Transcript from Webinar on February 1, 2019
Best Practices in Study Reporting:
The What Works Clearinghouse Guide for Authors

Slide 1
Brice: Hello everyone, and thank you for attending today's webinar. I will be briefly going through some housekeeping information before we get started.

You can make the slides larger on your screen by clicking the bottom right corner of the slide window and dragging. If you have access to the audio for the webinar through the teleconference line, you may experience a slight delay. If possible we encourage you to listen to the webinar through your computer or device speakers.

We encourage you to submit questions throughout the webinar using the Q & A tool on the webinar toolbar on your screen. You can ask a question when it comes to mind, you don't have to wait until the question and answer session.

Because we are recording this, every member of the audience is in listen only mode. That improves the sound quality of the recording, but it also means that the only way to ask questions is through the Q & A tool. So, please use that.

We have scheduled 60 minutes for this webcast. We will try to answer as many questions as possible. The slide deck and a recording and transcript of the webinar will be available on the What Works Clearinghouse website for download. So with that introduction, let's get started. I'd like to introduce Chris Weiss of the U.S. Department of Education, Institute of Education Sciences, who is the Team Lead for the What Works Clearinghouse. Chris, you now have the floor.

Chris: Thank you, Brice. Hi, I'm Chris Weiss. I am, as Brice just said, the Team Lead for the What Works Clearinghouse at the Institute of Education Sciences at the U.S. Department of Education. On behalf of the Clearinghouse, I would like to welcome you to this afternoon's webinar on best practices in study reporting. Over the next hour, you will learn more about what the WWC looks for in reviewing a study. We will present some resources to help you in your research, and conclude with a question and answer session, which we hope will address questions you may have, or learn from others who have questions as well. We would like to really thank you for joining us this afternoon. And with that, it is my pleasure to turn it over to Megan Shoji. Megan?

Megan: Thank you Chris, and thank you to everyone for joining us today. My name is Megan Shoji, and I'm a researcher at Mathematica Policy Research, and a reviewer for the What Works Clearinghouse, or the WWC. And I am joined today by my colleague Dana Rotz, who is a senior researcher at Mathematica, and one of the deputy project directors for the WWC. During today's webinar, Dana and I will be describing the WWC and its operations, focusing on what it looks for in studies. Understanding these processes will help you align with best practices and

study reporting to the WWC. And it will also enable you to position your studies for complete and efficient WWC review, so our staff won't need to contact you for more information.

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Our plan for today is to present for no more than 40 minutes on what the WWC is, what information it looks for in studies, and what happens if the WWC needs more information than a study provided. We will briefly share some additional WWC resources, and will then have time for questions. As a reminder, you can submit your questions using the Q & A tool at any time. You don't have to wait until the question and answer session. And if you have more questions after today's webinar, we encourage you to submit your questions through the WWC Helpdesk by February 15th. And we will share answers to those questions on the WWC website. And with that, I will turn it over to Dana to start us off on today's presentation.

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Dana: Excellent, thanks Megan. Before we jump into best practices for reporting study information to the WWC, we would like to take a moment to talk about what the What Works Clearinghouse is.

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Dana: Over the past two decades, there has been an increased emphasis on making instructional or education policy choices using evidence from scientifically-based research. But identifying evidence-based programs and practices can be both time-consuming and difficult. Searching for research may return dozens or even hundreds of studies. And, even with a lot of time to read all of this research, it can be difficult to identify the high quality studies that provide the best evidence. Or, to know which evidence to believe when different studies show different findings.

The What Works Clearinghouse was established in 2002 to be a central and trusted source of scientific evidence for what works in education. It was one of the first investments of the Institute of Education Sciences, which is an independent nonpartisan entity within the U.S. Department of Education, responsible for education-related research, statistics, and evaluation. The WWC seeks to identify all relevant rigorous research studies on a topic, review those studies against WWC design standards, and then summarize the findings from the high-quality research.

The WWC's goal is to help busy educators and policymakers efficiently make evidence-based decisions based on the most rigorous research. The WWC does not directly test or study education interventions. Instead, we summarize existing evidence for educators, administrators, and other stakeholders and can support decision-makers and researchers in finding and accessing evidence to answer a range of questions related to the effectiveness of education interventions, including practices, products, programs, or policies.

