call it the Galaxy Math. There is actually a version of it, an earlier version called Number Lockets. That a pretty large IF study that I had nothing to do with just looked at it and it looks pretty good, but we think Galaxy Math is better and it's primarily a conceptual instruction in numerosity and providing a strong foundation for at risk kids in terms of their math concepts with us also focused on promoting competence with arithmetic and number accommodations. So, I forgot to turn off my phone, I'm sorry, that's always embarrassing when the presenters...

So, I'm not going to spend time on talking about Galaxy Math, if we have time at the and then we can go back to that or if people have questions about Galaxy Math, we can get back to that.

The main thing I want to spend time on is screening and progress monitoring within RTI and also what tertiary prevention looks like. So, we're going to take a break from talking about primary and secondary prevention, talk about screening in progress monitoring for a while and then returned to tertiary prevention.

So, RTI is a system of interventions that goes from least to most intense, but it's also a system of intervention that systematically integrates assessment practices and so it is the assessment information that's driving important decisions about who gets what level of the prevention system and the nature of the instruction that provided. So, I'm going to talk about curriculum-based measurement, which I need to clarify does not refer to a product. Okay. CBM is not a product. Instead it's an approach to assessment. It's generally a brief test that used to assess students overall competence in an academic area and typically as a progress monitoring tool. It's got many alternate forms so it can be used at one point in time for screening or over the course of many weeks with different alternate form administered each week for indexing a student's responsiveness to the instructional program, indexing their progress and therefore their

response to the program. Okay. So, there are many CBM products, okay? There are many and there were sort of an original set of CBM products and since then there have been many vendors getting into the act and putting, which is good and getting tools out there that all fall under the CBM umbrella, okay. And if you go to RTI for success, the 3<sup>rd</sup> tools chart mentions screening of management instructional tutoring programs. There is a second tools chart and there is a third one on progress monitoring, which is actually the oldest of the 3 tools charts. You can go there and you can look to see technical data on different progress monitoring tools and to see whether they've set benchmarks. What the evidence is on the integrity of those benchmarks and so forth. Okay.

We use CBM in a two-stage screening process so that we do a universal screen and what we do based on the research that what we've done and the research of others is that we recommend that you do 2 alternate forms in the same setting of the child and you average those scores to get the estimate of the students overall competence and you compare that to the cut score that the vendor has given you that designates, it's a cut point for designating students who are at risk from students who are not at risk. Okay.

Once students have been on the basis of the universal screen they appear to be at risk; this is what I was talking about before, but we like to recommend 6 to 8 weeks of weekly progress monitoring. We draw a line of best fit to get like a slope of improvement on the students. Weekly assessments, talking brief, 6 weeks is generally enough. That is a good way of reducing if not eliminating entirely false positives. Okay? We get a better idea of where students are actually growing in response to the gen education program and therefore do not need secondary prevention. And the two-stage screening process can be repeated in the winter and/or the spring. Questions or comments about that?

**AUDIENCE MEMBER:** Inaudible

LYNN FUCHS: Well, it depends on the measure you're using. Some are more, some CBM measures are, you know, some measures that fall under the CBM umbrella are more reliable than others, but for something like oral reading blank, which is probably the most widespread use. That's a very, actually precise measure and you don't need, you don't get very much by adding a third measurements as in terms of reliability. Something like, funding segmentation fluency, you need a lot of repeated, you need a lot of measures to get a reliable estimate. So, and you can get that kind of information from the website I mentioned, but it does depend upon the measure were using and the precision.

For progress monitoring, we use CBM in a somewhat different way, as I said were doing weekly measurements or monthly measurements therefore monitoring a large number of students. And we look at the slope, the weekly rate of improvement through those points and we use that information to make decisions about whether those students are developing at a typical rate. So one of the things you should be



concerned about when you're picking up progress monitoring tool is that, that tool provides you with good norms for what typical development is as represented on that measure. Okay. And that's one of the pieces of information that the tools charts will provide you with. Okay.

We also at the end of secondary and tertiary prevention we take the last to weekly measurements to compute the student's final level of performance and what we'd like to use is both the slope of improvement and the final estimate of performance together to decide whether a child has responded to the intervention or not. In our decision rules, children have to be both low at the end and low growing to be deemed unresponsive to the intervention, okay. If you are high at the end or if you're not so high at the end, but you have grown nicely then our decision rules you are considered a responder to the intervention and we have cut points, precise cut points for those decisions. And any progress monitoring tool you should feel that you should feel that you should ask for that information.

