

Comparative Effectiveness and Probabilistic Ranking of Hyaluronic Acid Fillers for Chin and Jawline Augmentation

A Bayesian Network Meta-Analysis of Randomized Controlled Trials

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PROSPERO: CRD420251162642

INTRODUCTION

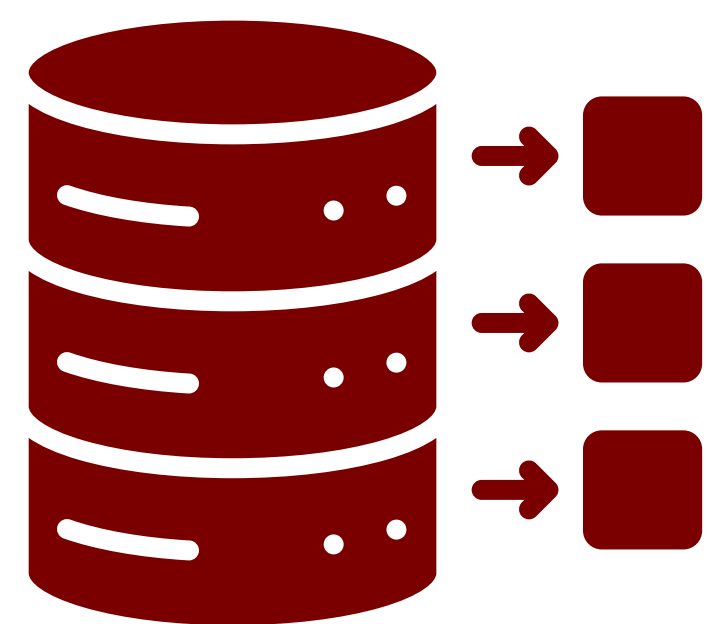
Hyaluronic acid (HA) dermal fillers are widely used for **nonsurgical chin and jawline augmentation (1,2)**, yet few randomized controlled trials (RCTs) directly compare products, limiting procedure-specific comparative inference. **Comparative effectiveness across fillers remains unclear** due to predominantly control-anchored designs and the absence of head-to-head trials. We conducted an RCT-restricted **Bayesian network meta-analysis (NMA)** to estimate comparative efficacy and treatment rankings probabilities for chin and jawline augmentation.

Evidence gap: Prior systematic reviews are descriptive and lack statistical power for comparative analysis. No NMA has simultaneously compared multiple HA fillers.

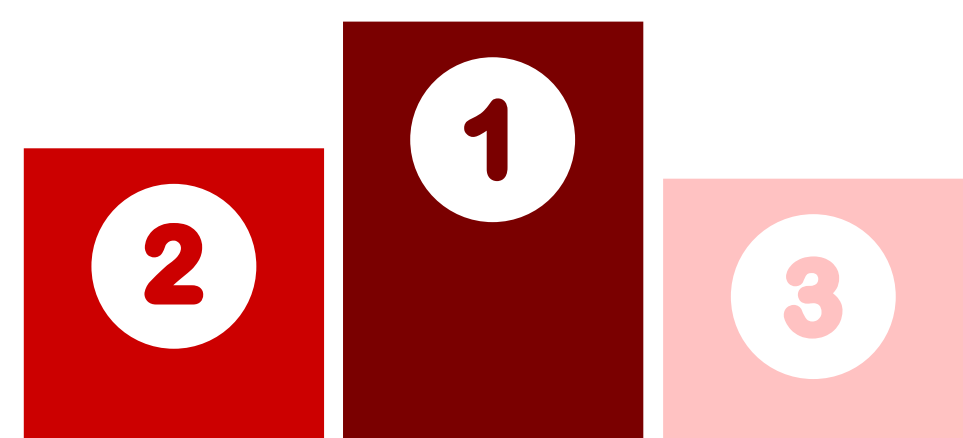
Objective: First Bayesian NMA to simultaneously compare multiple HA fillers for chin and jawline augmentation using evidence exclusively from RCTs.

