**KTDRR and Campbell Collaboration Research Evidence Training:**

**Overview of Systematic Review and Research Synthesis**

*Presenter: Terri Pigott, PhD*

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>> JOANN STARKS: Good afternoon and welcome to today's webcast brought to you by the Center on Knowledge Translation for Disability and Rehabilitation Research (or KTDRR) at American Institutes for Research, in coordination with the Campbell Collaboration. The Center on KTDRR is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research (known as NIDILRR) in the U.S. Department of Health and Human Services, Administration for Community Living. The Campbell Collaboration is an international organization that promotes positive change through the production and use of systematic reviews and other evidence synthesis for evidence-based policy and practice. The Center on KTDRR partners with the Campbell Disability Coordinating Group, or DCG.

I am Joann Starks with the Austin office of American Institutes for Research (or A-I-R) and I will be the moderator today. I also want to thank my colleague Shoshana Rabinovsky who is helping with the logistics. The KTDRR Center and the Campbell Collaboration are working together to offer a five-part training course that focuses on high-quality methods for synthesis of evidence, including the procedures and methods for conducting systematic reviews/research syntheses as well as software, tools, and strategies for analyzing and reporting data.

This first session, an Overview of Systematic Review and Research Synthesis, describes the benefits of evidence from systematic reviews, some different types of reviews, and looks at the differences between systematic reviews and research syntheses.

Now, I'd like to introduce our speaker. Now I’d like to introduce our speaker. Dr. Terri Pigott is Associate Provost for Research and Professor of Research Methodology at Loyola University Chicago, and she is a former Dean of the School of Education. She is currently the Senior Methods Editor of the Campbell Collaboration Editorial Board and the co-editor of the Campbell Collaboration Methods Group. Dr. Pigott received the *Frederick Mosteller Award for Distinctive Contributions to Systematic Reviewing* from the Campbell Collaboration in 2016 and is an author on six completed Campbell reviews. She has served on a number of editorial boards and is the founding chair of the American Educational Research Association Special Interest Group on Systematic Review and Meta-analysis, and is a member of the Society for Research Synthesis Methodology.. Now, let's get started.

>> TERRI PIGOTT: Thank you, Joann. Welcome, everyone. I want to start with our goals for the presentation today, so today I'm going to discuss sort of the rational for why we would do a systematic review and meta-analysis. I'm also going to describe the different types reviews that we might encounter in the literature, and then sort of give a little bit of a preview of overview of the stages of a systematic review and meta-analysis, although we will really deal with those issues in the upcoming webinar in March, we'll go into more detail about stages of systematic review and meta-analysis.

So let's start with the big question, why use systematic review and meta-analysis anyway? We'll start with the definition of systematic review, from Petticrew and Roberts’ book in 2006, a systematic review is a review that strives to comprehensively identify, appraise and synthesize all the relevant studies on a given topic, so I use the term systematic review to think about, to describe the activities of really trying to get all of the studies on a given topic and try to understand what they're all saying.

As Petticrew and Roberts say in the second quote there, it's a method of making sense of a large body of information, and a means of contributing answers about what works especially when we're looking at systematic reviews of interventions and what doesn't work, and many other questions as well.

The essential goals of a systematic review are as I alluded to, to summarize existing empirical research, but also to inform policy and practice. So we want to really understand what we've done, what we know about the literature in some given area in order for us to actually make the world a better place in some respects, and it also provides us directions for future research. If we're looking at a whole body of literature, if we really do get a handle on what we've done so far, it also gives us an idea of what we haven't done and provides some directions for future research.

And then the other essential goal of a systematic review is to use replicable and transparent methods to summarize existing research. We know how to do a very good primary study, we have a scientific method that we've used to, to get good primary study data. We want to use those same scientific techniques also in order to review and synthesize a whole other set of data.

Another piece of rationale or reason why we want to use systematic review is examining the results of multiple studies provides much stronger evidence than results from a single study. I think we can all think of an example where a single study has had or can have undue influence on practice and policy, and we also know that single studies have limitations in their design, their generalizability, maybe in how an intervention was implemented, and so forth.

