**Living Systematic Reviews**

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JOANN STARKS: Good afternoon to everyone, although it is good evening to today’s speaker Professor James Thomas, who is joining us from London to guide us through the “what, why, and how” of Living Systematic Reviews, and will share the latest updates on this emerging synthesis strategy.

I am Joann Starks, from the Center on Knowledge Translation for Disability and Rehabilitation Research, KTDRR, housed at the Austin, Texas office of American Institutes for Research or A‑I‑R. The Center on KTDRR is funded by NIDILRR, the National Institute for Disability, Independent Living, and Rehabilitation Research. I also want to thank my AIR colleagues, Shoshana Rabinovsky and Ariana Hammersmith who are helping with logistics. We have CART captioning available today in a separate Window. I'll ask Ariana to put the link into the chat box. I mention at the end of the presentation I'll be asking you to provide your feedback in a brief evaluation form.

Next, I will review some basic features of the Zoom platform. You should be listening to the presentation through your computer speakers. You can adjust the volume on your own computer, or, click on “Audio Settings” on the left‑hand side of the menu bar located at the bottom of the Zoom window. Please be sure to keep yourself on mute throughout the presentation. You can make comments and ask questions in the “Chat” window that you should see at the bottom of your browser window. If you have any technical issues, just let us know in the Chat and one of our team will work with you. I'd like to invite everyone to introduce themselves using that chat feature.

A reminder that we are recording today’s session to make an archive. If you prefer not to be identified in the recording, you can skip identifying yourself now and when you ask questions in the Chat box. In the center of your screen is the main presentation area where the slides are shared. A copy of the presentation file can be downloaded from the KTDRR webcast page in the reminder email that you received.

Now let’s welcome our speaker. James Thomas is Professor of Social Research & Policy at the EPPI‑Centre, University College London. He has written extensively on research synthesis, including methods for combining qualitative and quantitative research in reviews, and leads the Systematic Reviews Facility for the Department of Health, England. He's done a lot more than that and is an expert in this area, so James, thank you, again for agreeing to share this cutting‑edge information with us.

DR. JAMES THOMAS: Thank you very much. Good evening, good morning, good afternoon, depending on where and when you're listening to this. Can I just check that my audio is working okay?

JOANN STARKS: Yes.

DR. JAMES THOMAS: Okay. Brilliant. Thanks. I'm going to be talking about Living Systematic Reviews during this web cast. What I want to do, first of all, is to acknowledge a lot of the thinking and the work I'm going to be talking about is not my own. There's been a team of people working on this for a number of years now. So, there are a series of articles in journals about this, and there's new guidance come out recently by Cochrane Reviews, and also the Cochrane Handbook has some guidance on Living Systematic Reviews. There are others, as well. These are simply the ones I want to acknowledge here because I'm drawing on the content of these papers during this little talk.

The main objectives of this section, I want to outline some of the reasons that we now have this term Living Systematic Review and the differences between that and a Systematic Review and to get into some of the detail about the processes that are used for maintaining Living Systematic Reviews. It's important to note these are under development. It's quite an interesting area to get involved in. I'll talk a little bit more about that in a little while, because there are opportunities for you to participate or contribute both to Living Systematic Reviews themselves, but also to the emerging methodology and the tools which we are using to support keeping on top of the evidence base.

I'm going to discuss a little bit about technology enablers that seek to make Systematic Reviews more maintainable and doable into the future, and then I'll give you some resources and further reading that you can take away. So, to begin with, the first section, what is a Living Systematic Review? Well, before we get to Living Systematic Review, we should probably at least define Systematic Review. And the Cochrane Handbook is as good a place as any for this. Basically, a Systematic Review attempts to collate all the empirical evidence. The important thing there is "attempts" and "all." We know Systematic Reviews can't always find all the relevant evidence, but we do try to find as much as feasibly possible, and we have prespecified eligibility criteria, so we know which pieces of research are relevant for inclusive review and which aren't.

