Methods Research Report

Development and Usability Testing of EPC Evidence Review Dissemination Summaries for Health Systems Decisionmakers

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Prepared for:
Agency for Healthcare Research and Quality
U.S. Department of Health and Human Services
540 Gaither Road
Rockville, MD 20850
www.ahrq.gov

Contract No. 290-2015-00001-I

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AHRQ Publication No. 18(19)-EHC027-EF
November 2018

Key Messages

Purpose of Project

To evaluate evidence summaries of Evidence-based Practice Center systematic reviews for their content, components, and usability among health systems decisionmakers.

Key Findings

- Decisionmakers (i.e., leaders within units of a large health system that help develop and implement evidence-informed health improvement strategies) thought the summaries would be foundational for other products such as clinical pathways.
- Decisionmakers preferred a 3-page summary with key messages, details on results, meaningful figures/tables, and strength of evidence; detailed methods and contextual information were less important.
- Development of a summary involved about 90 hours of person-time, and required expertise in systematic reviews and meta-analysis, qualitative analysis, and graphic design.
- Three-page summaries could be produced for most EPC reports and have value for end-users; however, consideration should be given to their purpose and format (e.g., "one size fits all," tailored for specific decisions).

This report is based on research conducted by the University of Alberta Evidence-based Practice Center under contract to the Agency for Healthcare Research and Quality (AHRQ), Rockville, MD (Contract No. 290-2015-00001-I). The findings and conclusions in this document are those of the authors, who are responsible for its contents; the findings and conclusions do not necessarily represent the views of AHRQ. Therefore, no statement in this report should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help EPCs and AHRQ understand health-systems need and use of evidence to inform their decisionmaking. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

Persons using assistive technology may not be able to fully access information in this report. For assistance contact EPC@ahrq.hhs.gov.

Suggested citation: Hartling L, Gates A, Pillay J, Nuspl M, Newton AS. Development and Usability Testing of EPC Evidence Review Dissemination Summaries for Health Systems Decisionmakers. Methods Research Report. (Prepared by the University of Alberta Evidence-based Practice Center under Contract No. 290-290-2015-00001-I). AHRQ Publication No. 18(19)-EHC027-EF. Rockville, MD: Agency for Healthcare Research and Quality. November 2018. Posted final reports are located on the Effective Health Care Program search page. https://doi.org/10.23970/AHRQEPCMETHENGAGEDEVELOPMENT.

Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To improve the scientific rigor of these evidence reports, AHRQ supports empiric research by the EPCs to help understand or improve complex methodologic issues in systematic reviews. These methods research projects are intended to contribute to the research base in and be used to improve the science of systematic reviews. They are not intended to be guidance to the EPC program, although may be considered by EPCs along with other scientific research when determining EPC program methods guidance.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality. The reports undergo peer review prior to their release as a final report.

If you have comments on this Methods Research Project they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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Acknowledgments

We thank Michele Dyson for input on study design and planning. We would like to thank Dr. Robert Moriarty (Department of Pediatrics, University of Alberta) and Ms. Morgan Potter for taking the time to pilot our interview guide and process. Many thanks also to the study participants from three of Alberta Health Services' Strategic Clinical Networks (SCNs): Emergency SCN (including Patrick McLane), Addiction and Mental Health SCN, and Maternal Newborn Child and Youth SCN (including Debbie McNeil). We also thank Dr. Jill Huppert, Task Order Officer, from AHRQ, for her assistance during this project, and for reviewing our proposal and this report.

Development and Usability Testing of EPC Evidence Review Dissemination Summaries for Health Systems Decisionmakers

Structured Abstract

Objectives. To develop dissemination summaries based on AHRQ EPC evidence reviews, and to evaluate the summaries, and their components, for usability among health systems decisionmakers.

Methods. For each of two reviews, we designed a three-page summary with the intent that the first page could potentially be a stand-alone one-page summary. Summaries included various report elements (e.g., key questions, methods, eligibility criteria, analytic framework, summary tables, forest plots) and varied in layout and design (e.g., text only vs. use of images). We conducted 'think aloud' telephone interviews with six decisionmakers from Strategic Clinical Networks, which are clinician-led teams that develop and implement evidence-informed health improvement strategies within a province-wide fully integrated health system. We analyzed the data thematically and translated themes into recommendations.

Results. Interviews yielded information on content, layout and design, and usability. With respect to content, themes included purpose, methods, summary data, and overall message. Recommendations regarding content were to: include a purpose statement and define the intended audience; discuss the methods briefly; when possible, provide data to support the findings (e.g., summary estimates with confidence intervals and strength of evidence, use standard well-organized tables and figures); state the overall message on the first page (include key findings, knowledge gaps, and take home message(s)). For layout and design, themes included readability, visual appeal, figures, tables, and credibility. Recommendations were to: use brief titles and subheadings; avoid acronyms; organize content logically; balance text with images and white space; use standard figures to present findings and when feasible, use figures instead of tables; use standard tables to present findings and when feasible, use tables instead of text; include the organization and program logos; and employ professional design choices. Themes regarding usability included language, length, and content. Recommendations were to: use plain language consistently; keep the summary to three pages or less; provide a link to the full text; organize the findings for maximum use; and consider usability in greyscale.

Conclusions. Decisionmakers preferred a three-page summary that presented key messages, details on results, and strength of evidence; detailed methods and contextual information were less important. Decisionmakers preferred summaries with use of meaningful images, graphs, figures, and tables to convey information. Decisionmakers thought the summaries would be foundational for other knowledge translation products such as clinical pathways.

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Introduction

Evidence reviews by EPCs are used by groups, such as clinical professional organizations, health care organizations, and Federal agencies, to inform clinical practice guideline development, program planning, and research priorities. The AHRQ EPC program wants to improve the utility and uptake of existing EPC reports by learning health systems. To support this goal, the EPCs engaged health systems to develop and test products that will help them use EPC reports. There is uncertainty about how to present (i.e., content, layout) information from EPC reports to health system decisionmakers to optimize their understanding of the research evidence, its implications, and how the findings may be applied to their context. in order to use the findings for application in their context.

The University of Alberta Evidence-based Practice Center (UA EPC) sought to develop knowledge dissemination summaries based on recent comparative effectiveness reviews prepared for the AHRQ EPC Program. The summaries were based on models or features that have been developed and implemented by other organizations. For example, The Canadian Foundation for Healthcare Improvement (formerly the Canadian Health Services Research Foundation) provides guidance on writing specifically for decisionmakers and includes one page with key messages and a three-page executive summary. Further, Cochrane groups have produced infographics with a focus on images and figures to summarize and convey information. The summaries were developed by the UA EPC and evaluated by key health care decisionmakers working in Strategic Clinical Networks (SCNs) within the local health system in Alberta.

Local Health System in Alberta

Alberta Health Services (AHS) is the local health system used for this project. AHS is Canada's first and largest province-wide, fully-integrated health system. Over four million people in Alberta are served by AHS, as are some residents of the neighboring provinces of Saskatchewan and British Columbia, and the Northwest Territories. Programs and services are offered at over 650 facilities, including hospitals, clinics, continuing care facilities, cancer centers, mental health facilities and community health sites. Approximately 110,000 people are employed by AHS, and the system is also supported by almost 9,300 practicing physicians of whom 7,700 are AHS medical staff (e.g., physicians, dentists, podiatrists, oral and maxillofacial surgeons). In Alberta, under the Canada Health Act medical care is free although there are some exceptions (i.e., prescription drugs, dental care, glasses, home care and long-term care). It is similar to Medicare in the US but is available to everyone. Details regarding AHS are found at http://www.albertahealthservices.ca/about/about.aspx.

Structures and Processes for Evidence-informed Decision-Making in the Local Health System

In 2012, AHS developed new structures called Strategic Clinical Networks (SCNs) as a mechanism to create improvements within focused areas of health care (see http://www.albertahealthservices.ca/assets/about/scn/ahs-scn-primer.pdf). The SCNs are clinician-led teams in specific disease areas (e.g., Addiction & Mental Health), settings of care (e.g., Emergency), or populations (e.g., Maternal Newborn Child Youth). Each SCN identifies priority areas of research or quality improvement initiatives within their scope. They work in teams through a collaborative membership model to develop and implement evidence-informed health improvement strategies across the health system. They operate with a "bottom-up"

approach engaging multiple stakeholders including patients. A list of the existing SCNs is available in Appendix A.

Objectives

1. To develop dissemination summaries based on comparative effectiveness reviews conducted by EPCs for the AHRQ EPC Program.
2. To evaluate the dissemination summaries, and their components, for usability among key decisionmakers within Alberta SCNs.

We sought to understand preferences for extent of information (e.g., summary of full report vs. key messages without background or methods details), length and formatting (e.g., text only vs. text with images/color), and technical content (e.g., outputs from analyses, summary estimates, strength of evidence). We sought to understand how decisionmakers may use the evidence in practice, in particular what knowledge translation or implementation strategies they may undertake, and what additional information they require beyond that contained in the EPC reviews.

Methods

Health System and Representative Description

Prior to the current project, the UA EPC Director (LH) and Associate Director (AN) had worked directly with leaders of the Maternal Newborn Child Youth, Addiction & Mental Health, and Emergency SCNs on activities in both knowledge synthesis and primary research. For this project, the UA EPC worked with six leaders from these three SCNs to develop and evaluate dissemination summaries. The roles of these individuals included a Senior Medical Director, a Scientific Director, two Executive Directors, and two Assistant Scientific Directors. An email invitation to participate in this project was sent to each individual (Appendix B). We selected these individuals because they had leadership roles within the SCNs which are intended to develop and implement evidence-informed health improvement strategies across the health system. We felt that they would be key people in the health system who would use evidence reviews to inform and support the work of the SCNs.

In their daily work, these individuals are involved in various decisions related to health care research and quality. For example, when asked about their roles, two participants mentioned that they review applications for health care research grants and awards and contribute to decisions related to which projects should be funded. Two participants mentioned that they are involved in the short- and long-term planning, implementation, and evaluation of organizational strategies for health care quality improvement. Four participants mentioned that they are involved in the development of clinical pathways and the translation and dissemination of evidence into clinical practice.

Process Description

Development of the summaries involved a three-step process. First, leaders from the three SCNs were presented with a list of recent EPC reports that pertained to their areas of focus (Appendix C). Each SCN was then asked to choose three reports that addressed priority areas of research or quality improvement. One report selected was common to all three SCNs, therefore, we chose this report for the first product: “Strategies to improve mental health care for children and adolescents.”[1] During development of the first summary, we realized that the topic of the report did not lend itself to traditional meta-analytic methods. Moreover, the report reviewed complex interventions with an evidence base that was varied and sparse with respect to any given intervention. Further, the report was prepared by another EPC, which presented challenges and involved additional time for us to ‘translate’. Therefore, for the second summary we selected a report produced by our EPC on a topic of some relevance to all of the SCNs: “First and second-generation antipsychotics in children and young adults”.[2] This report varied from the other report in terms of volume of literature and included extensive quantitative analysis (i.e., pair-wise and network meta-analysis).

In step two, prototypes for summaries of the two topics were developed to communicate the reports’ findings and key messages. We aimed to incorporate elements identified as important to end-users of EPC reports in a recent EPC Research White Paper, such as key messages, hyperlinks to the full report, and contextual information (e.g., current process of care).[3] Presentation and formatting was informed by evidence summaries produced by other organizations: The Canadian Foundation for Healthcare Improvement (formerly the Canadian Health Services Research Foundation) (http://www.cfhi-

fcass.ca/Migrated/PDF/CommunicationNotes/cn-1325_e.pdf), which involves writing specifically for decisionmakers and includes one page with key messages and a three-page executive summary; Tools for Practice produced by the Alberta College of Family Physicians (https://www.acfp.ca/tools-for-practice/), which summarize evidence on a specific clinical question and include a focused clinical question, a bottom line statement and key points summarizing the results; infographics such as those produced by some Cochrane groups, which summarize information with a focus on images and figures to convey information.

For each topic, we designed a three-page summary with the intent that the first page could potentially be a stand-alone one-page summary. To facilitate the evaluation of users' preferences, we designed the products to differ with respect to the inclusion or exclusion of several features: key questions; methods including PICO elements; contextual information; applicability; research gaps; descriptions of strength of evidence ratings. Further, we attempted to vary the extent and type of images, text, tabular results, and graphs for communicating results. Table 1 provides an overview of the different elements for each summary.

Table 1. Overview of the topics, content and design features included in summaries

Nature of Review and Design Features Used	Relevant Element in Full Report	Strategies to Improve Mental Health Care for Children and Adolescents	First and Second-generation Antipsychotics in Children and Young Adults
Nature of Review	Topic	Complex strategies focused on implementation of evidence-based interventions	Comparative drug effectiveness (numerous comparisons of individual FGAs vs. individual SGAs)
	Analysis	Qualitative comparative analysis	Pair-wise meta-analysis for benefits; network meta-analysis for harms
	Evidence base	17 studies (multiple designs) evaluating 16 strategies	135 studies (95 trials, 40 observational studies) across numerous conditions
Design Features Used in Summary Product (Both Three Pages)	Color	Colorful, with focus on orange, turquoise and purple; multiple colors in one table on all 16 strategies	Two-tone with grey and navy throughout
	First page	Use of images, infographic style	Text only
	Key messages	None	Included on first page, with explicit heading; included research gaps and future needs
	Key questions	Included	None
	Analytic framework	Included as a figure	None
	Background/contextual information	Included on page 2; generic rationale for review	Included on first page as "importance of topic" with additional information (not in report) relevant to Canada
	Eligibility criteria	Included in a table	None
	Applicability section	Included	None
	Research gaps	None	Included
	Methods	Data sources and review approach described on second page	Very limited; just mention of systematic review on first page

Nature of Review and Design Features Used	Relevant Element in Full Report	Strategies to Improve Mental Health Care for Children and Adolescents	First and Second-generation Antipsychotics in Children and Young Adults
	Results	Description of key findings on first page with figure Table with study and intervention characteristics and conclusions (by study) on third page; included SOE findings for each outcome (by study) No numerical values	Narrative of some findings without numerical values; others presented in a table with summary measures, confidence intervals, and conclusions (incorporating SOE language) (by comparison and outcome)
	Figures from analysis	Figure from qualitative comparative analysis	Summary plot of multiple pair-wise meta-analyses; figure of network meta-analysis
	Description of SOE ratings	Included in text box with standard definitions	Brief (in figure footnotes)

FGA=first-generation antipsychotic; SGA=second-generation antipsychotic; SOE=strength of evidence

The summaries were developed through an iterative process involving the UA EPC Director and Associate Director (LH, AN) and several staff (Research Coordinator (MN), Program Manager (JP), Research Associate (AG)). First, the Directors and staff met in person to brainstorm about the content of the summaries and to map out the three pages. We designed the layout of information so that the first page could be a stand-alone summary with a focus on the key findings/messages. Next, the Research Coordinator and Program Manager worked together to identify information in the reports, and condense it where necessary (e.g., a 15-page table from the executive summary of one of the reports was condensed into a single page). To add local contextual information for one of the products, the Program Manager conducted a literature review for relevant studies and summarized this data. During this process, the Director and Program Manager convened a call with the Director and Project Lead from another EPC that had produced one of the reports. The purpose of the call was to clarify the analysis (qualitative comparative analysis) and results, and ensure our interpretation was accurate prior to developing the summary. We asked them targeted questions during the call, including what they considered to be the key and essential 'take home' messages from the report.

