The NSGC Practice Guidelines Committee ratified this revised policy on August 10, 2015 and the NSGC Board of Directors approved revisions on September 16, 2015 and March 3, 2020.

Contact:
NSGC PGC Liaison: Molly Giammarco (mgiammarco@nsgc.org)
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SECTION 1: Rationale for NSGC’s Clinical Practice Guideline Policy Revision

The National Society of Genetic Counselors’ (NSGC) established the Practice Guidelines Committee (PGC) in 2012 to facilitate NSGC clinical practice guidelines (CPG). Prior to 2012, the Access and Service Delivery Committee oversaw NSGC’s practice guideline efforts.

In 2014, the Agency for Healthcare Research and Quality’s National Guideline Clearinghouse\(^1\) (NGC) revised its practice guideline criteria to conform to the Institute of Medicine’s (IOM) CPG standards and definitions, which seek to minimize bias, enhance the evidence base, and increase the trustworthiness of guideline recommendations. To adhere to NGC’s new criteria, the PGC created a CPG-development policy in 2014-2015 to replace its 2012 Practice Guideline Policy and Development protocol.\(^2\)

NSGC’s 2014-2015 CPG revision establishes a process for producing evidence-based practice guidelines that conform to the IOM’s standards for developing trustworthy clinical practice guidelines (Figure 1).\(^3\) NSGC based these revisions on the now-defunct NGC criteria, PGC member discussions, experiences with current policy, other professional organizations’ guideline policies, clinical practice guideline-development protocol, and the 2014 New York Academy TEACH (Teaching Evidence Assimilation for Collaborative Healthcare) Conference.

The PGC revised its process for generating and prioritizing guideline topics, compiling author groups and establishing author roles, reviewing external CPG, and renewing NSGC’s existing clinical practice guidelines. Major additions to the guideline-development process include incorporating the IOM criteria, the GRADE (Grading of Recommendations, Assessment, Development, and Evaluations) system to evaluate evidence quality and recommendation strength, a systematic approach for developing recommendations using expert opinion when necessary, and mechanisms for assessing practice-guideline quality. The revised criteria includes a process for endorsing external organizations’ clinical practice guidelines and a comprehensive author Conflict of Interest (COI) assessment protocol. NSGC clinical practice guidelines developed after 2015 include “Evidence-Based Clinical Practice Guidelines” in their titles to distinguish them as evidence-based documents.

In 2019-2020, the PGC made additional revisions to the NSGC Evidence-Based Clinical Practice Guideline Development Manual to standardize the process of generating an evidence-based CPG across all topics and author groups. The PGC oversees the process for developing NSGC’s CPGs and reviewing externals groups’ practice guideline-endorsement requests (Table 1, Summary Roles and Responsibilities; and Appendix X: Detailed Roles and Responsibilities). The NSGC Board of Directors (NSGC Board) approves all CPGs before publication. The Journal of Genetic Counseling (JOGC) typically publishes NSGC clinical practice guidelines. NSGC posts referenced statements, or their summaries, on its website and may submit them to other media sources at the NSGC Executive Office’s discretion.

---

\(^1\) Defunct as of June 2018.

\(^2\) The NSGC Board approved the 2012 Practice Guideline Development Policy on February 18, 2012.

Figure 1. AT-A-GLANCE: Standards for Developing Trustworthy Clinical Practice Guidelines

Table 1. Summary Roles and Responsibilities. Appendix 1 describes roles and responsibilities in full.

<table>
<thead>
<tr>
<th>NSGC Governance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSGC Board of Directors</strong></td>
<td>• Oversees all NSGC program activities</td>
</tr>
<tr>
<td></td>
<td>• Reviews and approves all NSGC PGCs, PRs, and guideline</td>
</tr>
<tr>
<td></td>
<td>endorsements.</td>
</tr>
<tr>
<td><strong>NSGC Board Liaison to the PGC</strong></td>
<td>• Attends monthly PGC calls.</td>
</tr>
<tr>
<td></td>
<td>• Informs Board of PGC activities.</td>
</tr>
<tr>
<td><strong>PGC Chair and Members</strong></td>
<td>• Oversee all PGC activities.</td>
</tr>
<tr>
<td></td>
<td>• Liaise PGC author groups.</td>
</tr>
<tr>
<td></td>
<td>• Review and approve proposed CPG topics, prioritize topic</td>
</tr>
<tr>
<td></td>
<td>nominations, and ensure topic meets CPG criteria.</td>
</tr>
<tr>
<td></td>
<td>• Compile and approve CPG/PR author groups and lead authors.</td>
</tr>
<tr>
<td><strong>PGC Liaison to the CPG/PR Author Groups</strong></td>
<td>• Monitor CPG/PR development and provide updates to PGC.</td>
</tr>
<tr>
<td></td>
<td>• Identify and help obtain resources to support CPG/PR author</td>
</tr>
<tr>
<td></td>
<td>groups.</td>
</tr>
<tr>
<td></td>
<td>• Review and approve SER, PR, and CPG manuscripts prior to</td>
</tr>
<tr>
<td></td>
<td>review by PGC, JOGC, and NSGC reviews.</td>
</tr>
<tr>
<td><strong>NSGC Methodologist</strong></td>
<td>• Serves as supervising methodologist for all NSGC CPGs and</td>
</tr>
<tr>
<td></td>
<td>ensures that the SER and CPG author groups adhere to the</td>
</tr>
<tr>
<td></td>
<td>NSGC CPG Handbook and GRADE methodology.</td>
</tr>
<tr>
<td></td>
<td>• Provide guidance to the CPG/PR, and SER author groups</td>
</tr>
<tr>
<td></td>
<td>throughout the development and review processes.</td>
</tr>
</tbody>
</table>
• Provide training specific to SER and CPG for each author group, as needed.

Medical Librarian (Recommended) • Conduct literature searches in collaboration with PGC methodologist, CPG and SER author groups.
• Obtain full-text pdfs of available literature.

SECTION 2: What is a Genetic Counseling Clinical Practice Guideline?

“Clinical practice guidelines are statements that include recommendations intended to optimize patient care. They are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options.”

Clinical Practice Guidelines We Can Trust, Institute of Medicine, March 23, 2011

At the request of the U.S. Congress, the IOM published eight standards for developing rigorous, trustworthy, CPGs. The IOM standards have quickly become a benchmark for evaluating practice guidelines, and many professional societies now develop their guidelines accordingly.

A critical aspect of developing CPGs is differentiating between rigorous, evidence-based CPGs that attempt to conform to IOM standards and other clinical guidance documents that are less rigorous, but still inform clinical care. The NSGC PGC develops two types of clinical guidance documents that affect the practice of genetic counseling:

1. **Clinical Practice Guidelines (CPG):** Evidence-based recommendations and supporting documentation that attempt to conform to IOM standards.

2. **Practice Resources (PR):** Less rigorous documents relating to a broad category of information-sharing and genetic counseling best practices that do not require evidence-based recommendations.

CPGs are gold-standard documents that PGC prioritizes developing and publishing. However, the PGC recognizes that many topics are better suited to PRs. Both documents seek to assist genetic counselors and other healthcare professionals make clinical decisions and promote consistent, high-quality care. See Table 2 for information on NSGC’s CPGs and PRs level of rigor, focus, and distribution.

NSGC’s genetic counseling CPGs and PRs help demonstrate the integral role genetic counseling has in delivering high-quality healthcare. The PGC’s CPGs, PRs, and documents developed with other organizations should align with NSGC’s mission, vision, scope of practice, code of ethics, and strategic priorities. CPGs and PRs can include recommendations and best practices for using certain genetic information in healthcare, which include, but are not limited to, referral practices, disease screening, predictive testing, disease diagnosis, or treatment. Recommendations may also address accessing, assessing, or delivering genetic counseling services.
Table 2. NSGC Clinical Guidance Documents: Clinical Practice Guidelines and Practice Resources

<table>
<thead>
<tr>
<th>Level of Rigor</th>
<th>Clinical Practice Guideline (CPG)</th>
<th>Practice Resource (PR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Very rigorous.</td>
<td>• Variable rigor.</td>
</tr>
<tr>
<td></td>
<td>• Evidence-based.</td>
<td>• Evidence-informed.</td>
</tr>
<tr>
<td></td>
<td>• Aims to conform to IOM standards.</td>
<td>• Does not require a systematic review.</td>
</tr>
<tr>
<td></td>
<td>• Requires an explicit and transparent development process (e.g. GRADE).</td>
<td>• Does not require a formal assessment of the quality of evidence.</td>
</tr>
<tr>
<td></td>
<td>• Requires a systematic evidence review.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Requires relative benefits and harms assessment of the recommendations.</td>
<td></td>
</tr>
<tr>
<td>Focus of Content</td>
<td>• Focuses on genetic counseling best-practices that evidence-based recommendations enhance.</td>
<td>• Focuses on information-sharing and genetic counseling best-practices that do not require evidence-based recommendations.</td>
</tr>
<tr>
<td></td>
<td>• Typically focuses on a narrow patient population with a specific phenotype or genetic diagnosis.</td>
<td>• May focus on a narrow patient population with a specific phenotype, genetic diagnosis, or more “universal” practices that apply to broad patient categories.</td>
</tr>
<tr>
<td></td>
<td>• Examples: Indications for genetic counseling referral, indications for genetic testing, treating genetic conditions, and other management options.</td>
<td>• Examples: A condition’s natural history overview informed consent protocol; and eliciting and documenting family history.</td>
</tr>
<tr>
<td>Posting of Content, Distribution</td>
<td>• Published in Journal of Genetic Counseling or relevant journal.</td>
<td>• Published in Journal of Genetic Counseling.</td>
</tr>
<tr>
<td></td>
<td>• Posted on NSGC’s website.</td>
<td>• Posted on NSGC’s web site.</td>
</tr>
<tr>
<td></td>
<td>• Submitted to a national clinical practice guideline clearinghouse.</td>
<td></td>
</tr>
</tbody>
</table>

| Stakeholders in Approval Process                   | CPG authors                                                                                     | PR authors                                                                            |
|                                                    | • PGC members                                                                                   | • PGC members                                                                         |
|                                                    | • NSGC membership                                                                              | • NSGC membership                                                                     |
|                                                    | • NSGC Ethics Advisory Board                                                                     | • NSGC Ethics Advisory Group                                                           |
|                                                    | • NSGC Legal Counsel                                                                            | • NSGC Legal Counsel                                                                  |
|                                                    | • NSGC Board                                                                                   | • NSGC Board                                                                          |
|                                                    | • Endorsing organization (if applicable)                                                         | • Endorsing organization (if applicable)                                                |
|                                                    | • Joint/partnering organization (if applicable)                                                  | • Joint/partnering organization (if applicable)                                        |

GRADE (Grading of Recommendations Assessment, Development, and Evaluation); IOM (Institute of Medicine); NSGC (National Society of Genetic Counselors) PGC (Practice Guidelines Committee)
SECTION 3: NSGC Evidence-Based Practice Guideline Development Timeline

Figure 2. The Nine-Step Process to an Evidence-Based Clinical Practice Guideline

Evidence-Based CPG Development Process Overview:

1. Task: The PGC initiates the topic-exploration process by engaging other NSGC groups, external groups, and the public. The PGC recommends a CPG proposal to the NSGC Board. Upon Board approval, the PGC assembles the interdisciplinary SER and PG author groups.
   a. Timing: One-to-six months prior to project start.
   b. Engagement: PGC, NSGC Board.

2. Task: The SER lead authors, PG lead authors, PGC methodologist, and medical librarian finalize the SER’s PICO(TS).
   a. Timing: Month 1 – Month 3.
   b. Engagement: SER author group; PG author group; PGC methodologist, author-group medical librarian.

3. Task: The SER author group performs the SER, including data analysis and quality assessment, under guidance of the PGC methodologist.
   a. Timing: Month 3 – Month 18.
   b. Engagement: SER author group.
4. Deliverable: The SER author group delivers the Evidence Table/Summary of Findings Table to the PGC for review and informs the PG author group of the results. Task: The SER author group drafts the SER manuscript according to PRISMA standards.
   a. Timing: Month 18 (as soon as SER author group completes its data analysis) – Month 21
   b. Engagement: SER author group; PGC; PG liaison to SER author group.

5. Task: The PG author group develops recommendations using the GRADE framework and in some situations, uses a modified Delphi process or the RAND/UCLA Appropriateness Method.
   a. Timing: Month 21 – Month 27 (depends on the date the SER authors deliver the data).
   b. Engagement: PG author group; PGC methodologist.

6. Deliverable: The PG author group delivers the recommendations draft to the PGC. Task: The PGC returns revisions to the SER author group.
   a. Timing: Month 27
   b. Engagement: PG author group; PGC; SER author group

7. Task: The PGC reviews the recommendations and informs the NSGC Board. The PGC returns revisions to the PG author group. Task: the PG author group drafts and assesses the final guideline document. Task: The SER Author Group submits the final SER to The Journal of Genetic Counseling (JGC) or other relevant journal.
   a. Timing: Month 27 – Month 30.
   b. Engagement: PGC; NSGC Board; PG author group; SER author group.

8. Deliverable: The PG author group delivers the final guideline document to the PGC. Task: The PGC reviews and facilitates the necessary public/member comment, and NSGC committees/personnel, relevant organizations (jointly developed guidelines) approvals.
   a. Timing: Month 30 – Month 33.
   b. Engagement: PG author group; PGC; NSGC Board; NSGC Legal; NSGC Ethics Advisory Group; NSGC Other.