Systematic Reviews use explicit systematic methods. So, we specify what methods we're going to use. We have a research method for conducting the Systematic Reviews. And the aim is we minimize bias. One of the ways in which I like to think about Systematic Reviews is that we aim to minimize bias which is either stemming from the studies which the Systematic Review might contain, and so there we're thinking, okay, we have to check that the studies are reliable and, hence, all the focus on quality assessment that goes on in Systematic Reviews and risk of bias assessment, so we want to make sure that the studies inclusion reviews are reliable, and also that the way that the review is done itself is reliable.

So, those two factors are quite important when we're thinking about Systematic Reviews, both that we use reliable research and that the process of doing the review itself is reliable as we can make it. So, what's that we're trying to do when we're doing Systematic Reviews. We want to get reliable evidence that's then available for decision‑makers to use in a wide range of decision‑making contexts.

And the Cochrane collaboration was founded a number of years, in fact, decades ago now, by Iain Chalmers, and his vision was it would be placed on a library of trial overviews, which will be updated when new data become available. And that had been the challenge which certainly Cochrane and anybody doing Systematic Reviews has faced over the years, that, okay, we can come up with a Systematic Review and conduct one and publish it, so we can have a library of these completed Systematic Reviews, but actually keeping them up to date has been a challenge over many years, and we can see there are various pieces of research that have looked at currency and Systematic Reviews. This is one of the frequently cited papers on the subject, suggesting that some Systematic Reviews are out of date as soon as they're published, maybe 23% of them need updating within two years. And various other statistics around currency are available.

But the point is here that Systematic Reviews can become out of date, but also keeping them up to date is very difficult. This paper now, 75 trials and 11 Systematic Reviews a day, how will we ever keep up? This was a great paper in its time. We've probably got a hundred trials a day, I should think, being published now, and way more Systematic Reviews than that. So, the question how do we ever keep up is increasingly important. And that's where the move towards Living Systematic Reviews has come, really. The idea here is to think, well, a Systematic Review isn't something that is just static. It's a lot of work to do, to get the thing done in the first place. And they tend to then sort of be left and not maintained. What we want to move towards is having a Systematic Review which is continually updated that incorporates relevant new evidence as it becomes available.

So, that's the real key difference between what you might think of as a Systematic Review and a Living Systematic Review. A Living Systematic Review has all those other features I mentioned about explicit questions and reducing bias and being clear about what's relevant and what isn't, et cetera, but the key difference is that the Living Systematic Review is continually updated, bringing on new evidence as it's available.

The other key point here is that it's an approach to review updating. So, we're not suggesting here that Living Systematic Reviews are a whole new methodology for Systematic Reviews. They're simply really a stance that you take which is around making sure that the Systematic Review is constantly updated. You can use Living Systematic Review methods for any time of review that you might think of. If you can review it, you can create a Living Systematic Review on it, potentially. That goes for systematic maps and that kind of thing, if you've come across maps. As I said, other than that, they reuse the same standard Systematic Review methods, simply with this explicit a priori commitment to making sure we maintain the review up to date. Also, here, we have this definition in the last bullet point that it's a predetermined frequency of search. So, people know when they're looking at the review when it's likely to be updated next.

This slide here just emphasizes those points. It's not a new method for doing reviews. It's an orientation around keeping the evidence in the review up to date. Now, having sort of set the scene there in terms of what and why Living Systematic Reviews are being developed at the moment, I'm going to talk in some detail now about the processes for maintaining Living Systematic Reviews. I'm going to think a little bit about when a Living Systematic Review might be appropriate. You don't always need one. Some of the main characteristics of Living Systematic Reviews, and then some issues that we need to consider.

So, first of all, when a Living Systematic Review, LSR, as it's often abbreviated to, when are they appropriate? Like all Systematic Reviews, critically it should address an important question, and there should be some uncertainty, which it's addressing. There's no point in doing a Systematic Review which doesn't matter to anyone. And also, where we already know what the results or the conclusions are likely to be, there's no value, really, in doing that. It's an awful lot of work.

So, what we want to make sure is that we're addressing questions which are actually important to decision‑makers and there are a number of different methods and approaches to ensure that questions and topics are going to be of use to decision‑makers, but that's a whole other talk. But in addition to thinking about what makes a good Systematic Review, with a Living Systematic Review we need the additional criteria, that the evidence base is actually changing rapidly. In some cases, we know the evidence base is not changing all that rapidly. A Living Systematic Review is not necessary, not appropriate. It's probably a poor use of resources.