So, we focus on CBM, because CBM as a general approach to assessment is relatively well researched. It doesn't mean any specific tool that says it's CBM is technically strong, but as an approach its conceptualized and there are many tools under that umbrella that have some good technical adequacy.

So, I'm going to use just speak for a few minutes to explain what I mean about a CBM approach and I'm going to clarify that by exclaiming first what CBM is not, okay. And what CBM is not is what people call mastering measurement. Where you are tracking a student's progress through a series of instructional objectives. And if I were a teacher implementing mastering measurement, I would have to determine the sequence of skills and my structural hierarchy and for each skill in that sequence I would have to either design or find a criteria reference test to index mastery of that skill. So, let's say were looking at a simple curriculum like math computation and let's say these are the 10 skills that constitute my 4th grade computation curriculum and I'm going to teaching them in this order. Okay. I'm going to begin with multi-digit addition with regrouping. I need a criterion reference test that I will be administering on a routine basis until the child or my class shows mastery on that skill. What we have here is weeks, about 5 weeks, 4½ weeks of focus on multi-digit addition. The child gradually improved his performance. Met the mastery criteria of 3 scores above 80%. The teacher deemed that mastery of multi-digit addition and so moved onto the next skill, which is multi-digit subtraction with regrouping. Okay, and I'm sure this sounds very familiar to you all. There's the subtraction criteria and reference test and there we see gradual improvement again over time, mastery and now it's time for the next skill in the sequence.

Now, I was part of the original group that did the foundational work on a CBM approach to assessment at the University of Minnesota in the 1980s. We began, and our talent was to create an assessment system that would be useful for teachers and their instructional decision-making, and we began with mastering measurement framework, but over some period of time we decided that, that was not going to work for

these reasons. The first reason was that the hierarchy of skills that you see in math, although it's logical. It's not empirically derived. There really aren't empirically derived instructional sequences that we know children move through an orderly way. So, for example addition and then subtraction, a lot of people think, and there is some evidence to suggest, that at least some children master multiplication before they master subtraction with regrouping. It's worse in reading. The idea that a child is going to for example learn constant and vowel consonant E words, final E words before they learn our controlled words. There is not a lot of evidence. We've actually did a study where we tried to see whether that was a viable idea and couldn't get clear evidence that those skills were really represented a hierarchy. So, that's the first problem and why is it our problem, well because we were sort of locking a kid into that hierarchy, because our measurement system is intertwined with the idea that you have to master a skill before you go to the next one. The second problem with mastering measurement that we faced was that when you do mastery of a single skills, so that like all of the items on that test are subtraction with regrouping, there are certain children and they're the children we tend to worry about, who can do that, because they know that every skill on that test requires subtraction with regrouping. Okay. But, can they do the high-stakes test where you kind of mix up all different kinds of problems or can they do math in the real world where nobody tells them this is a subtraction with a regrouping problem. Not so much. So, that's a second problem and a third problem is that sometimes a child will master subtraction with regrouping and we move on to multiplication and then what happens? They forget how to do subtraction with regrouping. So, for that and a few other reason what happens is that, you know we wanna believe that the number of objectives mastered is a good representation of overall progress, but the relationship between the number of objectives mastered and performance on that high-stakes test is not as good as we would like it to be.

So, for those reasons we moved to SEDM Framework, which is quite different even though we also use graphs. I think that's the confusing thing between mastering measurement and CBM. But here we have the same curriculum. We as assessment people really don't care what order the teacher teaches in. That's the instructional program influenced by the teacher's professional development and her interaction with the child in her class and how they're doing. She can move freely between the objectives. The assessment system might inform some of her decision-making, but in a differing way of mastering measurement. It's not like we're waiting for mastering one skill before we move onto the next. Okay. And here we have a CBM test and probe on the same third grade curriculum, so the immediate thing, what you notice immediately is that these are all different skills. They are the skills that constitute the 4<sup>th</sup> grade computation curriculum and they are on every test. Every weekly test is of similar difficulty and every weekly test is systematically sampling the various skills represented in that 4<sup>th</sup> grade computation curriculum. Okay. So, at the beginning of the year children aren't going to, most children are not going to score high, and we have to explain that to children that this is a different kind of test. Your job is to find the skills you can do and do them well. We will give you another test like this periodically and you'll be able to see yourself growing, because you'll be able to do more and more of this test as I teacher this year's program. That's one alternate form. That's another

alternate form, so the problems represent the same kind of skills from alternate test to alternate test, but they're in a different order and they're not exactly the same problems. They're just representing the same problem types. There we see a child's graph and it's quite different from the mastering measuring graph, because we can index student improvement with alternate forms on the same, alternate forms of the same CBM test over time and we can compare this score to that score, to that score to see how quickly the child is gaining confidence in the annual curriculum, because every test is an alternate form of the same difficulty representing the same curriculum. Any comment about that?