METHODS

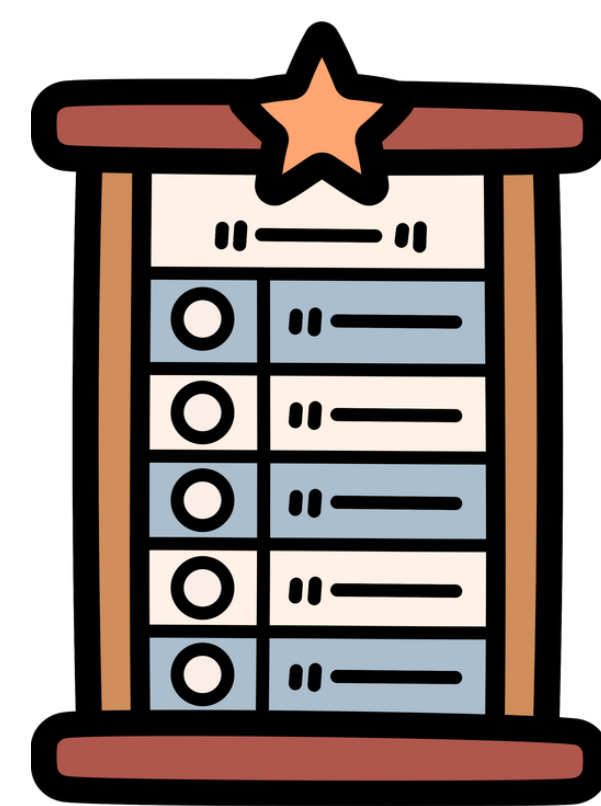
This Bayesian network meta-analysis was conducted following the PRISMA-NMA extension (PROSPERO: CRD420251162642).



PubMed, Embase, and the Cochrane Library searched through December 2025 for randomized controlled trials enrolling adults ≥18 years with chin retrusion or jawline volume deficiency.



Effect sizes are reported as Risk Ratios (RR) with 95% Credible Intervals (CrI), estimated under a binomial likelihood model using four MCMC chains of 100,000 iterations each. Treatment hierarchy was quantified using the Surface Under the Cumulative Ranking Curve (SUCRA) using R 4.5.2



The primary outcome was responder rate on the Allergan Chin Retrusion Scale/Global Chin Rating Scale (ACRS/GCRS) at 12 and 24 weeks; the secondary outcome was the Investigator Global Aesthetic Improvement Scale (iGAIS) at the same timepoints.

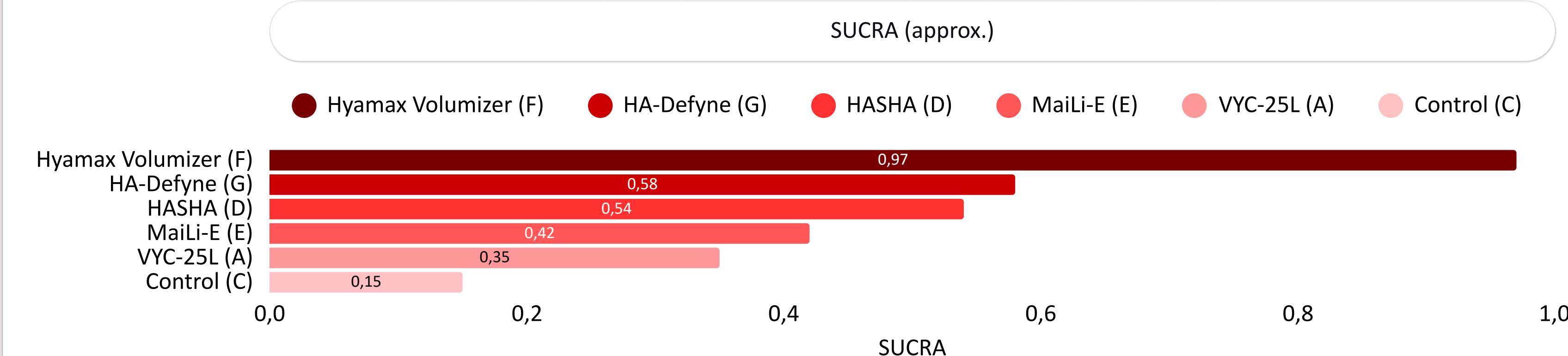
RESULTS

★ **KEY FINDING:** Hyamax Volumizer ranked #1 across all 4 analyses (SUCRA >92%) • All 6 HA fillers superior to control