So, in terms of some of the practical considerations around that, it's important to think about how frequently the review might need to be updated. I'm going to show towards the end of this talk some work we're doing at the moment on COVID‑19 where we're updating searches at the moment very regularly, because the evidence base is changing very frequently. In other situations, we see Living Systematic Reviews updated every few months, sometimes every quarter. So, it doesn't necessarily mean that you're updating it every day. The point is that there is an expectation that the review will be updated at particular regular points in time.

If you're thinking of undertaking a Living Systematic Review or setting up, really, we should think of these things as a process to maintain a Systematic Review, it's important to think about the resources that's going to be necessary to maintain it. So, we've got to be thinking in particular that we need to maintain a surveillance of the relevant databases, of the relevant evidence, as it's being populated and coming through the system.

So, there's resources necessary to do that, both in terms of running the searches, but also in terms of the expertise of the people who are going to be doing that. Likewise, there needs to be people who are ready and willing to undertake analysis of new papers, writing up the review reports, editorial processes potentially, in getting the report published and making sure the publications are up to date. And making sure it's used and disseminated to that the people who need to know that the evidence has been updated are aware of it.

Like all Systematic Reviews, Living Systematic Reviews have protocols which set out explicitly and in advance the methods that are going to be used in the review, the rationale that has informed its development, and for example, such as public participation in the process, and that kind of thing, all of that standard information is in the protocol. But in addition, the Living Systematic Review protocol includes a justification as to why a Living Systematic Review is necessary in this particular scenario. And an explicit statement of how frequently it's going to be updated and how that's going to be managed. And as we are in fairly early stages of developing methodology in this area, we're probably being more explicit about these issues at the moment. So how are we going to practically manage updating searches and other key processes? How is that going to be maintained in order to give people a good idea of the robustness not only just of the review but also of sort of the process, the back-end process of making sure it's being kept up to date?

The other issue which obviously is going to become more relevant as more and more Living Systematic Reviews are set up is this idea of transitioning out of living mode. Just as we have a justification at the beginning that the evidence base is shifting very rapidly, it may well be that after a period of time the evidence is not moving as quickly, and it might be more appropriate, then, to move out of this high intensity process, if you like, and move into something where updates are made less frequently.

So, again, the criteria that's going to be used in order to make that decision about moving out of this living mode and into a more sort of standard systematic review update mode. So, the key characteristics, I'm sure you're sort of starting to get the picture here, where we maintain a constant surveillance of the evidence base. We run our searches. We ‑‑ that doesn't just mean electronic searches. There are also some other ways of finding relevant studies. But we maintain this constant surveillance so we're aware of both ongoing studies and when they're likely to be completing and when they're going to report as well as searching in order to find studies that we didn't know even that were going on.

So, we're aware of what's there, what's likely to be coming up, so we can keep that Systematic Review updated. As you might expect, though, it's not always obvious. As Living Systematic Review will always start with a Systematic Review. If there's no Systematic Review there already, then what we need to do is create one in order to keep it up to date. So, start with Systematic Review is conducted to begin with, and then we maintain that publication with updates in terms of its current status.

So, I'm going to show you now a slide which depicts the Cochrane Living Systematic Review workflow. Not that it's the only possible workflow, but it's quite a nicely laid out picture which is in the guidance for Cochrane Living Systematic Reviews. It starts by considering the methods, as I mentioned. The key here is planning ahead. The last virtual Cochrane colloquium, in the methods symposium, we had a session on protocols where we considered in detail the importance of protocols and planning ahead, both in terms of being explicit and transparent about the methods, but also as a communication tool both across the team to understand, make sure that people have the same understanding of concepts and definitions, but also a way of communicating outside the team what a particular review is about.

It also helps us to plan the actual process plan, the work, which is project management. I can't emphasize too much planning ahead, planning at the beginning, thinking through what it's going to be, just as important as any other Systematic Review or any other project. So, we probably should protocol, if it's a completely new review, there's a Living Systematic Review protocol. Otherwise, it's sort of appended to an existing review protocol and the review is then conducted up to date, so we have an up‑to‑date review we're working with.