**AUDIENCE MEMBER: Inaudible**

LYNN FUCHS: I can help you with some references and I think that the argument though that tends to win the day in schools is that if you administer the tests using directions that help children understand that how the assessments work and they adjust to the idea just fine, that this is a different kind of test that in that teacher is come to understand that they can get information on a child's performance on any skill in the curriculum at any given time. Teachers come to understand the value of this assessment compared to the value of mastering measurement. So, that is what we found in our work. If the children take to it and the teachers gain familiarity with it. They become comfortable with the idea that they can get good information out of this assessment. So, so. Yeah.

AUDIENCE MEMBER: Have you found an argument that wins the day with parents? Most parents, they don't understand.

LYNN FUCHS: I think both children and parents or even I think parents or teachers understand, usually the idea that what they want to see on this assessment is increasing scores. And they can gauge how well the level of the child's overall competence in the curriculum, you know, the top score you can get on the test. That provides more information than knowing that your child has now mastered multidigit addition with regrouping while we know nothing about how he's doing in the 4<sup>th</sup> grade curriculum, only that he has mastered this one skill. So, I don't think that, I mean this has to be explained, because it's different. And some schools have their own policies about how much they involve parents, sometimes schools use CBM graphs during parent teachers conferences when they can explain on a one-to-one basis. Some schools send them home with explanations. Some schools are reluctant to do that just because some parents of their kid's scores are not going up are punitive with their child and they want to avoid that sort of thing, but it's not because they get pushed back and if they decide not to involve parents on a routine basis, it's not because they're getting pushed back. If it's explained well, parents understand it, and they find the information useful, informative.

**AUDIENCE MEMBER: Inaudible**

LYNN FUCHS: And you can look to see, which skills are being retained and which skills are not retained, because on every assessment you've got every skill assessed. So, it provides a technically better measure. It's more reliable. It's more valid. It relates well to, you can understand just by looking at the test why it's going to relate better on improvement on these tests. It's going to relate better to the end of year high stakes test, and with mastering measurement, because just look at the test. It looks a whole lot like the end of the year high-stakes computation tests, so.

What I said about computation is also true for concepts and applications. So this is the first page of a 3-page CBM 4<sup>th</sup> grade concepts and applications test. And so, in the same way across the 3 pages all the concepts and application skills that are embedded in the 4th grade curriculum are systematically assessed on every assessment. Now, whereas a computation 4<sup>th</sup> grade test I think takes 4 minutes or 3 minutes I cannot remember off hand. This one is more like 6 or 7 minutes, but both tests are tapping what we consider to be sort of tool skills. Skills that children should be able to use, know relatively fluently so that they can use them in the service of math problem solving and higher levels of math.

Other questions and comments?

**AUDIENCE MEMBER: Inaudible**

LYNN FUCHS: Most of the, there's not, there is much less work on math screening than areas of reading screening. There is more work at kindergarten and 1st grade than at the higher levels. Most people who do screen the higher levels use our CBM probes. So, they work just fine, but really there has not been a lot of work on alternatives. Other questions or comments?

So, what we're doing with CBM is we are sampling performance in the name of progress monitoring and every time we sample for a test we are sampling the same year-long curriculum. Okay. And by doing that, we avoid the pitfalls of having to generate a skills hierarchy, because our assessment is not tied to a skills hierarchy. We are avoiding single skill test. The situation where children can do addition with regrouping, because they know every problem on the test requires it. We are automatically assessing maintenance so that if children are learning skills as the teachers are teaching them and then promptly forgetting them. Their CBM scores are not going to be going up. Okay. So, that's the signal to the teacher that something is wrong and she can go to a skills profile to look to see, you know what skills are being mastered and then forgotten and what skills are never mastered. To help her design her instructional program.