9. Deliverable: The PG author group submits the final guideline document to JOGC and to ECRI Guidelines Trust.
   a. Timing: Month 33 – Month 36.
   b. Engagement: PG author group.
STEP 1: GENERATING TOPICS AND FORMING AUTHOR GROUPS

Generating and Selecting Topics
The NSGC Board, the PGC, NSGC SIGs and committees, NSGC members, and external groups may use the PGC’s Topic Proposal Form to submit evidence-based CPG topics (Appendix A).

The PGC’s Topic Proposal Form asks submitters to describe the topic area and questions that the proposed CPG would cover. The PGC encourages submitters to thoroughly describe the PICO(TS), and if possible, construct the topic’s key questions. Submitters without prior SER experience or those who find this task difficult should contact the PGC Chair, who can help to identify assistance. Submitters should also list key references, especially if published SERs exist or are underway that would guide the recommendations the PG authors could use to form the practice guideline (this reduces the SER author group’s process for developing the Evidence Report for the PG author group).

The PGC will review CPG topics on a rolling basis and consider timeliness, relevance to the profession, and estimates of the evidence-base to inform the topic in question as criteria for advancing the topic. The PGC methodologist may assist the PGC in assess a topic. In special circumstances, the PGC may prioritize a CPG topic/proposal due to timeliness of a particular topic. The PGC may periodically engage the membership or other experts by, for example, posting key questions and outcomes on the NSGC website for comment for to generate high-priority topics.

When reviewing a proposed topic, the PGC will also consider joint-guideline suitability, as well as identify other professional societies who may endorse the CPG. If this is the case, the PGC will seek NSGC Board approval to contact relevant organizations once the PGC and Board approve a CPG topic. In
the case of a joint effort, NSGC and other organizations will develop a joint-review process that will integrate each organization’s review policies and timelines for each step.

For joint guidelines, participating organizations will request or require one or more of their members to be voting members of the PG author group. NSGC may require these organizations to provide one or more members to assist with the SER author group. The participating organizations may simultaneously conduct some review processes (e.g. Board reviews). During the topic-review, the PGC may also deem a proposal more suitable to a different type of document (e.g., Practice Resource).

**Forming SER and PG Author Groups**

The PGC will compile two author groups to develop an Evidence-Based CPG: (1) SER author group, and (2) Practice Guideline author group.

Roles and Responsibilities (Appendix A for detailed roles and responsibilities):

- The SER author group performs a systematic literature review, synthesizes the evidence, grades the quality of the evidence, completes the GRADEpro Evidence Table/Summary of Findings Table, and writes the SER manuscript.
- The PG author group creates recommendations based on the Evidence Report, grades the strength of the recommendations, and writes the Evidence-Based Practice Guideline according to the GRADE framework or, in certain situations, according to a modified Delphi process or the RAND/UCLA Appropriateness Method.

Author Composition:

- SER author groups may consist largely or exclusively of genetic counselors, a medical librarian, and a methodologist.
- PG author groups should be multidisciplinary and reflect the relevant stakeholders who will use and/or benefit from the resulting guideline, to meet IOM recommendations and to optimize national-agency ratings, such as the ECRI Guidelines Trust. Depending on the topic, this may include physicians or other stakeholders outside of NSGC.
- When feasible, the PG author group should consider patients, parents of patients, or advocacy groups for their unique perspective. Strategies to recruit non-genetic counselor authors or obtain input from other stakeholders may vary for each guideline. In some cases, citing publications that capture outside opinion may suffice.
- A methodologist is a non-voting member of the PG author group that facilitates the guideline-development process and ensures that authors adheres to GRADE methodology.
- At least two authors in each of the author groups must be full NSGC members, and as a group, author must be affiliated with at least two different institutions.

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• The PGC will assign Committee members to liaise the SER author group, and the PG author group. PGC liaisons cannot be listed authors for the resulting SER, or the PG.

Soliciting Authors:
• The PGC will solicit author applications by announcing a specific CPG topic/question and invite NSGC members and non-NSGC potential candidates to submit CVs, interest statements, and PGC Conflict-of-Interest Disclosure Forms (Appendix A).
• The PGC announcements for CPGs/questions will include the skill sets necessary for each author group. Applicants may indicate their interests in serving on either the SER author group or the PG author group. Applicants may also indicate their interests in serving as a lead author for either author group.
• NSGC does not preclude PGC members from participating as authors in NSGC CPGs or PR author groups when appropriate. If participating, PGC authors would recuse themselves from PGC discussions pertaining to the said CPG or PR.

Selecting Authors:
• The PGC will identify authors, select lead authors, and if necessary, work with the lead authors to establish individual-author roles.
• If an author group has two lead authors, these authors must come from different institutions.
• The PGC, in consultation with the NSGC Board, must approve any author who is not an NSGC member.
• In accordance with the PGC COI Policy [Appendix B], the PGC will evaluate any potential COI when selecting author groups, as well as throughout the CPG/PR development process.
• The PGC will vote to approve CPG and PR author slates. In certain cases, the PGC may request that the NSGC Board also review author slates.
• The PGC can require an author step down from an author group if the author is not able to fulfill his/her responsibilities, are uncommunicative or disrespectful to fellow authors, the PGC, or NSGC staff.

As a prerequisite to authoring a CPG, and in accordance with NSGC’s agreement to publish the proposed guideline (i.e. Contribution), authors must sign NSGC’s Author Agreement Form (Appendix A). This form assigns and transfers all rights, titles, and interests (including all copyrights in the contribution) to NSGC.

STEP 2: FINALIZING PICO(TS)

The first task for the newly formed SER and PG author groups is to finalize the PICO(TS) and construct the key question(s) (KQs) with help from the methodologist and the research librarian. During this initial meeting, the authors finalize Population (P), Intervention (I), Comparator (C), Outcome(s) (O), and optionally, the Timing (T) and Setting (S).
Although authors may have developed initial PICOTS and KQs during the topic-selection process, it is critical that the author groups work together with the methodologist and librarian to revise the PICOTS/KQs as necessary to ensure that the project scope is reasonable and that the resulting evidence base will support the ensuing guideline.

CPGs can address several types of questions:
- Therapeutic intervention/therapy
- Disease etiology
- Diagnostic test accuracy or diagnosing
- Prognostic accuracy or predictions
- Prevention/Population screening.

See Appendix 2 for PICOTS and KQs examples.

Once the author groups finalize the PICOTS and KQ(s) and the PG authors finalize outcomes of interest, the SER author group begins the SER and the medical librarian runs the literature search in the relevant databases. During this time, the PG author group keeps the PG author group updated through its liaison to the SER author group. The PG author group does not have any deliverables or tasks to complete until the SER author group complete the Evidence Table/Summary of Findings Table in GRADEpro.

*******************************Systematic Evidence Review Author Group*******************************

STEP 3: PERFORMING THE SYSTEMATIC EVIDENCE REVIEW

What is a Systematic Evidence Review (SER)?
A SER gathers evidence that informs a CPG’s topic. The SER is the preferred process to develop a CPG because its specific methodology is less prone to author bias. The SER assesses the body of literature for specific- and systematically defined KQs using a transparent and reproducible search query, identifies gaps in the scientific literature, and synthesizes the published evidence for each outcome across studies.

How does a SER differ from a narrative review (also called expert review)?
A narrative review can review a broad or a narrow topic using literature that supports the expert opinion, is not comprehensive, or is non-systematic or non-described. Although narrative reviews are publishable in peer-review journals, they are not sufficient foundation for CPG because their recommendations can be subject to author bias. A CPG that uses a narrative review does not comply with national CPG standards.6

_____________________
Table 3. Comparing Systematic Evidence Review and Narrative Review

<table>
<thead>
<tr>
<th></th>
<th>SER</th>
<th>Narrative Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question</td>
<td>Strictly formulated</td>
<td>Broadly formulated</td>
</tr>
<tr>
<td>Methodology</td>
<td>Clearly defined</td>
<td>Not or insufficiently described</td>
</tr>
<tr>
<td>Search strategy</td>
<td>Clearly defined</td>
<td>Not described</td>
</tr>
<tr>
<td>Selection of studies</td>
<td>Clearly defined</td>
<td>Not described</td>
</tr>
<tr>
<td>Ranking of the studies</td>
<td>By levels of evidence</td>
<td>Not performed</td>
</tr>
<tr>
<td>Analysis of the studies</td>
<td>Clearly described</td>
<td>Not described</td>
</tr>
<tr>
<td>Interpretation of results</td>
<td>Objective</td>
<td>Subjective</td>
</tr>
</tbody>
</table>

Performing a Systematic Evidence Review

An SER involves multiple steps beginning with finalizing PICOTS and KQs and concluding with evidence synthesis/analysis. A stand-alone SER manuscript is the SER author group’s final deliverable (Figure 4).

Figure 4. SER Flow Chart.

The following summarizes the steps to a SER. See Appendix C for more information.

**Literature Search**
Medical librarians can play an important role in the SER process because they assign index terms to articles. Medical librarians can also help author groups with a variety of necessary tasks, from searching multiple databases to procuring literature for review.

**Screening Title Abstracts**
Once the SER authors upload the literature into the Covidence project, start to screen the results. Based on *a priori* inclusion and exclusion criteria, the authors will review the title and abstract to identify articles that are clearly irrelevant (excluded), those that are clearly pertinent (include), and those for which a determination cannot be made based solely on the title and abstract alone (unclear). Two authors will review each study who are blinded to the other author’s decision. The two reviews can manage conflicts through discussion or third, independent reviewer. Articles marked “include” and “unclear” move to full-text review.

**Full-Text Review**
In this step, SER authors will make final inclusion-exclusion decisions about articles included from the abstract screening. Unlike the previous step, authors use the entire article (including supplemental materials, if needed) to determine inclusion. Explicit exclusion criteria are essential for this stage: authors must justify excluding any articles. The articles included until this point proceed to the data-extraction stage. As with title-abstract screening, two independent, blinded authors provide full-text review and adjudicate conflicts.

**Data Extraction**
During data extraction, SER authors will input study design information, patient/population characteristics, and relevant study results into the Covidence data-extraction form and extract quantitative and qualitative data. The methodologist will work closely with the SER author group to create the extraction form in Covidence and provide guidance about standardizing extracted data. As with the previous stages, two blinded authors perform this review, followed by an adjudication process.

**Quality Assessment**
Concurrent with data extraction, SER authors will use pre-determined frameworks to assess each individual study’s quality/risk of bias. For randomized controlled trials (RCTs), authors will use the Cochrane Risk of Bias v.2.0 tool; for non-RCTs, authors will use the ROBINS-I tool. Authors may use other quality-assessment tools after consulting with the methodologist for individual projects, as appropriate.

**Grading the Overall Evidence Body**
Authors grade the evidence by evaluating the quality of evidence from the included studies. This evaluates the body of evidence. The SER author group assesses the confidence that the estimated effect is true for each outcome. Authors document this step in the GRADEpro software; see Appendix 4 for a worksheet example. The methodologist will provide guidance to the SER author group for all
components of grading the overall body of evidence. SER authors use robvis, a data visualization tool (https://www.riskofbias.info/welcome/robvis-visualization-tool) (Figure 5) to present the quality assessment for individual studies and for the overall body of evidence robvis.

**Figure 5. robvis Data Visualization of SER Risk of Bias Assessments.**

![Data Visualization of SER Risk of Bias Assessments](image)

**Evidence Table/Summary of Findings Table**

Once authors complete all data analysis, or they assess each outcome separately (ideally), the lead SER author(s) and/or methodologist should input the result into the previously created GRADEpro evidence table/summary of findings table.
Step 4: Transitioning the SER to the Practice Guideline Author Group and SER Documentation

Handoff to the PG Author Group. The SER lead author and/or methodologist will populate the SER data into the GRADEpro evidence table. As authors complete the data analysis and grade the overall evidence body for each outcome, the PGC liaisons will inform the PG author group. Authors will use an expert panel consensus-method, such as a Delphi process or the RAND/UCLA Appropriateness Method for outcomes that have no evidence.

Due to the extra time commitment for these non-GRADE processes, it is essential that the SER author group identify these outcomes and inform the PG liaison in a timely manner. Once the SER author group completes all data analysis, including integrating any new studies from the updated literature search, the SER lead author will inform the PG liaison that the Evidence Table/Summary of Findings Table is ready for the PG author group. The SER lead author will discuss the findings on a conference call with the PG author group and the methodologist.

Documenting a Systematic Evidence Review. The SER author group will create an SER manuscript to summarize its work, which will fully describe the SER, evidence-synthesis, and evidence-grading processes according to PRISMA. The methodologist will provide guidance to the SER author group to ensure the SER manuscript addresses the items in the PRISMA checklist. Once authors populate the evidence table, grade the evidence, and upload data to GRADEpro, the SER author group will report their final analyses, key findings, and plan for the SER manuscript to the PGC and PG author group.

The PGC will send the Evidence Report (exported from GRADEpro) to the NSGC Board as an informational update. The PGC liaisons will relay any feedback in writing to the SER author group members, which will have one month to submit written responses. The SER author group will make any necessary revisions to the Evidence Report. The SER authors will simultaneously convey substantive revisions to the PG author group.