Then it moves into a living mode where the reviews are conducted maybe monthly, or more or less frequently. If there are no new research, it's considered up to date. Then we need to make sure that the publication of the review states that it's up to date and that the search was last done on this particular date, so that people are aware of the currency of the review, the fact it's being maintained as you'd expect by its protocol.

However, if new studies have been found, then we've got another choice to make. Because potentially the new study as well as having new information they actually don't change the findings at all. There might be one small new study to contribute to a review with 80 or 150 reviews in this already. In which case, maybe it's not a good resource to go through the whole thing and republishing a review if basically it's not going to change. It might be enough to decide, well, we're going to integrate those findings later. The review findings themselves are essentially up to date. And what we need to log is both the fact we've done this search and also found some new studies but they're unlikely to change the conclusions of the review.

So, the situation where we would update the review is where the studies, the new studies, would have an important impact on the review's findings. At that point, we said, okay, we have to update the review, which means redoing the data extraction or at least doing the data extraction of those studies, doing the quality assessment, risk of bias assessment, and the analyses, the synthesis, and then publish the review update. At that point, we can consider the review up to date.

With all of these different processes that I've mentioned, where for example there are no new studies identified, or there's new studies but doesn't change the findings, potentially a note, if it takes a while to create the new studies, that the review may not be completely up to date because there are new studies currently on the way through the analysis and where there are new studies now been incorporated we go back round and then run the searches again. There's no point at which we sort of exit this continual update process, where we run searches and find studies. If there are no new studies, that's fine. We just come around and update the searches again. If there are new studies, we update the review and then still come back round and update the searches again.

If that feels like a lot of effort, it's because it is. Those of you who have been involved in Systematic Reviews will know conceptually they're straightforward but operationally they're quite complex. If you can imagine doing a Systematic Review but just keeping up to date regularly, yes, the Systematic Review and Living Systematic Reviews are time‑consuming and labor‑intensive endeavors.

One thing about Living Systematic Reviews to bear in mind is while there's initial work to get the first review done and published, then the effort after that is more evenly distributed. You don't have that big peak of labor anymore. You have sort of more lower intensity but even effort where we're continually running searches and continually checking whether studies are relevant and then updating the review, which doesn't involve the big efforts of conducting and writing up the full Systematic Review.

However, it's still important to ensure sufficient resources are in place, because there is that continual effort. In order to make sure the review itself is published on time and up to date, then we do need to have the resources available. They're not a small commitment. If you're thinking about starting a Living Systematic Review, it's important to think about the resource implications. However, having said all of that about the amount of effort, there is work in progress. So, I'm now going to move on to the next section, where we're going to think about some of the processes which enable Living Systematic Reviews to be conducted.

Some of these we use the shorthand of "enablers" to summarize what we're talking about here. It's things which help us to make that review process more efficient. Some of these processes can be used just as well in standard Systematic Reviews as Living Systematic Reviews. And I'm going to draw on a couple of papers with other colleagues here. One is in the Systematic Searching book that came out last year, and from the journal of clinical epidemiology paper. Journal number 2, which looks at combining human and machine effort.

So, making this more efficient, breaking the review down into microtasks, using artificial intelligence, automation, and then actually thinking about taking some of the tasks, completely outside the scope of individual reviews. I'll talk about each of those in turn now.

In terms of breaking the review down into microtasks, often what you find is the Systematic Reviews are conducted by a team of paper, rarely conducted by one person, but it doesn't tend to be a very large team. You don't have 50 people all collaborating to do a single Systematic Review on the whole.

So, the concept of breaking things into microtasks is, well, if we could rather than sort of think of a review activity for example screening 5,000 records to check their eligibility for a review, rather than one person doing that, what happens if we break that down so that lots of people did a small amount? Made a small contribution in a small task? That would mean while the same collective effort was involved, we managed to do one review, there was no need for one person to engage in, as I've mentioned, screening 5,000 studies. It would be distributed across a larger team.

