Anesthesiology Resident Journal Club Handbook: Critical Appraisal Made Practical

## Introduction: Re-Envisioning Journal Club as a Core Competency Engine

Journal club has long been a staple of graduate medical education. Yet in many programs, it remains a passive exercise: one resident presents, others skim the paper (if at all), and the discussion drifts. This traditional format fails to meet the demands of competency-based medical education (CBME) and the ACGME’s mandate for “evidence-based, data-driven, clinical learning.”

For anesthesiology residents, time is precious. Every educational activity must deliver demonstrable skill acquisition. This framework re-envisions journal club as a **two-hour, flipped-classroom model**: one hour of structured pre-work and one hour of facilitated group discussion. Anchored to the **ACGME Anesthesiology Program Requirements and Practice-Based Learning and Improvement (PBLI) Milestones**, it transforms the journal club from a routine meeting into a **practical, high-yield educational tool** that builds evidence-based practitioners.

# Section 1: Why This Matters — The ACGME Imperative

## 1.1 Meeting the Scholarly Activity Mandate

ACGME requirement 4.15 mandates [1] that all residents “must participate in scholarship.” A structured journal club presentation qualifies as an academic assignment equivalent to grand rounds or a local scientific presentation. By formalizing journal club expectations, programs can ensure each resident repeatedly completes qualifying scholarly activity throughout residency, sustainably fulfilling this requirement.

## 1.2 Journal Club as a PBLI Laboratory

The journal club is uniquely suited to developing **PBLI 1: Evidence-Based and Informed Practice [2]**, which progresses from:

* **Level 1**: Accesses and uses evidence in routine care
* **Level 2**: Frames clinical questions (PICO) to guide care
* **Level 3**: Locates and applies evidence to complex patients
* **Level 4**: Appraises and applies evidence amid uncertainty
* **Level 5**: Coaches others and contributes to guideline development

Each journal club simulates this entire cycle—identifying a question, appraising validity, interpreting results, and debating application—making it one of the most efficient tools for competency development.

# Section 2: The 2-Hour Flipped Classroom Method

## 2.1 The Rationale

The flipped model shifts information transfer (reading the article) into independent pre-work, reserving group time for higher-order tasks: critique, synthesis, and clinical application. This ensures **all participants are prepared**, not just the presenter, and transforms the session into an active, collaborative learning experience.

## 2.2 Part A: The Pre-Work Hour — Critical Appraisal Checklist (Appendix A)

Residents complete a **guided, high-yield appraisal tool** adapted from CONSORT, STROBE, and PRISMA but simplified for busy clinicians. The tool focuses on three fundamental EBM questions:

1. Are the results valid? (internal validity)
2. What were the results? (magnitude and precision)
3. Will these results help my patients? (external validity)

**Example (Condensed RCT Checklist):**

* **Validity:** Randomization? Blinding? Baseline similarity? ITT analysis? Equal treatment?
* **Results:** Effect size, CI, p-value; calculate ARR/NNT; harms reported?
* **Applicability:** Patient similarity? Feasibility in our setting? All key outcomes addressed?

Deliverable: completed checklist = **completed *before*** discussion.

## 2.3 Part B: The Session Hour — Structured Agenda

|  |  |  |
| --- | --- | --- |
| Time | Activity | Objective |
| 0–7 min | **Context & BLUF** | Resident presenter frames clinical question and gives one-sentence conclusion |
| 7–25 min | **Validity** | Group dissects methodology and bias |
| 25–40 min | **Results** | Move beyond p-values to effect sizes, NNT, and harms |
| 40–55 min | **Clinical Application** | Apply findings to patient vignettes (“How would this apply to a patient with severe CAD?”) |
| 55–60 min | **Summary & Milestone Linkage** | Faculty highlights 2–3 takeaways, ties explicitly to PBLI milestones |