Once the content for each summary was established, the Research Associate, with skills and experience in graphic design programs, formatted the information, created graphics, and drafted the summaries. All team members reviewed the drafts and provided input; the summaries were revised accordingly prior to evaluation with the decisionmakers. Development of the summaries involved approximately 180 hours (90 per product) of person-time. A substantial portion of this time was required for (1) understanding the methods and findings (for the topic not conducted by our EPC), and (2) conducting the literature review to provide contextual information (for the review conducted by our EPC). Skill sets necessary to develop the summaries included expertise in systematic reviews and meta-analysis, qualitative analysis (owing to one of the selected review topics), and graphic design.

Evaluation Methods

In step three, we interviewed SCN leaders who were asked to evaluate the summaries by completing a 'Think Aloud' exercise.[4-6] Thinking aloud is a method grounded in cognitive psychological and educational research whereby individuals talk aloud while performing a task. The method was intended to generate direct data on the ongoing thought processes of SCN leaders while reviewing the summaries (i.e., when reviewing a specific summary, how do they

see themselves using this information to inform decisions, and could they communicate this information to their colleagues and staff). This exercise covered critical evaluation aspects of the summaries.

We developed an interview guide and pilot tested the guide and interview process with two individuals outside of the research team: one researcher and one physician. We modified the interview guide and format of the interview substantially following pilot testing, in particular to ensure that we were able to review both summaries in the 60-minute time period allocated for the interviews. The final interview guide is in Appendix D. We also alternated which product was discussed first to ensure that we gathered detailed information on each. Prior to the interviews we sent participants the summaries and asked that they spend time (at least 10-15 minutes) reading through them prior to the call. The email sent to participants ahead of time is in Appendix B. The interviews were completed by telephone and were digitally recorded. The interviews lasted approximately 60 minutes each. The Research Associate with experience in qualitative research conducted the interviews. The UA EPC Director, Associate Director, Program Manager, and Research Coordinator were present.

The recorded interviews were transcribed and data were analyzed using NVivo software (v. 11, QSR International). A standard, systematic approach to qualitative data coding[7] and thematic analysis[8] were used. All analyses were undertaken by the Research Associate, with input from all other team members at various stages to reduce interpretive biases. First, initial coding was undertaken by moving quickly through the text and applying codes to each line, while remaining close to the data by using participants' own words as much as possible. Next, focused coding was undertaken whereby the data were reviewed to identify the most significant and frequent codes. Similar codes were combined and categories of codes were renamed to more accurately reflect the data. Memos were then developed for each emergent category (or theme). Following initial and focused coding, the research team convened to review the analysis and discuss differences in interpretation. All disagreements were resolved via discussion and minor revisions were made as appropriate. Following the consensus meeting, the Research Associate refined the original themes and translated these into recommendations for practice, which were agreed upon by the team.

Ethics approval was received for this work from the University of Alberta Health Research Ethics Board prior to conducting the interviews. All interviewees provided verbal consent to be interviewed, for the interviews to be recorded, and for the results to be presented in aggregate form.

Planning for and conducting the interviews, analyzing the data, and revising the summaries involved approximately 180 hours of investigator and staff time. Experience in facilitating interviews and conducting qualitative data analysis was required.

Results

Evaluation Results

Table 2 summarizes the themes that emerged from our interviews; focused codes and memos are available in Appendix E. With each theme we have provided illustrative quotes and recommendations developed based on the findings. The themes were grouped into three areas: (1) content, (2) layout and design, and (3) usability.

Content

Interviewees felt that the purpose and the intended audience of the summaries should be clearly indicated on the first page. In general, interviewees felt that details on methods were not needed, and that methods could be mentioned only briefly if space was available or reference made to the full technical report. None of the interviewees liked the analytic framework that was included in one of the summary products; they found it confusing and unhelpful. Interviewees liked to see the data including summary estimates with confidence intervals, forest plots and graphs from network meta-analyses, and strength of evidence findings. Interviewees appreciated when the results data were organized in summary tables. Interviewees liked the key messages and indicated that these should be on the first page. They felt that this gave a strong overview of the content of the report. Interviewees felt that research gaps and clinical implications should be included in the key messages that are presented upfront.

Layout

Interviewees felt the titles and subheadings should be as straightforward and unambiguous as possible. This may involve using a title that is different from the technical report (i.e., interviewees found the title for one of the summaries was unclear). Interviewees thought it was best to avoid acronyms. Interviewees felt the information was presented in a way that was logical and easy to use. Interviewees preferred a mix of images and text and suggested adding ‘white space’ or other measures to break up sections that were dense with text. While images were generally appealing, they felt the images needed to be meaningful, easily understood, and relate to the subject matter. If figures described the findings well there was no need to add textual descriptors of the same information. Interviewees liked the tables with results and conclusions and found that a lot of information could be organized in a small space; they preferred tables over dense text. Interviewees felt that the organization and program logos enhanced the credibility of the summary and suggested placing them in a noticeable location (e.g., top of the page). While interviewees found the colorful product engaging and approachable, they suggested using color and shading purposefully and that conventional designs may give the product more credibility.

Usability

Interviewees felt that plain language should be used to reach a broad audience of decisionmakers, with consistent style and reading level throughout. They recommended avoiding the use of jargon. Interviewees felt that three pages of information was ideal; however, a fourth page could be used for additional information such as references. They liked the idea of a hyperlink to the full report for more detailed information; however, they recommended that the

hyperlink be large enough and in a location that it would not be overlooked. Interviewees recommended ordering information in a logical way; they suggested ordering results in tables by outcome, strength of evidence (i.e., high to low) or direction of the conclusions. Interviewees indicated that the colors of the products were appealing; however, summaries should also be understandable and visible if viewed or printed in black and white.

Table 2. Recommendations for summaries based on interviews with six decisionmakers[a]

Themes	Component	Illustrative Quote(s)	Recommendation(s)
Content	Purpose	"When I hear the word 'summary', this is the end of combining all three pages, right? So if you're asking me is there a summary section on these three pages, the answer would be no. […]." (Participant 2) "[…] I think it would have been very helpful at the outset to clarify who the audience was." (Participant 6)	**Include a purpose statement.** The purpose statement should be placed on the first page and make it evident that the document is a summary of a systematic review. Include suggestions for how the findings of the review could be used. **Define the intended audience(s).** Clearly state the intended audience(s) for the summary on the first page.
	Methods	"I, sort of, wonder if I want this information on a three-page document? […] it's pretty easy to go to the systematic review and look at the methods." (Participant 1) "I like the criteria for selecting studies. Like I thought that was really nice and succinct, and then data sources and review approach. That was really nice and succinct in terms of the methods." (Participant 4)	**Discuss the methods briefly.** Detailed methods may not be an effective use of space. Instead, consider using a clear statement and including a hyperlink to direct readers to the full text of the review. When methodological details are included in the summary, provide the data sources, search strategies, and selection criteria succinctly (e.g., in tables and/or figures).
	Summary data	"[…] it provides the actual data in a very organized fashion which allows you to look at the degree of…of impact, or the degree of benefit […]. So I like this." (Participant 4) "I liked the clear strength of evidence scale." (Participant 5)	**When possible, provide data to support the findings.** Include summary data (e.g., risk ratios with confidence intervals) for each outcome. Use standard, well-organized tables and figures for conciseness. If possible, provide the strength of evidence for each outcome. Tailor the format of presentation to the target audience(s).
	Overall message	"Page one is really clear and like, here you go, here's the take home message, and then two and three are such good support for the take home message." (Participant 5)	**State the overall message on the first page.** The message should include the: (a) key findings, (b) conclusions, (c) knowledge gaps, and (d) take home message(s). Subsequent pages should provide support for the overall message.
Layout and Design	Readability	"[…] I probably struggle with even understanding what the title meant." (Participant 6) "[…] it took me a while to figure out what SOE even was though it was at the bottom." (Participant 3) "What I appreciate is that very logical way in which it's laid out." (Participant 3)	**Use simple, brief titles and subheadings.** Titles should be as straightforward and unambiguous as possible. Consider including the review title in a consistent format on each page. **Avoid acronyms.** If acronyms are unavoidable, define them as explicitly as possible. **Organize content logically.** The content should follow a logical sequence so that pertinent information is easy to find. Use a consistent layout for each page and standard headings similar to that in the full text report to ease readability.

Themes	Component	Illustrative Quote(s)	Recommendation(s)
	Visual appeal	"[…] white space is always, you know, visually appealing to the eye if you have it." (Participant 6) "[…]. I find that the two that you've given us, one has all text, one has mostly images. I would like somewhere in the middle between the two [..]." (Participant 6)	**Balance text with images and white space.** Avoid text-only pages, and break up text with meaningful visuals and/or white space. Include only relevant, easy-to-understand images, tables, and/or figures that support the overall message and add value. Consider using bulleted lists to break up paragraphs of text.
	Figures	"When I read through, the first figure I had to really think it through as I was looking at the arrows and what was…what was trying to be…portrayed by that." (Participant 4) "I think the nature of the table is such that it doesn't lend itself to a figure […]. That would be the only kind of way of presenting it if it's appropriate for this context that I would prefer." (Participant 3)	**Use standard figures to present the findings.** Use figures that are familiar to the intended audience(s) (e.g., forest plots for academic audiences) to present large amounts of data concisely. Include summary data on the figures when possible. All figures should be unambiguous and support the overall message. **When feasible, use figures instead of tables.** When the nature of the data allow, figures may be easier and quicker to read. Compared to tables, figures can be a more efficient use of space.
	Tables	"[…] I like that it's shaded so you can follow it across […]." (Participant 5) "I think it's good. It puts a lot of information in a small space which I think is great […]." (Participant 1)	**Use standard tables to present the findings.** Tables should be well organized, and include simple, explanatory titles and column headings. Shade alternate table rows to improve readability. Place legends, when needed, below tables. **When feasible, use tables instead of text.** Tables that summarize the findings may be preferred over dense text.
	Credibility	"Yes, I thought the logo was beneficial and I didn't think of the credibility issue. The antipsychotic one, I mean that is what I expect to see when I'm looking at things like this. So I suppose it looked more credible […]. So I don't want to 'ding' the other one as not credible, but […] that did come up in my head, I guess." (Participant 5)	**Include the AHRQ and EPC logos.** Highly visible logos, at least on the first page, may enhance credibility. Place the logos at the top of the page to improve the likelihood that they are noticed. Within reason, larger logos may be more effective than smaller ones. **Employ professional design choices.** Use colours purposefully. Low-intensity colours may be less distracting. Conventional designs may improve perceptions of credibility. Tailor the design to the intended audience(s).
Usability	Language	"I think one of the things that I really like what you're trying to do here is the use of plain language writing." (Participant 2) "Well, operations are the people to get it done […]. So it has to be something tangible that operations can understand." (Participant 2)	**Use plain language as much as possible.** Tailor the technical level and density of information to the target audience(s). Plain language will be understandable to a broader audience of decisionmakers. Avoid using jargon. Maintain consistent language (style, reading level) throughout the summary.
	Length	"You could put references on a fourth [page] but I would…like you get to four or five [pages] and I'm like this isn't a summary." (Participant 5) "I suppose if someone asked me for more details on one of those I would use it [the hyperlink], but in this case in neither case did I think to click on that	**Keep the summary to three pages or less.** If necessary, a fourth page may be used to provide additional information (e.g., references). **Provide a link to the full text.** Provide the hyperlink in a size and location such that it will not be overlooked. Linking to the full text of the review may reduce the level of detail needed in the summary.

Themes	Component	Illustrative Quote(s)	Recommendation(s)
		link. […]. I didn't actually even notice that I could." (Participant 5)	
	Content	"So I don't know if there was some rhyme or reason to the…how you listed these, but it would have been nice to have seen the ones where there was insufficient evidence all together and ones where there was no evidence." (Participant 6) "[…] because I ended up looking at this in non-colour the strategy components, I can't actually distinguish." (Participant 1)	**Organize the findings for maximum utility.** Organize the findings in a logical sequence such that readers can easily identify those that are the most useful to them. For example, consider ordering tables of study results in a meaningful way (e.g., by outcome, strength of evidence, or direction of the conclusions). **Consider usability in greyscale.** The content should be equally understandable whether it is printed in colour or in greyscale. Consider using patterns or shapes to replace colours for items that need to be distinguished in greyscale.

[a]Additional details (focused codes, categories, and memos with additional quotes) are in Appendix E.

Final Product Description

Tables 3 and 4 describe the final products, including the components included, where the information was found in the original EPC report, and any notes on how information was translated/interpreted or adapted for the summaries (original and revised versions). More details are included in Appendix F, and the final summaries are in Appendix G.

Table 3. Description of final product: strategies to improve in mental health care for children and adolescents

Component of Summary	Source in Original EPC report	Original Content/Format	Changes Made Based on Evaluation
Report title	Original title	Placed the original title center-justified at the top of the first page.	Left-justified the title to make room for the AHRQ log in the title banner.
AHRQ logo	Official logo	Placed the logo in a banner at the bottom right-hand corner of the first and second pages.	Moved to the top right-hand corner of the first page, and made larger.
Color	Not applicable	Colorful, with focus on orange, turquoise and purple. Used different colors to represent different strategy components in table.	Changed color to purple with blue headings. Used numbers instead of colors to represent different strategy components.
Background	Executive Summary	Included brief, generic rationale for the review on the second page, under the heading "Contextual information".	Moved to the first page, under the heading "Background". Simplified the language.
Purpose of the summary and intended audience	Not applicable	Not included.	Under the heading "Purpose", added a section to the first page that included the purpose, research questions, intended audience, and potential uses for the summary.
Key questions	Executive Summary	Included the three key questions at the top of the first page. These were modified slightly from the executive summary for brevity.	Moved to a section titled "Purpose", removed jargon (e.g., KQ1, KQ2), and converted to plain language.