The other thing that sampling performance on the year-long curriculum facilitates is standardized procedures for how to sample curriculum, how to administer the test and how to score the tests rather than having teachers that have hierarchy skills and free skill that have defined a mastering measurement tasks and they often don't know the technical properties of that mastering measurement test. There is a lot less research on

technical properties of mastering measurement tests. And all of that comes together so that CBM scores relate in a more reliable and valid ways to performance on the high-stakes test. So, any other questions or comments about that?

Just a couple of examples here of our screeners, there is a kindergarten screener. Where each group administer, which is nice. So, the child is taught the item types, the problem types, so they have to write for here. They have to, you know do the addition problem, but with concrete objects to do it with. There are either doing an addition problem, but with only the Arabic numerals to do it. Cross out 2, that's a subtraction problem with concrete objects to do it with. There is one with Arabic numerals and those are the problem types that are always displayed on each weekly test in random order and different problems, but representing a same problem types in the same proportion. So, we can use that for screening or progress monitoring.

This is a screener called a number sets test, which I think is a very good screener for 1st and 2nd grade and it really provides a good measure of an individual's numerosity. So, it can tell you who is at risk or not for that outcome. What it soon does is there is the target numeral and they have to move very quickly. They only have 60 seconds to do this as much as they can on this entire page and they have to circle all of the dominoes that sum to 5. So what it requires is sort of this quick apprehension of a quantity. Seeing immediately that's 4 without having to count 1, 2, 3, 4, all right, and putting the combination together to match it against the 5 and so they have 60 seconds on those pages and 90 seconds on those pages and that turns out to be one of the more reliable mass screeners at 1st and 2nd grade. There is a website that I mentioned. There is an example of a page from the tools chart that's on that website and so you can go to the different tools and you can click there and or click on any of the bubbles to get more information about how the tool did on any of the different criteria that technical review committee rates tools on. So there's something like that for progress monitoring. This is the progress monitoring one. There is something like that on screening and their something like that on what will be available by June on tutoring programs. I actually think that I need to stop there to open it up for questions. See what you guys want to, questions you want me to answer? Or things you want to talk about?

**AUDIENCE MEMBER: Inaudible**

LYNN FUCHS: Okay, let me do that. So when I think about and I found out about the tertiary versus secondary prevention, I think that there are a few things that distinguish it from secondary. In tertiary prevention, I think this is the first time that we are setting individualized goals for students, so sometimes we are talking about actually moving a level down the curriculum to set the year-end goals. So a child might be in 3<sup>rd</sup> grade and the goal is to master the 2<sup>nd</sup> grade math curriculum. That some people might think it's controversial. The people in the US Department of Education do not. And we can talk about that more if you'd like. And, we are talking about an individualized programming, I believe, so that we start out with a validated protocol. So we began tertiary prevention with a validated program, tutoring program, but we are implementing

it more frequently with longer sessions, with smaller group size. At least one of those 3 level dimensions of intensity to make the protocol more intensive than it is when it's used for secondary prevention.

So for example, for people who are in morning session for using Hotmath small-group tutoring, for secondary prevention, and we have a group of children who don't respond, which we do. We always do. I mean, if anybody tells you that they have a program that works for everybody, you should be skeptical, okay? So, small-group Hotmath tutoring works for most kids, but it doesn't work for everybody. And, what I would suggest is, okay, Hotmath is a pretty good program. Let's start with Hotmath, but instead of doing it 3 times a week for 20 minutes a session in groups of 2 to 4. We're now going to do it for 40 minutes, we'll still use small groups, cause that's efficient, and we'll do it instead of 3 times a week we'll go for 4 times a week. So we've already made that program more intensive than it was designed, but when it was validated, okay. But in addition to doing that we're going to collect ongoing progress monitoring data and we're going to use those ongoing progress monitoring data to inform us about how well the child on an ongoing basis, we're going to look at those data frequently to decide whether the student is responding to that intensified tutoring program. We don't really expect that the child will. That's not our expectation. He might. Which would be wonderful, but this is a child who has been given pretty good quality instruction and has not profited. So we are prepared for the possibility that the child is not going to respond and are going to have a pretty flat line representing his lack of progress and we are then going to use the ongoing progress monitoring data as our dependent variable to experiment with changes to the instructional program. Okay. So we are going to, let me give you an example what I mean.