All NSGC SER publications must include an acknowledgement statement that recognizes NSGC. The SER informs genetic counselors and patients of the limitations/strengths of the evidence and identifies gaps in the existing literature. SER author groups may publish their SERs as stand-alone documents to inspire future research.

Note: SERs are not, by themselves, NSGC-endorsed documents and therefore do not need to follow NSGC's approval process for publications.

Documenting an SER enables others to replicate the steps and develop the same set of studies to inform the practice guideline. Some journals have specific requirements for reporting the SER process and its findings, such as PRISMA and MOOS. The PGC will require its SER author groups to structure the SER according to the PRISMA checklist, unless otherwise agreed upon at project outset, based on the anticipated target journal for SER publication and its specific requirements for SERs. This will ensure that all SER groups adequately document the following items:
- Search Terms/Key words used
- Databases Searched
- Time period searched: Beginning Date (month/year) and End Date (month/year) Dates when initial and updated literature search(is) were performed
- Study Inclusion Criteria
- Study Exclusion Criteria
- Total identified studies (presented in a PRISMA flowchart, Figure 6).

Figure 6. PRISMA Flowchart Example Outlining Study Inclusion and Exclusion.
**STEP 5: DRAFT AND GRADE ACTIONABLE RECOMMENDATIONS**

Ideally, the PG author group will convene in person or by conference call to construct and grade its recommendations based on the SER’s Evidence Report. The PGC can provide conference lines for author groups but does not budget for in-person author meetings. The PG author group will have **up to six months** from the date of receiving the Evidence Report to complete the Evidence-Based Practice Guideline. If the authors do not meet expected deadlines, the PGC and NSGC Board may withdraw its approval or solicit other authors to complete the document.

The PG author group should format recommendations to link them to the clinical question. The PG author group will use the information in the GRADEpro project to develop recommendations with methodologist guidance. Outcomes with no evidence identified in the SER will undergo the modified Delphi method or the RAND/UCLA Appropriateness method. The SER author group will provide guidance on non-GRADE methods to the PG author group, if necessary. Authors will integrate the resulting consensus into the GRADE system. The PG author group will use the GRADE system to consider:

- Quality of evidence
- Balance of benefits and harms/burdens
- Distribution of values and preferences
- Resource implications.

**Quality of evidence.** The SER author group assesses the quality of evidence and the PG author groups should develop succinct statements that summarize the evidence to answer the specific clinical question. These statements should indicate the magnitude of the effect and the quality of evidence. The lowest quality of evidence for each of the critical outcomes determines the overall quality of evidence. The higher the quality of evidence, the more likely an outcome warrants a strong recommendation.

**Balance of benefits and harms/burdens (or Balance between desirable and undesirable effects).** The larger the difference between the desirable and undesirable effects, the more likely it warrants a strong recommendation. The narrower the difference, the more likely it warrants a weak recommendation.

**Distributing values and preferences.** This refers to the relative worth or importance of a health state or consequences of a decision to follow a particular course of action (benefits, harms, burdens, treatment, and resources). Individuals usually assign less value to, and have less preference for, more impaired health states compared to other health states. The more variability in values and preferences, or the more uncertainty in values and preferences, the more likely it warrants a weak recommendation. Engaging advocacy groups/external stakeholders (e.g. patients) will also help identify values and preferences.

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Resource Implications. The higher the costs of an intervention (the more resources consumed) the less likely it warrants a strong recommendation. This may be subjective.

Based on the above factors, authors classify recommendations as “strong” or “conditional.” Recommendations strength depends on a balance between all desirable and all undesirable intervention effects (i.e. net-clinical benefit), quality of available evidence, values and preferences, and resource used (cost and others). In general, the higher the quality of the supporting evidence, the more likely it is for the recommendation to be strong. Conversely, low quality or very low quality likely results in a conditional recommendation. [Note: Use “conditional” instead of “weak”].

Strong recommendations based on low or very low-quality evidence are possible, particularly if authors make them against using poorly investigated new technologies (where, for example, net-clinical benefit is questionable, harms are possible or probable, and the new technology is highly resource-intensive). Authors may express strong recommendations as “we recommend” and conditional recommendations as “we suggest.” Authors should include statements about the underlying values and preferences that inform the recommendation strength as well as the remarks are integral parts of the recommendations, which help accurately interpret the recommendations.

TIP: When formulating evidence-based conclusions, avoid the terms “proven effective” or “established as effective.” Evidence is never definitive, and conclusions derived from evidence cannot be “proven” or definitively “established.”

Appendix 6 includes additional information about interpreting strong and conditional stakeholder recommendations and an example recommendation.

Note: ECRI Guidelines Trust does not exclude a CPG if the SER identified specific gaps in the evidence base for some of the CPG recommendations. In this case, any recommendations must reflect this in their wording, and acknowledge the identified evidence gaps in a transparent manner.

However, there may be cases when no specific recommendation is made
- The advantages and disadvantages are equivalent
- The target population has not been identified or studied
- Insufficient evidence (for/against a clinical decision) to formulate a recommendation.

Even with high-quality evidence, a recommendation need not necessarily follow. For example, there may be major concerns of generalizability or clinical applicability within the evidence base that would question the usefulness of any associated recommendations. In these circumstances, a formal recommendation is not required. A placeholder within the document where the recommendation would normally appear still needs to be present. This placeholder section would briefly explain why authors did not make a recommendation. In most circumstances, the authors would explain the evidence limitations that result in the absence of a recommendation in the published guideline.
Consensus Process for Developing Recommendations

Occasionally, after completing the SER and grading the evidence, SER authors will identify outcomes with no evidence, or the PG author group will conclude that the evidence base is too weak to support any meaningful practice recommendations. If no evidence for all critical and important outcomes exist, it may be appropriate for authors to stop the PG process rather than attempt to develop an evidence-based practice guideline. Authors may instead consider developing a PR after consulting with the PGC.

However, it may be possible to develop practice recommendations (and a CPG) that are conditional and transparent about the weak evidence base, often because there is no other such resource available on the topic. The PG author group may determine a need for more extensive stakeholder contribution in developing recommendations and may employ a structured approach (such as the Delphi method or RAND/UCLA Appropriateness Method).

The methodologist is available to provide guidance for, and to facilitate, these alternate strategies. Authors may also use these consensus-based processes to appreciate the clinical implications for individual outcomes for which SER authors identify no evidence. The methodologist will work with the PG author group to help them integrate the results into the GRADE process.

**STEP 6: DRAFT RECOMMENDATION TO THE PGC**

Once the PG authors formulate recommendations, the PGC liaison to the SER group will deliver the draft recommendations to the PGC. Authors should export these recommendations from the GRADEpro project and include the table (Figure 7) and any commentary explaining the group’s decision. During the PGC review, the PG author group can begin drafting the guideline manuscript.

The PGC will review the draft report and will communicate any questions or clarification request to the PG author group in writing. PG author groups will have one month to submit written responses to the PGC. The PGC feedback may include requests to revise the recommendation(s) or other aspects of the report. It is possible that some responses will indicate that there is no strong rationale for revising the document. The PGC will move forward with the CPG as represented in the revised draft report and forward a discussion summary and vote outcome to the NSGC Board.
**Clinical Practice Guideline Content and Format**

CPGs should be well written, clear, and concise. Appendix 7 includes details about document specifications and a checklist for PG authors.

The PGC formally reviews all practice guidelines. Depending on the length and content of the guideline, the PGC may execute a streamlined review (in which PGC members read the guideline and a subset formally appraises it, all discuss and review together, and PGC guideline liaisons send a summary with appraisal results to the authors) may occur.

**STEP 7: PREPARING AND ASSESSING THE FINAL PRACTICE GUIDELINE DOCUMENT**

After the PGC reviews the recommendation and inform the NSGC Board, the PGC will return the draft recommendations with any required or recommended revisions to the PG author group. The PG author group will prepare the final guideline document and assess it according to the AGREE II criteria. Appendix 7 contains document specifications and a checklist for guideline authors.

**STEP 8: ADDITIONAL REQUIRED STEPS**

Once the PGC reviews and accepts a CPG document, the NSGC Ethics Advisory Group (EAG) will review and provide comment, and the document will simultaneously undergo a 30-day NSGC Member-Comment period. PGC can alert SIG leaders or other members about the open-comment period. The NSGC Member-Comment process replaces Expert Review.
Upon receiving EAG and NSGC Member comments, authors will have 48 days to revise the document before submitting it to the PGC for high-level review. After approving the revisions, the PGC will send the document to the NSGC attorney for Legal review. Representatives from relevant consumer or applicable professional organizations may also review the document if the PGC or the Board deem necessary. After Legal review, the PGC will submit the CPG to the NSGC Board for final review.

**STEP 9: SUBMIT TO JOURNAL OF GENETIC COUNSELING***

Once the NSCG Board approves the CPG for publication, the corresponding (lead) author submits the CPG to JOGC, or another journal, for review. If JOGC accepts the guideline, it will generate proofs for the corresponding author to review. The corresponding author will notify JOGC once the authors review and approve the page proofs for publication.

*There may be circumstances, such as joint guidelines, in which another journal publishes an NSGC CPG.

**SECTION 4: Renewing Guidelines**

**Evidence-Based Practice Guidelines (Published January 1, 2015 or After)**

The PGC reviews NSGC’s practice guidelines every five years and will initiate the review process three-to-four years after the original guideline’s publication date, and every three-to-four years thereafter, to allow ample time for revision, if necessary. For efficiency, the PGC may review guideline renewals at the same time as prior external guideline endorsements (Section 5). The review process includes the following steps:

- An expert SER consultant will conduct an updated systematic search to determine if new evidence exists that the existing document should incorporate.
- The PGC will use an updated systematic review report and the criteria below to review the document prior to voting to recommend reaffirmation, revision, or retirement.

**Table 4. Criteria to Determine Reaffirming, Revising, or Retiring an Existing Clinical Practice Guideline**

- Changes in the relevance of a clinical question to the practice of genetic counseling
- Changes in available interventions (e.g. new drugs or devices)
- Changes in evidence on the existing benefits and harms of interventions
- Changes in outcomes considered important
- Changes in values placed on outcomes
- Changes in evidence that current practice is optimal
- Changes in resources available for healthcare
- Changes in strategic importance to NSGC

Adapted from American College of Chest Physicians’ “Update Prioritization Criteria” (accessed March 30, 2015)
The PGC will recommend one of four options for the existing practice guideline: 1) Reaffirm CPG as originally published; 2) Reaffirm the CPG with focused revisions that will be described by commentary in JOGC; 3) Retire the original CPG and initiate a full revision; or 4) Retire the original CPG and do not initiate a revision.

**Reaffirmation:** If the reviewing parties do not identify substantive changes outlined in Table 4, the PGC will recommend reaffirming the CPG. Once Board-approved, NSGC will post the reaffirmation date on the NSGC website and inform relevant parties.

**Revision:** If the PGC deems focused or substantial revisions are necessary, the PGC will recommend revising the CPG.

**Focused Revision:** A focused update that addresses one or a small number of points/recommendations in the CPG that need updated. The PGC will work with the author group to publish the focused revision and update the previously published CPG to link the focused revision/addendum or publish an e-update with a notice in the relevant journal. NSGC will post the revision history and original guideline-publication date on the NSGC website and communicate the update to relevant parties.

**Full Revision:** This takes place after retiring an existing CPG. The PGC recommends a full revision if reviewers identify a large number of revisions, or the CPG’s scope needs revised. The PGC may also recommend a full revision if the CPG has undergone two focused revisions. NSGC will post the revision history and date with the original CPG on the NSGC website and relevant clearinghouse website.

If the PGC recommends a full revision, it may invite members of the existing author group to apply to join the new author group (SER author group or PG author group). The PGC may also appoint additional authors. The Committee will use the procedures for soliciting and determining authors described in Section 3, Step 3. Authors must complete the PGC COI Disclosure Survey. Author groups will use the procedures for creating an Evidence-Based CPG in Section 3. The PGC will communicate the revision plan to the original authors and invite them to take part in the revision’s author-selection process.

If the PGC becomes learns of major publication(s) that significantly affect an established CPG’s integrity, the Committee will initiate the CPG’s review process, regardless of the publication date. NSGC will post information about these publication(s) and the PGC’s revision process on the NSGC website.

**Retirement:** The PGC may recommend retiring an outdated CPG. Upon Board approval, NSGC will list the CPG as retired on NSGC’s Practice Guideline webpage. The PGC will notify appropriate parties, including the relevant clearinghouse, if applicable. NSGC will archive the retired CPG.
**Guidelines Published Before January 1, 2015**

NSGC practice guidelines published before January 1, 2015 do not meet NSGC’s current CPG criteria. The PGC has reviewed all NSGC CPGs published before January 1, 2015 and used criteria in Section 4 to reclassify, retire, or revise these documents. NSGC documents all reclassifications, revisions, and retirements on [NSGC’s Practice Guidelines webpage](#).

**SECTION 5: External Clinical Practice Document Representation and Endorsement Policy**

**Endorsement Definition and Justification**
Endorsing a document publicly and officially supports an external organization’s CPG(s). Other professional organizations may request that NSGC endorse their CPGs or other clinical practice documents (e.g., practice resources, consensus statements, expert opinions, etc.). Endorsing external documents increases the number of high quality, NSGC-vetted documents available to the membership to guide clinical decision-making and clinical practice. Secondarily, endorsing external documents may increase NSGC visibility in the medical community.