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Like researchers, the WWC seeks to advance scientific evidence for what works in education. Helping students is the WWC's ultimate goal, and that is what motivates many of us, as well as you all in the audience, to do the work that we do. To achieve this goal, the WWC focuses on

getting information about what works in education into the hands of key stakeholders, such as teachers, school and district leaders, and state federal policymakers. Because it's all about supporting educators to improve student outcomes, the WWC also solicits feedback from stakeholders about what they need to know.

Researchers are a critical partner in this process. With an eye toward supporting evidence-based decisions in education, the WWC reviews studies against standards designed to identify evidence of interventions that improve student outcomes. Researchers are key partners in developing those standards, and the WWC publicizes its standards and other resources on the web to help researchers generate more research that can support evidence-based decision-making. So, the WWC is really a joint effort with the research and education communities to create an effective cycle of research and dissemination that flows towards improving student outcomes and other outcomes relevant to education.

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The WWC documents study characteristics and the context of reviewed studies because study conditions, sample characteristics, and the study setting provide important context for understanding findings. The WWC then summarizes evidence from reviewed studies in four types of publicly available products. These products include intervention reports, which review all of the publicly available research on specific interventions, and synthesize the findings from rigorous studies to guide evidence-based decisions. There's also practice guides, which help educators address challenges using evidence-based strategies. There's quick reviews that provide timely assessments of recent research studies receiving public attention. And finally, individual study reviews summarize individual studies the WWC has reviewed.

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The best practices and reporting that we will describe in this webinar are important for all studies eligible for WWC review, regardless of the type of summary the WWC generates. And although we will focus primarily on group design studies, including randomized controlled trials and quasi-experimental design studies, regression discontinuity design studies and single case design studies are also eligible for WWC review.

Please take a moment to think about how you see your role in building scientific evidence about what works in education. For example, do you see your role as developing new education interventions to test? Maybe generating evidence on the impacts of interventions? Or, generating evidence about the context or populations for which an intervention works best? Or, identifying the implementation supports and conditions needed for an intervention to work? Maybe you see your role as a combination of these things, or maybe all of them. The WWC can help with each of these goals, but we need certain information from study authors to complete our reviews of studies.

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Next, we will describe what information the WWC looks for in studies identified for WWC review. I'll turn it over to Megan to start us off.

Megan: Thanks, Dana. So I will start with the big picture, and then we can dig into some details about what the WWC looks for in studies.

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So at a high level, the WWC looks for evidence of what works in education. Education research examines a wide variety of issues. Topics include implementation, assessment of disparate outcomes, the effectiveness of interventions, and many other topics. But the WWC focuses specifically on research on causal effects.

The WWC rates the quality of evidence that a study provides for demonstrating effects of an intervention. And to do this, the WWC asks, "Does the study have a design that can support causal inferences about the impact of an intervention on student outcomes?"

We can have confidence in impact studies when the design rules out other potential causes of effects. In other words, a well-designed study is one where you can be confident that any improvement you see in student outcomes was due to the intervention being studied, and not to some other characteristic of the districts, the schools, the teachers, or the students participating in the study.

We should interpret findings from impact studies with caution when there are design factors that call into question whether the study really rules out other causes of effects. Such as, if there was high sample loss over the course of the study, which is known as attrition, or if there was nonrandom assignment of study participants to intervention and comparison groups.

We cannot have confidence in impact studies when factors besides the intervention may be responsible for the measured effects. For example, this is the case for a study that lacks a comparison group, a study with substantial differences between the intervention and comparison groups at the start of the study, which is known as baseline nonequivalence, or, a study with a factor other than the intervention that was perfectly aligned to one study condition, which is known as a confounding factor.

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Now that we have a sense of the big picture, let's dig into the details. The WWC looks for three basic types of information in impact studies: study characteristics and context, study design and analysis details, and study data. In the next part of the webinar, we will walk through each of these in detail, and describe the specific types of information that the WWC looks for in a review.

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I'll start with study characteristics and context. The WWC looks for information on three aspects of study characteristics and context that ultimately help education decision-makers understand whether the intervention might work in their own context.