Component of Summary	Source in Original EPC report	Original Content/Format	Changes Made Based on Evaluation
Analytical framework	Executive Summary	Modified with colors of summary.	Removed based on negative feedback about poor understanding and lack of added value
Summary of methods including literature sources and eligibility criteria	Report methods	Included on the second page, under the major heading "Systematic Review Methods". The criteria for selecting the studies were in a table and the remaining methods (data sources and review approach) were in text.	Modified the language to avoid jargon. Simplified the methods to provide basic information on data sources and study eligibility criteria. Moved to the bottom of the first page.
Key messages	Executive Summary (limitations and conclusions)	Not included.	Added to the first page, highlighted within a colored box. Included the importance of the strength of evidence and what this means for the efficacy of strategies and potential harms.
Link to full report	Obtained from AHRQ website	Included in a banner along the bottom of the first page (left justified).	Added the link to the bottom of the second page, as participants indicated they appreciated the opportunity to look further into aspects of the report. Also added a link within the text on the first page to make the availability of more information more evident.
Included studies	Executive Summary (Figure B and results)	Depicted with a combination of images and text to show how many studies, strategies, and solutions were included.	No change, as participants indicated they liked the white space that the combination of images and text provided.
Evidence of effectiveness	Executive Summary (figure); full report results section for areas where no benefit was found	Included a figure modified slightly from that in the Executive Summary to show the solutions associated with success and the number of studies supporting each solution.	Change to a table format to reduce confusion around number of studies versus the strength of evidence. Changed terminology from "solutions" to "strategy features". Changed the language around the strength of evidence, as participants found statements such as 'low strength of evidence of no benefit' and 'insufficient evidence' to be confusing.
Implications for research and practice	Executive Summary (discussion, key findings and research recommendations sections)	Not included.	Added a bulleted list at the bottom of the second page titled "Implications for Research and Practice".
Summary of individual studies with 16 strategies	Executive Summary (Table C)	Condensed the 15-page table in the Executive Summary to a single page to show all strategies along with their components, strength of evidence, and outcomes. Included on the third page.	Removed acronyms because the interview participants found them to be confusing.

KQ, key question; SOE, strength of evidence

Table 4. Description of final product: first-and second-generation antipsychotics for children and young adults

Component of Summary	Source in Original EPC report	Original Content/Format	Changes Made Based on Evaluation
Report title	Cover page	Same as original report.	No changes.
AHRQ logo	Cover page	Top right corner of first page of summary.	No changes.
Background/contextual information	Not from report since contextual related to Canada – from literature review	Middle of first page; paragraph format.	Same location but bullet format and removed some text to shorten.
Purpose of the summary and intended audience	Abstract or executive summary	Top of first page in paragraph format; header "Focus of Summary".	Top of first page in bullet format; header "Purpose".
Key questions	Not used	Not used.	No change.
Summary of methods including literature sources and eligibility criteria	Not used	Not used.	No change.
Key messages	Executive summary	Bottom of first page, bullets with in-line subheadings.	Placed in text box with bold blocked color border; shortened by removing some text and subheadings; pulled out one main message and placed in italics and centered at very bottom.
Link to full report	AHRQ website	Link on bottom of first page.	Added link in Purpose and another link on last page.
Included studies	Abstract and executive summary and results section (for outcomes with insufficient SOE)	Number of total studies and for each outcome (with total sample size); no individual study characteristics.	No change.
Evidence of effectiveness/benefits	Executive summary; results section for definition of outcomes and related to findings with low or insufficient SOE	Some results in textual (bullets) format without numerical values; some in tables with detailed information (e.g., # trials, # patients, measurements tools, effect sizes, conclusions).	All in tables with detailed information. Added description of what response rates meant. Bolded and italicized findings of no benefit.
Evidence of harms	Executive summary	Figures with text describing main findings and defining type of analysis.	Removed text that was not required due to clear message in figures.
Implications for research and practice	Executive summary	Incorporated into bullets on first page and section on "Knowledge Gaps and Other Issues" on last page.	No changes.
Other	Not in report	Nothing on brand names for drugs.	Added appendix on fourth page with common brand names for drugs.
	Not in report	Some text was in bold font (e.g. clauses in key messages, subheadings).	Added more bold font to emphasize important points that may be missed.

Discussion, Limitations, and Conclusion

Utility and Applicability for other Health Systems

A three-page evidence summary was seen as useful by decisionmakers to provide an overview of the results of a full evidence report. Interviews yielded much information about evidence summaries with respect to the content, layout and design, and usability of the products. Decisionmakers preferred a three-page summary compared with just one page, and indicated that more than three pages would be too much. The decisionmakers in our sample wanted details on results and strength of evidence; methods and contextual information were less important. They liked having key messages upfront. Our participants preferred summaries with some 'white space' and use of images, graphs, figures, and tables to convey information; they found the analytic framework confusing and unnecessary. They suggested using plain language, and avoiding jargon and abbreviations, in order to reach a broad audience of decisionmakers (i.e., to share with front-line staff).

Decisionmakers felt the summaries could be used as a foundation for other knowledge translation products such as clinical pathways, but more actionable information may be required to support uptake and implementation. The type of information may vary by topic, the nature of the decision, and the type of decisionmaker. For example, decisionmakers indicated they would need more details on implementation interventions for the mental health strategies topic (e.g., while educational interventions were identified as a strategy, there were no details on the optimal intervention components). In the context of the antipsychotics topic, it was felt that the decisionmakers would be the front-line clinicians. In this case, key messages about clinical implications as well as specific data and strength of evidence on comparative effectiveness with respect to benefits and harms of individual antipsychotics were considered important. Decisionmakers involved in allocation of research funding wanted information on research gaps to inform research priorities. Further, some may need sufficient content related to costs and cost-effectiveness to inform decisions about uptake and implementation of evidence-based strategies.

The types of products developed for this project would likely be useful for other health systems. Summaries are likely most useful for decisionmakers who have requested information on the topic, as content can then be tailored to their purpose and needs. The decisionmakers we interviewed felt that the summaries we developed would not be useful for patients.

Lessons Learned and Applicability for Other EPC Reports

The summaries and evaluation approach we produced could be applied to other EPC reports. The summaries need to clearly identify their purpose and target audience. A variety of stakeholders (even within health systems) might have an interest in this information (e.g., leadership, clinical governance, operations); therefore, summaries should either be understandable and appealing to a broad audience or tailored to specific and clearly identified decisionmaker needs.[9] It is likely most efficient for the EPC who produced the report to also develop the summary; we encountered challenges finding and interpreting the information from a report that we did not produce and needed to communicate with the other EPC to ask questions. While the EPC producing the report is in the best position to summarize the data and identify key messages, review of the summary by others (including end-users) would be required to ensure it is understandable and meaningful.

Creation of summary products would not necessarily require changes to the current EPC reports, although additional time and resources would be required (and likely reformatting and synthesis of information in the main report, e.g., we created a graph showing summary estimates from multiple meta-analyses). Different products may be considered if the intent is to provide a summary that is broadly applicable versus one where the information is tailored to the needs and questions of a specific health system (with specific actionable recommendations). The summaries we developed were seen as a good source of background information or a foundation for other knowledge translation tools such as clinical pathways; however, additional details from the report and other information would likely be required to develop certain tools. Standardization of summaries (e.g., a template that EPCs could work from to fill in the required information, then generate the summary with automated formatting) would likely be most efficient in terms of time and resources. A standard template would give the summaries a similar look with consistent recognition of the program and organization.

Limitations

Our sample was limited to six decisionmakers from one health system, therefore results may not be generalizable to other decisionmakers; moreover, results are not applicable to other end-users, such as frontline health care providers, operations staff, and patients. While our interviewees had leadership roles within units of the organization that were meant to facilitate and implement changes/improvements to the system, most did not have direct decisionmaking responsibilities, rather they were in a position to advise on issues. This evaluation was done within a hypothetical scenario; that is, the decisionmakers we interviewed had not requested the review nor did they have an immediate need or purpose for the information. Results, including type of information, details and formatting of information, may be different for those with a specific need or purpose.

We developed and evaluated summaries for two reports, therefore results may not be generalizable to other reports. The topic of one of the summaries was complex, therefore, evaluation of the product and its usability may have been confounded by the nature of the topic; moreover, there was sparse and insufficient evidence across interventions, therefore, impressions of the content and usability of the product may have been confounded by the extent and nature of the evidence. While we revised the summaries based on results of the interviews, we did not have decisionmakers review or evaluate the final versions.

Finally, we developed the summaries ‘in-house’ with the expertise we had available within our EPC. While our team has extensive experience, expertise, and formal training in scientific writing, we did not involve individuals with specific expertise in health communications, plain language writing, information design or user-centered design.

Conclusion

While the results of this evaluation were positive, that is decisionmakers generally liked the summary products, further evaluation should be done before widespread recommendations can be made across the EPC program or all reports. Development of each summary involved approximately 90 hours of person-time, and required expertise in systematic reviews and meta-analysis, qualitative analysis (owing to one of the selected review topics), and graphic design. The time required might be reduced if standard templates were available. Consultation with professionals in information design and user-centered design, health communications, and plain language writing would be advantageous.

Based on this initial evaluation, we would suggest that summaries (three pages) could be produced for most EPC reports and would have value for end-users; these products would be distinct from the existing evidence summaries (which are typically very long, technical, and include detailed methods with analytic frameworks) and abstracts (which are technical and include methods). The summaries should include key messages which are becoming a standard feature in the upfront material of reports; however, our interviewees would not have been fully satisfied with the key message sections of EPC reports as they valued having information on the numerical results and strength of evidence assessments. Further, interviewees suggested that a similar format across products (e.g., structure and content of tables) would be helpful.

However, we would caution against a large investment in generating the summaries before clearly identifying their purpose and audience; for instance, their format and content may differ depending on whether they are intended to be broadly accessible plain-language, user-friendly summaries versus supporting specific decisions and needs within a given health system (which may require more targeted products involving end-users in their development, and more actionable information). In short, we would advise the program to think carefully about the purpose—whether these are intended as a 'one size fits all' product or whether more tailored products would be more useful and appropriate.

References

1. Forman-Hoffman VL, Cook Middleton J, McKeeman JL, et al. Strategies to Improve Mental Health Care for Children and Adolescents. Comparative Effectiveness Review No. 181. (Prepared by the RTI International–University of North Carolina Evidence-based Practice Center under Contract No. 290-2012- 00008-I.) AHRQ Publication No. 16(17)-EHC035-EF. Rockville, MD: Agency for Healthcare Research and Quality; December 2016. www.effectivehealthcare.ahrq.gov/reports/final.cfm. PMID: 28079996

2. Pillay J, Boylan K, Carrey N, et al. First- and Second-Generation Antipsychotics in Children and Young Adults: Systematic Review Update. Comparative Effectiveness Review No. 184. (Prepared by the University of Alberta Evidence-based Practice Center under Contract No. 290-2015-00001-I.) AHRQ Publication No. 17-EHC001-EF. Rockville, MD: Agency for Healthcare Research and Quality; March 2017. www.effectivehealthcare.ahrq.gov/reports/final/cfm. doi: https://doi.org/10.23970/AHRQEPCCER184. PMID: 28749632

3. White CM, Sanders-Schmidler GD, Borsky A, et al. Understanding Health-Systems Use of and Need for Evidence to Inform Decisionmaking. (Prepared by the University of Connecticut and Duke Evidence-based Practice Centers under Contract Nos. 290-2015-00012-I and 290-2015-00004-I) AHRQ Publication No. 17)18)-EHC035-EF. Rockville, MD: Agency for Healthcare Research and Quality. October 2017. www.effectivehealthcare.ahrq.gov/reports/final.cfm.

4. Ericsson KA, Simon HA. Protocol Analysis: Verbal Reports as Data. MIT Press, Cambridge, MA (1984).

5. Charters E. The Use of Think-aloud Methods in Qualitative Research. An Introduction to Think-aloud Methods. Brock Education 2003; 12(2):68-82. DOI: HTTPS://DOI.ORG/10.26522/BROCKED.V12I2.38

6. Nielsen J. Usability Engineering. Boston, MA: Academic Press; 1993.

7. Charmaz K. Coding in grounded theory research. In Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis. London, UK: Sage Publications; 2006, pp. 42-71.

8. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. Nursing & Health Sciences. 2013;15(3):398-405. PMID: 23480423. DOI: 10.1111/nhs.12048

9. Marquez C, Johnson AM, Jassemi S, et al. Enhancing the uptake of systematic reviews of effects: what is the best format for health care managers and policy-makers? A mixed-methods study. Implementation Science. 2018;13:84. PMID: 29929538. DOI: 10.1186/s13012-018-0779-9

Appendix A. Alberta Health Services Strategic Clinical Networks

- Addiction and Mental Health
- Bone and Joint Health
- Cancer
- Cardiovascular Health and Stroke
- Critical Care
- Diabetes, Obesity and Nutrition
- Digestive Health
- Emergency
- Kidney Health
- Maternal Newborn Child & Youth
- Population, Public and Indigenous Health
- Respiratory Health
- Seniors Health
- Surgery

Appendix B. Letter of Invitation and Letter Sent Prior to Interviews to Leaders in Alberta Health Services' Strategic Clinical Networks

Letter of invitation

Dear {participant},

Over the next year, the University of Alberta Evidence-Based Practice Centre (UA EPC) has an opportunity to conduct an exciting knowledge translation project with funds provided by the Agency for Healthcare Research and Quality (AHRQ). Lisa Hartling (Center Director), Michele Dyson and I (Associate Directors) are hoping to work with individuals in key leadership positions in Alberta's SCNs to conduct this work. This will only require a few hours of your time over several months. I am hoping you will consider working with us.

The KT project will entail three steps:

1. We will ask you to match a priority area for the {participating} SCN with an existing comparative effectiveness review that has been conducted for the AHRQ EPC program. We will provide you with a list of relevant reviews to choose from. At a first glance, there are several excellent reviews that could serve evidence needs for the {participating} SCN.
2. We will then create 4 different products to communicate/summarize the key findings from the chosen review. The full reports of comparative effectiveness reviews can be 50 to 100+ pages, and we recognize these reports are not readily translatable to 'on the ground' use.
3. We will share the 4 different products with you, and during a 30-minute phone call, we will ask you to assess the design attributes and format of each product.

The details of the project still require AHRQ approval. We are hoping to start the project this November. The project will span several months. At this time, we are only asking for confirmation as to whether or not you would be interested in representing the {participating} SCN for this project. If you are not able to participate, we would also gladly take any suggestions of colleagues' names. Again, this should only involve several hours of your time over a few months, and we hope to create products and a model for communicating evidence that are useful to your SCN.

Many thanks for considering this request. I look forward to hearing from you,

Mandi Newton

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Amanda S Newton, PhD, RN
Associate Professor, Department of Pediatrics
Clinician Scientist, Child and Adolescent Psychiatry Research
CIHR New Investigator
Faculty of Medicine and Dentistry, University of Alberta

Letter sent prior to interviews

Dear [participant],

As indicated in our previous emails, we will be meeting on [date] at [time] to interview you about summary products for systematic reviews. We will be completing the interview by teleconference, and you can find the call-in information at the bottom of this message.

