

Mawiiyahk Nakatikasho: No One Left Behind

Assessing and Improving Competence in Caring for Two-Spirit Métis Patients through an AI-Assisted Objective Structured Clinical Examination (OSCE): A Multisite Randomized Controlled Feasibility Trial for Ob/Gyn Residents

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Lay Abstract

Two-Spirit (2S) Métis people experience discrimination, exclusion, and culturally unsafe care, especially in reproductive, perinatal, and gender-affirming contexts. These experiences contribute to significant barriers to healthcare access and negative health outcomes. Training that strengthens residents' capacity to provide culturally safe, identity-affirming, and respectful care is critical to dismantling these intersecting forms of oppression.

This study pilots an innovative **AI-assisted Objective Structured Clinical Examination (OSCE)** to assess obstetrics and gynecology residents' competency in providing culturally safe care to 2S Métis patients. The AI system serves two primary functions: (1) co-developing culturally grounded assessment rubrics in collaboration with 2S Métis community members, and (2) standardizing patient portrayal during clinical encounters. This approach eliminates the variability and emotional burden associated with repeated standardized patient portrayals while ensuring cultural integrity and consistency.

Residents will be randomized across three Canadian universities (Alberta, Manitoba, Saskatchewan) to receive either the novel 2S Métis Academic Half Day (AHD) with AI-assisted OSCE evaluation or standard institutional anti-racism training. The primary outcomes are feasibility (recruitment, retention, delivery fidelity) and residents' ability to demonstrate culturally safe and affirming clinical skills, assessed using the AI-driven OSCE rubric. This study represents a transformative model of medical education, integrating artificial intelligence, Indigenous governance, and culturally specific evaluation frameworks to improve healthcare equity for 2S Métis peoples.

Purpose, Background, and Rationale

Two-Spirit (2S) Métis people face systemic discrimination in healthcare settings, particularly where gender identity, culture, and spirituality intersect. Despite the Truth and Reconciliation Commission's Call to Action #24, few medical education programs offer meaningful training addressing the specific care needs of 2S Métis patients. This study responds to that gap by combining Indigenous-led pedagogy with cutting-edge AI tools that uphold community sovereignty and cultural integrity.

The AI-assisted OSCE ensures that cultural authenticity and equity are built into both the **assessment tool** and the **patient interaction experience**. Through collaboration between Indigenous clinician-scientists, Elders, and 2S Métis community members, the AI system synthesizes community priorities to generate and refine a culturally grounded rubric and standardized patient persona. This provides a consistent, scalable, and respectful approach to evaluating residents' clinical and relational competencies.

Study Objectives

1. Develop and validate an AI-assisted OSCE that measures Ob/Gyn residents' competency in providing culturally safe care to 2S Métis patients.
 2. Evaluate the feasibility and efficacy of integrating a 2S Métis Academic Half Day (AHD) into postgraduate medical training across three academic sites.
 3. Assess the impact of the intervention on residents' communication skills, trauma-informed care, and respect for 2S Métis identities through AI-standardized encounters.
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Study Design

This multisite randomized controlled feasibility trial will involve Ob/Gyn residents at the University of Alberta, University of Manitoba, and University of Saskatchewan. Participants will be randomized 1:1 to either:

Intervention Group: 2S Métis AHD + AI-assisted OSCE

Control Group: Standard institutional anti-racism and Indigenous cultural safety training+ AI-assisted OSCE

Participant Groups

Resident Participants: Up to 90 Ob/Gyn residents (PGY1–PGY5) across three sites will be recruited through each institution's residency office. Participants will complete baseline surveys, participate in the assigned training, and undergo AI-assisted OSCE evaluation.

Community and AI Development Participants: Two-Spirit Métis Elders, Knowledge Holders, and community researchers will co-develop AI scenarios, ensure cultural fidelity, and validate assessment rubrics.

Assessors: Two raters per OSCE recording, including at least one 2S Métis community member, will score interactions using the co-developed rubric.

Inclusion Criteria

- Current enrollment in an accredited Obstetrics and Gynecology residency program at one of the three participating institutions.
- Postgraduate Year 1 through 5 (PGY1–PGY5).
- Fluency in English to ensure comprehension of AI-based encounters.
- Willingness and ability to participate fully in both the AHD and AI-assisted OSCE assessments.

- Provision of informed consent.

Justification: These criteria ensure participants have comparable clinical training, can meaningfully engage in the AI encounter, and can provide reliable feedback for feasibility assessment.

Exclusion Criteria

- Prior participation (within 12 months) in 2S Métis-specific or similar cultural safety OSCEs or workshops.
- Residents not enrolled in participating Ob/Gyn residency programs.
- Inability to complete both intervention and assessment components due to scheduling or personal constraints.
- Declining to provide informed consent.
- Insufficient English proficiency for AI-based communication.

Justification: These exclusions minimize bias from prior exposure, ensure comparable participant experiences, and protect study validity.

Participant Recruitment

Eligible residents will be recruited in collaboration with residency program offices at each participating institution. Recruitment will occur through official communication channels, including:

- Institutional email invitations.
- Announcements during Academic Half Day sessions.
- Posters and digital flyers shared through resident learning management systems.

Interested residents will receive a recruitment package containing the study overview, eligibility criteria, expectations, and confidentiality assurances. To minimize perceptions of coercion, recruitment will be conducted by members of the research team who are not involved in resident evaluations or promotions.

Two-Spirit Métis community partners will also be engaged through formal partnerships and invitations to participate in co-design sessions for the AI system. Recruitment of Elders, Knowledge Holders, and community researchers will be conducted through established community networks and guided by Métis governance protocols.