Using systematic review can help us understand a whole body of literature where all the studies may have a little bit ‑‑ may have a few limitations, but as a whole the body of literature says something that a single study cannot. And we also don't use a‑subject design to assess public opinion and so we shouldn't do that also when we're making policy decisions in a given area.

Another compelling reason to use systematic reviews is that systematic reviews can provide us opportunity to examine various cross studies that are not possible in a single study. If we have multiple study, we can actually ask the question about why studies result ‑‑ why study results might differ or vary from each other? Is it because all these different studies are using different research designs or different samples or have different implementation of the intervention or are implemented in different contexts or use different measures, for example?

So meta-analysis, which is part of a technique you can use in systematic review can help us to statistically examine associations between study of results and variation in methods of cross studies, so I have a little illustrative example here on the left of the slide. This is made up, but for example, this is an illustration of effect size, the relationship of effect size to the percent of females in the intervention sample, and what we can see in this illustrative picture is that effect size ‑‑ studies with higher percentage of females in the intervention sample, tend to be, can have higher effect sizes.

What I'm going to do right now is we're going to examine one particular study, so I can again show you and illustrate some of the reasons why systematic review and meta-analysis is important. This particular study, there is a reference at the bottom of the slide from Littell entitled "Evidence‑Based or Biased? The quality of published reviews of evidence-based practices.” This is a traditional narrative review studying a particular intervention called Multi-Systemic Therapy, sort of a wrap‑around intervention for helping students who are in danger of actually getting into the criminal justice system. One part of this study examined how each of the narrative reviews characterized the results of the single primary study on Multi-Systemic Therapy, and so we're going to first look at the results of one study, and then we're going to look at how the narrative reviews, using that study, characterize its results.

One study that was included in the Littell piece is a study by Brunk, Henggeler and Whealan, comparing Multi-Systemic Therapy and parent training in a brief treatment of child abuse and neglect. There were 43 studies, oh I'm sorry, 43 families of abused and neglected children in this particular study, and randomly assigned either to parent training or to Multi-Systemic Therapy. 33 of the 43 families actually completed the treatment and provided data on all the outcomes, so there was some attrition in this particular study, and they collected data on 30 outcomes, which includes both the primary skills and their subskills.

This is a little sort of graphic presentation of the results that this study obtained comparing parent training and Multi-Systemic Therapy. The little white squares are the outcomes, so there are 30 outcomes represented here and the white squares are the outcomes where there was no significant difference between parent training and Multi-Systemic Therapy. The green boxes are outcomes where Multi-Systemic Therapy led to better outcomes for the families than the parent training. The red boxes are outcomes where the parent training outcomes were better for parent training than for Multi-Systemic Therapy, and the gray one is an outcome that was measured in the study but was never reported on in any of the subsequent papers.

The primary study, and interpreting the results, so if you look at the primary study, data was provided on all 7 statistically significant results in the paper, and then 12 of the 22 non‑significant results were actually recorded and reported in the study, and the study used a series of MANOVAs with groups of measures to look at the results.

You'll see that right away, I just want to point out, there are some outcome reporting bias here. We don't know what happened with the gray outcome and 10 of the non‑significant results are not actually provided in the text of the paper. What I want to do next is say, okay, so we have one more slide I think here.

What Brunk et al. said was that both groups showed decreased psychiatric symptoms, reduced stress and reduced severity of identified problems, so both parent training and Multi-Systemic Therapy were effective in decreasing some symptoms in the families, but that Multi-Systemic Therapy was more effective than parent training at restructuring parent/child relations, but parent training was more effective than MST--Multi‑Systemic Therapy--at reducing identified social problems. What I've given you now is just sort of a summary of what the primary authors have found in their particular study. Let's now look at how narrative reviews report on the results of this study.

So one review by Brunk et al., the little blue box in the middle shows you what Burns et al. focused on when reporting on the Brunk study. They focused on psychiatric symptoms and reduced overall stress. They talked about both interventions were effective there and also talked about MST improving parent/child relations. Note, they only talk about 5 of the 30 outcomes that were actually reported in the study and they focus on 2 of the significant ones that were significant in favor of MST, 3 that had no differences, and they do not talk specifically about any of the outcomes where parent training was superior to MST, so that's one narrative review's description.