The PGC reviews NSGC-endorsed documents every three-to-five years, or when appropriate. For efficiency, the PGC may review endorsement requests at the same time as guideline renewals (Section 4). NSGC will post all NSGC-endorsed CPG/PR documents to the NSGC PGC webpage with a web link to the published document and will include endorsed practice documents in the annual JOGC listing for retired, reclassified, or reaffirmed CPGs and PRs. The PGC’s endorsement criteria aligns with NSGC or other relevant policy, NSGC’s Strategic Plan, professional knowledge gaps, or other identified needs, as approved by the PGC.

**Process to Consider External Organization Collaboration Requests**
NSGC may be invited to collaborate with external professional organizations on a clinical-guidance document. There are various types of collaboration requests that may come before the PGC. Examples may include invitations to:
- appoint NSGC representative(s) to an external document author group
- suggest NSGC representative(s) for an external document author group
- produce a joint guideline/clinical guidance document
- other types of opportunities not specified above.

**Considering External Organization Collaboration Requests**
- Although initial collaboration conversations may occur with a variety of NSGC stakeholders (e.g. PGC members; PGC Chairs; NSGC Board; SIG Chairs, etc.), the PGC will only formally consider written invitations to collaborate on a clinical-guidance document.
- Written invitations should be submitted to the PGC NSGC Staff Liaison. Once a written invitation is received, the PGC Chairs will perform an initial review of the invitation to assess the merits of participating in the project. Ideally, organizations should send collaboration requests prior to developing the document or early on the development process.
The PGC should consider the following questions:

- Is the project considered, or titled, a “Clinical Practice Guideline” (CPG) or “Practice Guideline”?
  - If so, for NSGC to participate, the development process must meet the NSGC standards for a CPG (i.e. based on a systematic evidence review and recommendations based on graded evidence).
  - If the project does not meet the NSGC CPG standards, does the invitation state that the document would not be named or considered a CPG?

- Is there a clearly delineated process with the following information?
  - The proposed type of collaboration (e.g. joint guideline, NSGC representative on author group, other)
  - The number of NSGC representatives requested
  - The proposed expectations for NSGC
  - The proposed expectations for each participating individual
  - The estimated time-commitment and timeline for completion
  - The proposed financial considerations (including NSGC’s financial commitment)
  - The proposed author requirements including, but not limited to, conflict of interest policies, specific expertise, location, institutional requirements, etc.
  - The final publication expectations
    - The authorship plan
    - The target publication journal
    - The opportunity for NSGC to provide feedback to and approve the final manuscript content
    - How will the NSGC and/or the NSGC Representative be recognized in the final publication

- The endorsement-request process and timeline
  - Does NSGC have the appropriate expertise to contribute to the project?
  - Does collaborating with the external organization benefit NSGC and/or the genetic counseling profession?

If the PGC Chairs deem the collaboration worth considering, they present the request to the full PGC for discussion.

After discussing the merits of the collaboration (considering at a minimum, all previously mentioned factors), the PGC will vote to recommend to accept or decline the invitation.

- Once the PGC vote on a recommendation, the PGC Chairs will send the recommendation via written memo to the Board for final approval.
- If the NSGC Board declines the collaboration invitation but still sees potential for collaboration, the PGC may request revisions to the invitation from the external organization.

The NSGC Staff Liaison will oversee communications with the external organization regarding the NSGC decision or any matters related to the collaboration effort.

Any collaboration is subject to the PGC CPG development processes outlined in the PGC Manual. At a minimum, the PGC, NSGC Legal, and the NSGC Board will review all resulting manuscripts from any collaborations prior to final publication.
NSGC Representative Appointment Process
Once the NSGC Board accepts an invitation from an external organization, the PGC will identify the appropriate representative(s). This process is outlined below.

- The PGC will send the following groups invitations to apply to be NSGC project representatives:
  - The PGC membership
  - Members of the most appropriate SIGs. The PGC will ask appropriate SIG Chairs to send an invitation to participate to their membership.
- Applicants will need to submit the following to the NSGC Staff Liaison
  - CV
  - Statement of Interest
  - Completed PGC COI Disclosure Form
- Application Review
  - PGC Chairs (or one-to-two appointed PGC members) will review applications including at least one content expert, most often an appropriate SIG Chair.
  - PGC Chairs will identify an individual (from the PGC membership or general NSGC membership) if the most appropriate SIG Chairs have submitted applications.
  - The PGC will assess applications based on the following criteria, in no particular order:
    - Related Topic Expertise
      - Previous experience in a similar project
      - Elements of the personal statement such as motivation, ability to commit time, interest in the project, etc.
      - An ability to represent and advocate for the genetic counseling profession and by extension NSGC, during author-group discussions and decision-making processes.
    - The PGC leadership will present the proposed NSGC representative (or slate of representatives) to the PGC during a monthly conference call for discussion and a vote.
      - If the vote is favorable, the PGC Chairs will notify the NSGC Board, followed by the outside organization. The PGC Chairs will also notify individuals not selected.
      - If the vote is not favorable, the application review committee will reconvene and either propose another candidate from the current pool of applicants or, if necessary, solicit for additional applicants.

Expectations for Authors Representing NSGC on an External Organization’s Clinical Practice Document

- Communication with the PGC
  - Authors should communicate project status to the PGC leadership on a quarterly basis, or more frequently as needed.
  - If several individuals represent NSGC on the same document, authors should select one individual to communicate with the PGC.
  - Authors should immediately escalate any concerns to the PGC leadership, including if they are unable to fulfill their author obligations.
  - Authors will abide by relevant COI policies and will inform the PGC and the external organization of COI changes.
To assist with the PGC’s document review, the PGC may ask authors to provide additional information about the clinical practice document’s content or development process.

- **NSGC Representation**
  - Authors will actively participate in author-group calls, complete delegated assignments, and communicate any concerns or ideas about the clinical practice document’s content or development process to the lead authors/writing group, and if appropriate, PGC leadership.
  - Authors will provide the external organization/author group an expert opinion on the genetic counseling profession.
  - Authors will advocate for policies and clinical practice documents consistent with NSGC position statements.
  - Authors will represent NSGC in a manner consistent with all NSGC policy, including the NSGC Code of Ethics and NSGC’s Confidentiality Policy.

**External Document Endorsement Criteria**

- PGC receives an endorsement request.
- The document in question should be published and available in a peer-reviewed journal or in final-draft format prior to submitting to a peer-reviewed journal.
- PGC Chair(s) will ask PGC members to evaluate the document.
  - Members will consider the value the document adds value to genetic counseling practice.
  - Members will use the AGREE II instrument in blinded fashion to evaluate the CPG content.
- PGC members will vote to recommend
  - Fully endorsing the external document.
    - NSGC only fully endorses external CPGs full endorsement if, using the AGREE II instrument, the document qualifies as a CPG based on NSGC’s CPG-development criteria.
    - For external documents that are not clinical practice guidelines (e.g., practice resources, expert consensus statements, expert opinions, etc.), NSGC may fully endorse the external document if it meets NSGC standards for a practice resource, expert consensus statement, expert opinion, etc.
  - An “Affirmation of Value” for the external document: this classification is not a full endorsement, but acknowledges the document’s value.
    - May be for an external CPG, practice resource, expert-consensus statement, expert opinion, etc. that does not meet the NSGC standards for these documents, but may still provide value to the NSGC membership.
    - May be for a document that meets the NSGC’s criteria for a CPG but for some other reason does not receive a full endorsement. In such cases, the PGC would issue a written explanation for why NSGC affirmed, rather than fully endorsed, the document.
May be for a document that includes some content that NSGC cannot endorse or is missing content that NSGC deems important but may still provide value to the NSGC membership.
  o Neither endorse nor affirm the external document.
    ▪ If unpublished, the PGC may offer edits/changes to the external organization instead of endorsing/affirming the document in its current form.
    ▪ If the external organization incorporates the PGC’s/NSGC’s, the PGC may use the process outlined in 4a and 4b to re-evaluate the document for endorsement.

- The PGC will draft a summary of the external document evaluation (including AGREE II assessment and additional discussions CPGs) that include the PGC’s endorsement, affirmation of value, or recommendation not to endorse or affirm the external document. Once the Committee votes, the PGC will make a recommendation to the NSGC Board.
- The Board will review the decision.
- With Board approval, the NSGC will communicate its decision to the external organization.
- The PGC may write an endorsement, which may publishable in JOGC.
- NSGC may request open access for NSGC members so they can access the endorsed document.

NSGC communicates endorsement decisions via written agreement, in a format acceptable to NSGC in its sole discretion, which includes (i) the ability for NSGC to revoke its endorsement at any time, in its sole discretion; and (ii) an appropriate indemnification of NSGC from the endorsed or sponsoring party.

SECTION 6: Conflict of Interest Policy

NSGC’s mission is to advance “the various roles of genetic counselors in healthcare by fostering education, research, and public policy to ensure the availability of quality genetic services” and strives for the highest standards of integrity, particularly regarding education, research, publications, and shaping public policy. As such, it is crucial that all NSGC Board, Committee, and Special Interest Group members, as well as any agent acting on behalf of NSGC, disclose information that may lead to a real or perceived COI.

NSGC depends on its members’ volunteer efforts and acknowledges that personal and business interests may occasionally cause a real or perceived COI. All relevant parties should disclose interests that could lead to real or perceived COI in a timely fashion. PGC leadership will remove individuals who fail to disclose COI from their current positions.

The PGC develops CPGs to promote high quality, evidence-based care. Confidence in these guidelines depends on a completely transparent guideline-development process. The policies below also apply to PRs and individuals applying to author an SER or a PG. The PGC, author groups, and expert reviewers must disclose any potential COI both for themselves and, if applicable, their immediate families. This
includes, but is not limited to, employment, consulting relationships, advisory boards, grants, royalties, and stock ownership. The PGC COI Disclosure Survey applies to all current interests and interests within the past 12 months.

**PGC COI Policies**

1) PGC members and all authors working under PGC review must complete the PGC’s COI Disclosure Survey at the beginning of each calendar year and update this form within 30 days of any COI changes. Author groups’ liaisons will ask authors and reviewers for COI updates at the beginning of each month.

2) The NSGC Board will make a good-faith effort to appoint a PGC Chair and a Vice Chair with no actual, potential, or apparent COI at the time of their appointments. Should a conflict arise for either during his/her term, the individual should immediately disclose the conflict to the full PGC and the NSGC Board. His/her fellow Chair, in conjunction with the NSGC Board, will appropriately manage the conflict. This may include, but is not limited to, recusal from particular reviews, discussions, or PGC votes; or the individual resigning from the appointed leadership position before the end of his/her term.

3) PGC members who are also authors must recuse themselves from associated PGC discussions.

4) PGC lead authors cannot have a real or perceived Tier-One COI at any point in the SER-, PG-, or PR-development process. An author is eligible to serve as co-lead author if he/she has active Tier-Two COI if the fellow co-lead has no active Tier-Two COI. Authors with expired Tier-Two COI can serve as a co-lead. The PGC will consider COI present in the 12 months preceding the last day of a CPG or PR author-application period.

   a. Tier-One COI

      i. Direct, personal financial benefit to the individual author or family member, that is ongoing or occurred within the past 12 months, including salary, stock options, or other payments from a commercial entity that could benefit directly from the practice guideline.

         1. This includes employees who would reasonably be expected to represent a company or its products.

         2. This also includes research funding from a commercial entity that comprises of more than 25 percent of an author’s salary support.

         3. This includes research funding for authors serving as Principal Investigators on commercially funded studies.

      ii. PGC leadership will document Tier-One COI that is not current and did not occur within the past 12 months during the lead authorship-selection process, but will consider it “inactive.”

   b. Tier-Two COI

      i. All other perceived or real COI that does not qualify as Tier-One COI such as:

         1. Limited consultant roles, including paid travel or stipends for education provided to a company where the author was not representing the company. This does not include travel grants for national conferences.
2. Employment or ongoing paid-consultant roles with companies (may include non-profit) involved in healthcare and/or genomic medicine but would not clearly benefit directly from the practice guideline.

3. Research funds from commercial entities designated for research activities, infrastructure, other institutional research support, or salary support of less than, or equal to, 25 percent effort. Research must directly relate to the CPG or PR topic.

   ii. Tier-Two COI expires if the COI activity or business relationship has ended and did not occur within the past 12 months.

5) The PGC will strive to minimize the number of accepted Committee members and authors with COI. An exceptional situation is one in which avoiding PGC members or authors with COI is impossible because of the need for specific expertise.

   a. The PGC will publicly document that they made a good-faith effort to find experts without COI by issuing a public call for members and other recruitment measures.

   b. At most, 40 percent of authors can have active Tier-One COI, and at most, 80 percent of authors can have active Tier-One or Tier-Two COI. The window for assessing relevant COI is the 12 months preceding the last day of the CPG or PR author-application period.

   c. An author group must document its real or potential COI composition and detail the group’s management plan.

6) The PGC will not accept direct funding for developing CPGs or PRs from medical-product companies or company foundations.

7) Authors, including those participating in CPG and PR revisions, must complete the PGC’s COI Disclosure Survey when applying, at the beginning of each calendar year, and within 30 days of any changes to their COIs.