During this interview, we will be reviewing two summary products (attached). One is from a review that you selected as relevant to your SCN, and the other is one you may not have selected but we have summarized to provide a different style of summary product. Both of these summaries are attached to this email.

Prior to our interview on [date], we ask that you **print both of these documents**, ideally in colour, and **review them both for 10-15 minutes** in order to familiarize yourself with them. While you review these documents, please write down any notes on your initial thoughts directly on the summary product, as we will request that you scan and return these notes after the interview. It is very important that you have reviewed these documents prior to the interview, so that you are able to answer questions regarding the content.

The current documents are just prototypes, so we ask that you do not distribute them further at this time. We will provide you with the final products that can be shared when your feedback has been incorporated.

Thank you and we look forward to speaking with you,

Megan Nuspl on behalf of Mandi Newton and Lisa Hartling

Dial in numbers:

XX

Access code:

XX

Megan Nuspl
Research Coordinator

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Appendix C. List of Comparative Effectiveness Reviews Relevant to the Strategic Clinical Networks, Used for Selection

We selected recent comparative effectiveness reviews of potential relevance to the Strategic Clinical Networks (SCNs) who will participate in this project (Addictions & Mental Health, Maternal Newborn Child Youth, Emergency). This list was proved to participant for them to select which ones we would use for the summaries.

Anxiety in Children
Date: August 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: Mayo Clinic

Tympanostomy Tubes in Children With Otitis Media
Date: May 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: Brown University

Interventions Targeting Sensory Challenges in Children with Autism Spectrum Disorder—An Update
Date: May 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: Vanderbilt University

Medical Therapies for Children with Autism Spectrum Disorder—An Update
Date: May 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: Vanderbilt University

First- and Second-Generation Antipsychotics in Children and Young Adults: Systematic Review Update
Date: March 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: University of Alberta

Glasgow Coma Scale for Field Triage of Trauma: A Systematic Review
Date: January 2017
EPC Type: Comparative Effectiveness Reviews
EPC Name: Pacific Northwest Evidence-based Practice Center—Oregon Health & Science University

Strategies to Improve Mental Health Care for Children and Adolescents
Date: December 2016
EPC Type: Comparative Effectiveness Reviews
EPC Name: RTI International - University of North Carolina at Chapel Hill

Omega-3 Fatty Acids and Maternal and Child Health: An Updated Systematic Review
Date: October 2016
EPC Type: Evidence Reports
EPC Name: Southern California Evidence-based Practice Center—RAND Corporation

Psychosocial and Pharmacologic Interventions for Disruptive Behavior in Children and Adolescents
Date: October 2015
EPC Type: Comparative Effectiveness Reviews
EPC Name: Vanderbilt University

Antidepressant Treatment of Depression During Pregnancy and the Postpartum Period
Date: July 2014
EPC Type: Evidence Reports
EPC Name: Pacific Northwest Evidence-based Practice Center—Oregon Health & Science University

Appendix D. Interview Guide

Section of Interview	Main Question	Probes	Notes
Features – Page 1 Strategies	Drawing your attention to the title on this page, do you think it is clear?	Are the sub-headings clear?	
	What is the overall message of this page?	Is the overall message clear? Is the information you want easy to find?	
	Drawing your attention to the figures on this page, do you think they are understandable?	What do you understand from the figures? Do they help support the overall message?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Features – Page 2 Strategies	Are the sub-headings on this page clear?		
	What is the overall message of this page?	Is the overall message clear? Is the information you want easy to find?	
	Drawing your attention to the figure at the top of this page, and the table in the bottom right corner on this page, do you think they are understandable?	What do you understand from the figure? What do you understand from the table? Do they help support the overall message?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Features – Page 3 Strategies	Is the title of this page clear?		
	What is the overall message of this page?	Is the overall message clear? Is the information you want easy to find?	
	Do you think that the table on this page is understandable?	What do you understand from the table? Does it to help support the overall message?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Impressions – Strategies Overall	What were the findings from each review that the authors were most confident about?		
	How do you feel about the length of the product?	If you read the information on page 1, would you need the information presented on pages 2-3, or do you think the first page is enough?	

Section of Interview	Main Question	Probes	Notes
	Do you think this summary is easy to understand?	How do you feel about the technical level and density of information of this summary? Would the language used in this document be easy to understand among your target audience?	
	In your SCN role, how would you use the information from this review? [e.g., create a pathway, update a position statement on clinical care] Can you tell us what type of decisions you make in your role?	Is there enough information in this product to use it the way you would need to? Is this the right type of information for your purpose? What is missing? Why do you need this? [e.g., cost analysis, context] Is there anything that needs more clarification?	
	Would the product be useful to you if you had to make a decision on the topic it summarizes?	If yes, how would it be useful? If no, why not?	
	Who would you share the information found in this product with? [e.g., Policy makers, patients, clinicians]	For each person/group, how would you share this information? Would this product appeal to your target audience? Why or why not? Would you use or share it as is? Would you need to create something different? If something different, why? Have we presented information in this product in a way that you could share?	
	Is there anything else we should know about this product?	Any additional comments or questions we have not covered?	
Features – Page 1 Antipsychotics	Drawing your attention to the title on this page, do you think it is clear?	Are the sub-headings clear?	
	What is the overall message of this page?	Is the overall message clear? Is the information you want easy to find?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Features – Page 2 Antipsychotics	Do you think the title on this page is clear?	Are the sub-headings clear?	
	What is the overall message of this page?	Is the overall message clear?	

Section of Interview	Main Question	Probes	Notes
		Is the information you want easy to find?	
	Drawing your attention to the table on this page, do you think it is understandable?	What do you understand from the table? Does it help support the overall message? Do the numbers in the table add anything?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Features – Page 3 Antipsychotics	Are the sub-headings on this page clear?		
	What is the overall message of this page?	Is the overall message clear? Is the information you want easy to find?	
	Drawing your attention to the figures on this page, do you think they are understandable?	What do you understand from the figures? Do they help support the overall message?	
	Reviewing the features on this page…	Is there anything about the layout you like? Why? Is there anything you do not like about this page? Why?	
Impressions – Antipsychotics Overall	What were the findings from each review that the authors were most confident about?		
	How do you feel about the length of the product?	If you read the information on page 1, would you need the information presented on pages 2-3, or do you think the first page is enough?	
	Do you think this summary is easy to understand?	How do you feel about the technical level and density of information of this summary? Would the language used in this document be easy to understand among your target audience?	
	In your SCN role, how would you use the information from this review? [e.g., create a pathway, update a position statement on clinical care] Can you tell us what type of decisions you make in your role?	Is there enough information in this product to use it the way you would need to? Is this the right type of information for your purpose? What is missing? Why do you need this? [e.g., cost analysis, context] Is there anything that needs more clarification?	

Section of Interview	Main Question	Probes	Notes
	Would the product be useful to you if you had to make a decision on the topic it summarizes?	If yes, how would it be useful? If no, why not?	
	Who would you share the information found in this product with? [e.g., Policy makers, patients, clinicians]	For each person/group, how would you share this information? Would this product appeal to your target audience? Why or why not? Would you use or share it as is? Would you need to create something different? If something different, why? Have we presented information in this product in a way that you could share?	
	Is there anything else we should know about this product?	Any additional comments or questions we have not covered?	
Comparison – Both documents together	What does strength of evidence mean to you?	Does the use of strength of evidence help to determine what the authors are confident about? (only stated in the Strategies summary) Do the terms used in the antipsychotics summary let you know if the authors were confident in their results? (key messages on first page: words like probably, may, might)	
	Do these documents appear credible to you?	What makes them seem credible? Does it help to have the logo on the page? Does it help to have the full text link? Would you use it? Does one appear more credible than the other? Why?	
	Do you prefer one product more than the other?	Why? What elements do you prefer? Are there any sections of pieces in one that you would like to see in the other?	
	There are some key differences between the two products, and I will go through a couple of them and ask which you prefer.	-Antipsychotics summary has text only on first page vs images for mental health	

Section of Interview	Main Question	Probes	Notes
		-Canadian background info is provided in antipsychotics vs none in mental health -Applicability is outlined in mental health (not in anti) -research gaps are identified in antipsychotics but not mental health -Mental health summary provides more methods (e.g. PICOS) than antipsychotics	
	Would you use these products as a printed or electronic item?	Possible issues with colours for printed? Vs PDF	

Appendix E. Focused Coding and Memos for Each Summary Product

Section of Interview	Focused codes	Memo
Mental Health Strategies: First Page	The page synthesizes dense, complex information well The page flows well The information is broken down nicely I like the use of plain language The volume of information is commendable The overall message is not clear The key questions are too complicated	Generally, participants thought that the first page flowed well, and that it did a good job of breaking down a large amount of information into something that was easier to understand. Some participants also thought that the amount of information that had been condensed into one page was commendable. Participant 4 said: "I find that you're trying to put a ton of information into one page and I certainly commend you for this. This is certainly very much needed in order for people to comprehend the vast amount of studies that have been provided. So I think I like how you've done this and I think, you know, you've broken it down quite nicely, which I really appreciate because sometimes it's just so vast. And your thought process, you know, you've identified the key issues, you've looked at some of the evidence of effectiveness and how you went about doing this." The same participant particularly liked the use of plain language, saying: "I think one of the things that I really like what you're trying to do here is the use of plain language writing." (Participant 4) Conversely, some participants thought that the overall message of the page was unclear and that the key questions were overly complicated. Participant 6 said: "[…] I had to go back and read the key questions probably ten times. I don't know if I just had a bad day. Maybe it was just me, but I really failed to understand the key question. Maybe there was just too many sub-bullets to them or something, but they just really lacked clarity to me." Participant 5 agreed, saying: "I agree completely. […] to break down into 1a, 1b, and 2, I was like…confused me." With regard to the overall message, Participant 5 said: "[…] I don't know what the overall message is."
	The page looks very approachable The layout is quite nice I like the combination of figures and words There is a good use of white space I want to pick it up and look at it The graphics were too difficult to understand The page is way too busy	A number of participants commented that they liked the look of the page and that it seemed very approachable. Participants particularly enjoyed the combination of figures and text. They thought that the images helped to simplify the information and attract their attention. Participant 5 summed it up well, saying: "Oh, I liked the graphics. […]. I liked…like when I looked at it, I liked that it made me want to pick it up and look at it versus the wall of text of the other one. So yeah, I did particularly like that." Some participants commented specifically about the combination of images and words (above the figure) and about the bar showcasing the number of studies, strategies, and solutions. Participant 2 said: "I liked the 17 studies, 16 strategies, seven solutions and stuff. I really like that and I like the…I like that combination of figures and words. That was probably the most clear […]." Similarly, Participant 5 said: "See, I liked the visual. Like I liked that…the bar with 17 studies, 16

		strategies and seven solutions." A couple of participants mentioned that they liked the use of white space. For example, Participant 3 said: "[…] the use of white space and the figures is good because it seemed very approachable." Other participants were emphatic about their dislike of the look of the page. When asked whether they liked how the page looked, Participant 6 said: "No. It was way, way, way too busy." Related to understanding the images, Participant 5 said: "[…] I think there's supposed to be three arrows going from the studies to the…like I think those three arrows sort of in the middle…I'm not sure why they're even there and I know that's really in the weeds but are you trying to show that the studies go into the solution? But then that's the definition of the solution, not the actual solution." Participant 6 did not like the images either, saying: "So in principle I like to see graphics, but I have to be honest. I found the graphics quite difficult to understand. So I kept having to look at them and say, 'Gee, I should be able to understand this.' I like the idea of seeing graphics, but I struggled to make any sense of them. I kept looking for how to make sense of them." Participant 4 thought that the graph image in particular was not clear: "The one with the graphs, I guess, out of any of them that's probably the most confusing […] maybe that one needs to be readjusted to tell the story a bit more."
	The page is not what researchers are used to I had to search for the information I needed The page was not understandable It was harder to identify the overall message It was unclear what the review was about	In contrast to the summary on antipsychotics, some participants mentioned that the format of this page was not how researchers were accustomed to seeing a review set up. Some participants thought that the page was not understandable at all. Participant 5 said: "So I liked the look of it and then when I started looking at it I was…like trying to get what it meant and I was stumped." Participant 6 agreed, saying: "[…] I clearly did not understand it." One participant said that they couldn't even figure out what the review was about. Participant 5 said: "I had to look back a lot to figure out what it was about. It was only about Q1 implementation and dissemination strategies and it didn't say of what, like what kind…what was it disseminating, what was it implementing? Like this felt like it could have been written about anything." When asked to identify the overall message of the page, some participants struggled. Most thought that it was more difficult to identify the overall message for this page compared to the first page of the antipsychotics summary. For example, Participant 2 said: "It's harder to…compared to the other one I'll just say." Some participants felt frustrated that they had to search for the information that they wanted. For example, Participant 5 said: "See, I liked the visual. Like I liked that…the bar with 17 studies, 16 strategies and seven solutions, but I was left wanting to know more about that and to find that I had to search."

