

ARGES-UC v2.0: Artificial intelligence-derived endoscopic severity scoring and disease characterization in ulcerative colitis (UC)

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Background:

- Endoscopic assessment is central to UC disease monitoring.
- Conventional endpoints (MES, UCEIS) are subjective and prone to inter-reader variability.
- Challenge: Pediatric UC studies are smaller and often rely on extrapolation from adult trials.
- AI-derived continuous endpoints may provide more objective, scalable, and sensitive disease assessment.

Objectives:

- Evaluate whether adult-trained ARGES-UC v2.0 produces comparable AI-derived disease severity trajectories in pediatric UC without fine-tuning.
- Enable harmonized assessment across treatment groups in adult (UNIFI) and pediatric (UNIFI-Jr) clinical trials.

What is ARGES-UC and what it measures?

- ARGES-UC v2.0 is an AI pipeline trained on 3,653 UC videos (~61M frames) from adult UC clinical trials to assess endoscopic disease severity.
- No pediatric-specific fine-tuning was performed.

ARGES computes:

- Camera localization^[2,6]: identify colon segments;
- MES_{ARGES}^[5]: compute Mayo Endoscopic Subscore;
- UCEIS_{ARGES} (bleeding, erosion, vascular pattern)^[5]: compute 3 UCEIS component scores;
- CMES^[1,2]: Compute a **novel measure, continuous** Mayo Endoscopic Subscore.

Why CMES (Continuous MES)?

Patients with **identical MES** may exhibit different **CMES values**, enabling higher-resolution characterization of disease severity & treatment response.

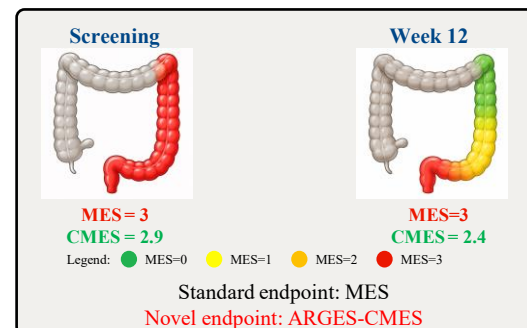


Figure 1: CMES computed by ARGES-UC pipeline vs traditional MES.

Methods (ARGES-UC Workflow):

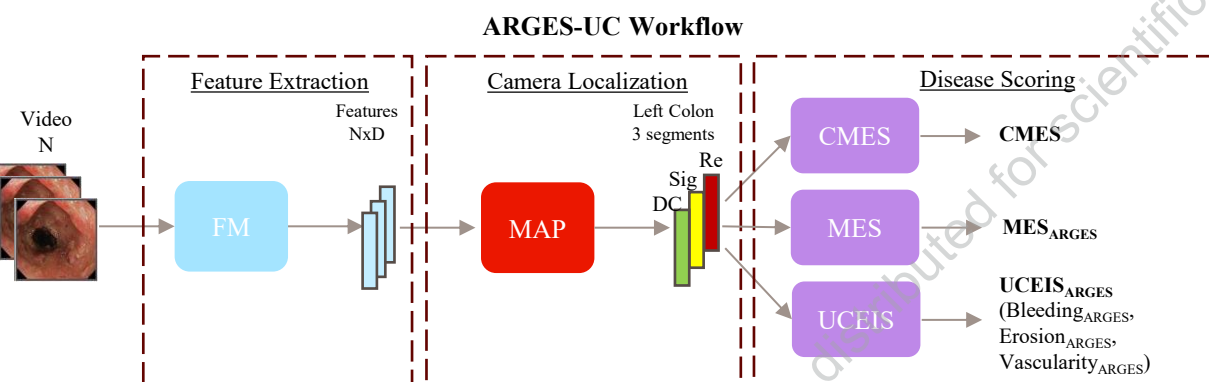


Figure 2: ARGES-UC v2.0 workflow. Endoscopy videos are processed using AI models for colon localization and disease characterization. The pipeline automatically generates MES, UCEIS component scores (Bleeding, Erosion, Vascular Pattern), and Continuous Mayo Endoscopic Score (CMES), enabling fully automated endoscopic assessment of UC disease activity.

Results:

- ARGES computes: MES_{ARGES}^[5], UCEIS_{ARGES} (bleeding, erosion, vascular pattern)^[5], Continuous Score^[1,2] (CMES).
- ARGES enabled comparison of continuous disease severity trajectories between adult & pediatric studies.
- Similar longitudinal trends were observed across AI-derived severity measures in adult & pediatric treatment groups.
- Disease activity decreased consistently from Screening → Week 8 → Week 52.