So, when we start to think in these terms about breaking what would be typical review processes down, we have to also then think about, well, what approaches can we use to get a larger team in? One approach to that is crowdsourcing. In order to do that, we need to think about task‑sharing platforms. There's some generic platforms out there, such as mechanical Turk, where you're able to post tasks up to a crowd to conduct. Cochrane has its own crowdsourcing platform called Cochrane Crowd where what we've begun to do is to put standard Systematic Review tasks up as tiny little tasks, tiny little activities on their own, where a large number of people are able, then, to contribute, maybe just a few minutes of time, but because there's over 10,000, maybe there's 15,000, I can't remember exactly how many people have signed up to this now, because there are so many people participating. They can participate for small amounts of time, but actually collectively they can get an awful lot of work done.

So, one microtask on the Cochrane cloud platform is whether a particular record is a randomized trial or not. There are various tools on the platform to help people make that decision. For example, highlights and training. And there's an algorithm behind the scenes which means that no one study, no single study, is seen by only one person. There's an algorithm which ensures that, collectively, the crowd is over 99% accurate for what it looks at. Their task on this one, is this a randomized trial or not? And there are other tasks which are more specific to individual reviews.

But the key point here is that someone can dip into this for a few minutes, maybe a few minutes a day or a few minutes a week. They can pick up a task, make a simple decision, and they can contribute collectively to the maintenance of the evidence base.

Another enabler is automation, and, you know, maybe some of you have already heard me talk about using machine learning and other technologies for supporting Systematic Reviews. I've done many presentations on that. On this one, I've only got one slide. I'm just going to summarize, really, by sort of saying it's in its infancy for some purposes. Some areas of Systematic Review processes where the technologies are now mature enough to be deployed in live reviews, and they work particularly well for study identification. Now, that's really quite helpful, because as you will have picked up, study identification, the identification and the searching and the screening of the studies, is one of those tasks in the Living Systematic Review that just has to keep learning. If we can use machine learning to learn the scope of a particular review to help us to identify those studies, then it can be a really key enabler in enabling us to maintain a Living Systematic Review.

The key proviso there is that we should see these tools at the moment is something in conjunction with human effort. It doesn't replace the person completely, but it can reduce the amount of time that people have to spend on that task.

Lastly, out of the three enablers, I wanted to talk a little bit about taking tasks outside individual reviews. This is really quite a shift in perspective and a shift in thinking about what we're doing when we're maintaining a Living Systematic Review or doing a Systematic Review. Many of the problems that we encounter, the fact that we have to screen thousands of records to find the ones which are relevant, are really the results of poor global research curation systems. They're because we don't look after the research that's conducted well enough. We do ‑‑ we spend a lot of money on conducting research and comparative little on making sure that research is findable and usable.

So whilst we have that problem at the moment, we can't fix that completely, but what we can do is start to think about organizing Systematic Review systems so that evidence is pre‑identified, so that we can find studies for inclusion in new reviews much more efficiently than we currently can, using the major databases, et cetera.

I'm going to give you an example of the Cochrane evidence pipeline. Cochrane has set up this thing called the evidence pipeline where we're using a centralized search, at the top, conducting regular searches across multiple databases, across lots and lots of topics. So, this is a living service, can support Living Systematic Reviews, but it's not just one single review. It's potentially supporting all of the reviews that might be relevant in Cochrane.

And then, also, it also uses machine learning and crowdsourcing. So, the process works by conducting these large searches across a large range of databases, and trials registries. The papers come in at the top of the pipeline and then move round the pipeline, and the first enabler they hit is a study design classification point in the pipeline. Here, we use machine learning, first of all, to identify all of those records which are very unlikely to describe randomized trials. If they're not randomized trials, for the sake of this purpose, we don't need to look at them anymore.

The ones which might be randomized trials move to the Cochrane crowd platform where we're able then to ascertain with accuracy those which are or aren't randomized. The first stage, actually, enables us to focus down and narrow down what we're looking at, and enables us to focus, then, much more detailed on the papers likely to be relevant for reviews.

Then we move through to the review topic area here. Oops. Come back. Review topic. Here, what we're thinking about is classifying broadly which review group, those of you who are familiar with Cochrane review groups, which domain or topic something might be about, is it about public health, is it about eyes, for example, there's various different Cochrane groups. We are able to get broad categories there, again, with machine learning. Now we're working on workflows where we can use machines and the Cochrane crowd platform in order to classify the search much, much accurately. It's population, intervention, the comparison, and the outcome looked at in the study, PICO, and then extracting some of the key data from that study.

