12 Steps to EAST Practice Management Guideline (PMG) Development

Eastern Association for the Surgery of Trauma
Advancing Science, Fostering Relationships, and Building Careers

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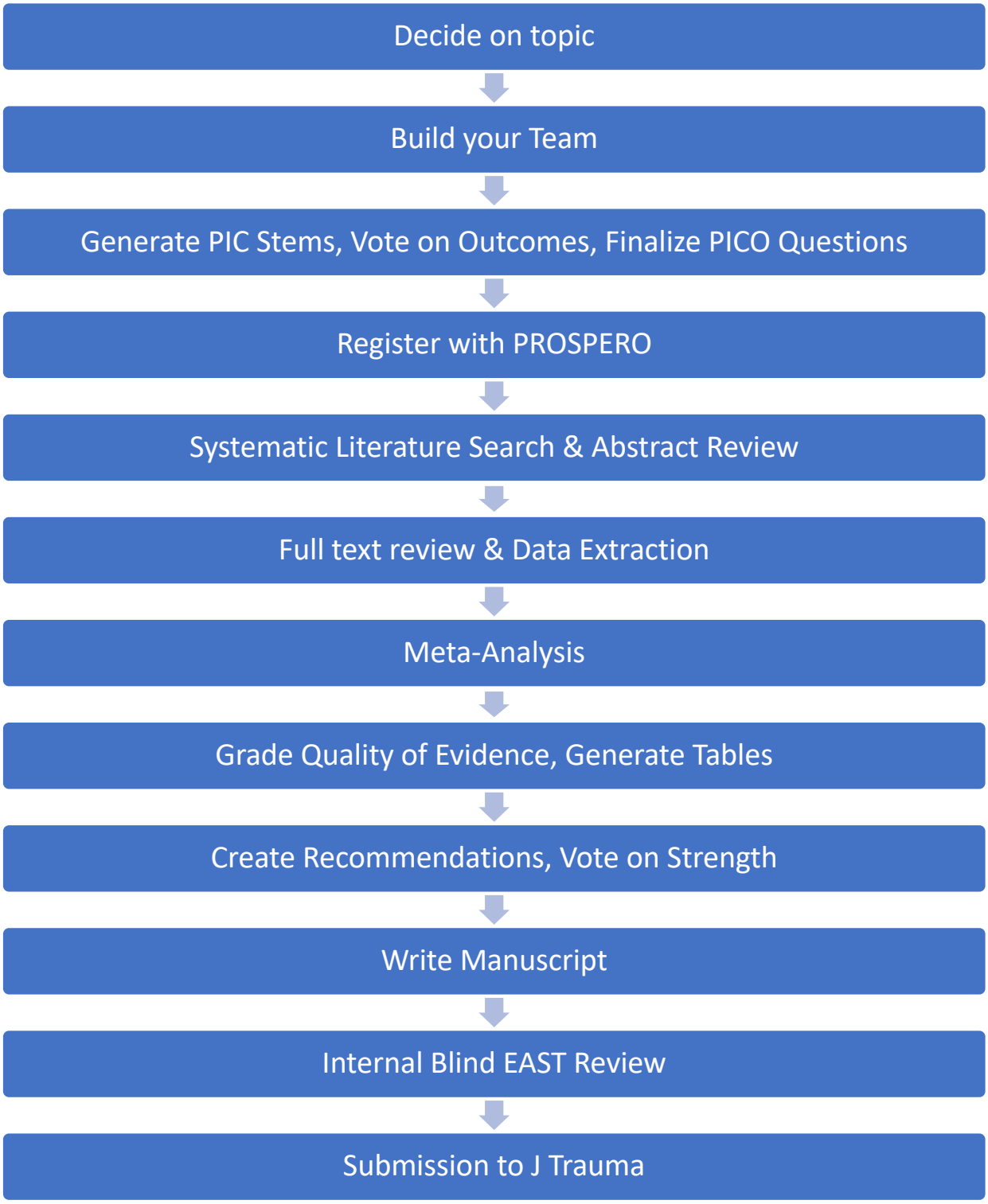

For more detailed guidance & info, please refer to the 'EAST Guide on How to Write a PMG using GRADE' white paper available here and the EAST PMG Development Video Series available here.