# Section 3: Implementation Toolkit

## 3.1 Article Selection

When choosing articles for journal club, prioritize studies that balance **clinical impact** with **methodological teaching value**:

* **Clinical relevance:** Focus on common, controversial, or novel perioperative questions (e.g., preoxygenation methods, PONV prophylaxis, blood pressure targets in neurosurgery).
* **Methodological interest:** Select studies that illustrate strengths and flaws in design, analysis, or interpretation (e.g., small RCT with good blinding vs large registry with confounding).
* **Design variety:** Include different study types over time—RCTs, cohorts, systematic reviews, diagnostic accuracy studies—to broaden appraisal skills.
* **Source quality:** Prioritize high-impact journals (*Anesthesiology, Anesthesia & Analgesia, BJA, JAMA, NEJM*).
* **Rotating themes:** Cover core anesthesia domains—airway, cardiac, neuro, obstetric, PONV, monitoring—so residents encounter a balanced curriculum.

**Encourage paired articles (“Pro vs Con”):**

* Select two articles on the same clinical question that reach **different conclusions**.
  + - Example: *BVM+PEEP vs NRM for preoxygenation* (pro-PEEP RCT like Roveri et al. 2025 vs older observational data suggesting simpler devices suffice).
    - Example: *Dexamethasone for PONV* (meta-analysis strongly supportive vs a trial highlighting potential side effects).
* This promotes critical discussion, highlights the role of study design in shaping results, and teaches residents how to reconcile conflicting evidence for practice.

## 3.2 Facilitation Essentials

The facilitator is a **guide on the side**, not a lecturer.

* **Preparation:** Completes the same checklist as residents
* **Socratic questioning:** Pushes residents from summary (Level 2–3) toward uncertainty appraisal (Level 4–5)
* **Psychological safety:** Encourages challenging published conclusions
* **Time management:** Keeps agenda on track

**Example Discussion Question:**

**Q: The CI crosses 1.0 for this outcome—how should that affect our confidence?  
  
A:** *Effect estimate favors treatment, but the 95% CI crosses 1.0, so this is* ***statistically inconclusive*** *and* ***imprecise****; it does/does not exclude a clinically important effect, so I* ***would/would not*** *change practice based on this study alone.*

### 3.3 Logistics

* **Protected time:** e.g., mandatory session
* **Assignments:** Annual presenter rotation; article distributed 1 week prior
* **Group size:** 5–8 residents per facilitator for active discussion
* **Technology:** Online submission of checklists; facilitators review in advance
* **Contingency:** If pre-work is incomplete → faculty-led demo of checklist

## Section 4: Assessment Framework

### 4.1 Milestone-Based Rubric

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Domain | Level 2 | Level 3 | Level 4 | Level 5 |
| Clinical Question | Identifies topic | Frames specific PICO | Critiques appropriateness | Coaches others |
| Internal Validity | Notes methods | Identifies strengths/weaknesses | Appraises subtle bias | Role models appraisal |
| Results | States conclusion | Reports effect + CI | Distinguishes clinical vs statistical | Synthesizes multiple studies |
| Applicability | States results could apply | Applies to straightforward patients | Weighs uncertainty in nuanced cases | Leads guideline integration |
| Communication | Reads summary | Presents concisely | Facilitates discussion | Teaches appraisal skills |

## 4.2 CCC Integration

* Rubrics generate **longitudinal data** for semiannual milestone reporting
* Demonstrates concrete PBLI progression (e.g., CA-1 Level 2 → CA-3 Level 4)
* Creates **defensible documentation** for the Clinical Competency Committee

## Conclusion: From Meeting to Active Learning

This framework transforms the journal club into a **cornerstone of anesthesiology education**:

* **Practical:** Runs in 2 hours (1 pre + 1 session)
* **Evidence-based:** Anchored in CONSORT/EBM methodology
* **Aligned:** Meets ACGME mandates for scholarship and PBLI
* **Assessable:** Produces standardized milestone data
* **Transferable:** Residents leave with skills they can teach and apply