	The figure is not effective The figure sends a clear message The figure is helpful I like the figure The figure is overly complicated The figure is not good value for the space The message is confusing The quality of the evidence needs to be highlighted	A couple of participants liked the figure on the first page. Participant 1 said: "[…] I like the bubbles. It's a nice, clear way of sort of demonstrating how many [studies] there are and it makes that point well and that there's not a lot of evidence." Both participants thought that the figure was understandable and supported the overall message well. The remaining participants were less keen on the figure, and provided some good advice as to how it could be modified to be more effective. Some participants did not understand that the size of the bubbles was related to the number of studies. Instead, many thought that the bubbles' size was related to the strength of evidence. Participant 2 said: "For me when I first looked at it, I thought it was around the strength of evidence I don't know why. And I mean I know it's not now, but when I first looked at it I went oh, so then solution 7? Yes because it's the biggest bubble but it's not, it's just good to have three studies […]." Other participants thought that the strength of evidence deserved more attention. Participant 3 explained it well: "[…] we've got the number of studies given as a number. The circles could tell me something else. Like, the size of the circle could be about which one has the best evidence associated with it. And those two things actually seem more important to me than the number of studies that looked at it." Participant 5 also said: "[…] when I got to the chart on page three I was kind of struck by how low quality all of the evidence was. So I guess low strength of evidence is the best you've got for these maybe, but maybe that should be highlighted." Other participants thought that overall, the figure was confusing and overly complicated. Participant 4 said: "When I look at the circles under the solutions, to me, the bigger the circle the more attention right? So are these all equal, is what I'm saying, or are you saying that solution one had the least amount of impact or improvement and the bigger circle has the bigger one? So I'm just cautious of…be careful what size you used, based on what solution, or if that, in fact, is what you're trying to determine, based on the size." Others mentioned that it took them a while to be able to figure it out. Participant 5 said: "I mean it's understandable but seems maybe to complicate something that doesn't need to be complicated." Another participant did not think that the figure was good value for space.
	The meaning of much of the content is not clear The title and subheadings are understandable The titles and subheadings are not understandable	There was a lot of content on the first page that participants could not understand. Although not true for all participants, some could not even get past the title or subheadings: "So I'm not sure. I didn't know what the strategies were and so I think I probably struggled with even understanding what the title meant." (Participant 6) By far the most confusing seemed to be the strategies and

	The solutions are not understandable Low strength of evidence of no benefit is confusing The section on insufficient evidence is confusing The section on applicability does not add value	solutions, what these were, and how they were defined. Participant 4 said: "[…] under solution six, educational materials, meeting, and educational outreach and reminders, that's very, very broad and that, to me, if you're looking for a solution, what is the specific, the tactic? Educational materials, to who, how are you going to deliver it? That's very, very broad so I don't really find that a solution, I find that just more of a category." Others agreed. For example, Participant 1 said: "Under each of the solutions, the titles themselves don't seem immediately self-evident to me, and I'd have to…maybe after sitting and thinking about it, it would be more, but they're not immediately…I don't fully get it." Beyond the solutions, some participants had trouble with the bottom of the page. Specifically, a number of participants found that the subheading, "Low strength of evidence of no benefit" was too confusing. Participant 3 said: "When I went down towards the bottom, low strength of evidence of no benefit for, I found that it took a bit of mental work to process that." Although it was understandable to some, others thought that the subheading, "Insufficient evidence to" was also confusing. One participant questioned the value of the section on applicability. Another thought that the section titled "Insufficient evidence" to should be more of a focal point on the page.
Mental Health Strategies: Second Page	The page is not appropriate for all audiences For some, the page could be very beneficial The table may need to be more explicit for some The language may be overly complex for some	Similar to the summary on antipsychotics, some participants pointed out that the audience for the second page of the summary on mental health strategies was not entirely clear. One non-researcher indicated that although the page did not resonate very well with them, they could see how it would be useful for others: "That's just not in my wheelhouse for operations, right? So summarizing it is probably, I mean, just two different peoples' opinion right, who are used to diving in, have an understanding where to go, how to summarize it. This is extremely beneficial to approach it this way. And, again, that's why I said earlier, who's your audience, right?" (Participant 4) The same participant suggested that the page might be good for those who do not have time to go through an entire systematic review. Some participants also pointed out that the content and vocabulary on the second page might be too complex for some audiences. Participant 4 said: "So if I'm giving this to day-to-day operations, I'm not sure if contextual information would be a language that they would be using on an everyday basis […] if you're just going to stick to plain language, use plain language consistently throughout the document." Participant 3 reiterated: "I don't know about operational folks. So I'm quite used to reading systematic reviews and I know what it means that a population's included. That means you would include a study only if it had

		those populations. I don't know if others would need a bit more to make sense of the table."
	The figure is difficult to understand The figure helps me understand the population The arrows are difficult to follow I do not remember the key questions There is too much information in one figure The figure is easy to gloss over The acronyms are an extra mental step The title is not understandable	There was not a single participant who was able to make sense of the figure on the second page. One positive comment was that the figure helped to clarify the target population for the strategies. Otherwise, the overwhelming majority of comments were negative. Participants found the figure difficult to follow, and were frustrated by having to go back to the key questions which were presented on the first page. Participant 4 said: "It's interesting how you put the key questions on the first page, right, but they're separated. So this is really speaking to those key questions and so I'm just looking at this and going, okay, question one, where is that question? And I have to, kind of, go back. To me it would make sense that you put them together." Most participants thought that the figure took too much mental energy, and was overloaded with information, making it very easy to gloss over. Participant 3 said: "I honestly was trying to read this as if, you know, I'm sort of a busy person and I'm making decisions and I saw it and, kind of, glossed over it immediately. You know, to try and follow the arrows and remember what the key questions from the previous page are and then look at these different bits of things that you looked at, I honestly didn't spend any time on this figure. I just looked at it and moved on." Some participants thought that the figure was not concise enough: "This particular area is not doing if for me because you've got a lot of different information. You've got population, you've got harm, intermediate outcomes. […] you're trying to get too much in one little spot and it's almost like you have to break it down from each question and then layer that in." (Participant 4) One participant added that not even the title of the figure was understandable, while another believed that the acronyms were just another tedious step in trying to understand it: "I don't like the graphic and even using the acronyms in the graphic it's just an extra mental step […]." (Participant 3) One participant suggested that the figure could be redesigned as an activation platform. Another suggested that the title of the figure should be placed above the box for consistency.
	The methods are clear and nicely portrayed The methods are nice and succinct The methods are easy to understand I like the shading on the rows of the table I like the contextual information I like the section on data sources The subheading is clear	Despite unanimously disliking the figure, the majority of participants agreed that the remainder of the methods were well presented. Participants appreciated that the methods were succinct. Participant 4 said: "I like the criteria for selecting studies. Like I thought that was really nice and succinct, and then the data sources and review approach. That was really nice and succinct in terms of the methods. It had a lot of text." Others appreciated how easy the methods were to understand. Participant 1 said: "That's all clear. That's easy to understand." One participant particularly liked that the data sources and search

	The methods section is not necessary The table should go on the first page	strategies had been included, while two others liked the inclusion criteria and contextual information. Most participants also liked the general formatting of the methods section. Participant 5 said: "I very much like that the data sources and the review approach are like highlighted in that box." Some participants also mentioned liking the shaded rows in the table, which made it easier to read: "I always like when to be able to have those…the shading so that you can follow the lines across." (Participant 5) One participant was adamant that the methods section should be relocated to the first page: "Can I ask why you wouldn't have put that up there when you did the evidence of effectiveness? Right? So, I'm not a researcher but what I am wondering is, part of the studies provided, this was, sort of, the criteria that I used in the second piece of the evidence of effectiveness. Like, why would you not put that up there and tie it…why you picked the studies that you did? […] Like I find that keep it together. Yeah." (Participant 4) Another participant suggested that perhaps the methods information was not necessary in the summary: "I, sort of, wonder if I want this information on a three-page document? This might be something you would…it's pretty easy to go to the systematic review and look at the methods." (Participant 3)
Mental Health Strategies: Third Page	The table synthesizes complex results well This is a clear way to present the studies This page is useful for those who want details I love the strength of evidence I love the column headings The acronyms should be defined The title could be simplified The study years should be added The table should be replicable	Most participants really liked the third page of the summary and thought that the table did a good job of synthesizing a large amount of complex information. Participant 1 said: "The studies are very complex obviously, some of them having multiple…assessing multiple kinds of interventions and so […] it's a very succinct way of allowing people to drill down and understand some of the complexity in some of these studies. So I think that was very well done." Most participants also believed that the page would be useful for people who wanted more details on any particularly strategy. Participant 3 said: " I think it shows that…I think having the information there is useful for people who are going to want to dig deeper on a particular strategy or people just to see, yes, the work's been done and here it is. This is, for each study, the strength of evidence, that kind of thing." One participant mentioned particularly liking the column headings and a number of participants mentioned particularly liking the strength of evidence component. For example, Participant 1 said: "[…] I also like the strength of evidence on the far right hand side because that…really nicely summarizes it." Participant 3 said: "[…] I liked the clear strength of evidence scale. I thought that was nice to just have there." Participants also identified a few areas for improvement. For example, one participant noticed that the acronyms within the table had not been defined: "[…] you've used the RCT acronym but it's not defined on this page. That's okay for me but

		then when I got down to, sort of, mid-page there's a place that says cluster RCT-NR and I didn't actually know what NT meant […]." (Participant 3) Even for acronyms that had been defined, some participants had trouble figuring out what they meant. The acronym SOE was particularly troublesome for two participants. Participant 1 said: "[…] it took me a while to figure out what SOE was even though I was at the bottom." Participant 5 said: "I liked the SOE column although…oh, strength of evidence. I was like now I can't remember what that stood for." Two participants thought that the title of the table should be simplified. For example, Participant 4 said: "[…] so when I look at characteristics and key findings of the included studies, included studies you're referring to the ones that were the 17 on the first page? Did I get that right? So why didn't you just say, the 17 studies provided?" One participant pointed out that the year of publication for the included studies should be added. The same participant argued that the format of the table should be replicable across multiple areas of healthcare.
	The strategy components are difficult to differentiate I really like the strategy components piece I get lost in the differences in the colours I like the coloured dots but constantly had to refer back The meaning of the dots is unclear I'd choose different colours than for the strength of evidence The dots could be replaced by numbers or shapes	Two participants mentioned that they really liked how the strategy components had been presented. Other participants, although they appreciated the presentation, identified a number of issues and how they thought these could be addressed. One participant mentioned getting lost in the differences between some of the colours, while another pointed out that the colours could not be distinguished when the summary was printed in greyscale (which is the standard at AHS): "[…] because I ended up looking at this in non-colour the strategy components, I can't actually distinguish." (Participant 3) Another participant mentioned that although they liked the coloured dots, they felt like having to constantly refer back to the legend was a hassle. One participant suggested using different coloured dots for the strategies compared to the strength of evidence scale to avoid confusion: "[…] I'd choose different colours than the strength of evidence. That was a little confusing to have the colours be the…using red as the…you know, so I kept kind of…I wouldn't choose the same colours. To overcome any issues related to the colours of the dots, one participant suggested using different shapes or numbers instead. Only one participant did not understand the strategies column at all. The participant's comment illustrates the potential for confusion: "The strategy component is, if I'm reading this correctly, the more dots down, the more…the more what? The strength, the stronger of a study it is? Is that what the outcome is supposed to be here?" (Participant 4)
	The table's layout could be more effective I like the shaded rows	One facet of the table's layout that participants liked was the shading of the rows, which made it easier to read across the table. Two participants disagreed on whether the legend should be above the table, or below it. One participant thought that the

	The legend fits well at the bottom of the page The table should be organized by outcome The table should be organized by the direction of the conclusions The table should be organized by the strength of evidence The layout is not consistent	formatting of the page was not consistent with the previous pages: "[…] you know, at the very first page you've got strategies to improve mental health care for children and adolescents. There's nothing wrong with continuing that theme consistently throughout your document, right, so characteristics…so if this document had got separated, right, these characteristic key findings of 17 studies for, to improve mental health care. So if you keep that consistent like you've done on the first page." (Participant 4) A number of participants pointed out that it would have been helpful if the table had been organized by strength of evidence. Participant 6 said: "I would have liked you to have clumped the strength of evidence items together. So I don't know if there was some rhyme or reason to how you listed these, but it would have been nice to have seen the ones where there was insufficient evidence all together and ones where there was no evidence. So you know, like there are some that have insufficient evidence together so the eye could have seen them all together." Participant 5 agreed, and also mentioned that it would have been helpful to have the studies with stronger evidence first: "I'm on a list sort of where they send it out with the high evidence ones up top and then lower evidence ones below it and that's a nice way to know that you're looking at the stronger studies first." Other participants would have liked to see the table organized in other ways. One participant thought that there should be two tables, based on the direction of the conclusions: "I found that the conclusions include both negatives and positives, so you've got, like, the top one is that there's no benefit from that study and then later you have benefits. I didn't know if maybe there could be two tables? So these are the things that showed a positive result and these are the ones that didn't." (Participant 3) Other participants suggested that the table could be organized by outcome. Participant 3 said: "I would have been more interested in the table of, instead of organized by study, I thought maybe organizing it by outcome and then I could, if I had a table of the outcomes in which strategy has achieved those outcomes, that might be more useful from a decision-making perspective because, presumably, I would know what outcomes I was looking for."
Mental Health Strategies: Overall	The summary is visually appealing Visually I preferred this one The length is fine This summary looks less credible	Most participants believed that this was the more visually appealing summary as compared to the one on antipsychotics. To match the visual appeal, they wished that the summary would have been more useful. Participant 6 said: "[…] typically in my day to day work I tend to like products that have more visual appeal like the other one [the mental health strategies summary], but I just found it too frustrating. […]. But in a perfect world, I tend to like more visually appealing products like the mental health care for children and adolescents."

		Participant 5 responded, saying: “Yeah. I agree wholeheartedly. Visually I liked this one [the mental health strategies summary] but when it came to utility I like the antipsychotic one.” Participants agreed that the length of the summary was fine. Because it was different from the types of summaries that they were used to seeing, one participant thought that the mental health strategies summary seemed less credible compared to the one on antipsychotics.
	The information is not communicated clearly This is a really strong tool The purpose of the summary is not clear The key messages are not clear The summary was frustrating to get through The summary did not flow as logically I did not think to click the link	We received an overwhelming number of comments regarding the content of the mental health strategies summary, which the majority of participants believed was not understandable. Only one participant had much positive feedback with regard to the summary overall: “[…] I think you guys are really on the right track because I’ve been, you know, handed pages and pages of research systematic reviews and I just glaze over them I’m being honest with you. I don’t have the time to filter through all of it so summarizing it into something like this is a really strong tool so I want to congratulate you for this.” (Participant 4) Otherwise, a number of participants were unclear on the purpose of the summary. Participant 4 said: “[…] I guess I’m struggling. When I hear the word summary, this is the end of combining all three pages, right? So if you’re asking me is there a summary section on these three pages, the answer would be no.” The same participant thought that a purpose statement might help to clarify the purpose of the summary. Another participant believed that having some background information would help to clarify the information presented. Most participants thought that the summary was frustrating and time consuming to get through. One participant mentioned that it took many reads through the summary to understand the key messages. Another participant said: “If I was to document the amount of time that I spent, I spent way more time on the mental health care for children and adolescents to try and understand it. […]. I struggled with this one a lot. I took a lot of time to try and make sense of what this document was and I had a hard time.” (Participant 6) A third participant pointed out that the key messages should be highlighted somewhere within the summary: “To me, the key messages really should be the highlight of your document, right, of what you’re trying to glean […].” (Participant 4) Participants generally found the concept of the strategies and solutions to be difficult to understand, and could not identify the intervention or target population. Despite generally not understanding the content of the summary and acknowledging the potential utility of the full text link, one participant pointed out that they did notice or consider clicking it. Most

		participants agreed that the first page could not stand on its own, and that the subsequent pages were required to even begin to try to understand the first page of the summary. Participant 2 said: "Yeah, you need the three pages. The first page I would've been really lost on it if it weren't for the…like that last page made such a difference for me to be able to understand the first page." One participant in particular believed that the summary did not flow as logically as the one on antipsychotics.
	The summary has potential to be useful The strength of evidence is helpful The summary helps to understand the evidence The summary could inform pathways and policies The summary could be used to improve systems The summary could be the foundation for a business plan The reader is left with little evidence to move forward The summary might be usable if it were understandable	Most participants thought that the summary had the potential to be useful. Participants mentioned that the summary provided a good overview of the available evidence, and that it would be helpful to identify key issues and knowledge gaps. Other potential uses for the summary as suggested by the participants included informing pathways work and policy decisions, improving systems, developing a business plan, and the planning, implementation, and evaluation of mental health care strategies for children and adolescents. Participant 2 said: "Well I think...and there is I think potential to use this as we think about children's mental health in between our SCN and the addictions and mental health SCN and I think that in particular this…the last page I think could be really helpful as you start looking at where we could potentially improve the systems…and so I could see using it from that perspective." Participants generally agreed that having the strength of evidence helped them understand which outcomes the review authors were confident about. Nevertheless, many participants seemed dismayed by the lack of strong evidence for any strategy, and for this reason they found difficulty seeing its practical potential. For example, Participant 5 said: "I didn't see any conclusions and all the evidence is really weak so probably not worth using." Similarly, Participant 1 said: "So the way I would see this being of use in the SCN is so for example if we have a broad mental health strategy, understanding that this…these are ways that we can implement those things […]. Unfortunately where it leaves us is that there isn't any sure-fire ways to move forward to develop implementation strategies." Finally, some participants thought that the summary might be useful, but that they were too perplexed by the content to tell. Participant 6 said: "I think if we could get some clarity around it, it would probably be useful."
	The summary should appeal to a broad audience I would share this with leadership I would share this with decision-makers I would share this with clinical governance I would share this with operations	Most participants thought that the summary was appropriate for a broader audience compared to the summary on antipsychotics. One participant thought that it looked like something that they might see in a doctor's office. Nevertheless, a few participants brought up the fact that the intended audience for the summary was not clear. A number of participants mentioned that the appropriateness of the length, technical level, and density of information in the summary would depend on who the target audience was, which was unclear.