Here is a second one done also in the blue part of the slide on the second piece, the Corcoran piece, and in this particular piece they focused on 3 of the 5 outcomes that were in favor of MST, which were 4 of the 22 outcomes there were no difference, and they found 3 outcomes for parent training, and we're not sure where that third outcome came from, that were in favor of parent training.

And so here is just a little summary of a whole set of published reviews on discussions of that single study that we just talked about, so you can see that each of these narrative, traditional narrative reviews focused on different parts of that single study, and we might make the case that no single one of these narrative reviews has actually captured the complexity of the results in that particular study.

Most of these reviews used a single phrase to characterize the results of the Brunk study and highlight ‑‑ and most of them highlighted the advantages of Multi-Systemic Therapy and didn't say anything about the advantages of parent training, and most of the reviews in discussion of this particular single study, ignored valuable information on the relative advantages, disadvantages, and the equivalent results of parent training.

So let's look in even more detail about what happened in these particular narrative reviews that used the Brunk study. There were over 86 reviews of Multi-Systemic Therapy published after 1996, and in fact there were more reviews than primary studies.

The Littell of 2008 study assessed 66 of these reviews and found that many of them were actually what was characterized as light reviews, meaning they relied on other reviews, so they referenced each other in discussing the results of primary studies on MST.

And 37 of the reviews included cited one or more of the primary studies, so Littell 2008 actually looked even more closely at the 37 reviews that cited one or more primary studies as opposed to citing other reviews.

In the 37 reviews that cited one or more primary study, most of them were traditional narrative summaries of convenient samples of the published reports of MST. Most of them concluded that MST worked, was consistently more effective than alternatives, and some of these reviews concluded that MST was effective across problems, population, and settings, and most of them cited Brunk as one of the only studies that showed evidence for effects of MST in cases of child abuse and neglect.

We can compare that what these 66 or 37 reviews actually found to an actual systematic review of MST which Julia Littell did in 2005 using all the systematic techniques you will learn about in the second webinar.

What Julia found in a systematic review of MST was that effects were not consistent across studies. There were very few studies, and most were conducted by the program developers and most of these studies were conducted in the U.S. In all of the studies they had mixed results across outcomes, except for those that actually found no results or null results on outcomes.

So Julia Littell's 2005 systematic reviews on Multi-Systemic Therapy was actually contrary to the conclusion of most of the published narrative reviews which suggested that the effects of MST are well established and consistent across studies, and oh, I see there is a question here about a narrative review as opposed to a systematic review. I think that's a good question to stop and talk about.

What I mean by a narrative, a narrative review is when ‑‑ is what we think about in a traditional narrative review. It gets a whole bunch ‑‑ it gets a set of studies and then in an essay form, discusses their results. And this is in a narrative review as opposed to a systematic review. In a systematic review, we have very clear ways of how to identify the numbers of the studies that will be included into the review.

In a narrative review, which tends to be more argument based, we might not know how the studies were selected into the review, and that is a very important point, so when I'm using this language about narrative reviews, I'm also talking about reviews where we're not sure how the studies were ‑‑ what decisions were made about how the studies were actually included in the review. In a systematic review, we have to be very upfront about what our inclusion criteria are and we have to have very clear searching strategies and transparent ways of getting studies into a review.

So you can see why this is important, why I needed to stop and talk about that because what I want to talk about is the potential bias in traditional narrative reviews when we don't know how the studies were selected to be in the review.

And the potential bias comes from sort of three major areas, general selection bias, so a lack of transparency for how studies are included, and I'm going it talk in a second about publication bias, confirmation bias and allegiance bias and I'm also going to talk about outcome reporting bias that tends to be more of a problem in traditional narrative reviews. And then I'm also going to talk about the use of cognitive algebra to synthesize results.

It’s a potential problem if we don't know in a traditional narrative review, if we don't know how studies get in, a problem is publication bias. Traditional narrative reviews tend to rely on the published literature, but we also know, which I think is pretty clear now, that published studies are three times more likely to be published than similar studies with null or negative results. The reference I have there to Song et al. is in an area of health research.