8) The PGC will review author groups’ PGC COI Disclosure Survey responses when reviewing the SER report, PG, or PR recommendations. The PGC will determine the COI disclosure language for publication at that time.

**PGC Membership**

Because the PGC consists of a diverse cross-section of NSGC members, NSGC recognizes that occasionally, a PGC member will need to recuse him/herself from discussing, reviewing, and voting on a PGC-affiliated document if there is potential for a real or perceived COI. The PGC member is obligated to report such potential conflicts. A PGC member may recuse him/herself from reviewing a specific PGC-affiliated document while continuing to review other PGC-affiliated documents that do not directly relate to the said conflict. The PGC Chairs will review all PGC members’ PGC COI Disclosures before discussing and prioritizing possible CPG or PR topics to identify members with real or perceived COI.

If a PGC member is a part of an author group, that member will recuse him/herself from all discussions, reviews, and voting pertaining to the document for which he/she is an author. The PGC leadership will remove PGC members who fail to disclose professional interests, personal interests, or both within 30 days of any changes for a minimum of one year.
**Author Groups**

While it is ideal for all PGC-affiliated authors to be free from any financial relationship with any entity that has a commercial interest in a PGC document, such individuals may have unique subject knowledge and expertise and that should not automatically preclude them from participating after disclosing all potential conflicts. Thus, individuals who are employed by, or have a financial interest in, an entity that could potentially benefit from, or be harmed by, a PGC document’s recommendations or guidance (Tier One COI) may not serve as the lead author of that document. These individuals may not constitute more than 40 percent of the author group.

Upon submitting an author application, the applicants must also complete a PGC COI Disclosure Survey. Authors must notify the PGC within 30 days of any COI changes that occur at any time during the document’s development. If the PGC concludes that this change represents a Tier-One COI, the PGC will determine whether the author must recuse him/herself from the lead-author role, if applicable.

If the newly identified COI (Tier One or Tier Two) would increase the number of authors with Tier-One COI to more than 40 percent or with either Tier-One or Tier-Two COI to more than 80 percent, the author group may need to seek an additional author with no COI to balance the group. The author group may also request that the author in question recuse him/herself from authorship.

PGC leadership will remove authors and bar them from future PGC-affiliated documents if they fail to disclose changes in their statuses via the PGC COI Disclosure Survey within 30 days of the change. If the author group cannot reach a consensus on whether an author should recuse him/herself, the PGC Chairs and COI Subcommittee Chair will speak with the lead author and the author with the conflict to determine the author’s contribution up to that point, as well as any other relevant factors. If the author is the lead author, the PGC Chairs and COI Subcommittee Chair will instead speak with a majority of author group members before making a final decision.

**The PGC’s COI Disclosure Form and PGC COI Disclosure Survey Review Process**

The PGC considers the following when evaluating potential COI:

1) The nature and content of the document
2) The nature of the individual’s financial and/or professional interest(s)
3) The degree to which the document’s recommendations or guidance may affect the individual’s interest(s)
4) The degree to which the individual’s interest(s) may affect, or be perceived to affect, the document’s recommendations or guidance.

The following questions can help assess potential COI. In general, answering “yes” to these questions increases potential for relevant COI.

1) Is the COI subject/topic directly related to the CPG/PR subject/topic?
2) Is there a direct financial relationship between the author and another entity (e.g. paid position, consultancy, paid travel) that is/was more than a one-time interaction?
3) Did the author’s relationship with a company include representing the company or its products?
4) Did the author’s role with a company go beyond providing clinical perspectives, research interests, and/or education to the company?

The PGC COI Subcommittee and PGC author group liaisons will review their author groups’ PGC COI Disclosure responses. This information will remain confidential, and used solely to determine whether a COI exists. The PGC will vote (by majority) to determine if a COI exists for each potential author. In the event of a tie, the final decision will rest with the PGC Chair and Vice Chair, who may call upon the NSGC Board, as necessary. The PGC will not invite an individual with Tier-One COI to be lead author and will ensure that no more than 40 percent of invited authors have Tier-One COI, and no more than 80 percent of invited authors have Tier-One or Tier-Two COI.

The PGC will also consider external organizations’ COI policies for joint CPGs and PRs.

**COI Review for Incoming PGC Members**

PGC members will review all PGC applicants’ PGC COI Disclosure responses. Real or perceived COI (determined during the PGC’s member-recruitment process) does not prevent an applicant from joining the PGC, as PGC-affiliated documents cover expansive areas of practice, and a conflict in one area may not be a conflict in other areas. If any current PGC member has a close professional or personal relationship with the applicant, he/she may contribute to the discussion regarding the applicant’s PGC COI Disclosure, but must disclose this relationship to the PGC prior to the discussion and abstain from the final vote.

**SECTION 7: Author Resources**

**SER TOOLS**
- **Covidence**: https://covidence.org
- **robvis**: https://mcguinlu.shinyapps.io/robvis/
- **GRADEpro**: https://gdt.gradepro.org/app/

**FREE RESOURCES**

<table>
<thead>
<tr>
<th><strong>Databases</strong></th>
<th><strong>Links</strong></th>
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<tbody>
<tr>
<td>Cochrane Library</td>
<td><a href="https://www.cochranelibrary.com/">https://www.cochranelibrary.com/</a></td>
</tr>
<tr>
<td>Centre for Reviews and Dissemination (CRD) Databases (critical appraisals, economic evaluations, HTA projects)</td>
<td><a href="http://www.crd.york.ac.uk/crdweb/">http://www.crd.york.ac.uk/crdweb/</a></td>
</tr>
<tr>
<td>EvidenceAlerts (ratings and comments on articles in core clinical journals)</td>
<td><a href="https://www.evidencealerts.com/">https://www.evidencealerts.com/</a></td>
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<tr>
<td>Resource</td>
<td>URL</td>
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<tr>
<td>Health-evidence.ca</td>
<td><a href="http://health-evidence.ca/">http://health-evidence.ca/</a></td>
</tr>
<tr>
<td>(quality appraisals; good for public and aboriginal health issues)</td>
<td></td>
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<tr>
<td>Canadian Agency for Drugs and Technologies in Health (CADTH)</td>
<td><a href="https://www.cadth.ca/">https://www.cadth.ca/</a></td>
</tr>
<tr>
<td>(checklist for searching grey literature)</td>
<td>resources/finding-evidence/</td>
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<tr>
<td>TRIP database</td>
<td><a href="http://www.tripdatabase.com/">http://www.tripdatabase.com/</a></td>
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<tr>
<td>(Turning Research into Practice)</td>
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<tr>
<td>Latin American and Caribbean Center on Health Sciences Information</td>
<td><a href="https://bvsalud.org/en/">https://bvsalud.org/en/</a></td>
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<td>(LILACS)</td>
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<td>(International/Resource-Poor questions only)</td>
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<tr>
<td>Health Sciences Online</td>
<td><a href="http://www.hso.info">http://www.hso.info</a></td>
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<tr>
<td>Guidelines</td>
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<td><a href="http://www.sogc.org">http://www.sogc.org</a></td>
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<tr>
<td>American College of Obstetricians and Gynecologists (ACOG)</td>
<td><a href="http://www.acog.com/">http://www.acog.com/</a></td>
</tr>
<tr>
<td>Royal College of Obstetricians and Gynaecologists (RCOG)</td>
<td><a href="http://www.rcog.org.uk/">http://www.rcog.org.uk/</a></td>
</tr>
<tr>
<td>Royal Australian and New Zealand College of Obstetricians and</td>
<td><a href="http://www.ranzcog.edu.au/">http://www.ranzcog.edu.au/</a></td>
</tr>
<tr>
<td>Gynaecologists (RANZCOG)</td>
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<tr>
<td>Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN)</td>
<td><a href="https://www.awhonn.org/page/">https://www.awhonn.org/page/</a></td>
</tr>
<tr>
<td>eGuidelines</td>
<td></td>
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<tr>
<td>GIN-McMaster Guideline Check</td>
<td><a href="http://cebgrade.mcmaster.ca/guidecheck.html">http://cebgrade.mcmaster.ca/guidecheck.html</a></td>
</tr>
<tr>
<td>GRADE Guideline development tool</td>
<td><a href="https://gdt.gradepro.org/app/">https://gdt.gradepro.org/app/</a></td>
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**SUBSCRIPTION-BASED RESOURCES**

<table>
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<tr>
<th>Databases</th>
<th>URL</th>
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<tbody>
<tr>
<td>BIOSIS Previews (via Ovid)</td>
<td><a href="http://ovidsp.ovid.com/">http://ovidsp.ovid.com/</a></td>
</tr>
<tr>
<td>Cochrane Library (via Ovid)</td>
<td><a href="http://ovidsp.ovid.com/">http://ovidsp.ovid.com/</a></td>
</tr>
<tr>
<td>Cumulative Index to Nursing &amp; Allied Health Literature (CINAHL)</td>
<td><a href="http://search.ebscohost.com/">http://search.ebscohost.com/</a></td>
</tr>
<tr>
<td>(via Ebscohost)</td>
<td></td>
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<tr>
<td>MEDLINE</td>
<td><a href="http://ovidsp.ovid.com/">http://ovidsp.ovid.com/</a></td>
</tr>
<tr>
<td>(via Ovid or available free to CMA members via Ebscohost)</td>
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**Point of Care Tools**

| ACP Journal Club (or via OVID)                                           | http://www.acpjoc.org/      |
| ACP Pier (free to CMA members via StatRef)                               | http://pier.acponline.org/index.html |
**SECTION 8: Appendices**

**APPENDIX A: ADMINISTRATIVE RESOURCES FOR AUTHORS**

<table>
<thead>
<tr>
<th>Document Tile</th>
<th>File</th>
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<tbody>
<tr>
<td>Topic Proposal Form</td>
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</tr>
<tr>
<td>NSGC Policy on Conflict of Interest &amp; Disclosure Form</td>
<td><a href="#">NSGC COI Disclosure Form.doc</a></td>
</tr>
<tr>
<td>Practice Guidelines Committee Conflict of Interest Disclosure Survey</td>
<td><a href="#">..\PGC COI Survey\PGC COI Survey 10062015 FINAL.docx</a></td>
</tr>
<tr>
<td>Author Agreement Form</td>
<td><a href="#">Author Agreement Form.docx</a></td>
</tr>
<tr>
<td>NGC Criteria Checklist</td>
<td><a href="#">PG NGC Criteria Checklist.pdf</a></td>
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**APPENDIX B: EVIDENCE CRITICAL APPRAISAL TOOLS FOR AUTHORS**

<table>
<thead>
<tr>
<th>Document Tile</th>
<th>File</th>
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<tbody>
<tr>
<td>Comparison of Two Grading Systems: GRADE vs. USPSTF</td>
<td><a href="#">GRADE vs USPSTF Comparison.docx</a></td>
</tr>
<tr>
<td>AGREE Instrument to Assess Guidelines</td>
<td><a href="#">24_agree.pdf</a> <a href="#">25_modified_agree_checklist.docx</a></td>
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<tr>
<td>CEP Trustworthy Guideline Appraisal Instrument</td>
<td><a href="#">CEP Trustworthy Guideline Appraisal Instrument (February 2014).pdf</a></td>
</tr>
<tr>
<td>NYAM TEACH Workshop Resources</td>
<td><a href="#">NYAM Worksheets.zip</a></td>
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APPENDIX C: RETIRED PRACTICE GUIDELINES COMMITTEE DOCUMENTS FOR AUTHORS

<table>
<thead>
<tr>
<th>Document Title</th>
<th>File</th>
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<tbody>
<tr>
<td>The Practice Guideline Committee Proposal and Review Processes: Author Cheat Sheet</td>
<td>PG Author Cheat Sheet.pdf</td>
</tr>
<tr>
<td>NSGC Practice Guideline Criteria</td>
<td>PG Criteria.pdf</td>
</tr>
<tr>
<td>Policy on Genetic Counseling Practice Guidelines</td>
<td>PG Policy.pdf</td>
</tr>
<tr>
<td>Practice Guideline Topic Proposal Form</td>
<td>PG Proposal.pdf</td>
</tr>
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</table>

APPENDIX D: UPDATES TO PGC GUIDELINE MANUAL

- **04/21/2016**: Added reclassification/retirement language for guidelines created before 2015.
- **01/2020**: PGC COI Policy, External Endorsement Policy, and Existing Revision Policy updates; PR language, SER and PG timeline revisions; methodologist role and contributions; GRADEpro terminology updates; ECRI language.

APPENDIX E: SER AND CPG DEVELOPMENT DETAILED ROLES AND RESPONSIBILITIES

Section 1 provides an abbreviated version of this table.