1. DECIDE ON PRACTICE MANAGEMENT GUIDELINE (PMG) TOPIC

- Decide to create a Guideline on something you are enthusiastic about and feel you can contribute something more.

- Ensure that no other societies have already a Guideline in place for the exact same topic (look at Western Trauma, AAST, other non-surgical societies that may be relevant to the topic, etc).

- Do a quick literature search to ensure there is enough data available on the topic. The importance of this step, cannot be overstated! It can save a lot of time and effort later on, if discussions are had and progress is made on a topic with little or no available literature.

- **Duration: 2-3 weeks**

2. BUILD YOUR TEAM

- Use your EAST network to gather peers who share your excitement about the topic you want to look into, and sign them up yourself!

- As a list of volunteers interested in participating in PMG development exists, feel free to ask the Guideline Committee leadership to connect you with potential candidates.

- Visit https://www.east.org/education/practice-management-guidelines/guidelines-under-development/proposal and provide details of your PMG proposal. If/when approved, it will be available on the EAST website for more volunteers to sign up!

- While topic experts are desirable in the team, ensure that opinions held by team members among the team are well-balanced, and there are no conflicts of interest.

- All team members need to be EAST members! An exception can be made when expertise may be available outside the trauma community (e.g. you are looking at rhabdomyolysis and feel a nephrologist would be able to add significant expertise).

- Ensure all group members are aware that they are expected to contribute equally to the workload.

- Set up a conference call among group members (Christine Eme - ceme@east.org - can help you with this) to start getting to know each other, exchange contact information, inquire about each other's practice patterns on the topic of interest, and start identifying potential questions that could/should be addressed on the PMG.

- In general, it is a good idea to keep notes of what is discussed in each conference call, and share afterwards with everyone on the team, including those that were unable to participate. Helps bring everyone up to speed!

- **Duration: 2-3 weeks**

3. FORMULATE PICO STEMS, VOTE ON OUTCOMES, FINALIZE PICO QUESTIONS

- Once you have decided on specific topics/questions to be addressed, start framing them in the **PICO** format: Decide on a specific patient population (**P**) (e.g. patients with high grade blunt splenic injury), and pick two methods that can be used to address the problem at hand, the Intervention (**I**) and the Comparator (**C**). (e.g. angioembolization vs splenectomy). '**O**' refers to the outcomes, which are discussed below.

- These are best and most efficiently decided via email. Ensure you include everyone in the group!

- Whenever you ask for feedback on something like this, set a deadline to respond by (around a week), or you will consider that non-responding group members are ok with the proposed questions/outcomes/results/etc. If you are not receiving feedback / responses from a few members repeatedly, contact them individually to ensure they are still interested in the project.

- Aim to address not topics that are very obvious and have been the standard of care for decades (e.g. In patients with gunshot wounds to the abdomen presenting with hemodynamic instability and peritonitis, should immediate operative intervention vs observation be considered), but areas where management is still reasonably controversial and variable (e.g. In patients with persistent neck pain after blunt trauma and negative CT imaging, should MRI imaging be obtained vs prolonged c-spine immobilization), or topics where new technology or methodology has recently become available (e.g. In patients with hemorrhagic shock after penetrating trauma, should thromboelastography be used to guide resuscitation vs low-ratio component therapy be undertaken)

- Remember that each outcome requires its own literature search, abstract & manuscript review, data extraction and analysis, so choose wisely the number of questions / outcomes you want to address. 2-3 PICO Questions with 1-3 outcomes each is a good number for a PMG.

