N-OF-1 TRIALS IN FAMILY MEDICINE EDUCATION

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Family Medicine Focus

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N-of-1, or single-case trials, are individualized, crossover studies that compare intervention effects within a person or group. They provide a framework for personalized clinical or educational decisions by alternating interventions while collecting outcomes.

Single-Case Trial Types

Type	Description	Purpose	Key Considerations	Examples
Single-or double-blind, crossover (ABAB crossover)	Learner or faculty alternates between interventions. Outcomes compared within individual or group learners.	Compares two teaching approaches on learning outcomes.	Controlling confounders; best in repeatable, similar contexts.	Comparing teaching with/ without decision aids.
Multiple-baseline design	Intervention has several components targeting skills/ behaviors, measured at baseline. Interventions implemented one at a time.	Evaluates specific program elements.	Identifying targeted intervention for specific skills/ behaviors.	Evaluating program to improve patient-resident communication and prescribing.
Sequential or adaptive design	Intervention adjusted based on feedback or performance.	Allows iterative improvement while collecting data.	Documenting changes and rationale.	Adapt workshop structure based on feedback.
Aggregated N-of-1 trials	Multiple educators or learners undergo personalized interventions. Data pooled for group-level trends.	Blends individual-level responsiveness with group-level conclusions.	Standardizing outcome metrics.	Evaluate personalized learning plans for underperforming residents across programs.

Example: Dr Lopez, a family medicine educator, compares immediate verbal feedback with written feedback and reflection prompts to improve a resident's teaching using an N-of-1 multiple crossover design over several precepting sessions.

Example Design

Element	Details
Trial type	ABAB crossover
Participant	Single resident or group precepting with faculty
Intervention A	Immediate verbal feedback post-session
Intervention B	Written feedback + structured reflection
Assignment	Residents randomized into intervention A or B
Blinding	Unblind (resident and faculty are aware of intervention)
Outcomes	Self-assessment, faculty evaluation, resident feedback and satisfaction
Duration	5–6 sessions; crossover every 1–2 sessions

Flow

Session 1: Baseline Evaluation
↓
Session 2: Verbal Feedback
↓
Session 3: Written + Reflection
↓
Session 4: Written + Reflection
↓
Session 5: Verbal Feedback

Strengths & Weaknesses

Strengths	Weaknesses
Personalized evaluation: Tailored to individual leaners or educators.	**Limited generalizability:** Results may not apply to larger groups.
Rigorous design: Structured randomized approach reduces bias.	**Resource intensive:** Requires significant time and effort.
Flexibility: Allows real-time adaptation and improvement.	**Overstatement Risk:** May focus too narrowly on one experience.
Cost-effective: Cheaper than large-scale studies.	**Potential for bias:** Due to lack of blinding.
Facilitates evidence-based teaching: Uses data for informed decisions.	**Limited control of confounders:** Difficult to control external factors.
Encourages reflection: Helps identify effective learning or teaching methods.	**Complex data interpretation:** Requires careful analysis and statistical knowledge.

N-of-1 trials are valuable in family medicine education for assessing personalized teaching strategies and learner progress. They effectively support individualized learning when used thoughtfully.

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