This is, we call him Roberto and that's his progress-monitoring graph when he's entered tertiary prevention, okay. And we started actually what the Hotmath protocol implemented more frequently for longer duration and actually on a one-to-one basis. Okay? He did very nicely in computation. His trend is looking higher than the individual goal we set for him, okay. But look at his response to on concepts and applications. Okay. It's, that goal line is flatter than his, that trend line is flatter than his goal line. So he is not making adequate progress to master the goal. Okay. So what his teacher did at that point was to say, "Okay, I need to make a change in the instructional program. I'm not throwing out pirate math, you know I'm not going to design an entirely new program, but I'm going to look at his CBM probes, look at the word problems on those tests. I'm going to figure out what he is having difficulty with." So she considered Roberto's performance at that point and she determined that based on her interactions with him during tutoring and his assessment data that he was having difficulty differentiating the word problem types. Especially when irrelevant information was in the problems, okay. So what she did was she added some instructional time on mixed problem types. She lent in an activity into the program that gave Roberto practice in sorting problems into their problem types and she added the instructional time on irrelevant information, okay. That's what she tried. That's represented in this intervention line and then she continued to collect data to see whether that instructional change was going to produce a more acceptable rate of progress for Roberto and you

can see that now his trend line is steeper than his goal line, so things are looking pretty good. She's going to continue to collect data to make sure that as the year is playing out we're continuing to see adequate progress, but that's what I mean about, that's a very big intensification from secondary to tertiary. In secondary we're using a program that we expect to work with most children. When we find that it does not work with a small subset of children in our school we have to do something that's more responsive to their individual needs and, so we're going to a process where we're using data to help us empirically individualized that child's program so it will work for him. Questions and comments about that?

AUDIENCE MEMBER: The amount of time spent on progress monitoring as opposed to them spending their time.....

LYNN FUCHS: Well remember, it's once a week. It's not every session. So, these are weekly, weekly assessments. We don't think that there is much gain by doing the progress monitoring, data collection more than once a week, from a technical standpoint. We, so if you're doing both concepts and computation, applications at 2<sup>nd</sup> grade, 2<sup>nd</sup> grade CBM, then we're looking at about 4 minutes of testing a week. So you have to decide, you know as a professional, whether you think the information you're gaining on an ongoing basis to help you, you know, tailor the program over time is worth the, cause your right! You are sacrificing some instructional time for the purpose of assessment. And there are some programs actually that are entirely computerized, but they tend to be more expensive than programs that are paper-pencil based and those programs are on the tools chart and they tell you which ones are computerized and what they do and how much they cost and so forth.

AUDIENCE MEMBER: In the morning session you spoke to my study right at the end of the session, you spoke to a study that you have done where you examined the benefit or added value of core instruction along with tertiary secondary or tertiary instruction. Could you speak to that a little bit for us to with this in mind, because I am also grappling with the time issue. This is, I'm thinking, more time for us to pull this off and where can we get that time from.

LYNN FUCHS: Well I think that, you know, you have to, and it's, you know there is sort of a political correctness to all this, so, I'm not entirely comfortable, but I think that you have to as the school look at each individual child and look at the relationship between where there still needs are and where the general education program is targeting its instruction, probably involve the parents in the decisions and decide whether how much value added there is from the primary prevention program. What contribution you're estimating that's making as opposed to what kind of contribution something like this could make. If I were a teacher doing this, I would feel good about removing the child from some portion of his general education program if I felt that first of all I was seeing progress. So I saw some good response and second of all I felt that what we were working on was being connected to what the general education program was working on in some important meaningful way. So, I think that you know those are hard decisions to make, but I think schools should think flexibly

about that. I had this talk that I once gave at the US Department of Education and if you're interested I'll send it to you and that kind of speaks to that issue. You know, what does access to the general education curriculum mean? And, you know people in the field I think are kind of scared by that and think that, that means that they have to have a kid in the general education, literally in that classroom all the time. Working on exactly what the general education program is working on. That's not how the US Department of Education interprets the access to the general education curriculum. So if you're interested in that paper I can e-mail it to you.

AUDIENCE MEMBER: Do we just give you our email addresses and...

LYNN FUCHS: I guess I don't know how I would collect it, because I'm going to leave in just like 2 minutes, but my e-mail address is [Lynn.Fuchs@Vanderbilt.edu](mailto:Lynn.Fuchs@Vanderbilt.edu) and if you somehow don't get that, then the last slide in the presentation has Flora Murray's e-mail and if you tell her what you want she'll e-mail me and she'll either respond or I'll respond to you directly.

So any final questions before I depart?

I wish you success and good luck with your RTI Systems and this is an ambitious undertaking.