- With the PIC stems available, it is time to decide on the Outcomes (O). Come up with a broad list of potential outcomes for each PICO, both specific to the studied topic, plus some broad commonly measured outcomes (e.g. mortality, ICU LOS, hospital LOS, duration of mechanical ventilation, etc). Share with the group and ask if they have any others they would like to add in one or more PICOs. *Best done via email, not conference call*.

- The outcomes are specific to and tailored to each PICO, and different PICO questions covering the same topic may cover different outcomes.

- When the final list of potential outcomes for each PIC stem is available, send again to the group, and ask *everyone* to rate each outcome on a scale from 1-9, with 9 being very important, and 1 of very little importance. Stress that each rating should be specific for the PICO question asked: e.g. although survival is obviously the most important outcome, it should not be rated as the most important when the goal is ventilator weaning.

- Stress that each member has to respond to you privately (so they do not influence one another). Set a small internal deadline, as discussed earlier! Send individual emails to those who have not responded by then, asking for a response. You need a rating for each outcome for each PICO from every member of your group!

- Calculate the means of the ratings for each outcome for each question - there can only be up to 7 per PICO question. Even that is too many usually, as each outcome requires its own analysis. You may have to typically limit to just the critical ones (those with a rounded mean of 7-9), and perhaps the important ones (those with a rounded mean of 4-6). The outcomes of limited importance (rounded means of <4) are typically not studied.

- Keep track of the list of outcomes and their ratings for each PICO question, as this process is commonly included in the manuscript!

- **Duration: 4-6 weeks**

4. REGISTER YOUR GUIDELINE WITH PROSPERO

- Register your project to PROSPERO (http://www.crd.york.ac.uk/PROSPERO) – ideally before the literature search, and definitely before data extraction!!! Takes less than 20 minutes! You describe the project in a few words, and state what questions you will be addressing. The purpose of this topic is so that questions do not change after the results of the review.

- Remember to visit again at the end of the project, and state your findings / recommendations.

- **Duration: 30 minutes**

5. SYSTEMATIC LITERATURE SEARCH & ABSTRACT REVIEW

- **Use your institution's librarian** for your literature search – they are typically far more comfortable running complex searches (each search engine uses different methodology). **Search at least 3 different search engines** (PubMed, Cochrane, Embase, Web of Science, etc). Try to use broad search terminology, especially if you are aiming to do just one literature search for all PICOs combined (have librarian use Boolean terms). Keep track of the exact terms / methodology used, as most journals will ask for it (usually as an e-supplement) at the time of manuscript submission.

- Gather all abstracts in an Excel sheet, and remove the duplicates. Then **assign each abstract to two group members for review**. They have to decide whether it should be included or not, and if excluded why. (see example Sheet below)

- Instead of manually keeping track of abstract reviews, the process may be automated via literature managing software, such as:
    - **Covidence** (covidence.org) (requires subscription)
    - **Rayyan** (rayyan.qcri.org/welcome) (free), and
    - **Colandr** (https://www.colandrapp.com/signin) (free)

  Help guides are available for all three:
    - http://support.covidence.org/help_center
    - https://libraryguides.mcgill.ca/rayyan/gettingstarted
    - https://www.colandrcommunity.com/training.html

  These web-based tools facilitate collaboration, storing, accessing and reviewing available data

- For abstracts to be included in the next step (full manuscript review), they need to include a patient population similar to the one you are studying, and must include groups with the two interventions being compared in your PICO. Case reports, commentaries, reviews, and animal studies are excluded. Although meta-analyses are also excluded, they can be useful to help identify literature that should be included in your PMG. Depending on availability of translation services at your institution, you may limit your search to the English language, or not.

- The reason for exclusion for each abstract has to be recorded. Common reasons include: 1. Study does not include intervention & comparator groups, 2. Not a primary study (e.g. commentary, meta-analysis, review), 3. Case report, 4. Animal study, 5. Not in English, 6. Other. If more than one reasons exist for an abstract, select the higher one on the list.

- Allow 2-3 weeks for abstract review (depending on number of abstracts assigned per reviewer).