We also know that in education, for example, published studies have effect sizes that are larger, about .19 standard deviations larger than unpublished study, and the sources of publication bias are complex. We know, for example, that investigators are less likely to submit null results for conference presentations and for publications. These are well‑documented in empirical studies in the literature, mostly in medicine, but they've also been replicated in the social sciences, particularly psychology.

And then we also know that peer reviewers and editors are less likely to accept and publish null results, and so when a traditional narrative review, if we're only relying on published studies, we're going to have a tendency to get studies with larger effects.

Another way selection bias might occur if we're only relying on published results is dissemination bias, so that studies with significant results are also published faster, cited and reprinted more often, more likely to be published in English than in other languages, and easier to locate. So if we're only relying on the published literature as we do in traditional narrative reviews, we are again going to perhaps going to have a bias sample and bias understanding of the results of particular studies in an area.

Another way that we can be biased if we're not using systematic review techniques that have clear selection criteria for studies in the review is that we can tend to be, to fall prey to confirmation and allegiance bias. Of course, if I am making an argument that I want ‑‑ I want to convince people that I'm going to have a tendency to seek and accept information that confirms my prior expectations or hypotheses and ignore evidence of the contrary, so if I'm doing a traditional narrative review and I don't ‑‑ I'm not upfront and transparent about how I'm selecting studies into my review, I am probably going to, you know, be in danger of just selecting those studies that confirm my already strongly held opinion, and the same thing operates with allegiance bias. We know that researchers’ preferences can sometimes predict results.

Another danger if we're only relying on published studies and we're not upfront about our selection criteria for studies, is that in traditional narrative reviews, they tend to report on the statistically significant results from a primary study, and I think we saw that in the Littell piece, that most of the reviews on MST focus the on those statistically significant results as opposed to looking at those results that were not statistically significant. Within primary studies that have mixed results, we see that significant results are also more likely to report that are mentioned at all and also more likely to be fully reported.

There is active research on outcome report being bias in medicine. There is a very interesting study by Vedula on reporting bias on the effects on the indication effects of a drug called Gabapentin and then I've also contributed to this in education.

Finally, another sort of danger of traditional narrative reviews, as opposed to using systematic review techniques with meta-analysis is just that we tend to use what a colleague of mine calls cognitive algebra to synthesize results. We know studies are complex and they include many measures, many statistical analyses, and that makes making a narrative summary difficult.

I mean, there is a tendency for us to try to get clarity and try to simplify a complex set of information, so there is a tendency for us to count up the number of results that support or that don't support a given hypothesis, and this is a procedure that we call vote counting.

The problem is that vote counting does not provide statistically defensible results, given that many primary studies have power issues, so that in times of complex amounts of information, we tend to try to make it simpler and many narrative reviews focus on just counting up the number of results either for or against a given hypothesis, which is not a good thing to do. And this use of cognitive algebra reminds me of the Kahneman book, *Thinking Fast and Slow,* but it seems to be, we have a tendency to pay more attention to simplify the information around us rather than to think more carefully and more complexly.

So systematic reviews are actually then an alternative to the kinds of bias and error that might occur in traditional narrative reviews that aren't using a clear and replicable methods for getting a set of studies into a review, so what we try to do in systematic reviews is to develop and follow a predetermined plan or protocol and use transparent, well‑documented, and replicable procedures for the entire process, both to locate studies that will be included in the review, analyze the studies and synthesize the studies in order to come to a conclusion about what is happening in a given particular literature.

What we do to avoid and reduce bias and error is to set explicit inclusion and exclusion criteria about the studies that will be in the review that anyone can actually look at and also take issue with if that's the case. We develop and document strategies for locating all relevant studies, regardless of their publication status, we focus and attend to interrater agreement or reliability on key decisions that happened in a systematic review, particularly around extraction of data from the primary studies, coding of those studies. We formally assess the study quality of the primary studies in our reviews, so we understand how or what the strength of evidence is, and then we use meta-analysis when possible to synthesize those results across studies.

So, I thought it might be a good time to talk a little bit about what meta-analysis is. I used meta-analysis as the term for the set of statistical techniques we use to synthesize quantitative results from a set of studies, so meta-analysis techniques include both methods for estimating the average effect of say a treatment across a set of studies, and also the variance of that average effect.