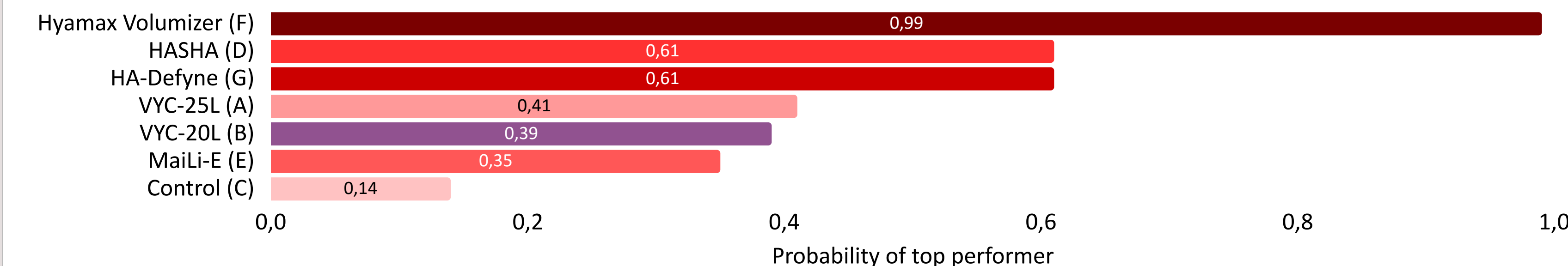


USA (n=2) • Canada (n=1) • China (n=5) | Single-blind RCTs | 5/8 multicenter | Follow-up: 6–12 months

12-Week ACRS/GCRS: Hyamax Volumizer most likely top performer | 5 RCTs | I²=3%



24-Week ACRS/GCRS: Hyamax Volumizer most likely top performer | 7 RCTs | I²=3%



Secondary Outcome: iGAIS Responders — Hyamax Volumizer leads at both timepoints

12-week (3 RCTs, I²=3%): Hyamax Volumizer → VYC-25L → Control.

24-week (4 RCTs, I²=2%): Hyamax Volumizer → VYC-25L → Maili-E → Control.

Evidence certainty (CINeMA) — MODERATE for HA fillers vs. no treatment; **LOW** for comparative rankings (sparse data, indirect evidence, wide CrI).

Effect estimates: All 6 active HA fillers showed RR > 1.0 vs. control (95% CrI excludes null) at 12 and 24 weeks. Hyamax Volumizer had the largest posterior median RR at both timepoints.

Sensitivity analyses: Findings **directionally stable** across fixed-effects Bayesian models and frequentist NMA (*netmeta*, R). **Consistency assumption untestable via node-splitting** — no closed loops present in any network.

Safety: HA fillers were **generally well-tolerated** across all 8 included RCTs. Adverse events consistent with known injection-related profiles; no unexpected safety signals identified.

CONCLUSIONS

Bayesian NMA supports HA fillers as evidence-based options; Hyamax Volumizer leads but head-to-head trials still needed

- **First Bayesian NMA** to simultaneously compare multiple HA fillers for chin/jawline augmentation using exclusively RCT-derived evidence.
- **All 6 HA fillers demonstrated superior aesthetic outcomes** versus no treatment at 12 and 24 weeks, with generally good tolerability across included trials.
- **Hyamax Volumizer ranked highest (SUCRA >92%);** rank 1 probability 91.5% at 12-weeks and 95.1% at 24-weeks. Findings directionally stable across sensitivity analyses.
- **Direct head-to-head RCTs** with standardized protocols and ≥12-month follow-up required to confirm treatment hierarchy.

CLINICAL IMPLICATIONS

- **All HA fillers are evidence-based options** for chin and jawline augmentation. Product selection should remain individualized based on anatomy, patient goals, and injector experience.
- **SUCRA hierarchies support clinical decision-making** (biomechanical demands, projection vs. contour refinement) but do not replace clinical judgment.
- **VYC-25L showed sustained efficacy over 12 months; Hyamax Volumizer showed consistently high responder rates across all analyses.**

LIMITATIONS

- Star-shaped, control-anchored networks — no closed loops; consistency assumption untestable via node-splitting.
- Few RCTs per node → wide credible intervals; Hyamax Volumizer ranking advantage should be interpreted probabilistically.
- Most trials single-blinded; aesthetic endpoints include subjective components susceptible to expectation bias.
- Short-term endpoints (12–24 weeks); durability, retreatment needs
- Potential industry sponsorship across included trials

FUTURE DIRECTIONS

- Head-to-head RCTs directly comparing leading fillers (e.g., VYC-25L vs. Hyamax Volumizer) under standardized protocols.
- Standardized outcome measures: ACRS/GCRS, iGAIS, 3D volumetric metrics, photographic analysis.
- Extended follow-up (≥12–24 months) for durability, retreatment needs, and late adverse events.

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