First, the WWC looks for information on the intervention and comparison conditions. WWC reviewers look to answer what intervention does the study evaluate, and what services, if any, were provided to the comparison group. The goal here is to understand what is being tested, and

the contrast between the intervention and comparison groups. So, the WWC looks for a description of the intervention that the study evaluates, which could be a program, a product, a policy or a practice, as well as a description of any services received by the comparison group.

For example, a study might evaluate an early math curriculum designed to improve young children's early numeracy skills, and the study might use a comparison group in pre-K classrooms in public schools that is not receiving similar services to the early math curriculum being evaluated. The WWC will look for specific information on several aspects of the intervention to provide context for understanding study findings. This includes its intended and actual duration, intensity, content, and delivery. For example, over how many weeks was the curriculum used? How many minutes a day did they spend on the curriculum? What specific math topics were covered? Who delivered the curriculum? And how does this compare to what the curriculum developers intended? The WWC will also look for information on any implementation supports provided, such as initial training or ongoing coaching for implementers of the curriculum. And, the WWC will look for information on the delivery method. For example, was the curriculum implemented with individual students, with small groups, with whole classes, or with whole schools? This type of information helps education decision-makers understand what is involved in implementing the intervention. And, it helps them assess whether the intervention might be a good fit for their context and for their needs.

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Beyond the intervention and comparison conditions, the WWC also looks for information on the study sample to understand who participated in the study. The WWC looks for things like student ages or grade levels, the population or subgroup that students represent. For example, this might include whether the sample is from the general education population, or a subgroup, like special education students or English learners. The WWC also looks for the school type—meaning whether the sample was drawn from public, private, charter, or parochial schools—and student background characteristics, such as the racial, ethnic, and gender distribution of the sample and the proportion of students eligible for free or reduced-price lunch. This information ultimately helps decision-makers assess whether the study findings might apply to their own populations of students.

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Finally, the WWC looks for information about the study setting to understand where did the intervention occur. For example, the country or state, whether the setting was urban, suburban, or rural, and the school or classroom context where the intervention occurred. For instance, was it in school or out of school? Was it in regular or inclusion classrooms, or perhaps it was only in Title I schools? The WWC will also look for any other notable setting characteristics, such as whether the intervention occurred in classrooms of teachers with a specific credential. This information helps decision-makers assess whether the study findings might apply in their own context.

Next, Dana will talk about the second type of information the WWC looks for in impact studies, which is study design and analysis information.

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Dana: Thanks Megan. The WWC looks for four aspects of the design and analysis to determine how to rate the study design of each analysis reported in the study. First, the WWC looks for information on the measures used in the study. For each outcome measure, this includes a description of the measure, and its psychometric properties, the scoring procedures used, and whether the data were collected using the same procedures for the intervention and comparison groups. For instance, the example early math study Megan described earlier might use the *Individual Growth and Development Indicators of Early Numeracy* as its outcome measure. This is a 10-minute assessment that measures early numeracy and has high established test-retest reliability and concurrent validity. Knowing this information helps the WWC assess the eligibility of studies to be reviewed under different topic areas. To be eligible for WWC review, the study's outcome must be related to the topic area, and meet criteria described in the specific review protocol. For example, a review protocol might require that either the outcomes be standardized measures with established psychometric properties, or that outcomes demonstrate the minimum level of reliability or validity based on the study data.

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The WWC also looks for basics of the study design, including how eligible students, classrooms, teachers, or schools were identified and recruited for the study and how study participants were assigned to the intervention comparison groups. For example, this includes whether the study recruited and assigned individuals to intervention and comparison groups, or clusters of individuals, such as classrooms or schools. It also includes whether the individuals or clusters of individuals were assigned to the intervention and comparison groups through random assignment, or by some other method. And it includes the assignment procedures and processes used, including when and how the study assigned participants to intervention comparison groups. For example, for a random assignment study, the WWC would want to know if authors varied assignment probabilities, or used stratification in random assignment. For a nonrandom assignment study, they might ask, "What kind of matching methods did the study authors use?" The WWC uses this information to determine what study data will be needed to assess the quality of the study design.