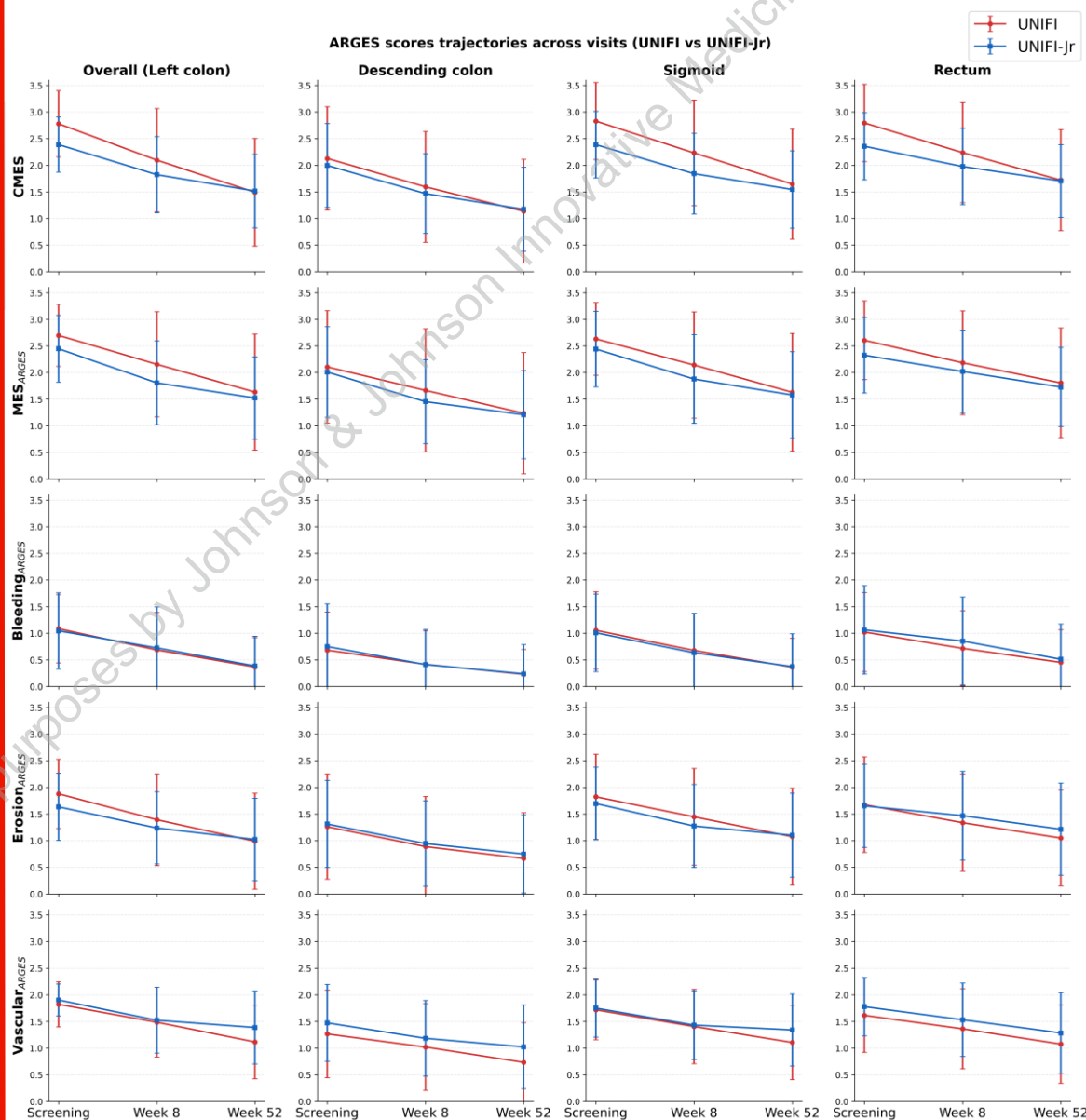


Figure 3: Longitudinal disease severity trajectories derived by ARGES-UC v2.0 for adult UNIFI and pediatric UNIFI-Jr treatment groups for Left colon and segments (d-colon, sigmoid, rectum). Panels show: (A) CMES, (B) MES_{ARGES}, (C) UCEIS_{ARGES}-Bleeding, (D) UCEIS_{ARGES}-Erosion, and (E) UCEIS_{ARGES}-Vascular Pattern. Comparison shown for treatment groups only. Placebo arms from adult UNIFI were excluded because placebo cohorts were not available in pediatric UNIFI-Jr.

Key takeaway



ARGES-UC v2.0 enables harmonized endoscopic disease severity assessment across adult and pediatric UC clinical trials using a common adult-trained AI framework without pediatric-specific fine-tuning.

Conclusions



ARGES-UC v2.0 automatically computes MES, UCEIS component scores, colon localization, and CMES from endoscopy videos.



Adult-trained models were applied directly to pediatric UC without pediatric-specific fine-tuning.



CMES, a novel, AI-derived continuous measure complements traditional ordinal endpoints by providing higher-resolution disease severity characterization.



ARGES-UC enables scalable, reproducible, and harmonized endoscopic endpoint evaluation across adult and pediatric UC clinical trials.

Clinical Potential:

- Fully automated endoscopic severity assessment.
- Reduced reader burden and variability.
- Harmonized adult-pediatric trial assessment
- Continuous CMES → more sensitive disease monitoring^[1].

Disclosures

All authors are employed by Johnson & Johnson. All AI model development and analysis presented in this poster has been conducted internally within Johnson & Johnson Innovative Medicine. All authors have declared no conflict of interest.

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