The point here is whilst this is a living system and maintaining a living evidence base for us, it's not maintaining one single review. The point here is that it's looking across a whole domain and just maintaining an evidence base, then, which is available to support multiple reviews.

So you can see there that those three enablers, as I mentioned, all come together to enable this register of studies now to be maintained up to date with really quite detailed information about studies which will then support people either updating reviews or conducting living systemic reviews. So hopefully that's illustrated for you the benefits of taking the task outside individual reviews and setting up an infrastructure to identify studies, especially to maintain an evidence base up to date.

We have the microtasks. And taking the tasks outside individual reviews, combine machine learning and human efforts. You can see from this graph here, that it's had quite an impact on the number of records that Cochrane is now able to process before the process is started in 2010 also Cochrane was processing around 50,000 records a year. The Cochrane crowd, when it started in 2014, big increase, over 100,000. But now the crowd has grown. We're also using machine learning. We have the centralized search. We're looking at more sources. By 2018 there's 450,000 plus records going through the system. So, a big increase.

Now, coming sort of more up to date, thinking about COVID and coronavirus and maintaining a surveillance on that evidence base, I can show you something we've been working on recently here, which has been a living map of the evidence. So, we're not yet synthesizing the evidence. We're not finding out what it says. But we are maintaining a search. So, this is a visualization of the results of that search where we've broken the search down into particular categories, for example, transmission, diagnosis, health impacts, vaccine development, treatment development, genetics, et cetera. A set of studies on case reports, some case studies on organizations, relatively few studies on socioeconomic impacts and even fewer on mental health impacts at the moment. Comparisons with other viruses. And a large number of editorials and opinion pieces rather than sort of collecting primary data.

What we're doing here is we're conducting regular searches and then we're putting the records into buckets, if you like, to categorize them broadly, and then, for example, if we're interested in looking at case reports, we can then zoom in and users can zoom in and look at them in more detail. So this is an example, again, of looking outside an individual review. This is looking across what might be topics for multiple reviews, but just helping us to stay on top of a really fast‑moving evidence base. If I show you in the "about" screen, we have a document which summarizes our search strategy. Key to the fact that this is a living evidence base, we say when we last updated the search and we actually updated it again today. So, there will be a new version of this out tomorrow. And we're updating this effort two weeks.

So, people who look at this will know when it was updated, how current it is, and also how frequently we're updating it, when they can expect an update. So that's some of the key principles there. You can see live on a very, very current and important issue, using Living Systematic Review methods to keep on top of the evidence base. So how do I minimize that? There we go. Right. Coming towards the end now, to summarize, you can see the Living Systematic Reviews are a response to a situation where we need to keep on top of a rapidly changing evidence base, and also some of the approaches that we need to adopt in order to conduct them.

Important to emphasize they're not new methods but they're an approach, an orientation, to keeping a particular evidence synthesis up to date. They need the careful planning and resources that I've outlined. Definitely planning ahead and considering whether or not the resources and the skills are in place. We're getting increasing benefit from some of the enablers, the technology enablers, to facilitate conduct of Living Systematic Reviews and maintenance of reviews and maps. And there's a lot of the support and resources available. So, there's something called the Living Evidence Network which you're very welcome to join, facilitated by Cochrane, but there's lots and lots of reviews and domains covered across lots and lots of fields of science. More than 170 people and organizations involved. It's really around sharing ideas and information and helping people to think together about developing living evidence concepts.

There are research groups, search and technology, methods, publication, as well as knowledge translation stakeholder engagement. It's an interesting area of work and people to collaborate with. And there are also various resources you could look at various publications to pick up on if you'd like to read more on this.

So that's the end of what I had to say. Thank you for listening. And I think I'll go to the last slide here, if that's right. If you have any questions, I'd be happy to answer them.

JOANN STARKS: Thank you so much, James. That was really interesting, and we actually do have quite a few questions. If everyone can go ahead and write their questions in the chat area, as you have done, or if you prefer to voice your questions you can unmute your microphone and just be sure to put yourself back on mute when you have finished. So the first question was from Susan. Some organizations update their systematic reviews every five years. Would it be better for them to switch to Living Systematic Reviews? And she's talking here about rehabilitation therapy fields.