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The WWC also looks for information about the analytic approach. Its goal is to understand what analytic methods were used to estimate impacts and calculate effect sizes. For example, the WWC looks for whether the study conducted the analysis using data on individuals, or data aggregated into groups, such as classrooms or schools. The WWC will also look for the method used to compare outcomes for the intervention comparison groups, for example, linear regression, or ANOVA, or a comparison of means. And also, which variables if any, were controlled for in that analysis. In addition, the WWC will look for how statistical significance and standard errors were calculated. This includes whether any adjustments were made to correct for clustering of individuals within groups, or for testing impacts on multiple outcomes.

And finally, the WWC will look for information on which units, and by that I mean students, teachers, classrooms, or schools were included in the sample used to measure the impact of the intervention. This includes whether any units were excluded from the sample, and if so, why. And, in the case of a randomized controlled trial, whether any units entered the sample after

random assignment. The WWC calls individuals who enter clusters after random assignment "joiners."

The WWC uses all this information to determine how to report the findings of the study.

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Finally, the WWC looks for information about how the analysis accounted for missing data, including which methods were used, and which software was used to carry out those methods. For example, this method might be multiple imputation with chained equations, and the WWC would also look for the author to specify the specific software package used to carry that imputation out. The WWC is interested in this information, with respect to both baseline data, meaning pre-intervention measures, and outcome data. And the WWC uses this information to determine whether the study used acceptable methods to account for missing data.

Lastly, Megan will describe the types of study data the WWC looks for in impact studies.

Megan: Thanks, Dana.

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The WWC looks for three types of study data that it uses to summarize findings and rate the study design of each analysis. First, the WWC looks for outcome and baseline data for each analysis. In all studies, for each outcome measure and pre-intervention measure, the WWC looks for the numbers of individuals in the analytic samples, the means, and the unadjusted standard deviations for the intervention and comparison groups. The WWC uses this information to assess baseline equivalence of the intervention and comparison groups, and to document impacts. For instance, the example study of an early math curriculum might report these means and unadjusted standard deviations for 55 students in an intervention group and 60 students in a comparison group. The WWC could use the means and unadjusted standard deviations for the study's outcome measure, which is the spring numeracy test, to document impacts. The WWC could use the same information for the study's pre-intervention measure, the fall numeracy test, to assess baseline equivalence of the intervention and comparison groups.

Second, the WWC looks for the estimated effects of the intervention on each outcome measure, including the statistic used to estimate the effect. One statistic might include a regression coefficient, the associated *p*-value, and the effect size. When reported, the WWC uses this information to document impacts. For example, the early math study might report this t-statistic, associated *p*-value, and effect size for the difference in means between the intervention and comparison groups.

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Besides the number of individuals in intervention and comparison groups for each analysis, the WWC looks for additional sample size information for two types of studies. Randomized controlled trials, or RCTs, where the study of randomly assigned individuals or clusters to intervention and comparison groups, and cluster designs, where the study assigned clusters of individuals to intervention and comparison groups through either random assignment or nonrandom assignment.

For all RCTs, the WWC looks for the number of individuals in intervention and comparison groups at the time of random assignment. For example, the early math study we've been discussing might report that 55 students were randomly assigned to the intervention group, and 65 to the comparison group. The WWC uses this information to calculate sample loss, which is also known as attrition. In the example, only 60 of the randomly assigned comparison group students were included in the analysis for the spring numeracy test, so the WWC would calculate attrition rates based on the five students who dropped out of the sample.

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For cluster designs, the WWC also looks for the number of clusters in the analytic sample for the intervention and comparison groups for each outcome measure, and the number of individuals within those clusters around the time that baseline data were collected, and around the time that outcome data were collected. To illustrate, the example early math study might report that there were five intervention group classrooms and six comparison group classrooms in the analytic sample for the numeracy test outcome. In the fall, when baseline data were collected, there were 63 students in those five intervention group classrooms, and 67 students in those six comparison group classrooms. But in the spring, when outcome data were collected, some students had moved away and left the analytic sample classrooms, so there were only 60 students still enrolled in the five intervention group classrooms and only 63 students left in the six comparison group classrooms.

The WWC uses this information to assess two things. First, baseline equivalence of the intervention and comparison clusters and, second, whether the analytic sample is representative of the clusters. Recall that for this example, the analytic sample itself included 55 intervention group students, and 60 comparison group students.