Meta-analysis techniques also exist for exploring the variation across study results. Why aren't we getting the same treatment effect across studies? Is it associated with differences across studies in the patient's or population that are in the studies, in the context, in how well the intervention was implemented and so forth?

And then also meta-analysis techniques exist to examine the sensitivity of our results to potential bias. I also want to note here that systematic reviews and meta analyses can be distinct, so for example systematic reviews might not include a meta-analysis, so you might not go ahead with new systematic review techniques to gather up a set of study, but you might not use meta-analysis to actually synthesize them. You may actually use narrative ways of talking about the studies, or you might have multiple meta analyses.

And it's also important to note that meta analyses are not always based on systematic reviews. Some meta analyses may also fall into the same trap as traditional narrative reviews and just use a convenient sample of published studies, and then they are vulnerable to the same kinds of biases as I've been talking about with traditional narrative reviews.

Now that I've talked to you a little bit about why we would do systematic reviews and given you some rationale for why they're important and shown you some of the biases that result if you don't use systematic review techniques, I just want to stop and briefly about different purposes for systematic reviews and the different kinds reviews you might encounter in the literature.

So Gough, Oliver, and Thomas discussed one difference between systematic review is aimed at what they call configuration versus aggregation. There are a whole set of systematic reviews that are really called configurative synthesis and it involves interpretive conceptual analysis of a set of studies, so you use systematic reviews techniques to gather a representative sample or all of the studies on a given topic, but the purpose of your analysis is to really look at the concepts and help get a conceptual understanding of this set of studies.

And that is in contrast to what we've really been talking about today, which is aggregative synthesis, so we really want to aggregate these studies in some way to understand what the treatment effect is, for example, across the studies rather than in a configurative synthesis where maybe we're interested in how is disability, for example, defined across a set of studies.

Another kind of review that I've been seeing more of in the literature are ‑‑ is this thing called evidence and gap maps, and so this is a way of sort of mapping the literature. So we use systematic review techniques to identify studies that we are ‑‑ that are going to be eligible for a given review, and then we organize them into a map.

This gives us a sense of understanding for the landscape of research that exists on a given topic, and so typically I'll show you one in a second. Typically, the rows are interventions and the columns are outcomes, and 3ie is an international organization and Campbell Collaboration has produced a number of these maps and they're really interesting.] I urge you to click on these links here. Here is just a quick picture of an Evidence Gap Map from 3ie and these are about interventions to provide youth with transferable skills, so it's hard to read, but you can see the rows are different kinds of interventions, like providing teacher incentives, for example, to teach transferable skills, or having actual courses on transferable skills, and then the columns are different outcome, learning and behavior outcomes, and what you see there, the size of the gray little dots in those cells show, are proportional to the number of studies that exist that look at that intervention and that outcome.

So this is one way of using systematic review techniques to examine a set of literature, and this gives you sort of a set of ‑‑ it gives you where the evidence actually lies, and you can see there are some interventions here where we have no ‑‑ we actually have no primary studies.

Some other review strategies you might hear about in the literature. One is scoping reviews, so scoping reviews are typically used to understand how many studies might exist in the literature, so here you might want to know if it's worthwhile to actually do a systematic review with a meta-analysis or not? Is there enough evidence in the literature base to actually do a review? And in scoping reviews, you have to be careful because they can either be systematic or use un-systematic ways to research the literature, and sometimes we use them in a very informal way when we're writing ‑‑ or when we're trying to figure out, again, if it's worthwhile to ‑‑ if the literature is at a point in which it's important to do a review.

You might also hear about Rapid Evidence Assessment, and so Rapid Evidence Assessments are reviews conducted on a short timeline, usually to give a rapid response to a policy question. There may be a policymaker who really wants to make a decision on whether or not they're going to go forward with some intervention, so they ask researchers to produce a very quick evidence assessment. Typically, Rapid Evidence Assessments involve a limited literature search, for example, limited to publish literature for example and limited coding and analysis strategy.

Once you ‑‑ not to warn anyone off this area of research, but a good systematic review that has a lot of literature takes a little bit of time, and a lot of the time is spent in trying to identify studies and then code those studies for review, but I will talk ‑‑ that is a topic for another webinar.