# Endnotes:

1. **ACGME Requirement 4.15 — Why Journal Club Counts as Scholarship:** requires that *all residents participate in scholarship* (Requirement 4.15). Each resident must complete, under faculty supervision, an **academic assignment** (Requirement 4.15.a). Outcomes should be suitable for presentation at a scientific meeting or result in an abstract/manuscript.
2. **PBLI 1: Evidence-Based and Informed Practice** — ACGME Milestones sub-competency describing the progression from *accessing evidence in routine care (Level 1)* → *framing clinical questions (Level 2)* → *applying evidence to complex patients (Level 3)* → *appraising and applying evidence amid uncertainty (Level 4)* → *coaching others and contributing to guideline development (Level 5).*

**Appendix A: Resident Critical Appraisal Checklist**

(Adapted from CONSORT, STROBE, PRISMA — simplified for busy clinicians)

**Three guiding EBM questions:**

1. Are the results valid? (Internal validity)
2. What were the results? (Magnitude and precision)
3. Will these results help my patients? (External validity)

|  |  |  |
| --- | --- | --- |
| **Domain** | **Guiding Questions** | **Resident Notes** |
| 1. Validity (Internal) | • Was randomization adequate? • Was allocation concealed? • Were patients/clinicians/assessors blinded? • Were groups similar at baseline? • Was follow-up complete (ITT analysis)? |  |
| 2. Results (Magnitude & Precision) | • What was the primary outcome and effect size? • Were confidence intervals (CIs) and p-values reported? • What is the clinical significance (ARR, RRR, NNT)? • Were harms/adverse events reported? |  |
| 3. Applicability (External Validity) | • Is the study population similar to ours? • Is the intervention feasible in our setting? • Were all important patient outcomes considered? • Bottom Line: Should this study change my practice? |  |

**Example:**

Roveri, G., Camporesi, A., Hofer, A., Kahlen, S., Breidt, F., & Rauch, S. (2025). Preoxygenation with and without positive end-expiratory pressure in lung-healthy volunteers: A randomized clinical trial. *JAMA Network Open, 8*(5), e2511569. https://doi.org/10.1001/jamanetworkopen.2025.11569

**Bottom Line:** This well-conducted crossover RCT in healthy volunteers shows that NRM is inferior to both BVM and BVM+PEEP for preoxygenation. BVM+PEEP further improves oxygenation and dependent lung ventilation, particularly in obese adults and children. While the trial doesn’t measure clinical endpoints (safe apnea time, desaturation rates), the physiologic rationale and feasibility suggest BVM+PEEP should be preferred over NRM in emergency and perioperative settings, especially when NIV isn’t available.