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For cluster designs that are also RCTs, the WWC also looks for the number of clusters in intervention and comparison groups at the time of random assignment, as well as the total number of individuals in the analytic sample clusters at the earliest point in time after any joiners entered clusters that remain in the analytic sample. In our early math study example, three students in comparison group clusters and two students in intervention group clusters enrolled in study classrooms after classrooms were randomly assigned to study groups, but within the first month of school. And, the study later collected data on these joiner students and included them in the analytic sample. For clusters included in the analytic sample, which are shown in the second row of this table, the WWC would need to know the total number of students, including these joiners, in the intervention and comparison group clusters at the earliest point in time after these joiner students entered the sample. This is shown in the third row of this table. This would include both students who end up in the analytic sample, and the students in the analytic sample clusters, but whose individual data are not actually used in the analysis. The WWC uses this information to assess cluster-level attrition, and nonresponse within clusters.

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Finally, only for studies that have missing baseline data or studies that use imputed data for any missing observations on outcome measures, the WWC looks for information on the missing and imputed data for each analysis. The WWC looks for baseline and outcome data for measures for which any observations are missing or imputed in the analytic sample. The WWC can use that information about non-missing data to infer something about the missing data.

The WWC looks for the number of individuals and the baseline and outcome means for the intervention and comparison groups, as well as the correlation between the baseline and outcome measures, calculated using only non-imputed data. For its numeracy test outcome measure, our example early math study might report that all 55 students in the intervention group had both baseline and outcome measures—in this case that's the fall and the spring tests. But, while 55 students in the comparison group had both fall and spring tests, five students had only the spring outcome measures. Moreover, the correlation between the fall and spring measures was 0.89.

When a study uses imputed baseline data, the WWC can use this information to assess baseline equivalence between intervention and comparison groups. And when a study uses imputed outcome data, the WWC can use this information to assess whether potential bias is limited.

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For the next section of the webinar, I will turn it back over to Dana to talk about what happens if the WWC needs more information than a study provided.

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Dana: Okay, great. So, if after three WWC staff members have examined a study and conferred on it, and that team determines that the WWC needs more information than the study provides in order to conduct their review, the WWC will request additional information from the study author or authors. This is called an author query; a request is sent to a study author for additional or clarifying information needed to review a study. Providing this new information could result in the WWC assigning the study a higher rating. Authors typically have two weeks to respond to an author query, but may request an extension. And all information received by the WWC is used by the WWC for its review, and is documented in a report made available to the public. If the WWC does not receive a response to its query, reviewers proceed using only the available information.

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The WWC will ask for any information not provided in the study that could affect the study's rating. Typically this includes information about the study's sample sizes, baseline or outcome statistics, or information about study group formation, confounding factors, outcome measures, or imputation procedures.

In addition to the information needed to determine the study's rating, the WWC may also ask for other information that could be reported, such as the sample's characteristics, features of the intervention or comparison group conditions, or analyses that were referenced in the study, but not fully presented. But, the WWC will not ask authors to conduct any new analyses as part of an author query.

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Okay, so we have now presented on what the WWC is, what information it looks for in studies, and what happens if the WWC needs more information than is provided in the studies in order to conduct their review. Before moving onto our participant Q and A session, I would like to present some of the resources the WWC can offer to study authors.

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There are several resources you may want to access after today's webinar for additional information. First, there's the WWC reporting guides for study authors. We have versions for group design studies, and regression discontinuity design studies. The WWC also reviews single case design studies.

WWC review protocols might also be useful to you. These protocols contain information on study eligibility for different review efforts.

And the WWC Procedures and Standards Handbooks are also available. These describe WWC review procedures and standards in greater detail. Separate standards exist for group design studies, regression discontinuity design studies, and single case design studies, as described in the handbooks.

With that, I will turn it over to Elias Walsh, a senior researcher at Mathematica, and one of the project directors for the WWC, to moderate the question and answer portion of today's webinar.

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Elias: Thank you, Dana and Megan. As a reminder, you can submit questions through the question and answer tool, and if you have more questions that do not get answered today, after today's webinar, we encourage you to submit your questions through the WWC Helpdesk, by February 15th. We will share answers to the questions we receive on the WWC website.