- The group leader has to now combine the data from group members in a single master sheet, and adjudicate any differences. Alternatively, any of the automated literature review web-based solutions may help with record keeping. Please keep track of the above, as it will be needed for the PRISMA Study Flow sheet.

- **Duration 3-4 weeks**

Reviewers	First Author	Year of Pub	Title	PMID	Abstract	Include	Reason for Exclusion
						1: Yes, 0: No	1: No Int/Comp groups 2: Not primary study 3: Case report 4. Animal study 5. Not in English 6. Other
AG, DC							
AG, GK							
GK, DC							

6. FULL TEXT REVIEW & DATA EXTRACTION

- Find and download the full manuscripts of all 'to be included abstracts' from your institution's library. Place them all on an online folder, and share with the group. If you don't have access to all manuscripts, ask if any other members can find them and also place them in the online folder (The online literature review solutions may also help with this task).

- Repeat the review process with the full manuscripts (whether they should be included). To be more efficient, you can combine this step with data extraction. Each manuscript should again be evaluated by two members of the group. The data extracted from the two reviewers need to match. If not, adjudicate. (see sample data extraction Sheet below)

- Allow 3-4 weeks for this task, depending on number of manuscripts & available reviewers. Make sure everyone stays on track! Communicate closely with members that may be falling behind and motivate them politely as needed!

Reviewers	First Author-Year	Patient population	Study Design	Include	Reason for Exclusion
		1. Surgery 2. Trauma 3. SICU 4. Medicine 5. Peds	1. PRCT 2. Retrosp 3. Observ.	1: Yes, 0: No	1: No Int/Comp groups 2: Not primary study 3: Case report 4. Animal study 5. Not in English 6. Other
AG, DC					
AG, GK					
GK, DC					

(continued)

Intervention – sample size	Intervention – Continuous Outcome 1 Mean	Intervention – Continuous Outcome 1 SD	Comparison – sample size	Comparison – Continuous Outcome 1 Mean	Comparison – Continuous Outcome 1 SD	p-value

(continued)

Intervention – sample size	Intervention – number with Outcome 1	Intervention – number without Outcome 1	Comparison – sample size	Comparison – number with Outcome 1	Comparison – number without Outcome 1	p-value

- **Duration: 3-5 weeks**

7. META-ANALYSIS

- Time for the meta-analysis! If you don't have access to a statistician with the skill, EAST can help!
- Two of the most commonly used software packages for meta-analyses include:
    - **RevMan** (https://community.cochrane.org/help/tools-and-software/revman-5) (free for academic use)
    - **Stata** (https://www.stata.com)

- **Duration: 2 weeks**

8. GRADE QUALITY OF EVIDENCE, GENERATE TABLES ON GradePRO

- Once you have the results of the **meta-analysis**, including your **Forest plots**, and have a **Study Characteristics table** (summarizing the patient population, intervention and control, and outcomes of the analyzed studies), generate a separate table for each Outcome on GRADEpro (https://gradepro.org) . Then, select the type of outcome (**dichotomous**, **continuous**, **time-to-event**, **narrative** depending on the type of measurement); and choose **pooled**.

- Fill out the **number of studies** analyzed and the **type of study design** (if there are more than one study type, eg both observational and randomized controlled trials (RCTs), you may separate them in two smaller tables, or take their pooled effect. Typically, in there will overwhelmingly be more observational trials than RCTs), and the number of patients in each Intervention and Control group. You don't need to enter any info in the **Control Risk** section. (If you do, select a low, moderate or high risk of the condition under study depending on its incidence in the general population – commonly quoted in most Background / Introduction manuscript sections.)