All participants will provide written informed consent prior to participation. Residents will be reminded that participation is voluntary and will not affect their academic standing or program evaluations.

Proposed Methods for Protecting Against Sources of Bias

Allocation Concealment: A statistician at the Centre for Healthcare Innovation will maintain the master randomization list. Site research coordinators will access allocation codes only after

baseline OSCE assessments are complete to prevent selection bias. Allocation will occur through a secure, web-based platform to ensure concealment and traceability.

Blinding: Full blinding of participants is not feasible given the educational nature of the intervention. However, several safeguards will mitigate bias:

1. AI-generated patient encounters will be standardized across all participants, removing human variability.
2. Assessors (including 2S Métis raters) will be blinded to group allocation and will review anonymized recordings of AI-patient interactions.
3. OSCE scoring will be conducted using structured, AI-developed checklists with central adjudication.
4. Data analysts will remain blinded to participant allocation during statistical analysis.

Statistical Analyses: To preserve randomization integrity, all analyses will follow an intention-to-treat approach. Primary analyses will employ linear mixed-effects regression models, accounting for fixed effects (trial arm, baseline OSCE score, PGY level) and random intercepts for site. Baseline-adjusted models (ANCOVA) will be used to enhance efficiency, assuming a pre/post correlation ($r \approx 0.6$).

Power Calculation: The study will recruit 90 Ob/Gyn residents across three sites (30 per site). Residents will be randomized 1:1 to intervention or control (45 per arm). Assuming 80% power ($\beta = 0.80$) and a two-sided alpha of 0.05, the study is powered to detect moderate effect sizes (Cohen's $d = 0.4-0.6$) in OSCE score changes. Adjusting for baseline performance and clustering by site, this design provides sufficient power for feasibility objectives while informing parameters for a future definitive trial.

Multiple AI-assisted OSCE stations and blinded assessors will improve measurement precision. As a pilot, emphasis will be placed on estimating effect sizes and 95% confidence intervals rather than p-values. Findings will guide the design, refinement, and scaling of subsequent randomized controlled trials.

Intervention

AI-Assisted OSCE Design

This research employs an AI-enhanced OSCE model integrating Indigenous knowledge and technology to evaluate resident competency. The AI system performs two main functions:

- **Rubric Development:** Synthesizes 2S Métis community input to generate assessment domains on communication, cultural humility, historical awareness, trauma-informed practice, and identity recognition. (in collaboration with the U of T AI team led by Dr. Kam)
- **Standardized Patient Simulation:** Portrays a virtual 2S Métis patient seeking obstetric care, ensuring consistent patient portrayal and scenario delivery in the OSCE style. .

AI Patient Development Process

1. Co-creation of case scenarios by 2S Métis peoples/community members/researchers reflecting real clinical experiences.
2. Programming AI responses reflecting authentic communication, worldview, and cultural nuance.
3. Incorporation of intergenerational and systemic trauma contexts.
4. Iterative validation with 2S Métis Elders and Knowledge Holders.

Encounter Flow

1. **Pre-Encounter Briefing (5 min):** Residents review patient context and encounter goals.
2. **AI-Patient Interaction (15–20 min):** Residents engage via text or voice interface; AI responds in real time.
3. **Post-Encounter Reflection (5 min):** Residents reflect on communication, empathy, and bias awareness.

Two assessors, including a 2S Métis community member, will independently score each interaction using the AI-generated rubric. Discrepancies will be resolved collaboratively, prioritizing cultural insight.

Outcomes

Primary Outcome: OSCE performance scores across domains of cultural humility, communication, trauma-informed care, and affirmation of 2S Métis identity.

Secondary Outcomes:

- Resident self-reported confidence and reflection scores.
 - Inter-rater reliability and cultural validation of AI-generated assessments.
 - Qualitative feedback from 2S Métis assessors on cultural fidelity.
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Ethics, Governance, and Data Sovereignty

The AI system and all associated data are governed by principles of **Indigenous Data Sovereignty (OCAP®)**. Community partners retain authority over:

- Cultural content embedded in the AI model.
- Determination of what constitutes culturally safe care.
- Approval of assessment criteria and patient portrayals.
- Ownership and interpretation of all findings involving 2S Métis representation.

No AI data will be shared externally without explicit community consent. All algorithms, datasets, and outputs are stored on secure institutional servers in alignment with OCAP® and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

Risks and Mitigations

Potential risks include:

- **Technological Limitations:** Addressed via pre-testing and user training.
- **Cultural Misrepresentation:** Prevented through continuous community validation.
- **Participant Fatigue:** Managed by clear time limits and support from Elders and counselors.

Participation is voluntary; residents may withdraw at any time without consequence.

Significance and Innovation

This study pioneers the use of AI in medical education through an Indigenous governance lens. By co-developing culturally grounded assessment tools and AI simulations, it:

- Reduces harm to community members otherwise acting as standardized patients.
- Ensures consistency, fairness, and authenticity in competency assessment.
- Advances reconciliation in medical education by embedding Indigenous knowledge systems into evaluative frameworks.

This approach exemplifies innovation in equity-oriented healthcare training and contributes evidence toward scalable, rights-based education for future physicians.

Limitations

Potential limitations include:

- Limited generalizability beyond Ob/Gyn programs.
- Need for ongoing AI retraining to maintain cultural integrity.
- Dependence on technological infrastructure.

These will be addressed through iterative refinement, community oversight, and ongoing validation cycles.

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