Let's start with a question that we received during the webinar. A participant asks, "How I can get an existing study reviewed by the WWC?" So, you can submit all suggestions you have about studies that you would like to see the WWC review to the WWC Helpdesk. The WWC will consider your suggestions when deciding on topics for systematic reviews, or when conducting other study reviews that the WWC will conduct. If you have suggestions, by all means submit them through the Helpdesk.

Here is a question that we hear a lot from folks that I'll ask Megan to respond to. "Can my response to an author query ever lead my study to get a lower rating than it might have otherwise?"

Megan: Yeah, so this is a great question. And the answer is that we assign ratings to a study as a final step at the end of the review based on all of the information we obtain, including information from the author query. So in many cases, the information provided by an author query does affect the WWC's conclusions and the ratings that the study would receive. In many cases, the information can lead to the study receiving a higher rating than it otherwise would.

For example, we might obtain data that allows us to assess baseline equivalents of a QED, a quasi-experimental design. But it is possible it can go either way because we use all the available information in order to assign the study rating.

Elias: Thanks, Megan. Another one for you that we hear a lot, "Does the WWC sometimes ask authors for information that is not necessary for its review of a study?"

Megan: Yeah, so the WWC aims to ask only for information that is needed to complete our reviews. However, sometimes some of the information that we are asking for that we described in today's webinar, for example, may turn out to be unnecessary based on what we ultimately learn about the study through the review. So, for example, we talked about how we look for the sample sizes, means, and unadjusted standard deviations for intervention and comparison groups for all studies, which we can use to document impacts. But, if the study also reported the estimated effect of the intervention, and we find that they appropriately adjusted for any clustering of individuals within groups, or testing of impacts on multiple outcomes, then we could use the study reported estimated effects to document impacts. And we will always report that information when it is appropriate. However, providing the other information ensures that we will be able to document impacts even if we discover that the study did not appropriately adjust for something like clustering, or multiple comparisons. So we recommend that authors include this information in their studies up front because it will ensure that the WWC staff won't need to contact you for more information later.

Elias: Thanks, Megan. We received a question about a specific kind of study, a school-level assignment study with analysis conducted at the school level, such as looking at school-level student achievement. The question is in this situation, "Would the WWC need to know how many students are in each school?" That's the first question, the answer to that first question is, not necessarily within each school. But the WWC would want to know potentially how many students are present in the schools in each condition that are included in the analysis, and how many are in the school that may or may not have been included in the analysis. The reason the WWC wants that information is to understand whether the individuals, the students within the schools, are representative of the whole school. That's part of the assessment that the WWC will make in assigning a rating to the study.

Another question here is whether the authors can demonstrate baseline equivalence in a study like this by showing that the school level-student achievement at baseline is within the range that is acceptable to the WWC. And yes, that can be an acceptable way to show baseline equivalence. To look at school-level achievement in the previous year even though students would not be the same in the baseline and the outcome sample, because students progress through grades over time. The WWC can use that information to assess baseline equivalence. But, again, it would need to know that the students included in the data used to measure pre-intervention and outcome data are representative of the students in the schools more generally. And to do that, it would need to know the sample sizes of students.

So, that is an answer to a specific kind of research design.

Another question we got here is someone who wants to know if they have submitted a suggestion for the WWC to review a particular study, but didn't hear back from the WWC, what does that mean. The WWC does not make immediate decisions, typically, on the studies that it receives as suggestions. It might be helpful for me to talk a little bit more about how the WWC does decide to review studies. There are a few different reasons that the WWC will identify a study for review. One is as part of its systematic review process, to develop products like intervention reports and practice guides, as described in the WWC Procedures Handbook. The WWC has a process to identify topics for these products, and that process considers things like the amount of evidence available on each topic, and the relevance of the topic to decision-makers. Once a topic is selected, the WWC would then conduct a thorough search to identify all of the available research on that topic.

But the WWC also reviews some studies outside of its systematic review process. These include new studies that are getting media attention that the WWC will then try to review quickly to get an assessment out to the public quickly. The WWC also reviews studies that are cited in the Department of Education grant competitions, to provide evidence of the effectiveness of an intervention or approach, and for some other reasons. So, those are some of the reasons the WWC reviews studies. In making those decisions, hearing from the public, and from researchers, about studies they would like to see reviewed, is helpful information to make those decisions.