Okay, so just to sort of conclude this section of the webinar, different review methods produce different results, and traditional methods as I think I've shown you today, can be haphazard and can sometimes lead to wrong conclusions. What we need to do is use scientific methods as we do in primary studies, and we need to use those same scientific methods when we're planning and conducting systematic reviews. In Chalmers, Hedges, and Cooper, they said science is cumulative but scientists rarely accumulate evidence scientifically, so we need to and can use scientific principles and methods to synthesize evidence.

And I just also wanted to just mention that another potential contribution of systematic review is to the current debate about replication in the social sciences and in medicine. Research on power and meta-analysis can have direct application to replication studies. When we're asking the question about whether or not two studies replicate, what's embedded and implied in that question is also, you know, how much power do we really have to detect a variation across different studies effects and how much power do we have, physical power, to examine association between study effects and study methods, so I just quantity wanted to put a plug in for systematic review in the current debate about replication in medicine and the social sciences.

So what I wanted to end with here is just to give you some sources and organizations that support systematic reviews, so I'm going to be talking about each of these in turn.

We'll start with the Campbell Collaboration, and so as Joann said at the beginning, the Campbell Collaboration is a non‑profit international research network that produces and disseminates systematic reviews of the effects of interventions in the social and behavioral sciences. We have coordinating groups in international development, crime and justice, social welfare, and a Disability Coordinating Group and I have the link here. The Campbell Library is completely open access, so when you click on that link, you will have access to both the protocol and the review of any given topic. So what we do in the Campbell Review is actually provide authors with peer review of both their protocol before they start their review and also of the completed review itself, and all of these protocols and reviews are open access to anyone who clicks on the link there. And again, these are on the effects of social and behavioral interventions. There are a number of resources there in the Campbell Collaboration for conducting reviews.

The Cochrane Collaboration if you've not heard of it is, is sort of the granddaddy of them all, established in 1993 in London. Cochrane's mission is to promote evidence and informed decision‑making by producing high‑quality relevant systematic reviews in the area of health, and now these ‑‑ they also have the same process as Campbell. Campbell is a sister organization to Cochrane, where they provide study authors with review in the protocol and review stage, and they're all focused on health-related, health and medical-related issues. And much of the Cochrane Library, however, is behind a firewall. Some of you may be in an institution that subscribes to Cochrane so you're able to get those reviews, but I wanted to point out that one of the ‑‑ one very large contribution of Cochrane is actually the availability of the Cochrane Handbook for Systemic Reviews and Interventions. This is the official guide for preparing and maintaining Cochrane Systemic Reviews and it's freely available at the link I've given you here, and it's a really great resource on the whole process of doing systematic reviews, particularly on health interventions. Health intervention systematic reviews tend to be a little bit different from social and behavioral interventions in the social sciences, and there tend to be smaller numbers of studies and the interventions tend to be not quite as diverse as what we have in the social sciences, but the Cochrane Handbook is a great resource for people thinking about doing systematic reviews.

The American Academy of Neurology and the links there, they are a group that produces systematic reviews and also guidelines for practice that are based on systematic reviews. They use a strict evidence‑based methodology that follows the Institute of Medicine Standards for Systemic Reviews and you can go on their website as well, on the links that say Systemic Reviews and Guidelines at the bottom of the slide, it actually takes you to the set of systematic reviews in neurology that have been supported by the American Academy.

The Centre for Evidence and Implementation is based in Melbourne and they work on three areas, making sense of evidence, effectively implementing evidence in practice, and testing and evaluating and trials. They also produce systematic reviews, and also evidence and gap maps, and they're a nice source for looking at another set of systematic reviews in the field.

The Centre for Evidence Based Medicine that is based in Oxford was established in 1995≥ They develop and promote better evidence for healthcare, and they also generate syntheses of high‑quality evidence for patients and society and they have a lot of high-quality course available and also a library and set of tools, and they maintain a set of systematic reviews.