	This seems accessible to the general population The intended audience is unclear The appropriateness of the length and technical level depends on the audience	The participants mentioned a variety of groups of individuals with which they thought they might share the summary. These included people in leadership, decision-makers, clinical governance, people in operations, and any individual working in this particular topic area. Because of the variety of potential stakeholders, one participant pointed out that the content would need to be understandable and appealing to a broad audience. Participant 4 said: "Well, operations are the people to get it done, right, so if you're taking them out of the equation, you're really going to miss the people who get things done. So it has to be something tangible that operations can understand."

Section of Interview	Focused Codes	Memos
Antipsychotics: First Page	The page is clear and easy to understand The title and subtitles are clear High quality methods are implied I like the harms being upfront I like the key messages The age of the young adults is unclear The acronyms are unclear 'Focus of the summary' subheading is unnecessary	Overall, the participants thought that the first page of the summary was clearly laid out and easy to understand. Participant 1 said: "I love the way it's outlined. I think it's very clear […]. I love this layout. For me it's the right way to do it." In particular, several participants liked the key messages and appreciated that the harms were listed upfront. Participant 5 stated: "I really like the key messages and I like the harms being up front because I think sometimes we gloss over those. So I like…I really like that." All participants agreed that the title and subheadings were clear. Some participants thought that the look, feel, and choice of words on the page implied that the methods were of high quality. For that reason, they did not question the lack of methodological information. Participant 2 said: "[…] when I read 'systematic review' it implies the methods that are used in a systematic review and I knew it was coming from AHRQ […] so I knew that the methods were solid […] it doesn't really have all those details, but I wouldn't expect it necessarily." Some participants suggested areas for improvement. One participant found that the acronyms were not adequately defined: "[…] I have no clue what SGA is or FGAs? That is not highlighted in your Focus of Summary. When you first started writing you've got it in brackets […]. Where is it written out? I have no idea what that is." (Participant 4) Another participant noted that the age of the older adults was not clear, and that the 'Focus of the Summary' subheading was unnecessary: "The 'Focus of the Summary', […] that jumped out at me […] well, it's a summary so isn't the whole thing – like I don't know. It didn't seem necessary I guess." (Participant 1)

Section of Interview	Focused Codes	Memos
	The content and layout is appealing to researchers The content and layout is very typical of what researchers tend to read I am not put off by the dense text The page is too text heavy The page could use more white space The page is not very inviting	The participants with a research background, in particular, were very keen on the content and layout of the page. They described it as being typical of what they would normally read, and they were not put off by the dense text. Some participants expressed appreciation for the fact that others might prefer more white space. By contrast, some non-researchers thought that the page was too text heavy and lacking in white space. For this reason, it was described as uninviting. The dichotomy in participants' opinions of the layout is clear in the following conversation between two participants. Participant 4 said: "I find it really text heavy, and…it's all there, but it just feels…it doesn't look as inviting to read is the only thing even though it's got everything there." Participant 1 replied: "Yeah, and in contrast I'm not put off by the text. What I appreciate is that very logical way in which it's laid out and…as a researcher it's what I'm indoctrinated."
	The intended audience is not clear The page seems geared toward a broad audience The page would be appropriate for clinicians Assumptions are made about the audience The page is not appropriate for parents	A number of participants reported confusion as to the intended audience for the summary. Without explicit mention of the target audience, the participants were unclear as to who it should be shared with. Nevertheless, some participants liked that the page seemed to be intended for a broad audience without in-depth knowledge of the topic. Participant 6 said: "I found it quite easy to understand at a very high level. […] I felt it was geared more towards someone that didn't have a lot of breadth or understanding around this particularly fairly complex topic area." A number of participants thought that the page would be well suited for clinicians, but not for patients or parents. One participant summed up the ambiguity with regard to the target audience well: "[…] so I'm going to go back to my latest question because if this is intended for us to share, like I think we would need to be clear on who our audience was. This thing was completely appropriate for maybe clinicians, sort of that level, but this is not something I would give to a parent." (Participant 5) One participant also noted that because the target audience was never explicitly stated, certain assumptions had been made, for example that readers would know what a first generation and second generation antipsychotic is: "So I guess implicitly the assumption is that the audience would know what a first generation and second generation antipsychotic is. […] So that's an assumption. It's probably a safe assumption, but it is an assumption." (Participant 6)

Section of Interview	Focused Codes	Memos
Antipsychotics: Second page	The standard, organized format is appealing The page is well organized, detailed, and clear The page is very succinct The intended audience is unclear	Akin to the first page, the second page of this summary was appealing to most participants, especially researchers. The page was organized in a way that was familiar to them, making it relatively easy to read and understand. One participant said: "it's…done in a standard way, a way I use when I write out information which I'm communicating so it's something that I'm very used to."(Participant 1) Participants thought that the information provided, although highly detailed, was well organized and succinct. One participant said: "[…] I like the staged way in which it's done. It verbalizes very succinctly […] what the key messages are and then it provides the actual data in a very organized fashion […]." (Participant 1) The participants generally thought that the information flowed well, and that the outcomes were clear. All participants agreed that the title and subheadings were clear. A number of participants mentioned particularly liking the table, and all thought that it supported the overall message of the page well. One participant mentioned that the only preferable presentation format to the table would be a figure: "[…] I like it. I think the nature of the table is such that it doesn't lend itself to a figure […]. That would be the only kind of way of presenting if it's appropriate for this context that I would prefer." (Participant 1) Despite its general appeal, one participant did point out that it would have been helpful to define the intended audience upfront: "[…] I think it would have been very helpful at the outset to clarify who the audience was […]. If the audience is not researchers, then I would query why you would have the tables […]." (Participant 6)

Section of Interview	Focused Codes	Memos
	The page appeals to those who are interested in details I love that the data are provided The details help to better understand the first page The conclusions are really helpful I could use this page to prove a point This page requires more time and thinking	Most participants liked the level of detail provided on the second page, and thought that it helped to provide a better understanding of the key messages on the first page. One participant said: "The second page is nice for people who may be questioning your findings and want to dig into this in detail […]." (Participant 5) Participants also liked how comprehensive the information was: "I feel like I could go into a meeting with this and prove my point. So maybe not easy to find [the information you need], but I'm confident that it's there and that I could find it." (Participant 5) Participants were particularly enthusiastic about the data that were provided. Several participants also noted that the conclusions were exceptionally helpful to them, and that they flowed well from the other information in the table. Participant 2 summed up the thoughts of many participants well, saying: "I love where there's confidence in prescriptions and confidence intervals, and then the conclusions are really helpful, like quite helpful. I really like the conclusions." Participants unanimously agreed that removing the data from the table would diminish its value. Despite generally liking the table, a number of participants did admit that it took more time and thinking to understand it (e.g., compared to a figure). Nevertheless, the time and mental energy required to understand the table did not seem to be off-putting, for the most part. One participant explained: "And so I…that's much quicker for me [a figure], but I don't mind this at all. It's just it…yeah I guess by contrast you have to think a little bit more but I don't mind it. I think it's good." (Participant 1) Similarly, another participant noted: "It's understandable but it's like, you know, you have to go in and okay, SGAs, there's second generation versus placebo, okay, and then we're only in bipolar and we've got some relative risks […]." (Participant 3)

Section of Interview	Focused Codes	Memos
	The section on first-line treatments is unclear Unclear how first-line treatments are defined The key point is not evident The data do not seem strong The findings are confusing	Two participants identified points for clarification on the second page, specifically related to the section on first-line treatments. One participant requested clarification with respect to how first-treatments are defined and which drugs are approved as first-line treatments: "[…] who determines that they're first line treatment because later on it says that there's only actually one approved in youth for one thing, didn't it? […] So it didn't make sense to me that you could have sort of four front line treatments and then later say they weren't actually FDA approved." (Participant 5) Similarly, a second participant did not understand why the evidence for the section on first-line treatment was not highlighted more, and wondered if it was perhaps because the data for the first-line treatments was less strong: "So one question I have is so we've got lots of detail around the benefits where antipsychotics are not considered first-line and that makes sense to me because the people are thinking about whether they might want to use it for another condition. […] [For front-line treatments] We don't have that same amount of details. Obviously there's way more studies and…lots of things going on. The key point for benefits where antipsychotics are first-line treatment doesn't jump out at me as much […]. […] So there are benefits but there doesn't seem to be strong, like the data that's provided, that's strong I guess." (Participant 2) Finally, one participant found that the findings under the first-line treatments were confusing: "[…] in each of the first set, the first-line treatments, it says that like the SGAs probably increase response rate, decrease slightly symptoms and improve slightly global impressions of improvement, severity, and functioning, but the response rate is never defined and I think that phrase can be pretty…it can vary what people think you mean by that."(Participant 5)

Section of Interview	Focused Codes	Memos
Antipsychotics: Third Page	The page is very clear and easy to understand The titles and subheadings are clear The important information was easy to find The key message is very clear The data shown on the figure are helpful The space is used efficiently The figures support the overall message The figures are blurry The bullets are unnecessary	All participants agreed that the third page was very clear and easy to understand, and that the titles and subheadings were clear. They also agreed that the important information was very easy to find, and that the key message from the page was clear. When asked if the important information was easy to find, Participant 1 said: "Dead easy. My favourite kind of way to present it. […] You get a lot of weight gain from most antipsychotics. It's a very clear message, and it's easy." Most participants particularly liked the two figures. Compared to the table on the previous page, some participants noted that this was a very efficient means of presenting the data, and quicker for them to read. When asked whether the figures helped to support the main message of the page, many participants replied with great enthusiasm. For example, Participant 2 said: "Yes, it really, really does" and Participant 1 said: "Emphatically, yes." One participant particularly liked how the data were presented on Figure 2: "I like in the second one you've got the number of studies, and patients and I think that's really helpful when you're trying to assess so many different outcomes." The only criticisms about the page were about the bulleted list and the clarity of the figures. In particular, one participant believed that the bulleted phrases describing the figures should either be deleted or replace the figures themselves: "I kind of question whether you need the bullet point that olanzapine causes the most weight gain and the figure, like one or the other, but I'm not sure why you needed both." (Participant 5) Two participants noted that the figures were blurry. Participant 5 said: "Well on my printout at least the actual figure text is blurry." In response, Participant 6 said: "Yeah. It is on mine too."

Section of Interview	Focused Codes	Memos
	Some words of caution Figures could be difficult for some to understand Findings should not be interpreted too broadly Unclear how the harms were selected	Despite having overwhelmingly positive feedback about the third page, some participants did provide words of caution regarding some of its components. For example, although most people really liked the figures, one participant noted that for some people, they may be more challenging to understand: "[…] I do remember when I first saw a table like Figure 1 not understanding that the whole bar had to be across the line." (Participant 5) The same participant also mentioned: "Assuming people understand the length of the whiskers […] I really like this page." (Participant 5) Another participant commented that the findings needed to be interpreted cautiously: "[…] what's striking to me is the differences, they…not all the antipsychotics seem to be the same. I mean, but there's an awful lot of overlapping confidence intervals there so it's probably a little…one shouldn't interpret it too broadly, like the pimozide is a good example of that but for example the olanzapine, it's very clear that, that is a bad actor."(Participant 1) One participant brought up some areas that could use clarification. Participant 5 pointed out that it was not clear why the seven harms were chosen and why weight gain featured in both figures, saying: "[…] I guess […] I would question […] maybe a statement around why these seven harms and why weight increase made it to both. Like you have a special weight gain figure so then to also have it in the other harms although then you can compare the amount of harm, I suppose."

Section of Interview	Focused Codes	Memos
Antipsychotics: Overall	Provides a comprehensive overview in a familiar format The summary was easy to get through The summary is in the format that I expect The summary is the perfect length This summary appeared more credible	Overall, most participants thought that overall the summary was comprehensive, concise, and easy to read. Some were impressed with how much information had been integrated into just three pages. Participant 5 said: "I think you got a whole lot of information in three pages. I thought that was impressive." Similarly, Participant 1 said: "[..] the evidence…you've done such a nice way of synthesizing in a very concise way […]. Very compact, easy to get through and…it is very comprehensive." Many participants also appreciated that it was in a format that they were familiar with. Participant 5 said: "The antipsychotic one, I mean that is what I expect to see in sort of when I'm looking at things like this." Compared to the summary on mental health strategies, one participant thought that this one appeared more credible, mainly based on the placement of the logo and familiarity of the layout: "I thought the logo was beneficial and I didn't think of the credibility issue. The antipsychotic one […] is what I expect to see […]. So I suppose it looked more credible […]." (Participant 5) There was consensus that three pages was a good length for the summary. A number of participants mentioned that the first page might be sufficient for some people, but that they would always want the full three pages. Participant 5 summarised the thoughts of most participants well, saying: "I think page one is enough for…well, like for when you review articles and you only read the abstracts. Like page one is really clear and like here you go, here's the take home message, and then two and three are such good support for the take home message." Participant 1 also said: "[…] I would even argue that even some people who are not quite as evidence-based […] I would be really surprised if they thought they didn't need that second and third page." When asked about the maximum length that they would tolerate for a summary, two participants thought that four or five pages would be acceptable, but that anything over five pages would be too long.