- Add the **number of patients** that developed the outcome of interest in each the **Intervention** and **Control** groups, as well as the **Effect Estimate**, as determined from your meta-analysis in the **Relative Effect** (for dichotomous outcomes - the **Absolute** Effect is automatically calculated) or **Absolute Effect** (for continuous outcomes) column. **Certainty** of evidence is automatically calculated. Ensure that the type of risk selected is the same as that calculated in the meta-analysis (Relative Risk vs. Odds Ratio vs. Hazard Ratio vs. Rate Ratio for binary outcomes, or mean difference vs. standardized mean difference vs. mean vs. median for continuous)!
    - Use **Mean Difference** (equivalent to Weighted Mean Difference) if all studies use the same measure for the continuous outcome (e.g. all studies use hours or days to measure time). Select **Standardized Mean Difference** if different investigators have used variable scales to measure the same outcome (e.g. 10-point pain scale vs. a 4-point pain scoring system)

- Finally, enter the rating of each outcome, as voted by the group (Step 3 of this guide) in the last column.

- **Now it's time for a conference call,** and *it is very important for everyone to participate,* so the quality of the evidence can be rated! (It is a good idea to have reviewed this section of the document before the conference call, and to have it available for reference).

- First, decide as a group whether the **Control Risk** (discussed earlier) is *low*, *moderate* or *high*, then enter that incidence, as discussed above.

- Then rate the quality of evidence, *as a group*, based on the quality of the reviewed studies (the results of the **meta-analysis/Forest plots**, and the **Study Characteristics table** will come in handy for this task!) *This is best done on a conference call, as a consensus needs to be reached!*

  To rate the quality of evidence in the ensuing columns, consider the following:

- **Risk of Bias:** When data are derived mostly from low quality studies.
  Downgrade quality for: lack of blinding/randomization (limited RCTs); most evidence from retrospective studies

- **Inconsistency:** Signifies that different studies show different results.
  Downgrade quality for: Outcomes from different studies all over the map; I2 >70%

- **Indirectness:** Patient populations, Interventions, Comparators and Outcomes in reviewed studies are not the exactly the same as the one tackled in the PICO Question.
  Downgrade quality for: When any of the above is dissimilar to the what the PICO question studies, and believe that these differences may affect the final outcome.

- **Imprecision**: Different studies show widely ranging results.
  Downgrade quality for: A small number of studies included (usually <3-5) per outcome; the pooled Confidence Intervals are wide; there is uncertainty about the magnitude of the effect.

- **Publication Bias:** When only studies with a positive result/association have been published.
  Downgrade quality for: Small number of studies (usually <3-5/outcome); asymmetry in Funnel plot; vast majority of studies published show a positive association.

- **Other Considerations:**
  Upgrade quality for:
  i. Large treatment effect (e.g. if there is a narrow Confidence Interval that is not crossing the no-effect vertical line of the Forest plot)
  ii. Dose-response gradient (outcome increases proportionally with intervention dose, e.g. higher risk of bleeding with higher INR, greater survival in sepsis with earlier administration of ABx and achievement of source control);
  iii. If there is plausible residual confounding that could strengthen support for the intervention (e.g. the intervention increases survival in sicker, more comorbid patients, and those comorbidities have not been accounted for in the analysis)

- **DOWNGRADE** quality of evidence, for (whenever you do, add an explanation for why you choose to do so, by clicking on the icon on the top right hand corner of Grade Pro):

- **Risk of bias** (in general, due to lack of randomized studies – the majority of trauma studies. For more granular guidance, the Cochrane Risk of Bias Assessment Tool – available at www.riskofbias.info – can be filled out. More specifically, it is lower when the following were not met in the majority of included studies:
    - Random sequence generation in treatment allocation (addresses selection bias)
    - Allocation concealment (addresses selection bias)
    - Blinding of participants (addresses performance bias)
    - Blinding of outcome assessment (addresses detection bias)
    - Incomplete outcome data (addresses attention bias)
    - Selective reporting (addresses reporting bias)
- **Inconsistency** (when Heterogeneity is high – in general if I^2>70%)
- **Indirectness** (patient populations, interventions, comparators, outcomes not the same across studies, and these differences may affect how the outcome is determined)
- **Imprecision** (Small number of patients, wide pooled Confidence Intervals, uncertainty about the true magnitude of effect)
- **Other Considerations**
    - **Publication bias** (small number of studies available, only publications available with a positive effect, asymmetry in Funnel's plot, Eggert's test results from Meta-analysis)