The Centre for Reviews and Dissemination, CRD, at York University is a department at York that specializes in evidence synthesis and they have completed over 200 high‑quality systematic reviews in healthcare; they as well have courses and training publications. They themselves have produced also on doing systematic reviews, the CRD document, but their document, also a free document that talks about how to conduct systematic reviews and they maintain a database of abstracts there.

I just want to note to you that they have ‑‑ they maintain PROSPERO, which is an international prospective register of systematic review, so when you're starting out a systematic review, you can publish your protocol in PROSPERO for anyone to look at and then it will be there and freely available to the public, you know, once you complete the review.

The EPPI-Centre or Evidence for Policy and Practice Information and Co‑coordinating Centre is a center established 25 years ago in London, they have lots of years of reporting and conducting systematic reviews in education, health, and social care. They offer a number of courses and seminars and a number of publications, and I mentioned one that comes out of people in the EPPI-Centre, a book on systematic reviews by Gough, Oliver, and Thomas. They're at the EPPI-Centre and they also have an online software tool called EPPI-Reviewer that helps you do the systematic review from start to finish, starting with the identification of studies and all the way through the meta-analysis part, so they have lots and lots of support tools for doing and conducting systematic reviews.

The Joanna Briggs Institute in Australia is an international not‑for‑profit research and development center in the University of Adelaide and they do systematic reviews and trainings in courses, software system, and critical appraisal tools and so forth. They also have more resources on narrative reviews than some of the other references I've given you so far.

And finally, the National Academies of Sciences that's here in the United States established a long time ago, 1863, is a private non‑profit society of distinguished scholars charged with providing independent objective advice to the nation on matters related to science and technology.

What's important to note here is that the 2011 publication on finding what works in healthcare, standards for systematic reviews, also a reference that is free to the public and also gives you standards for systematic reviews in healthcare. It's just a very nice ‑‑ also a very nice guide for doing systematic reviews.

So I think that concludes my remarks. I have a set of references here that if you download the presentation slides, you can look up some of the references I've just talked about, and I thank you for your time, and we have a little bit of time for questions as well.

>> JOANN STARKS: Yes. Thank you very much, Terri. That was a good, in‑depth overview, you covered such a wealth of information. I found your examples really helpful to show why a systematic review is a really valuable way to examine research findings and showing some of the dangers on relying on just narrative reviews.

Let's see if the audience has questions. I see a couple of people typing. In the meantime, let me ask you one that came in. I think you touched on this a little, you talked about the libraries of Campbell and Cochrane, but one question is: Where should we look to find systematic reviews?

>> TERRI PIGOTT: They are indexed in any of the major databases. If you're in healthcare they're indexed on PubMed, I don't know what the exact terms would be, but meta-analysis, maybe you need to look under meta-analysis and also systematic review.

And in the social sciences, they're also indexed, depending on your, you know, area of expertise, and there are also particular journals that tend to publish these, and in psychology that would be Psychological Bulletin and Review of Educational Research, and some of the major medical journals, so I think those of you in healthcare know that these get published in the major medical journals.

>> JOANN STARKS: Thanks. We do have a question: Where does a critical and interpretive synthesis fall into these categories that you've mentioned?

>> TERRI PIGOTT: Right. I think that we haven't; so I would say that they fall into, because we've really been focusing a lot on the discussion of systematic reviews on what we would call aggregative syntheses. And a critical interpretive synthesis would probably fall into the category of doing a synthesis, a configurative synthesis where we're really trying to understand, you know, where you still use systematic techniques for getting the studies that are going to be included, but the goal of the synthesis is to understand something about that literature, whether it is ‑‑ so that is where I would put the critical interpretive synthesis. You're still using the same replicable techniques to get the studies, but the goal of the analysis of those studies is something about the concepts that are embedded in those studies.

>> JOANN STARKS: Okay, great. Here is another question: I've heard this discussed, “a review of reviews” - what can you tell us about that?

>> TERRI PIGOTT: Okay. A review of reviews is actually, so that's like a systematic review of systematic reviews. So if there have been a number of systematic reviews on a given intervention, there are some emerging techniques to think about how to examine variation across systematic reviews on the same topic. This is, as I said, an emerging area of research in terms of trying to make sense of why systematic reviews differ from one another.