Section of Interview	Focused Codes	Memos
	Information provided is sufficient to inform a decision This could inform a clinical pathway This summary had greater utility I like that knowledge gaps were highlighted I like that the data are provided I would like more information about the benefits I would like to see data about first-line treatments I would like to know how FGAs and SGAs are used	A number of participants commended the utility of the summary as an overview of the available evidence and to inform decision-making. Participant 5 said: "[…] it's good for maybe if you want to ensure you have all the facts making a decision and it is more than is needed to support probably a patient decision. […] If someone came to me and said I want to run a study on, you know, one of these in youth, I would be able to say, 'Hey, look at what we already know'." One participant noted that this summary seemed to have greater utility compared to the one on mental health strategies. When asked to comment on how they would use the summary, nearly all participants said that they would use it to inform clinical pathways or guidelines and clinical knowledge tools. Two participants liked that the knowledge gaps had been highlighted, and particularly that these included long-term benefits and risks. Participant 5 said: "I really appreciated the fact that one of your knowledge gaps is the long-term benefits and harms. I think we're seeing that that is of great interest especially when you start a drug in use, so […]." One participant also mentioned that they liked that the data were available for them to estimate the strength of evidence for themselves. Despite appreciating the comprehensiveness of the overview, some participants were still left feeling like they wanted more. One participant wanted more information on the conditions for which FGAs and SGAs were considered first-line treatment, and whether their use was regulated: "[…] it'd be interesting to know how often they're [FGAs and SGAs] being used this way. Like here's the current state of evidence but is it actually frequently prescribed […]. […] if there is regulation around the use of these that should probably be highlighted." (Participant 5) Others agreed that it was not clear why the section on first-line treatment was small compared to the one on conditions where FGAs and SGAs are not first-line treatments. They wanted more details related to the first-line treatments, including the data, which one participant suggested could be added as a table in an appendix. Participant 1 said: "[…] having a more detailed summary of the benefits for the conditions might be helpful. Some graphic way or table that would capture that a little more clearly."

Section of Interview	Focused Codes	Memos
	The summary could be broadly shared It could be highlighted in newsletters I would share it with researchers I would share it with clinicians The language would be clear among researchers It could be shared as is It could help patients make decisions I assumed the audience is not patients The audience seems different for each page The table reduces the understandability It is less accessible	Most participants thought that the summary was ready to be broadly shared, especially among highly educated audiences like researchers and clinicians. Participant 5 said: "I would probably share it with the research partnership program [RPP] and they own a website where they put up KT tools that they've developed. So I would probably encourage the inclusion on that and then highlight them in various newsletters to clinicians and other people interested. […] I would share it with other researchers and as I mentioned, the RPP." Most participants agreed that the language used in the summary would be understandable among researchers. One participant thought that it could be used to help patients make decisions: "[…] I want us to be thinking about how we help patients make decisions and parents feel overwhelmed and could we provide, you know, something that they could look at. Their doctor could say, you know, this is a lot of pressure. Here, take this away and look at it." (Participant 5) Still, some participants thought that the target audience needed to be clarified. In particular, one participant believed that the target audience was different for each page of the summary: "[…] essentially what this document is, is a combination of different audiences because the first page is great as an overall document that could be given to someone with fairly limited capacity to understand, I think. And then you get to the second page and the ability or need to have much more understanding in terms of research and ability to…you know, to understand concepts is significantly steeper, right? So […] I think your audience is different for the second page than it is for the first page […]." (Participant 6) One participant mentioned that they assumed the summary was not meant for patients, while another mentioned that if it was meant for patients, the information was not presented properly. One participant said that the understandability of the summary as a whole was diminished due to the table on the second page. One participant thought that, compared to the summary of mental health strategies, this one looked less accessible.

General Comments

Summary characteristic	Comments
Credibility	Overall, the summaries seem credible The logo makes them seem credible The citations make them seem credible
Layout	White space is always visually appealing Images should have meaning I like a balance of text and images Three pages is the ideal length At AHS you're not supposed to print in colour

Summary characteristic	Comments
Full text link	The link would be useful if I wanted more information I did not notice that I could click the link The full text link is helpful
Content	I like having the key messages I like having background when it is appropriate Applicability is nice but I would not miss it if it were not there “Probably” seems stronger than “may”

AHS = Alberta Health Services

Appendix F. Changes Made to Products Based on Findings

Strategies to Improve Mental Health

- Moved logo to the top of the page and made it larger
- Modified the color scheme to be more subdued (just used variants of two darker colors)
- Added background info and a purpose statement to the first page
- Added suggestions for how the summary might be used
- Provided a link to the full text within the main document
- Moved our brief methods to the first page, and removed the confusing flow diagram (analytic framework)
- Tried to use relatively simple language/less jargon, however the writing is still at a level appropriate for an academic/clinical audience
- Added Key Messages to the first page
- Removed any images that were confusing
- Edited the table on page 3 to remove all acronyms and make sure it would be understandable in greyscale
- Replaced the diagram with bubbles with a table, and revised the statements about "low strength of evidence of no benefit for..."
- Added Implications for Research and Practice (based on the comments that people did not know the purpose since the evidence was not strong for any strategy)

First and Second-Generation Antipsychotics for Children and Young Adults

- Changed most of first page text from paragraph to bullet format; reduced some text.
- Changed sub-titles on first page to clearly reflect the Purpose and Background.
- Added Text box around Key Messages box on first page; removed sub-headings in key messages and bolded key portions of bullets.
- Pulled out one key message as main conclusion and italicized.
- Added bolded link to full text in Purpose section, and added link to last page.
- Only used tables to show results on effectiveness (removed some that were in narrative format only). Italicized conclusions of no benefit.
- Added definition for response rates.
- Removed some points that repeated information that was clear from figures of harms.
- Added page 4 appendix with commonly used trade names of all drugs mentioned.

Appendix G. Final Products

Please see following pages.

First-Generation and Second-Generation Antipsychotics in Children and Young Adults: Current State of Evidence

Purpose

- This document **summarizes the findings of a comprehensive systematic review** of the benefits and harms of the use of first- and second-generation antipsychotics for various psychiatric and behavioral conditions in children, adolescents, and young adults ≤24 years of age. The full report is available online.
- The review included **135 studies (95 trials and 40 observational studies)** published up to October 2016.
- This summary may **assist informed decision making by clinicians and policy makers, and may help guide future research**. However, reviews of evidence should not be construed to represent clinical recommendations or guidelines.

Background

- In Canada, prescribing of antipsychotics for children, adolescents, and young adults increased up to 4-fold between 1996 and 2011. Among prescriptions, 12% were provided to children under the age of 9. In 2013, second-generation antipsychotics were dispensed 97% of the time.
- The diagnoses most linked to second-generation antipsychotic dispensing are attention-deficit hyperactivity disorder, mood disorders (anxiety, bipolar and depression), and disruptive, impulse or conduct disorders – even though these are *not* first line therapies.
- High use of second-generation antipsychotics (compared to first-generation antipsychotics) has been driven by perceptions of their more favorable benefit-to-harm ratio. However, second-generation antipsychotics have been associated with adverse effects such as weight gain, elevated prolactin, and metabolic syndrome.
- Canadian guidance exists for monitoring safety of antipsychotics in children and youth, and for the use of antipsychotics for some clinical conditions. Despite this, there remains a need for ongoing systematic review on the efficacy and harms of first- and second-generation antipsychotics to best inform treatment decisions.

Key Messages

- Second-generation antipsychotics **probably improve to some extent** key symptoms for which they are thought to be necessary for daily functioning (e.g., psychotic symptoms, mania in bipolar disorder).
- **Evidence was insufficient on their effectiveness for some conditions** in which they are fairly commonly prescribed (depression, anxiety, symptoms outside the context of a psychiatric disorder) or may be considered (posttraumatic stress disorder, eating disorders, obsessive-compulsive disorders).
- Second-generation antipsychotic augmentation to stimulant medication for attention-deficit hyperactivity disorder **may not be beneficial** unless targeted to treat severe aggression.
- Second generation antipsychotics cause **adverse effects** including weight gain (particularly olanzapine), high triglyceride and cholesterol levels, extrapyramidal symptoms, sedation, and somnolence.
- There was **little information directly comparing different antipsychotics**, on **patient-important outcomes** including quality of life, and on outcomes for **young children and young adults.**
- Priorities for future research are treatment in adjunctive or add-on (e.g., to behavioral/family therapies) scenarios, longer duration follow-up, and further development of systems for monitoring harms.

Clinicians might consider the benefit-to-harm balance, the management and reversibility of adverse effects, possible alternate treatments, the need and mechanisms for regular safety monitoring, and the patient's or caregiver's values and preferences in identifying the most appropriate treatment option.

Overview of Clinical Research Evidence - Benefits

Comparison	Outcome (N trials; N patients)	Findings and Tool with Range of Values, if Applicable	Conclusions
Schizophrenia SGA class vs placebo	Negative symptoms (9; 1788)	MD, -1.31; 95% CrI, -2.05 to -0.58 PANSS Negative; range 7-49	SGAs probably decrease to a small extent
	Positive symptoms (9; 1788)	MD, -2.20; 95% CrI, -2.98 to -1.48 PANSS Positive; range 7-49	SGAs probably decrease to a small extent
	Response rates (5; 993)	RR, 1.52; 95% CrI, 1.15 to 2.02	SGAs likely increase
	Global impressions of improvement (6; 1202)	MD, -0.54; 95% CrI, -1.07 to -0.14 CGI-I	SGAs likely improve to a small extent
	Global impressions of severity (9; 1788)	MD, -0.36; 95% CrI, -0.51 to -0.22 CGI-S	SGAs probably improve to a small extent
	Global impressions of functioning (7; 1339)	MD, 4.15; 95% CrI, 2.03 to 6.59 C-GAS; range 0-100	SGAs likely improve to a small extent
Bipolar Disorder (Manic/Mixed Phases) SGA class vs placebo Similar findings for aripiprazole alone, and for manic symptoms from quetiapine, but other individual drugs and outcomes lower quality	Response (10; 1664)	RR, 1.97; 95% CrI, 1.66 to 2.34 YMRS, 40-50% reduction in mania score	SGAs likely increase
	Remission (5; 944)	RR, 2.84; 95% CrI, 1.67 to 5.55	SGAs likely increase
	Manic symptoms (11; 1639)	MD, -6.42; 95% CrI, -7.88 to -5.26 YMRS raw scores; range 0-60	SGAs probably decrease
	Depression symptoms (9; 1622)	MD, -1.65; 95% CrI, -2.78 to -0.48 CDRS; range 0-113	SGAs probably decrease to a small extent
	Global impressions of severity (9; 1778)	MD, -0.65; 95% CI, -0.80 to -0.49 CGI-S[c]	SGAs likely improve to a small extent
	Global impressions of functioning (4; 1188)	MD, 6.64; 95% CrI, 2.45 to 10.95 C-GAS; range 1-100	SGAs probably improve to a small extent
Bipolar Disorder (Depressive Phase) SGA class vs placebo	Response (2; 225)	RR, 1.12; 95% CI 0.90-1.38 CDRS ≥50% reduction	SGAs may not improve in depressive phases
	Remission (2; 225)	RR, 1.26; 95% CI 0.90-1.75 CDRS score ≤28	SGAs may not improve in depressive phases
Autistic Spectrum Disorders SGA class vs placebo Aripiprazole and risperidone decreased irritability but other drugs and outcomes lower quality	Irritability (8; 809)	MD, -6.38; 95% CrI, -8.94 to -3.83 ABC subscale; range 0-45	SGAs decrease
	Lethargy/social withdrawal (7; 743)	MD, -1.67; 95% CrI, -3.05 to -0.28 ABC subscale; range 0-48	SGAs decrease to a small extent
	Stereotypy (5; 634)	MD, -1.73; 95% CrI, -3.16 to -0.05 ABC subscale; range 0-21	SGAs decrease to a small extent
	Inappropriate speech (7; 743)	MD, -1.04; 95% CrI, -1.83 to -0.26 ABC subscale; range 0-12	SGAs decrease to a small extent
	Compulsions (5; 568)	MD, -1.52; 95% CrI, -3.65 to -0.62 CY-BOCS; range 0-20	SGAs decrease to a small extent
	Response rates (7; 716)	RR, 2.22; 95% CrI, 1.29 to 4.17	SGAs increase
	Global impressions of severity (4; 522)	MD, -0.61; 95% CrI, -1.04 to -0.15 CGI-S	SGAs decrease to a small extent
ADHD and Disruptive, Impulse-Control, or Conduct Disorders (DICD) SGA class vs. placebo Treatment with quetiapine (1 study) and risperidone (6 studies) Results in ADHD limited to children with aggression	Conduct problems (6; 462)	SMD, -0.77; 95% CrI, -1.34 to -0.17	SGAs decrease
	Aggression (7; 495)	SMD, -0.43; 95% CrI, -0.67 to -0.14	SGAs decrease
	Hyperactivity (6; 468)	SMD of 5 trials, -0.39; 95% CrI, -0.76 to -0.07 1 RCT: No difference p > 0.05	SGAs probably decrease (in children with DICD +/- ADHD but possibly not in those with only ADHD, aggression and taking stimulants)
	Response rate (2; 193) (Patients with primarily ADHD and aggression)	1 RCT: RR, 1.12; 95% CI, 0.94 to 1.34 1 RCT: RR, 1.28; 95% CI, 0.93 to 1.77	SGAs may make little or no difference
	Global impressions of severity (3; 75) (Primary treatment in DICD)	3 RCTs: MD, -1.99; 95% CrI, -3.18 to -0.93 CGI-S; 0-6	SGAs may decrease in DICD +/- ADHD
	Global impressions of severity (2; 193) (Stimulant augmentation in ADHD)	1 RCT: MD, 0.0; 95% CI, -1.65 to 1.65 1 RCT: RR, 1.2; 95% CI, 0.95 to 1.5 CGI-S; 0-6	SGAs may make little or no difference
Tic Disorders SGA class vs. placebo	Tic severity (3, 114)	MD, -6.26; 95% CrI, -10.05 to -2.54 YGTSS Total Tic score, range 0-50	SGAs may reduce

Major and persistent depressive disorders, or disruptive mood dysregulation disorder, Obsessive-compulsive disorder, Eating disorders (i.e., anorexia nervosa, bulimia nervosa, binge-eating disorder), Behavioral issues outside the context of a mental disorder (e.g., aggression, agitation, behavioral dyscontrol, irritability, self-injurious behaviors, and insomnia): Few controlled studies exist and all outcomes had insufficient evidence.

Anxiety disorders, Substance use disorder, Posttraumatic stress disorder: No controlled studies were located.