- **UPGRADE** quality of evidence for (under the Other Considerations column):
    - **Large effect** (pooled effect estimate far away from the no-effect vertical line on the Forest plot)
    - **Dose-response gradient** (outcome increases proportionally with intervention dose, eg higher risk of bleeding with higher INR; the earlier antibiotics are administered in sepsis, the greater the survival benefit, etc)
    - **Plausible residual confounding** (when it strengthens support for the treatment effect, eg when an intervention increases survival in sicker patients with more comorbidities)

- **Duration: 2-3 weeks**

9. CREATE RECOMMENDATIONS, VOTE ON STRENGTH

- You can discuss this step at the time of the Grading the Evidence conference call, or at a subsequent one. Review the meta-analysis results and Grade Pro summary tables, and create recommendations for each PICO question.

- Decide on the strength of the recommendation for each PICO: **Strong** (should be the new standard of care) vs **Conditional** (intervention should be employed in the majority of applicable cases). To decide on strength, consider:
    - The quality of the evidence
    - The Risk-to-benefit ratio of implementing the recommendation
    - Patients' values / wishes
    - Cost and resources needed to implement the recommendation
    - Acceptability among physicians and patients
    - Feasibility

- **Go with the lowest quality of evidence for the harmful critical outcomes, and if none, by the highest quality of evidence for the beneficial critical outcome.**
  The Quality of Evidence for the harmful critical outcomes trumps the Quality of Evidence for the beneficial critical outcomes. (Important outcomes can be ignored in making recommendations if the risk for harm is considerable)

- If no consensus is reached at the conference call, follow up with email votes. Include the results of the vote in the manuscript! ***This process is public and all group members need to be comfortable with the recommendation being made!***

- ***For a recommendation to be strong, at least 70% of the group has to approve a strong recommendation*.**

- Word your recommendations based on the format of the PICO questions (e.g. In adult penetrating trauma patients who present with hemodynamic instability and peritonitis, we recommend immediate operative intervention (versus observation) to improve survival, decrease complications, shorten length of stay and allow earlier return to work).

- **Duration: 2-3 weeks**

10. DRAFT MANUSCRIPT

- Time for manuscript writing!

- Start with an introduction that states the magnitude of the problem, the current practice, and data already available. Then state what is still unknown, the purpose of the project, and the questions to be addressed.

- Clearly state the Objectives of the project, describe the PICO formulation process, the literature search, and data extraction methodology. If you have been diligent with the previous steps, all the information should be readily available to you.

- For each PICO, include a **Qualitative Synthesis** and a **Quantitative Synthesis** section.

- In the **Qualitative Synthesis** section, discuss differences in patient populations recruited, methodology employed, and findings among the reviewed manuscripts. Critically discuss these differences, and how they may affect your final recommendation. Also comment on notable observations from the literature review, if practice patterns seem to have changed over time, if there are specific subpopulations that may benefit more or less from the studied intervention, other nuanced observations that may sway management one way or another.

- In the **Quantitative Synthesis**, review and discuss the results of the meta-analysis, and present the findings on the GRADE pro tables.

- Finally, include a **Conclusion** section, where you summarize the recommendations, and reiterate any exceptions where the recommendations may be particularly or not applicable.

- Include a table with the PICO questions and Recommendations, for those who will not read the full manuscript.

- **Duration: 3-4 weeks**

11. SUBMIT TO EAST FOR INTERNAL BLIND REVIEW

- Submit to the Guidelines Committee leadership for blinded review.
- Edit your manuscript based on reviewers' comments.

- **Duration: 1-2 weeks**

12. SUBMIT TO THE JOURNAL OF TRAUMA

- Good luck!
- Don’t forget to sign up to help with other PMGs in development!

- **Duration: 1 afternoon**