>> JOANN STARKS: Great, thank you. You mentioned a lot about bias in traditional narrative reviews and you talked about the potential in systematic reviews, has it turned out to be a problem at all in systematic reviews or does the process really help to keep out bias?

>> TERRI PIGOTT: Well, I think as in a primary study, there is always the danger of bias creeping in, and I think what the goal is as in primary studies, is to be as transparent as your methods as possible, so that someone who is reading your systematic review can understand where bias might have crept in, so that's why sometimes these reviews are so dense in reading them because really what people are trying to do is identify what methods they took to guard against the bias. But as we know, it's always ‑‑ you know, there can always be bias in a review.

>> JOANN STARKS: Okay. We have another question from the audience. How important is it to register the systematic review before starting it?

>> TERRI PIGOTT: I think it's really important. I think in this day in age where we're really worried about bias, it's important to, you know, to at least have a plan before you start because when you start doing one of these review, you realize that every day that you're doing a review, you make a decision that could impact something that might happen later, and if we have the registry ahead of time, then we know what we said we were going to do and then we can talk about any deviations from that.

In addition, I worry a lot about in systematic reviews, like as I worry about in primary studies, sort of fishing for results. So if we have the set of hypotheses laid out at the beginning of a systematic review, then we can guard against, you know, fishing for results in our studies.

Did you see this one about what is the best source of systematic reviews about knowledge translations?

>> JOANN STARKS: Yes, I did.

>> TERRI PIGOTT: Okay, I can't answer that question. Do you know?

>> JOANN STARKS: Well, I don't know that there is one single source, but to respond to that I think we would identify some sources and then send a reply to everyone. We will be getting back to everyone, as Kathleen mentioned earlier, so we can send out that information to the people that registered for this webcast.

I think we've got time for maybe one more question: What benefit is there to a systematic review that does not identify any effective interventions for whatever reason?

>> TERRI PIGOTT: So, I always say that, and this happens in the Cochrane Collaboration and it happened in Campbell, where we get what we call an empty review, like there are no studies that fit the inclusion criteria. So if you can defend your inclusion criteria as being appropriate for that question, what that says to the world is that we don't have any good evidence about this and we should really find ‑‑ we should really support and do primary studies so that we have evidence about this particular intervention. I always think that it's like null results are important, and it's important to also in a systematic review, to also say that we don't have ‑‑ we don't have the evidence and we need more evidence.

>> JOANN STARKS: Thanks very much, and thank you, Kathleen, for answering the question about information about systematic reviews and knowledge translation.

We're just about out of time, but I would like to encourage everybody to go ahead and send us any questions that you think of later. We do have, let me go through the references here, we do have [Terri's email address](mailto:tpigott@luc.edu?subject=Webcast%20followup) here and you can also contact us at the Center on KTDRR at: [KTDRR@air.org](mailto:ktdrr@air.org) and we'll get those questions to Terri and we'll make sure that we get a response that we can share with everybody.

We want to thank you very much, and I want to thank Terri Pigott for taking time to prepare and give us this overview today of systematic reviews and research synthesis in an effort to ensure that evidence‑based information may have greater impact. And, I want to thank everyone for participating this afternoon. We hope you will take a few minutes to give us some feedback about the webcast by filling out the [brief evaluation](https://www.surveygizmo.com/s3/4841349/Evaluation-Webcast-Overview-of-SR-RS). You can see the [link](https://www.surveygizmo.com/s3/4841349/Evaluation-Webcast-Overview-of-SR-RS) right here, and I think Shoshana also just posted the link in the Chat Box and if you click on that you'll go right to the evaluation. We'll also be sending out an email with the evaluation link to everyone who is registered.

Finally, I want to thank everyone, from all the AIR staff and representatives from the Campbell Collaboration, that helped with planning and logistics, and of course NIDILRR for their support to offer these webcasts and other events.

We also want to invite you to the second webcast in this series, Basic Steps and Procedures for a Campbell Systemic Review, that will take place on Wednesday, March 20 at the same time. We are pleased to bring back Dr. Terri Pigott as our presenter. And, as a courtesy, everyone who registered for today's session will be registered for the other sessions in the series.Finally, we invite everyone to visit our recently refreshed and updated website at www.KTDRR.org.