<table>
<thead>
<tr>
<th>NSGC Governance</th>
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<tbody>
<tr>
<td>NSGC Board</td>
</tr>
<tr>
<td>• Oversees all NSGC program activities</td>
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<tr>
<td>• Reviews and approves all PGs and guideline endorsements.</td>
</tr>
<tr>
<td>NSGC Board Liaison to the PGC</td>
</tr>
<tr>
<td>• Attends monthly PGC calls.</td>
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<tr>
<td>• Informs Board of PGC activities.</td>
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<tr>
<td>PGC Chair and Members</td>
</tr>
<tr>
<td>• Oversee all PGC activities.</td>
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<tr>
<td>Role</td>
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| PGC Liaison to the CPG/PR Work Groups | - Monitor CPG/PR development and provide updates to PGC.  
- Serve as a “project manager” to ensure projects move forward expeditiously.  
- Identify and help obtain resources to support CPG/PR author groups.  
- Review and approve SER, PR, and CPG manuscripts prior to review by PGC, JOGC, and NSGC reviews.  
| NSGC Methodologist | - Serves as supervising methodologist for all NSGC CPGs and ensures that the SER and CPG author groups adhere to the NSGC CPG Handbook and GRADE methodology.  
- Provide guidance to the CPG/PR, and SER author groups throughout the development and review processes.  
- Provide training specific to SER and CPG for each author group, as needed. Facilitate the SER and CPG processes by administering SER software and GRADEpro projects, respectively.  
- Review and edit SER and CPG manuscripts prior to the review process.  
- Assume medical librarian duties as needed.  
| Medical Librarian (Recommended) | - Conduct literature searches in collaboration with PGC methodologist, CPG and SER author groups.  
- Obtain full-text pdfs of available literature.  |
APPENDIX F: PICOTS, KEY QUESTIONS, AND THE LITERATURE SEARCH

The PICOTS and Resulting Key Questions (KQs) Serve as the Basis for a Systematic Evidence Review.

- P: population
- I: intervention
- C: comparator
- O: outcome(s)
- T: timing (depending on the research question may not be relevant)
- S: setting (depending on the research question may not be relevant)

Although the overarching research question may be somewhat broad and include many patient subpopulations or interventions, it is important to be specific enough to yield evidence that supports clinically relevant questions while completing the SER in a reasonable period. Clarifying the PICOTS will ensure that the search query the medical librarian and/or methodologist develops with guidance from the SER and PG lead authors.

Authors can write the PICOTS as KQs differently based on the SER’s intervention/goal. Note again that timing and setting are optional and not necessary unless they are relevant for the topic (e.g., in-patient vs. ambulatory patients, timing of genetic counseling relative to genetic testing). Depending on the topic, there may be several KQs for a single SER. The following are examples of the types of KQs that authors could consider:

**Therapeutic Intervention:** This question is important when genetic counselors need to decide to use a specific intervention, such as ways to deliver genetic counseling or types of genetic testing to offer. Authors may structure a KQ for an intervention as: In <population>, what is the effect of <intervention> on <outcome(s)>, compared with <comparator> within <timing/timeframe>/ in <setting>?

Relevant outcomes of interest usually focus on an intervention’s effectiveness, safety, and tolerability. Authors should consider potential harms. During this initial task, the PG author group will prioritize the outcomes they considered critical (essential) and important for decision-making. Authors may identify and evaluate additional outcomes in the SER process that they do not consider important for clinical decision-making. The SER authors will assess and capture the data of all of the relevant outcomes for the PG author group.

An example of a KQ with PICOTS identified: In women with breast cancer (P), what is the impact of telephone-based pre-test genetic counseling (I) on patient knowledge about breast cancer and adherence to medical recommendations (O), compared with in-person genetic counseling (C)?

**Disease Etiology:** This question is important when genetic counselors need to decide what information to convey to patients during counseling. Authors may structure a KQ for disease etiology as: Are <population> who have <intervention> at increased/decreased risk for/of <outcome(s)> compared with <population> with/without <comparator> over <time period>?
An example of a KQ with PICOTS identified for disease etiology:

Are patients with breast cancer (P) who have genetic counseling and genetic testing (I) at decreased risk of developing ovarian cancer (O) compared with patients with breast cancer (P) who do not have genetic counseling (C) within 10 years of breast-cancer diagnosis (T)?

**Diagnostic Accuracy:** This question is important when genetic counselors need to counsel patients as to the most appropriate genetic test for their situation. Authors may structure a KQ for diagnostic accuracy as: Is <intervention> more accurate in diagnosing <population> compared with <comparator> for <outcome>?

An example of a KQ with PICOTS identified for diagnostic accuracy: Is first-line exome sequencing (I) more accurate in diagnosing patients with congenital anomalies (P) compared with sequential testing (i.e., aCHG, panel tests first, exome sequencing as last option) (C) for improved patient outcomes (O)?

**Prognostic Accuracy:** Authors may structure a KQ for prognostic accuracy as: In <population> how does <intervention> compared to <comparator> influence <outcome(s)> over <timeframe>?

An example of a KQ with PICOTS identified for prognostic accuracy: In patients with a family history of breast cancer (P) how does genetic counseling with a risk calculator (I) compared to genetic counseling without a risk calculator (C) influence the likelihood of the patient having a pathogenic variant (O)?

*Note that individuals could ask other genetic counseling practice-relevant questions, for example, about the diagnostic or prognostic accuracy of taking a pedigree or collecting family history information for a specific disease, condition, or at-risk status. Individuals often assess these questions from prospective, controlled, cohort surveys of the population of interest. Relevant outcomes relate to improving the clinician’s ability to predict the presence of the disease or the disease prognosis. The implication is that improving clinicians’ abilities to diagnose and prognosticate indirectly translates to improved patient outcomes.

**Prevention/Population Screening:** This question is applicable to situations in which a diagnostic intervention of established accuracy is employed and can be important, for example, when genetic counselors or other clinicians need to decide the scopes of their patient populations for specific procedures. A KQ for this category may be structured as: For <population> does the use of <intervention> reduce the future risk of <outcome(s)> compared with <comparator>?

For questions in this category, the relevant outcome is the yield of the procedure. If the yield is high enough, then clinicians would routinely order the procedure. NSGC clinical practice guidelines can address questions about patient/population scope under different scenarios. For example, if the CPG’s goal is to answer the question, “Should all pregnant patients routinely meet with a genetic counselor to identify potentially inherited conditions?” authors may write the KQ as: For all pregnant patients (P) does a routine appointment with a genetic counselor (I) reduce the risk of having children with inherited conditions (O) compared with referral-based genetic counseling appointments (C)?
In this case, the relevant outcome would be the frequency with which genetic counselors identify potentially inherited conditions in this patient population. Keep in mind that “genetic counseling to identify potentially inherited conditions” should have an established accuracy before embarking on clinical practice guidelines to address these questions.

SER and PG author groups can seek additional guidance, as needed, to develop/refine PICOTS and KQs from the methodologist and/or medical librarian.

Once the authors finalize the PICOTS and KQs, the medical librarian can:

- Translate the clinical question into searchable terminology, including appropriate synonyms or additional terms.
- Find literature beyond PubMed and Google Scholar databases.
  - Medline (Medical Literature Analysis and Retrieval System Online): Premier medical research database.
  - Ovid interfaces through institutional accounts and allows for more complex searching.
  - Embase (Excerpta Medica Database)
    - Large European database similar in scope and content to Medline
    - Includes many conference proceedings
    - Contains a substantial number of citations not indexed in Medline.
  - Cochrane-Controlled Trials Registry: Fastest, most reliable method to determine if a topic has a published controlled trial.
- Identify key pieces of “gray” literature (usually outside normal publishing sources, such as books or journals, and includes technical reports, dissertations, theses, article pre-prints, conference proceedings, white papers, etc.).

Items to Consider:
- Institutions have different policies regarding
  - Accessing online databases (all likely have access to free databases; but some databases require subscriptions).
  - Accessing articles (all have access to open-access articles, but many journals require subscriptions to access full articles).
  - Charging a librarian to conduct a systematic literature search (some institutions do not charge a fee for individuals affiliated with the institution). Librarians across institutions often collaborate to “fill the gaps” for searching databases and accessing articles.
- Author groups should allocate time to work with a librarian (the PGC can help identify librarians, if author groups need assistance).

Authors should use preliminary literature searches to ensure that the search query captures priori-identified studies to reduce the number of off-target returns. This iterative process may include identifying additional search terms to capture the literature of interest in multiple databases. Once the authors finalize the literature search, the medical librarian will run the searches in the relevant
databases and upload the results into an Endnote library or export the results as an XML file to the Google Drive for the SER project.

The methodologist or the medical librarian will use Endnote to perform a de-duplication of all search results and upload the non-duplicative returns into the SER Covidence project. Authors should upload the Endnote library to the Google Drive folder. Prior to evaluating the results, the SER author group and the methodologist will finalize the inclusion and exclusion criteria for title/abstract screening and full-text review. The methodologist will provide training to SER authors on the software platform and guide them on conducting the various SER stages. Authors should perform each SER step in duplicate; authors should deviate from this process only after consulting with the PGC and methodologist.

**APPENDIX G: SER SCREENING, REVIEW, AND DATA EXTRACTION**

**Title-Abstract Screening**
SER author groups will use the Covidence software platform to conduct the SER. The methodologist can set up the project. Authors should include the methodologist and medical librarian on the team list. Once the Covidence project is set up and the methodologist/author group uploads the non-duplicated studies, the SER author group reviews the results to separate irrelevant search returns from potentially useful studies.

The first step is to review only the title and abstracts of the results. Authors use inclusion and exclusion criteria, determined prior to evaluating any search results, to exclude off-topic studies. Authors should mark articles without published abstracts or articles that are not obviously off-topic based on title/abstract alone as “unclear” or “uncertain” and move them forward to full-text review. Authors should perform this step in duplicate; an independent third party (e.g., the methodologist) can review conflicts or by reviewers reaching a consensus.

For optimal efficiency, the medical librarian should periodically identify the studies advanced to full-text review and obtain the full-text pdfs of those studies rather than waiting for the title/abstract review to finish. The librarian should upload PDFs to Covidence and uploaded in the project’s Google Drive folder.

**Full-Text Review**
Authors fully review articles that they could not easily remove from consideration during the title-abstract screening process. Authors must then document their justifications for excluding articles. Unlike title-abstract screening, authors do not have the option to mark a study “unclear” or “uncertain.” It may be necessary to include supplemental materials to determine a study’s inclusion or exclusion.

Exclusion rationale can include study design, wrong patient population, no outcome of interest, or wrong intervention, among others. Any article included at the full-text review stage will undergo data extraction. Similar to title-abstract screening, reviewers should perform this stage in duplicate. The methodologist/third reviewer can address discordant decisions, or through the reviewers reaching consensus.
Data Extraction
While the SER author group performs the full-text extraction, the SER lead authors should work with the methodologist to create the data-extraction form. Data extraction and individual study quality-assessment occur in the same project. If authors used Rayyan for the first two steps, they will create a Google Form for data extraction and quality assessment. It is essential that authors standardize the data extraction form that will make data analysis easier, with minimal need for data cleaning or reformatting.

Important guidance to the SER author group:
- Set priorities for data to extract, emphasizing critical and important outcomes authors ranked at the project’s initiation.
- Anticipate the final evidence table’s structure and content.
- Resist the temptation to extract everything.
- Establish quality-control protocol and method for resolving discord.

Factors that will allow for quantitative or qualitative evidence synthesis include:

Generalizability
- Relating to the patient population.
  - Patient source (e.g. clinical oncologists).
  - Inclusion criteria to determine the presence of the condition of interest.
  - Patient age (e.g. mean and standard deviation).
  - Included population’s gender (e.g. proportion female).
- Relating to the intervention and co-intervention. These will depend on the clinical question, but could include the following:
  - Length of telephone-based genetic counseling session.
  - Timing of the telephone-based genetic counseling session.
  - Nature of the genetic counseling (e.g. telephone-based vs. in person) session.

Outcome Measures — These will also vary by question, but could include the following:
- Scale used to determine the outcome (e.g. adherence to medical recommendations).
- Duration of follow-up.

Patient Outcomes (Results, e.g. Effect Size) could include:
- Relative effect with 95-percent Confidence Intervals (CI).
- Best estimate of group risk.
- Absolute effect (95-percent CI).

APPENDIX H: SER: QUALITY ASSESSMENT AND DATA ANALYSIS

Quality Assessment (Individual Studies)
Authors should perform a quality assessment for each study included in data extraction. This is an integral component of performing an SER and is not optional. SER author groups should expect to use the Cochrane Risk of Bias v.2 for randomized controlled trials and the ROBINS-I for non-randomized
interventional studies. Authors can use additional assessment frameworks (e.g., for case reports or cross-sectional studies) after consulting with the methodologist. For SERs with a target audience that extends beyond genetic counselors (e.g., neurologists), authors should use other assessment tools that may be more appropriate after consulting with the methodologist. The methodologist will train SER authors on all quality-assessment tools that they will use.

**Note:** Prior to beginning data analysis, the lead SER author(s) should identify the outcomes the SER has evidence to analyze. If there are critical or important outcomes for which authors did not identify studies during the SER process, the SER lead author should convey this information to the PG lead author(s) with the PGC liaison’s assistance.

**Data-Analysis Preparation**

Once data extraction and quality assessment is complete, the methodologist will work with the SER lead authors to create a RevMan project. Covidence can export the study characteristics and extracted data directly into a RevMan project to perform the meta-analysis (see below). The methodologist can provide guidance on additional statistical software (e.g., SAS, SPSS, R, OpenMeta), formatting the Covidence export for this task, and what analyses may be appropriate. Groups with complex data analysis needs, such as network meta-analyses, may seek additional guidance from a biostatistician.

The master evidence table will succinctly summarize each study, including characteristics relevant to generalizability, risk of bias, and patient outcomes (harms and benefits). This table is distinct from the GRADEpro evidence table, which presents aggregated evidence by outcome. This process helps extract information that informs the authors’ judgment of each study’s relevance to the clinical question.