DR. JAMES THOMAS: Um. So, if they're updating their reviews every five years, should they move towards the orientation of a Living Systematic Review? I think it completely depends on the rate at which the evidence base is changing. There are some topics that, you know, five years sounds like quite a long time ago, but maybe the findings wouldn't have shifted. If not, it's not a good use of resource to continually research. Maybe find studies but not change findings. But the point is we need to be careful about the use of a scares resource, which people are, and make sure we only do this kind of thing when there's actually a need for it, when the evidence is changing.

I'd have thought if things are being updated every five years it would be worth sort of a check in between that there's not something that's shifted the evidence, but I don't think there's a hard and fast rule that says that, you know, all reviews should be considered Living Systematic Reviews. I don't think that's currently what we're thinking.

JOANN STARKS: Okay. Another question. Are only printed reviews used for the register of studies that could or should be used to update a review?

DR. JAMES THOMAS: No. Preprints and unpublished documents and also trials registry records are also included. Clinical study reports are also increasingly used in reviews. So, there's no reason that you should change the location of where you look for data if you're doing a Living Systematic Review. It should include all the sources that you would normally use for a Systematic Review.

JOANN STARKS: Great. Thank you. Another question is do non‑Cochrane researchers have access to Cochrane crowd to request help with sorting of articles?

DR. JAMES THOMAS: Well, there's a range of answers to that question. All the Cochrane crowd data are open, and you can download the whole data set. Though, what you get are identifiers and base identifiers. You need to have a base subscription to sort of decode them. That's just the nature of the thing. Cochrane can't republish records. But if you've got that, then you can reuse all of what they've already done.

And there are a number of collaborations, I know, where people are using the platform either for their own, you know, just using crowd, Cochrane crowd, for their own reviews, or sort of using the platform without it being specifically Cochrane crowd itself doing the work. If you like, you can separate the platform itself, the software, from the people who are currently members of the Cochrane crowd. So, there are different models of using it. There are also a number of different crowdsourcing platforms. Obviously, the Cochrane one is the one which I know the best, but there are a number of other platforms to consider using in different situations.

I think it depends whether or not what you want to use is the Cochrane crowd software, which is possible, though, there are other options; or whether it's the Cochrane software plus the members of the crowd itself. In which case, at the moment, if you want to use sort of the Cochrane crowd, then at the moment that's for Cochrane reviews. You can always, as I mentioned, download the data.

JOANN STARKS: Great. Thank you so much. Another question, is that living map, re: COVID‑19, going to become available, and if so how?

DR. JAMES THOMAS: Yeah. We want to update it tomorrow and then we'll put it on the website and then tweet where it is.

JOANN STARKS: Where should people go for that?

DR. JAMES THOMAS: I will tweet it and the EPPI‑Centre will tweet it. If you follow either account, you'll be able to pick up the URL once we know what it is.

JOANN STARKS: Great. Thank you. What are the criteria for deciding if enough studies are available in order to produce a review?

DR. JAMES THOMAS: Oh. Okay. Well, I've seen reviews with no studies, and there's debate about how useful they are in terms of decision‑making, et cetera. I've seen reviews with one study. I've seen reviews with two. You can't do a meta‑analysis with two studies, but I think sometimes the process of doing a review and sort of laying out what the issues are, those can be useful documents in and of themselves, even if there aren't many studies in them.

So, I wouldn't like to set a lower limit. There are obviously sort of technical and analytical problems with when you've only got one or two studies, but if that's the extent of the evidence in an area, then what you've done is you've gone out and looked for the evidence and said, "Well, that's what we know at the moment. There's one study. So, that's ‑‑ I wouldn't not publish it just because of that. That's knowledge in and of itself

JOANN STARKS: Another question. Can you please comment how Living Systematic Reviews can or should be used to inform living guideline recommendations? Especially in broad subject areas. For example, adult concussion management, where there will be general information as well as PICO considerations. Any recommendations?