CDRS-R = Children's Depression Rating Scale-Revised; C-GAS = Global Assessment Scale for Children; CGI-I = Clinical Global Impressions of Improvement; CGI-S = Clinical Global Impressions of Severity; CI = confidence interval; CrI = credible interval (used with Bayesian meta-analysis; MD = mean difference; N = number; RCT = randomized controlled trial; RR = risk ratio; SGA = second-generation antipsychotics; SMD = standardized mean difference; YGTSS = Yale Global Tic Severity Scale; YMRS = Young Mania Rating Scale

All values except Response, Remission, and Global Impressions of Functioning are favorable for the SGA when there is a negative effect estimate; the larger the magnitude of the number the larger the effect.
We did not pool data when only 1-2 studies reported on an outcome so these results are always presented separately.

Overview of Clinical Research Evidence - Harms

The strongest evidence for weight gain showed **greater harm from olanzapine** compared with risperidone, quetiapine, aripiprazole, and ziprasidone (Figure 1).

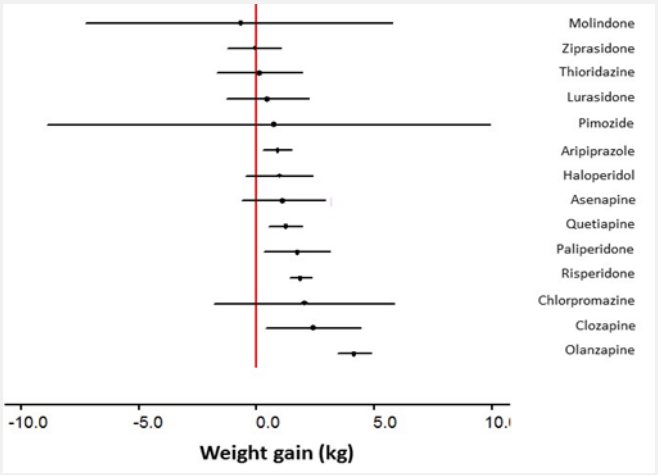

Figure 1. Results from a network meta-analysis combining results from 71 studies with placebo/no treatment or head-to-head drug comparisons. For each drug the mean effect and confidence interval is shown for gains in weight compared with placebo/no treatment (red line). Most studies (81%) were short-term and many only for 6-8 weeks.

Second-generation antipsychotics increase risk for several other harm outcomes (Figure 2).

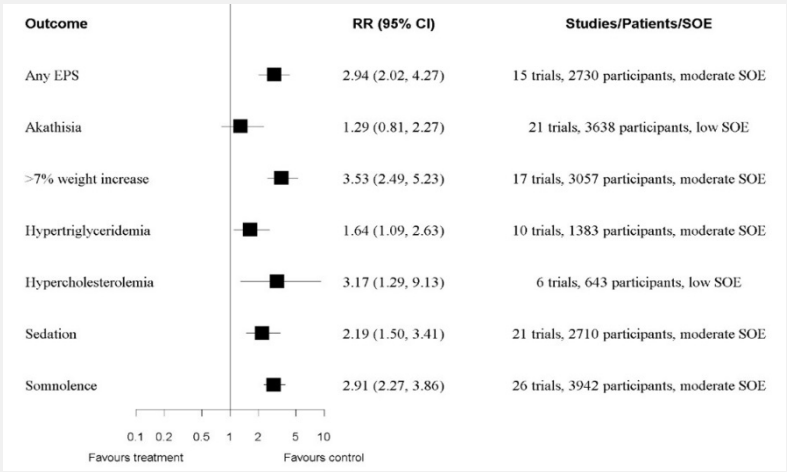

Figure 2. Results for multiple harm outcomes, each from a meta-analysis of studies comparing all second-generation antipsychotics versus placebo/no treatment. Number of studies and participants contributing to each meta-analysis is indicated.

CI = confidence interval, EPS = extrapyramidal symptoms, RR = relative risk, SOE = strength of evidence (degree of certainty review authors had in the effect size (RR) based on study quality, consistency in effects, precision of findings, other limitations; no outcome had high SOE)

Insufficient quality evidence was found for many harm outcomes, especially over the long term and for single drug comparisons.

Knowledge Gaps and Other Issues

- Evidence on the **long-term benefits and harms** of antipsychotics (and differences between antipsychotics) is limited. Future research should evaluate long-term developmental outcomes (e.g., growth and cognitive development).
- Data regarding the **impact on key patient subpopulations** are sparse. Effectiveness data for young adults would be helpful because of the unique issues associated with this population.
- Studies incorporating **therapeutic drug monitoring over long-term periods** in naturalistic settings would help create quality standards and inform recommendations for monitoring.
- Evidence on the **effectiveness and safety of combining antipsychotics** with other types of therapy (e.g., behavioral interventions) should be a priority.

Supplementary Information – Trade Names of Antipsychotic Drugs

Chemical Name	Trade Name(s)*
Aripiprazole	Abilify
Asenapine	Saphris
Chlorpromazine	Largactil, Thorazine
Clozapine	Clozaril
Haloperidol	Haldol
Lurasidone	Latuda
Paliperidone	Invega Sustenna
Pimozide	Orap
Molindone	Moban
Olanzapine	Zyprexa
Quetiapine	Seroquel
Risperidone	Risperdal
Thioridazine	Mellaril
Ziprasidone	Geodon, Zeldox

*Common brand names in the United States and Canada. Other names exist.

Strategies to Improve Mental Health Care for Children and Adolescents

Background

- About 20% of American children and adolescents are living with at least one mental health problem
- Despite advances in our knowledge of the benefits of various interventions to treat mental health problems in children, some outcomes remain suboptimal because of: (a) issues related to access to care, and (b) failure of healthcare systems and providers to adopt established quality improvement strategies

Purpose

This document **summarizes the findings of a comprehensive systematic review** to answer the following questions:

1. What is the effectiveness of quality improvement, implementation, and dissemination strategies in outpatient mental health services for children and adolescents? What are the harms?
2. Do characteristics of young patients, or contextual factors, modify the effectiveness or harms of these strategies?

The information presented in this summary could be useful for **researchers**, **clinicians**, and **decision-makers,** and may help to inform **clinical practices**, **guidelines**, and **policies**. The full report is available **online**.

Key Messages

- **Several approaches can improve both intermediate and final health outcomes and resource use**: 12 of 17 included studies (11 of 16 strategies) showed significant improvement in at least one outcome
- There are **not enough studies** to determine with confidence the efficacy of any one strategy
- The evidence for strategies with educational meetings, materials, and outreach was **inconsistent**; there seemed to be **no benefit** for strategies that included (a) only educational materials and/or meetings, or (b) only educational materials and outreach components (**low strength of evidence**)
- There is **not enough evidence** to judge the potential harms of using any of the strategies

Systematic Review Methods

Search strategies

1. Searched online databases from inception to January 14, 2016:
   - MEDLINE®
   - Cochrane Library
   - PsycINFO®
   - CINAHL®
   - Gray literature
2. Scanned reference lists
3. Contacted study authors

Criteria used to select studies

Criteria	Included	Excluded
Population	Healthcare systems, organizations, and practitioners that care for children and adolescents with mental health and/or substance use problems	Systems, organizations, and practitioners that care only for adults or only for children and adolescents with developmental disorders
Interventions (strategies)	Quality improvement, implementation, or dissemination strategies	Interventions targeting only drugs, only patients, or not otherwise stated as included
Comparator	Any control strategy	-
Outcomes	Multiple patient, practitioner, system, or organization outcomes	Outcomes not otherwise stated as included
Setting	Outpatient settings High Human Development Index countries	Inpatient or residential treatment settings, drug treatment programs, jails or prisons

Data were synthesized via qualitative comparative analysis and two reviewers graded the quality of the evidence

Summary of Key Findings

Included Studies

17 Studies provided **16** Strategies *and* **7** Features Associated with Success

13 randomized controlled trials
2 controlled clinical trials
1 cohort study
1 interrupted time series

7 studies evaluated **professional training strategies** and 10 evaluated **financial** or **organizational change strategies**

A strategy component or combination of components that resulted in significant **improvement in the majority of practitioner, system, and patient intermediate outcomes**

Evidence of Effectiveness

AT LEAST low strength of evidence

Of the 17 studies, **12 resulted in significant improvements**

Qualitative comparative analyses revealed **7 strategy features associated with success**

Low strength of evidence

There was **no benefit** for:

- Using only educational materials and/or educational meeting components
- Using only educational materials and outreach components

Strategy Features Associated with Success*	# of Studies
Financial component	1
Changing the scope of benefits	1
Multidisciplinary team *and* NO audit and feedback	1
Educational materials/meetings *and* patient-mediated intervention *and* educational outreach	2
Educational materials/meetings *and* patient-mediated intervention *and* reminders	2
Educational materials/meetings *and* educational outreach *and* reminders	1
Audit and feedback *and* NO educational outreach *and* NO multidisciplinary team	3

*Two studies did not contribute to any feature and one study met criteria for two features

There were **not enough studies** to judge the potential **harms** of using any of the strategies, or to assess which **moderators** might allow the strategies to work optimally

Implications for Research and Practice

- The current state of the evidence **does not give clinicians and healthcare decision-makers a definitive understanding of the best methods** to introduce evidence-based practices successfully in clinical settings
- Future studies should aim to **address the gaps in the evidence base** by:
  - Evaluating strategies for the psychotherapeutic and pharmacologic treatment of mental illness in youth
  - Focusing investigations on regulatory and financial components
  - Measuring and reporting on the fidelity to the original intervention
  - Documenting and reporting on the harms and costs of various strategies
  - Describing the strategies clearly and fully in published reports

Summary of the 16 Strategies

Strategy	Clinical Context	Patient Ages	Design	# of Clinicians	Strategy Features	Conclusions	Strength of Evidence
Adding an active learning component (in-person or computerized) to a professional training workshop to implement an evidence-based practice	Anxiety	8 to 17 years	Cluster randomized trial	115	1	No benefit for practitioner satisfaction, adherence, and skill	Low
Adding weekly feedback to 90-day feedback for practitioners regarding patient symptoms	Home-based mental health treatment	Mean age 15 years	Cluster randomized trial	144	2	Insufficient for practitioner adherence (poor training attendance) Benefit in functional severity	Insufficient Low
Adding intensive quality assurance to workshops for implementing an evidence-based practice	Substance use disorders	12 to 17 years	Controlled clinical trial	30	5	Insufficient for practitioner adherence and fidelity to cognitive behavioral therapy and monitoring techniques	Insufficient
Embedding a behavioral healthcare practitioner in pediatric primary care office for implementing and evidence-based practice	Various conditions	12 to 18 years	Cluster randomized trial	47	6	No improvement in practitioner adherence (less substance use disorder assessments and specialist referrals and more brief interventions)	Low
Paying practitioners for successfully implementing an evidence-based practice	Substance use disorders	Mean age 16 years	Cluster randomized trial	49	7	Improvement in practitioner competence Benefits in practitioner adherence and fidelity No benefit for patient mental health symptoms	Moderate Low Low
Co-locating a behavioral health evidence-based practice parenting program in primary care compared to referral to an external program	Externalizing behaviors	2 to 12 years	Controlled clinical trial	4 practices	10	Improvement in access to care (attendance of first evidence-based practice visit) Insufficient for service utilization (mean # sessions)	Low Insufficient
Training professionals with or without feedback to implement an evidence-based practice	Externalizing behaviors	3rd grade	Cluster randomized trial	Not reported	1, 2 1	No benefit for changes in mental health status with training and feedback Benefit for change in socialization skills and behaviors with training and feedback No benefit for changes in mental health status or in socialization skills and behaviors with training and no feedback	Low Low Low
Adding computer-assisted training with or without ongoing supervision and coaching to workshop for practitioners implementing an evidence-based practice	Substance use disorders	12 to 17 years	Cluster randomized trial	161	1, 8	Insufficient for changes in practitioner use, knowledge, and adherence for added computer assisted training and added supervision	Low
Training practitioners to identify and refer cases	First-episode psychoses	14 to 30 years	Cluster randomized trial	110	1, 8	Benefit for service utilization (time to referral to an early intervention service) Insufficient for referral to early intervention after first contact, changes in patient mental health status, and false-positive referral rates (harms) from primary care	Low Insufficient
Collaborative consultation to promote titration trials and periodic monitoring during medication management	Attention deficit hyperactivity disorder	Mean age 7 years	Cluster randomized trial	38	2, 6	Insufficient for practitioner adherence/fidelity, competence/skills, and change in mental health state symptoms	Insufficient
Training nurses to educate parents about evidence-based practices	Children suspected of abuse	2 to 17 years	Interrupted time series and randomized trial	Not reported	1, 3, 8	Benefit in patient access to care (parent rated), patient satisfaction, treatment engagement (parent rated), therapeutic alliance (parent rated)	Low
Training practitioners to use a patient medication monitoring program for second-generation antipsychotics	Children on antipsychotics	Mean age 11 years	Interrupted time series	Not reported	1, 4, 8	Improvement in practitioner adherence (metabolic monitoring and documentation) and metabolic monitoring over time	Low
Program to improve organizational climate and culture	General mental health	8 to 24 years	Cluster randomized trial	18 programs	1, 2, 7, 8	Benefit in practitioner satisfaction and patient mental health symptoms	Low
Program to improve organizational climate and culture	Externalizing behaviors	9 to 17 years	Two-stage randomized trial	257	1, 2, 7, 8	No benefit in practitioner adherence or patient mental health symptoms	Low
Adding diagnosis and treatment guidelines to a computer decision support system	Home-based mental health treatment	Mean age 15 years	Cluster randomized trial	Not reported	1, 3, 4, 5	Benefit for practitioner adherence and program model fidelity (e.g. uptake of guidelines for diagnostic assessment, ore reporting of symptom domains) Insufficient for practitioner adherence (e.g. reassessment, medication adjustments, referrals) and service utilization (visit to specialist)	Low Insufficient
Providing practitioner access to practice guidelines via an Internet portal	Attention deficit hyperactivity disorder	6 to 12 years	Cluster randomized trial	Not reported	1, 2, 3, 4, 5	Improvement of practitioner protocol adherence and program model fidelity	Low

Strategy Features

1. Educational meetings or materials
2. Audit and feedback
3. Patient-reported data
4. Reminders
5. Quality monitoring
6. Multidisciplinary teams
7. Provider incentives
8. Educational outreach visits
9. Provider satisfaction initiative
10. Changing the scope of benefits

Strength of Evidence	Definitions
High	High confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence shows few or no deficiencies. Findings appear stable.
Moderate	Moderate confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence has some deficiencies. Findings are likely stable but some doubt remains.
Low	Limited confidence that the estimate of effect lies close to the true effect for this outcome. The body of evidence has major or numerous deficiencies. More evidence is needed before concluding that findings are stable or that the estimate of effect is close to the true effect.
Insufficient	Evidence is unavailable or does not permit reaching a conclusion. There is no confidence in the estimate of effect, with no evidence available or unacceptable deficiencies.