**Data Analysis**

It may be possible during this phase for authors to qualitatively or quantitatively synthesize results across studies on one or more outcomes.

- Qualitative synthesis using evidence tables and written evidence summaries;
- Quantitative synthesis using meta-analysis;
- [https://rstudio.com/](https://rstudio.com/)
- Meta-Analysis:
  - Estimate a summary measure and its variance for each study.
  - Weight each study according to its variance
    - Not just a simple average.
    - Studies with larger variance (more uncertainty) receive less weight.
    - Statistically combine or pool results from each study to obtain a weighted average.
Differences in study design, populations, intervention, comparator, outcome definitions, and conduct of trials can lead to differing results between studies. Authors should use this phase to explore potential heterogeneity across the studies that could affect the overall quality of the evidence, consider subgroup analyses, and help individuals to understand the conditions most likely to yield positive or negative effects from an intervention.

**APPENDIX I: DATA ANALYSIS, QUALITY ASSESSMENT, TRANSITION TO PG AUTHOR GROUP**

SER author groups will use the GRADE system for this activity. The PGC independently assessed GRADE and selected it over other grading protocols (see Appendix B). Major organizations such as the Centers for Disease Control, Agency for Healthcare Research and Quality, American College of Chest Physicians, the Cochrane Collaboration, the Society for Critical Care Medicine, and the World Health Organization also use GRADE methodology.

A randomized study comparing six different evidence-grading schemas found that healthcare practitioners were more likely to follow recommendations that used the GRADE methodology than the other methodologies (Atkins et al 2004). This section provides additional details about assessing the quality of evidence.

When assessing the quality of evidence, authors should make these assessments for each outcome across the studies. GRADE considers the following eight factors across the studies and judges each of the first five factors as follows: no serious limitation; serious limitation (-1), very serious limitation (-2). GRADE judges the remaining three factors differently and can increase the quality of evidence if present. Authors make these judgments by considering the body of evidence across the studies.

GRADE Factor 1. Study design and rigor of its execution (often called Risk of Bias or Study Limitations). Authors should first assess Risk of Bias for each study and outcome. Use the Risk of Bias Tools—Randomized Controlled Trials use the Cochrane Group’s Risk of Bias v.2 tool (Appendix B); non-randomized interventional and observational studies use the ROBINS-I (Appendix B).

While authors can present this information in a table, they can use data-visualization software as an alternative (see Section 3). Table 5 provides an example of what a Risk of Bias Summary table could look like. The symbol, ‘+’ means the answer to the question is ‘yes’; ‘-’ means the answer to the question is ‘no’. Authors use ‘?’ when it is not clear from the study description.
Table 5. Example: Risk of Bias Summary – Outcome 1

<table>
<thead>
<tr>
<th></th>
<th>Study 1</th>
<th>Study 2</th>
<th>Study 3</th>
<th>Study 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate Sequence Generation?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Allocation Concealment?</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Patients Blinding?</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Providers Blinding?</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Data Collectors Blinding?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Outcome Adjudicators Blinding?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Data Analysts Blinding?</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Incomplete Outcome Data Addressed?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Free of Selective Reporting?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Free of Other Bias?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Intention to Treat Analysis?</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>


GRADE Factor 2. Indirectness: the extent to which authors can directly apply available evidence to the target, interventions, comparisons, and outcomes. Factors to consider:

- Indirect Comparison: A comparison of intervention A to B is not available, but A is compared to C and B is compared to C.
- Indirect Population, intervention, comparator, or outcome.

**Indirect population**
This occurs when studies pertinent to a question only include a subpopulation of patients with the disease. For example, some studies of genetic counseling sessions to discuss hereditary breast cancer may have only included women and not men.

**Indirect intervention**
If all studies of patients receiving genetic counseling to discuss hereditary breast cancer genetic testing were limited to women who had prophylactic double mastectomies, the generalizability of this evidence to other patients with different surgical histories is limited.

**Indirect Comparator**
If the literature search only found studies with genetic counseling offering genetic testing to patients with breast cancer and not those without breast cancer, the applicability of this evidence to the question of genetic testing is limited.
**Indirect Outcome**

A telephone-based genetic-counseling study to discuss hereditary breast cancer genetic testing that determines an outcome at two months would make it difficult to generalize this evidence to long-term outcomes.

**GRADE Factor 3. Inconsistent Results**

- Widely differing estimates of the effect-size across studies suggest true differences in the underlying treatment effect.
- This is the opportunity to quantify heterogeneity using a forest plot with $I^2$ statistic (see Figure below).

**Figure X. Forest plot with statistical test of heterogeneity. Published in: Sedgwick P. BMJ 2015;351:h4028.**

Authors faced with inconsistent results in the included studies should attempt to explain the inconsistencies. Systematic or random error can often explain such inconsistencies. A vote-counting approach is not acceptable; it ignores the potential sources of error within each study.

**GRADE Factor 4. Imprecise Results.**

- A function of sample size.
- Wide confidence intervals include no effect or cross the minimal-important difference for benefit or harm.
- If authors conducted a meta-analysis that has an overall effect size, authors should use this confidence interval to evaluate imprecision.

**GRADE Factor 5. Likelihood of Publication Bias.**

- This is a systematic underestimate or overestimate of the true effect of selectively publishing studies. Typically, authors do not submit studies demonstrating no effect for publication.
- This is the opportunity to create a funnel plot from the pool of studies.
The following three factors can increase the quality of evidence:

- **GRADE Factor 6**: Magnitude of the Effect.
- **GRADE Factor 7**: Demonstrating a Dose-Effect Relationship.
- **GRADE Factor 8**: The likely direction of impact of all plausible confounding factors on the observed effect.

### Worksheet 1: Assessing the Quality of Evidence across Studies for an Outcome

<table>
<thead>
<tr>
<th>Quality Criteria</th>
<th>Rating (Circle one for each criterion)</th>
<th>Footnotes (Explain reasons for up- or downgrading)</th>
<th>Evidence Quality (Circle one per outcome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome One</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk of Bias</td>
<td>No</td>
<td>Poor</td>
<td>High (++++)</td>
</tr>
<tr>
<td></td>
<td>Serious (-1)</td>
<td></td>
<td>Moderate (+++)</td>
</tr>
<tr>
<td></td>
<td>Very serious (-2)</td>
<td></td>
<td>Low (++)</td>
</tr>
<tr>
<td>Inconsistency</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious (-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very serious (-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirectness</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious (-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very serious (-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imprecision</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious (-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very serious (-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publication Bias</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Serious (-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very serious (-2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Effect</td>
<td>Large (+1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose-Response Gradient</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes (+1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plausible Confounding Would Change the Effect</td>
<td>No</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes (+1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From “GRADE track handout: TEACH Workshop NYAM August 7-9, 2013”
Next, produce an overall assessment of the quality of the body of the evidence for each outcome (Column 4 in Worksheet 1). The GRADE system classifies the quality of supporting evidence into four categories. The suggested terms are “high,” “moderate,” “low,” or “very low,” but some organizations use symbols or letters to rank evidence:

- **High:** Further research is very unlikely to change certainty regarding estimate of effect.
- **Moderate:** Further research is likely to change certainty regarding the estimate of effect.
- **Low:** Further research is very likely to change certainty regarding the estimate of effect.
- **Very low:** Any estimate of effect is very uncertain.

The overall quality of evidence is determined by the lowest quality of evidence for each of the critical outcomes (from GRADE and the Guideline Development Process, TEACH workshop NYAM August 7-9, 2014; GRADE Workshop, Orlando, FL September 25-27, 2019).

Example: Outcome 1 is a complete response of tumor to chemotherapy. Suppose there are five random-controlled trials.

- Factor 1 is judged as no serious limitations.
- Factor 2 is judged as serious inconsistency (-1).
- Factor 3 is judged as no serious indirectness.
- Factor 4 is judged no serious imprecision.
- Factor 5 is judged as publication bias (-1).

Conclusion: RCTs start out as High (+++), but with these judgments, two stars are removed, and the overall quality of the evidence body for this outcome is Low (++).

*Create Evidence Profile.* An Evidence Profile summarizes all of the relevant information about each outcome’s evidence-body quality and effect sizes.

**Table 7. Example: Complete Response of Tumor to Chemotherapy**

<table>
<thead>
<tr>
<th># Studies</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>RCT</td>
</tr>
<tr>
<td>Limitations</td>
<td>No serious</td>
</tr>
<tr>
<td>Inconsistency</td>
<td>Serious</td>
</tr>
<tr>
<td>Indirectness</td>
<td>No serious</td>
</tr>
<tr>
<td>Imprecision</td>
<td>No serious</td>
</tr>
<tr>
<td>Other considerations</td>
<td>Publication bias</td>
</tr>
<tr>
<td># patients – intervention</td>
<td>216/344</td>
</tr>
<tr>
<td># patients – control</td>
<td>211/344</td>
</tr>
<tr>
<td>Relative risk (95% CI)</td>
<td>RR 1.0 (0.92 to 1.1)</td>
</tr>
<tr>
<td>Absolute</td>
<td>0 fewer per 1000 (from 49 fewer to 61 more)</td>
</tr>
<tr>
<td>Quality</td>
<td>Low (+++)</td>
</tr>
<tr>
<td>Importance</td>
<td>Critical</td>
</tr>
</tbody>
</table>

*From GRADE Track handout: TEACH Workshop NYAM August 7-9, 2013*
APPENDIX J: GUIDELINE INTERPRETATION AND DEVELOPMENT

A strong or conditional guideline interpretation may have different implications depending on the stakeholder (Table 8).

Table 8. Interpreting “Strong” and “Conditional” Recommendations

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Strong Recommendation</th>
<th>Conditional Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Patients</td>
<td>• Most individuals would want the recommended course of action and only a small proportion would not.</td>
<td>• The majority of individuals in this situation would want the suggested course of action, but many would not.</td>
</tr>
<tr>
<td></td>
<td>• Formal decision aids are not likely to help individuals make decisions consistent with their values and preferences.</td>
<td></td>
</tr>
<tr>
<td>For Clinicians</td>
<td>• Practitioners should offer most individuals the intervention.</td>
<td>• Recognize that different choices will be appropriate for individual patients; authors must help each patient arrive at a management decision consistent with his/ her values and preferences.</td>
</tr>
<tr>
<td></td>
<td>• Adherence to this recommendation according to the guideline could be a quality criterion or performance indicator.</td>
<td>• Decision aids may help individuals make decisions consistent with their values and preferences.</td>
</tr>
<tr>
<td>For Policy Makers</td>
<td>• Entities can adopt the recommendation as policy in most situations.</td>
<td>• The policy will require substantial debates and involve various stakeholders before adaptation.</td>
</tr>
</tbody>
</table>


Example: Designing and Grading an Evidence-Based Genetic Counseling Practice Guideline as a Recommendation.

Clinical Question:
1) Is telephone-based genetic counseling as effective as in-person genetic counseling to identify patients appropriate for hereditary breast cancer genetic testing?
Outcome 1: (Desirable) Accurately Identify Patients who are Appropriate for Genetic Testing is deemed a Critical Outcome. For patients considering genetic testing for hereditary breast cancer, genetic counseling delivered by phone was not statistically different for identifying patients appropriate for hereditary breast cancer genetic testing compared to in-person genetic counseling (5-percent rate difference, moderate quality of evidence).

Outcome 2: (Undesirable) Patient Satisfaction is deemed a Critical Outcome. Genetic counseling delivered by phone produced lower patient-satisfaction rates than in-person genetic counseling (Standardized mean difference: Cohen’s d=0.3, high quality of evidence).

Outcome 3: (Undesirable) Patient Follow-Up Questions is deemed a Critical Outcome. Genetic counseling delivered by phone resulted in more patient follow-up questions compared to in-person genetic counseling (10-percent rate difference, moderate quality of evidence).