DR. JAMES THOMAS: That's a nice question. It takes us into another domain. I think probably what you find with guidelines is they're broader than individual reviews. So, what consideration has been given to is maybe not updating a whole guideline, but maybe making sure that particular sort of fast‑moving aspects of the evidence then inform particular recommendations which might be updated more frequently than the whole guideline.

But this is definitely a work in progress. So, whoever asked the question, if they'd like to get involved in the Living Evidence Network, I know there are people who are working on this very issue who I'm sure they'd like to get in touch with.

JOANN STARKS: Okay. We've got a little bit more time left, and we have another question. Which are your favorite meta‑analysis software’s for Systematic Reviews and how and when did you decide to perform a meta‑analysis with a Living Systematic Review?

DR. JAMES THOMAS: My favorite? The ones I've used more recently, have been in the various packages for meta‑analysis NR. There's one used very widely. I still like Stata. When I do, sometimes I use Stata. But it's been NR more recently. I can't remember what the other part of the question was. I got too taken with my favorite software.

JOANN STARKS: It's when do you decide to perform a meta‑analysis with a Living Systematic Review.

DR. JAMES THOMAS: Oh, well, the issues are just the same in terms of when you do a meta‑analysis. And there's actually been an awful lot of work gone on in the last couple of years on sort of critiquing the reasons why people do and don't do meta‑analyses. Sometimes it's just not appropriate. Sometimes it's just not possible. Sometimes it's more down to the type of question that people are asking. Sometimes it just seems to be down sort of individual reviewer preference. So, there are a ‑‑ this is a complex area in terms of when you do and don't meta‑analyze study findings. When possible, I like to have a narrative and I like to sort of think about the relationships between the concepts and the studies narratively, but I certainly would like to do a statistical analysis whenever we can. Sorry, what was the question again in there was one more thing I wanted to say on that.

JOANN STARKS: That last part was how and when do you decide to do a meta‑analysis within a Living Systematic Review?

DR. JAMES THOMAS: Oh, that was it. Yes. That's around doing a Systematic Review, but in terms of a Living Systematic Review I know there were questions and concerns raised about the sort of regular statistical tests which would then be doing in Living Systematic Review and whether we were going to be falling afoul of problems when you conduct multiple tests and end up with more false positives than ideally you would want to. This was something that was looked at in detail by a group of statisticians, and currently the guidance is that we shouldn't stop making any adjustments for repeated meta‑analyses when doing Living Systematic Review, that we should essentially treat each update of the review as an individual analysis without worrying about the fact that we're updating one that might have been done 10 or 20 times before.

JOANN STARKS: Okay. We don't seem to have any new questions coming in. We do have a little bit of time left. I really want to thank you very much, James, for your great presentation, and thank you for bringing in information that you're working on about the coronavirus. I think that's on top of mind for everybody right now. It's wonderful to be able to see how what you're doing is actually applied everyday today. Thank you for that. Does anyone else have any questions? Go ahead and send them to us right now. Or James, do you have anything you would like to say to wrap it up?

DR. JAMES THOMAS: No. Only thank you. I know it's a very strange time to be thinking about research methods. Thanks for coming in. I hope you found it useful.

JOANN STARKS: I think so. We had a very big crowd. I know people are very interested. Thank you again, James, for coming today and taking time. I know you're super busy now. Thanks to the staff helping with planning and logistics. We do have that [evaluation form](https://www.surveygizmo.com/s3/5501999/Evaluation-KTDRR-Living-Systematic-Reviews) mentioned earlier. I think [the link](https://www.surveygizmo.com/s3/5501999/Evaluation-KTDRR-Living-Systematic-Reviews) is in the chat box. If you'd like to give us feedback on that link, we'd really appreciate it.

I also want to thank NIDILRR for the support for these webcasts and other activities. Please visit our website at www.KTDRR.org. We have quite a few resources online. We look forward to seeing you at our next event, and again, we do appreciate your [evaluation feedback](https://www.surveygizmo.com/s3/5501999/Evaluation-KTDRR-Living-Systematic-Reviews). Lastly, as Kathleen mentioned ‑‑ or I guess Ariana mentioned, we'll be archiving this, so you'll be able to go back and check out this webcast in the future. In the next couple of weeks, we'll have it up online. Thank you so much.

DR. JAMES THOMAS: Goodbye everyone.