|  |  |  |
| --- | --- | --- |
| **Domain** | **Guiding Questions** | **Resident Notes** |
| 1. Validity (Internal) | • Was randomization adequate? • Was allocation concealed? • Were patients/clinicians/assessors blinded? • Were groups similar at baseline? • Was follow-up complete (ITT analysis)? | * **Randomization adequate?** Yes. Computer-generated list with block randomization; crossover design reduced interparticipant variability. * **Allocation concealed?** Sequence concealed from participants; investigators aware of device used. * **Blinding?** Participants blinded to order, but investigators could not be blinded due to device differences. Outcome measures (FeO₂, ORI, EIT) were objective. * **Baseline similarity?** Groups well described (normal weight, overweight/obese, pediatric); no major imbalances. * **Follow-up/ITT analysis?** All 53 participants completed all arms; no missing data. ITT not relevant since no dropouts.   **Overall:** Methodologically sound, though limited by lack of assessor blinding and artificial volunteer setting. |
| 2. Results (Magnitude & Precision) | • What was the primary outcome and effect size? • Were confidence intervals (CIs) and p-values reported? • What is the clinical significance (ARR, RRR, NNT)? • Were harms/adverse events reported? | * **Primary outcome:** Expired O₂ concentration (FeO₂) after 3 minutes.   + BVM > NRM (≈72% vs 52% NW; 66% vs 52% OW/OB; 65% vs 39% children).   + BVM+PEEP > BVM (≈3–7% higher). All P < .05. * **Confidence intervals / p-values:** Reported and statistically significant across comparisons. * **Clinical significance:** While ARR/RRR/NNT not directly applicable (physiologic outcomes, not clinical events), effect sizes are meaningful: ~20% higher FeO₂ with BVM vs NRM, and added 3–7% gain with PEEP. ORI decline delayed ~40–50 sec in OW/OB and children—potentially more safe apnea time. * **Harms/adverse events:** None reported; all subjects healthy volunteers.   **Bottom line on results:** Clear physiologic benefit of BVM (especially with PEEP) over NRM. |
| 3.Applicability (External Validity) | • Is the study population similar to ours? • Is the intervention feasible in our setting? • Were all important patient outcomes considered? • Bottom Line: Should this study change my practice? | * **Study population vs ours:** Lung-healthy adults and children, not critically ill patients. Generalizable to elective OR preoxygenation but less so to hypoxemic ED/ICU populations. * **Feasibility:** BVM+PEEP is widely available and feasible, especially if NIV not accessible. Requires good mask seal and trained operator. * **Patient outcomes considered?** Surrogates (FeO₂, ORI, EIT ventilation), not direct clinical outcomes like desaturation events or intubation success. * **Practice change?** Supports using BVM (preferably with PEEP) over NRM when preparing for intubation, especially in pediatrics and obese patients. Direct impact on hypoxemia rates still unproven. |

# Appendix B: 1 Page Quick Guide

## Quick Start Toolkit: Critical Appraisal Made Practical

### 1. Why This Matters

* ACGME Requirement 4.15 → Journal club counts as scholarship.
* PBLI Milestone 1 → Builds from finding evidence → appraising bias → applying to patients.
* Two-hour flipped model: 1 hr pre-work + 1 hr session.

### 2. Pre-Work: Critical Appraisal Checklist

Three guiding EBM questions residents answer before session:

|  |  |
| --- | --- |
| Domain | Guiding Questions |
| Validity | Randomization? Blinding? Baseline similarity? ITT analysis? |
| Results | Effect size? CI/p-value? ARR, RRR, NNT? Harms reported? |
| Applicability | Similar patients? Feasibility? Outcomes relevant? Change practice? |

### 3. Session Agenda (60 minutes)

|  |  |  |
| --- | --- | --- |
| Time | Activity | Focus |
| 0–7 min | Context & BLUF | Clinical question + one-sentence conclusion |
| 7–25 min | Validity | Dissect methods, bias |
| 25–40 min | Results | Effect size, CI, NNT, harms |
| 40–55 min | Clinical Application | Apply to vignettes |
| 55–60 min | Wrap-up | 2–3 takeaways + PBLI link |

### 4. Article Selection Guide

* Clinical relevance: Common, controversial, or novel periop Qs
* Methodological interest: Strengths and flaws
* Design variety: RCTs, cohorts, reviews, diagnostics
* Source quality: Anesthesiology, A&A, BJA, JAMA, NEJM
* Rotating themes: Airway, cardiac, neuro, obstetric, PONV, monitoring
* Encourage Pro vs Con pairings (e.g., BVM+PEEP vs NRM; Dexamethasone for PONV)

### 5. Faculty Essentials

* Prepare with checklist too
* Use Socratic questions (e.g., 'The CI crosses 1.0 — how should that affect our confidence?')
* Foster psychological safety for critique
* Keep session on track

### 6. Example Bottom Line

Roveri et al. (2025, JAMA Netw Open): BVM+PEEP improves oxygenation vs NRM, especially in obese adults & children. No clinical endpoints measured → physiologic rationale supports preference but not definitive practice change.