Megan, why does the WWC send multiple author queries sometimes?

Megan: So, there are two basic reasons why this might happen. One is, it's either because we can reduce burden on the author by first getting answers to more basic questions. Or, the second reason that multiple author queries might get sent is because we need to follow up on something that we have learned. So, for example, we might learn in a first author query that the study imputed baseline data. And then we need to follow-up with a second author query to get information on the imputed data and the methods and software that were used to impute them. That way, we can assess whether the study uses accepted imputation methods, and so that we can assess baseline equivalence and we wouldn't have known that we need that until we got the first set of information.

Elias: Thanks, Megan. Another question we have, which is a good one, I think, is, "What information do you wish you could report on, but we typically don't have enough information to report on?" And the participant suggests this might be something like student engagement in the intervention, details about the training.

And, certainly, implementation information is certainly something that study authors sometimes provide a lot of detail and other times provide very little detail. The WWC definitely benefits in how it can communicate the implementation resources, in particular, to decision-makers when authors include a lot of information about how the intervention was implemented and the support that was provided to implement the intervention.

Related to those issues are costs. I think another area where we often have very little information to report to decision-makers is in understanding the full set of costs associated with

an intervention. And there are a lot of ways interventions can impose costs, whether new instructors need to be hired to support the intervention, what kind of training and time and costs are involved, and just the cost of any resources, and along those lines. Cost I think is another area where we often would like to be able to report more from what studies often contain. That's a great question.

Let's see, we have a question here: "For pre-post studies and reporting, is there a preferred missing data technique, or procedure the WWC recommends? Or, are there times when list wise deletion [or complete case analyses as the WWC sometimes refers to that approach] are appropriate and no other missing procedure data be used?" Great question. Rather than giving a detailed answer here on the call, I would refer you to the WWC Standards Handbook, which can be accessed on the WWC website. There is a whole section of that handbook on missing data approaches, and there is a table in that section that describes the missing data approaches that the WWC will consider acceptable, and the circumstances under which they might be acceptable. So that would be the resource to consult there.

We have a question here, "Is there a minimum number of students required for a study to meet WWC standards without reservations?" Dana, would you like to take that one?

Dana: Sure. The answer there is, no. There is not a minimum number of students in order for a study to meet WWC group design standards, with or without reservations, with one kind of exception. And that's that there needs to be multiple individuals in both the intervention and comparison groups. So, if you only had one student in one of those groups, a study would be classified as having a confounding factor. But with the exception of that very, very small sample size, there is not a minimum number of students required.

Elias: Thanks, Dana. Another one for you, Dana, "Does the WWC have a template or tables describing the information that the WWC often looks for when evaluating a study, so that study authors can make sure to include that information when working on the manuscript?"

Dana: Yes, these are definitely available.

Flipping back to slide 27
So in this resources slide, the last slide that we had presented, we referenced the WWC reporting guides for study authors. And we have those reporting guides for both group design studies and regression discontinuity design studies. And those reporting guides actually contain the table shells that were used to develop today's presentation and the table shells that individuals can use to make sure they include all the needed information.

Elias: Thanks, Dana. Following up on the earlier question about what information the WWC would like to know more about, someone else asks about intervention studies that compare one intervention to another intervention. And says, "It seems less common to see an intervention study that has a true comparison group, in the sense that there is not a separate intervention implemented there. This makes it difficult to understand whether the intervention confers a value over what would maybe be typical instruction. Does the WWC require that an

intervention—require reporting on what happens in both the intervention and comparison groups?"

This is another area, as I mentioned, where WWC would often like to know more information than we typically have about comparison group. Because in an education setting, there is always something happening in the comparison group. And sometimes studies are very good at describing the curriculum or other activities, the setting in the comparison group. But other times, we're left guessing. This is another area where decision-makers would benefit from more detailed reporting about what is in the comparison group for each study so they can understand whether a particular study finding might be relevant for their context given what is business as usual in their schools. So yes, we look for information about the comparison group, and often would like to know more than what we see.