Table 9. Evidence Summary for Key Factors in Determining the Recommendation:

<table>
<thead>
<tr>
<th>Key Factors from GRADE</th>
<th>Comments for Hypothetical Example</th>
</tr>
</thead>
</table>
| Is the problem a priority? | • Judgement: Probably/Yes  
• Rationale: |
| How substantial are the desirable anticipated effects? | • Judgement: Moderate  
• Rationale: |
| How substantial are the undesirable anticipated effects? | • Judgement: Small  
• Rationale: The effect sizes of the undesirable outcomes are small. |
| What is the overall certainty of the evidence of effects? | • Judgement: Moderate  
• Rationale: The overall certainty of the evidence is moderate (see Evidence Table) |
| Does the balance between desirable and undesirable effects favor the intervention or the comparison? | • Judgement: Favors the intervention  
• Rationale: Benefits outweigh harms since patient identification does not significantly differ by counseling modality (based on Example Outcome 1); and effect sizes of potential harms are small (based on example Outcomes 2 and 3) |
| Is there important uncertainty or variability in how much people value the main outcomes? | • Judgement: Probably no important uncertainty or variability.  
• Rationale: The PG author group placed a high value on facilitating pre-test genetic counseling for individuals unable to attend an in-person session. |
<table>
<thead>
<tr>
<th>Question</th>
<th>Judgement</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>How large are the resource requirements (cost)?</td>
<td>Do not know</td>
<td>Cost-effectiveness analysis not performed. &lt;In some cases, resource implications may be evaluated if there are available studies from ICER, NICE, HTA databases, CADTH, etc.&gt;</td>
</tr>
<tr>
<td>What is the certainty of the evidence of resource requirements (cost)?</td>
<td>No included studies</td>
<td>&lt;see row above&gt;</td>
</tr>
<tr>
<td>Does the cost-effectiveness of the intervention favor the intervention or the comparison?</td>
<td>Favors the intervention</td>
<td>&lt;Depending on the intervention, it’s acceptable to use CDC, WHO, or similar organization to demonstrate the burden of disease, QALYs&gt;</td>
</tr>
<tr>
<td>What would be the impact on health equity?</td>
<td>Probably increased</td>
<td>In public payer systems, the intervention may improve health equity by increasing access to genetic counseling to at-risk patients. In private payer systems, the intervention may reduce health equity by limiting access to genetic counselors to those who can pay.</td>
</tr>
<tr>
<td>Is the intervention acceptable to key stakeholders?</td>
<td>Yes</td>
<td>Consider different stakeholder’s perspectives (need to have a multidisciplinary PG author group)</td>
</tr>
<tr>
<td>Is the intervention feasible to implement?</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

*Adapted from GRADEpro Recommendations Section

**Conclusion:** The [entity] strongly recommends telephone-based genetic counseling as an option to identify appropriate patients for hereditary breast cancer genetic testing.

***********************************************************************
APPENDIX K: DOCUMENT SPECIFICATIONS AND FINAL CHECKLIST FOR PRACTICE GUIDELINES

The guideline document specifications are:

- The CPG must reference the SER that took place and any other SERs published after the last search update for the SER that informed the PG.
- If the SER author group has submitted the SER for publication and has a citation for the SER, the lead SER author should share this information with the PG author group through the PG liaison.
- The draft guideline must be double-spaced, in Times New Roman, 11- or 12-point font, following the anticipated publication journal’s author guidelines (often The Journal of Genetic Counseling and another journal, if a joint guideline).

A CPG is not a review paper. The summary of key points and the SER data that inform evidence-based recommendations that facilitate the reader’s clinical decision. It can provide references to direct the reader to more detailed information about the process authors used to generate, analyze, and evaluate the quality of data to make the recommendations.

Practice Guidelines Must Include:

**Title:** The title should reflect the content of the Practice Guideline document and contain the phrase ‘NSGC Evidence-Based Practice Guideline.’

*NOTE: For joint guidelines, the PGC should approve the organization listing order in the publication.*

**Authors:** The PG author group determines the order, in compliance with PGC’s COI Policy.

**Purpose:** The CPG should include a clearly articulated purpose with specific recommendations for using genetic information in healthcare or the methods of access to, or delivery of, genetic counseling services. This section should also specify the intended audience.

**Introduction:** The introduction should:

- Explicitly state that the clinical practice guideline is based on a systematic review
- Include data from the Evidence Report supporting the purpose of the practice guideline
- State the topic’s relevance to genetic/genomic healthcare service delivery
- State why the topic is timely (e.g. new research findings and its relation to testing technologies, scientific, or practice discoveries; or correcting current inappropriate use/care)
- List the practice differences associated with the topic, if any, and how the practice guideline addresses them
- Describe how the practice guideline will improve or change genetic/genomic healthcare.
**Background:** The CPG’s Background Section should summarize the Evidence Table/Summary of Findings Table’s key data that support the authors’ recommendations. This section should direct the reader to references for more extensive details about the presented data. Evidence tables may help summarize key information. This section should specifically:

- Summarize the practice guideline’s evidence synthesis that relates the evidence to the recommendations, (e.g., descriptive summary or summary tables).
- Review the methodology used to evaluate and incorporate benefits/harms, values/preferences, resource implications.

**Practice Recommendations:** The authors should present the practice recommendations in the most concise format possible to increase the intended audience’s readability and utility. The recommendations must stem from the synthesis and evidence grading collected via the SER. Authors must grade the recommendations using a systematic and transparent consensus process, such as the AGREE II instrument (see Appendix B). NSGC highly encourages formats that include bullet points, numbered statements, charts, tables, and/or diagrams. The intended audience (outlined in the Purpose Section) should be consistent and clear throughout the document.

The clinical practice guideline or its supporting documents must assess the benefits and harms of recommended care and alternative care options.

**References:** Citations should follow the intended publication journal’s practice-guideline style guide. [http://healthlinks.washington.edu/hsl/styleguides/apa.html](http://healthlinks.washington.edu/hsl/styleguides/apa.html)

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**Disclaimer:** The following disclaimer should appear on each Practice Guideline:
“The practice guidelines of the National Society of Genetic Counselors (NSGC) are developed by members of the NSGC to assist genetic counselors and other health care providers in making decisions about appropriate management of genetic concerns; including access to and/or delivery of services. Each practice guideline focuses on a clinical or practice-based issue, and is the result of a systematic review and analysis of current professional literature believed to be reliable. As such, information and recommendations within the NSGC practice guidelines reflect the current scientific and clinical knowledge at the time of publication, are only current as of their publication date, and are subject to change without notice as advances emerge.

In addition, variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution or type of practice, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in this guideline.
Therefore, these recommendations should not be construed as dictating an exclusive course of management, nor does the use of such recommendations guarantee a particular outcome. Genetic counseling practice guidelines are never intended to displace a health care provider’s best medical judgment based on the clinical circumstances of a particular patient or patient population. Practice guidelines are published by NSGC for educational and informational purposes only, and NSGC does not “approve” or “endorse” any specific methods, practices, or sources of information.”

NSGC Criteria Checklist
In accordance with the IOM standards for clinical practice guidelines, the PGC requires all NSGC practice guidelines to meet the following criteria:

___ PGC Conflict of Interest Disclosure (Appendix A)
___ Sponsorship: An NSGC entity must sponsor the practice guidelines.
___ Recommendations: The practice guideline must contain systematically developed statements including recommendations intended to optimize patient care and help physicians and/or other healthcare practitioners and patients make decisions about appropriate healthcare for specific clinical circumstances.
___ Systematic Evidence Review: The practice guideline bases its recommendation on a systematic review of evidence by:
    ___ Explicitly stating that an SER informed the practice guideline’s recommendations and referencing that SER (when possible).
    ___ Describing the search strategy that lists databases searched, summarizing search terms used, detailing the specific time period the literature search covered [beginning date (month/year) and end date (month/year)], and the date the authors conduct the literature search.
    ___ Summarizing the study-selection process by noting the number of studies identified, the number of studies included, and the inclusion or exclusion criteria.
    ___ Synthesizing evidence from selected studies (i.e., a detailed description or evidence tables).
    ___ Summarizing the practice guideline’s evidence synthesis that relates the evidence to the recommendations.
___ Assess Harms and Benefits: The practice guidelines or supporting documents assess the benefits and harms of recommended care and alternative-care options.
___ Public Access: The practice guideline states that its systematic evidence review and other supporting documents are available in English, upon request.
___ Up to Date: The practice guideline must be developed, reviewed, or revised within five years and include appropriate documentation. Authors of practice guidelines that are more than five years old must demonstrate that the practice guideline is current by documenting one or more of the following:
    ___ A new systematic literature search occurred since the original publication (authors should describe the search terms).
    ___ Expert reviewers assessed the CPG for updates in accordance with the PGC’s described the review process.
    ___ Expert reviewers reviewed literature available since the original publication.
APPENDIX L: GLOSSARY OF SER TERMS

AGREE II: The updated Appraisal of Guidelines for Research and Evaluation II is a free, downloadable instrument that evaluates the process of practice guideline development and the quality of reporting. Used internationally, AGREE II comprises 23 items organized into the original six quality domains.

Agency Health Research Quality (AHRQ): The lead Federal agency charged with improving the safety and quality of America’s healthcare system by developing knowledge, tools, and data. Until 2018, had funding for National Guideline Clearinghouse.

Cohen’s kappa coefficient (κ): A statistic used to measure inter-rater reliability (and also Intra-rater reliability) for qualitative (categorical) items, generally thought to be a more robust measure than simple percent agreement calculation, as it takes into account the possibility of the agreement occurring by chance.

Covidence: A web-based software platform that streamlines the production of systematic reviews, including Cochrane Reviews.

Cochrane/ Cochrane Review/ Cochrane Library: An international organization of independent collaborators who create high quality systematic evidence reviews and syntheses on a variety of health-related topics, funded by governments and non-governmental organizations, academic institutions, hospitals, foundations, and private (non-commercial/conflicted) donations. The Cochrane Library is an open-access resource of Cochrane-developed reports, often with lay summaries designed for non-technical readers.

Cochrane Risk of Bias v.2: Version 2 of a tool used to assess the risk of bias in randomized trials included in Cochrane Reviews.

GRADE framework (aka GRADE process, GRADE system): Grading of Recommendations, Assessment, Development and Evaluations is a widely adopted, transparent framework for developing and presenting summaries of evidence and provides a systematic approach for making clinical practice recommendations.

- First, the authors decide what the clinical question is, including the population that the question applies to, the two or more alternatives, and the outcomes that matter most to those faced with the decision.
- A study, ideally a systematic review, provides the best estimate of the effect size for each outcome, in absolute terms (e.g. a risk difference).
- The authors then rate the quality of evidence, which is best applied to each outcome, because the quality of evidence often varies between outcomes.
- An overall GRADE quality rating can be applied to a body of evidence across outcomes, usually by taking the lowest quality of evidence from all of the outcomes that are critical to decision making.
- GRADE has four levels of evidence – also known as certainty in evidence or quality of evidence: very low, low, moderate, and high.

GRADEpro: Licensed tool that guides the process of guideline development from summarizing evidence to making recommendations in adherence with GRADE methodology.
The Institute of Medicine (IOM): Nonprofit organization affiliated with the National Academies of Science that aims to provide objective, timely, authoritative information and advice concerning health and science policy to government, the corporate sector, the professions and the public.

Medical Librarian: Specially-trained librarian who assists healthcare professionals, students, patients, consumers, medical researchers, and information specialists in finding health and scientific information to improve, update, assess, or evaluate health care.

Methodologist: An individual with specific training in systematic evidence reviews and guideline development.
- This includes knowledge and expertise in developing appropriate key questions to guide a literature search, specialty software that can be used to facilitate a systematic evidence review, meta-analysis/qualitative synthesis of evidence, quality assessment of individual studies, and grading the body of literature as a whole to support a recommendation, facilitation of guideline development using the GRADE framework and non-GRADE (e.g., modified Delphi process, RAND/UCLA Appropriateness Method) tools.
- An individual in the systematic evidence review work group or the guideline panel may serve as the group’s methodologist if one is not otherwise available.

Modified Delphi Process: Forecasting process framework based on the results of multiple rounds of questionnaires sent to a panel of experts. Researchers send several rounds of questionnaires to the group of experts, and aggregate and share the anonymous responses with the group after each round. The modified Delphi technique is similar but consists of beginning the process with a set of carefully selected items.

MOOS: Meta-analyses Of Observational Studies

National Guideline Clearinghouse: A database of evidence-based clinical practice guidelines and related documents. Defunct as of June 2018. This has been largely replaced by ECRI Guidelines Trust.

PICOTS: Population (P), Intervention (I), Comparator (C), Outcome(s) (O), Timing (T) and Setting (S) is a question format that gives a consistent "formula" for developing answerable, researchable questions.

PRISMA Standards: An evidence-based minimum set of items for reporting in systematic evidence reviews and meta-analyses. PRISMA focuses on the reporting of reviews evaluating randomized trials, but can also be used as a basis for reporting systematic reviews of other types of research, particularly evaluations of interventions.

RAND/UCLA Appropriateness Method: A published, step-by-step manual developed to combine the best available scientific evidence with the collective judgement of experts to yield a statement regarding the appropriateness of performing a given intervention based on a patient’s presentation. The rationale behind the method is that randomized clinical trials are generally either not available or cannot provide evidence at a level of detail sufficient to apply to the wide range of patients seen in everyday clinical practice.
RevMan: Review Manager is software used for preparing and maintaining systematic reviews that facilitates preparation of protocols and full reviews, including text, characteristics of studies, comparison tables, and study data. It can perform meta-analysis of the data entered and present the results graphically, as well as write reviews of diagnostic test accuracy studies, reviews of studies of methodology and overviews of reviews.

ROBINS-I: Risk Of Bias In Non-randomized Studies - of Interventions is a tool concerned with evaluating the risk of bias in the results of non-randomized studies of interventions that compare the health effects of two or more interventions. The types of studies that can be evaluated using this tool are quantitative studies estimating the effectiveness (harm or benefit) of an intervention, which did not use randomization to allocate units (individuals or clusters of individuals) to comparison groups.

Robvis: Risk of Bias Visualization Tool helps SER authors visually present risk-of-bias assessments by quality domain across studies. Authors using the Cochrane Risk of Bias, Risk of Bias v.2, ROBINS-I, and QUADAS tools for quality assessment can use robvis to create publication-ready figures.

TEACH Workshop: Teaching Evidence Assimilation for Collaborative Healthcare is a workshop held by the New York Academy of Medicine - Section on Evidence Based Health Care for healthcare professionals, administrators, and librarians on the foundations, policies, recommendations, and implementation of evidence-based care.