Another question, "Have we seen improvement in the quality of studies that we have been evaluating, and what do we think is causing the improvement if so?" That's a great question. I'm not sure we have an answer right here for that. But we have seen that when the WWC sets standards, it has influenced what gets reported in studies. And, so, I think when setting standards, the WWC wants to set things that are reasonable. But also wants to try to raise the bar for what is considered the gold standard for reporting and research. That's a good question. And we will continue to monitor and think about how the WWC is impacting research.

Dana, does the WWC review qualitative observational case studies?

Dana: So, qualitative studies don't fit into the effectiveness ratings that the WWC provides. And the WWC does not review these studies, in the sense that we review other studies. But qualitative studies and case studies can sometimes provide information on interventions or practices that feed into the products that the WWC produces. So for example, the WWC produces practice guides, and case studies and qualitative studies can be part of the information that we draw on to produce those practice guides. They're just not reviewed in the same way as impact studies are.

Elias: Thanks, Dana. What are common mistakes in statistical analysis that we frequently encounter in reviewing studies for the WWC, and that we would like to see fixed?

So, I would say the most common mistake is not sufficiently reporting on baseline data. We often see studies that don't fully report on the baseline means and standard deviations and sample sizes, so just careful reporting on baseline measures in a way that for the same sample generally that is used in the analysis of outcomes, would be one.

Dana, do you have other thoughts, or Megan, do you have other thoughts on that? That's the one that comes to mind for me.

Megan: I will add to what you said, you sort of touched on it, but that not only reporting the full amount of information we need on baseline data, but reporting it for the sample that was used to estimate the effects. I think that is a very common thing that we see is that the baseline data,

when provided, is not for the same sample, and we are looking for the analytic sample information.

Dana: That's right, and the WWC actually has processes and part of the review process can handle when, for instance, baseline data is missing, for instance, if a student just didn't take the baseline test, but is included in the analytic sample. That is one example of when that happens. Another example is when just the whole random assignment sample, for instance, is included in those baseline statistics. And the WWC can't use the full random assignment sample to assess baseline equivalence in most cases.

Elias: Thanks, Dana and Megan. Another question, "Could we talk about the frequency of updating reports that the WWC has produced [say intervention reports or practice guides that the WWC has produced]? Do we actively update?"

So, the WWC will update reports when additional evidence comes out, but not necessarily right away. The WWC needs to strike a balance between investing resources in reviewing interventions that it hasn't reviewed before, and updating reports that it has when new information—when new studies come out on the topic. That balance is struck through, there is actually a formal scoring approach that you can read about in the Procedures Handbook, for how we decide whether to develop a new report on a topic, that is of interest to decision-makers, or decide to update an existing report. And it has to do with how much evidence is available and some other factors. So yes, we do update, but we also are focused on producing information about new interventions.

Another question is, "Would you say that WWC standards for reviewing studies are more, less, or just as stringent as publication standards for academic journals?" Well, I would say they are different. And, the standards are very different, and in place for different purposes. Academic journals will often accept descriptive studies and other kind of studies that are not eligible for WWC review, or could not meet WWC standards. And that's appropriate, because that sort of information is helpful and useful for researchers to learn about and decide you know, what might be promising areas to conduct more rigorous research. So, I am not sure I would say more or less or just as stringent, they are different in their place for different purposes. The WWC standards are in place to identify the most promising evidence for interventions and communicate that to decision-makers.

Let's see, I think we have time for one more. And again, if we haven't gotten to your question, we have it and we will put answers to questions up on the WWC website. And if there's anything else you'd like to ask, please submit that through the Helpdesk and we can also answer that on the WWC website. "Will you be adding new categories, such as social emotional learning, which has been a hot topic lately?" So, the WWC is working on deciding which topic areas to identify new interventions to review, and is currently in that process of identifying new interventions to review in early childhood to grade 12, and part of that conversation is definitely to consider interventions that may affect outcomes in social emotional learning. So, stay tuned.

Slide 29
I think we are out of time for questions, so, Brice, I will turn it back to you.

Brice: This concludes the webcast for today; the on-demand recording will be available approximately one day after the webcast. It can be accessed using the same audience link that was sent to you earlier. You can submit any feedback to the team through the contact us form on our website: https://whatworks.ed.gov. Thank you, and have a great day.