# Cemented Stem Fixation for Femoral Neck Fractures — US Medicare Cost-Effectiveness

*Blythe R, Chen AF, Graves N, De A, Porter KR, Crawford R, Springer BD. A United States Medicare Population-Based Cost-Effectiveness Analysis of Cemented Stem Fixation When Treating Femoral Neck Fractures.*

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**Study type / level of evidence:** Health-economic evaluation — Markov (state-transition) cost-utility model with probabilistic sensitivity analysis, using AJRR registry data plus published parameters. Decision-analytic (no clinical level of evidence).

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## Part 1 — Leopold Five-Minute Critical Appraisal

**1. What kind of study and what design?**
An economic evaluation — a cost-utility Markov model populated with American Joint Replacement Registry (AJRR) rates and literature-derived costs and utilities, with 50,000-draw probabilistic sensitivity analysis. It models, rather than observes, costs and QALYs over a 5-year horizon.

**2. Does it study an important question?**
Yes, and it is squarely relevant to a managing partner and ASC medical director. More than half of US elderly femoral neck fractures (FNF) still receive cementless femoral stems despite AAOS and NICE recommending cemented fixation; this quantifies the dollar and QALY cost of that guideline non-adherence at population scale.

**3. To whom does it apply, and to whom not?**
US Medicare patients aged ≥65 treated with hemiarthroplasty or THA for FNF. It explicitly does not apply to osteoarthritis patients (different revision/dislocation profiles) or younger patients, and it is a policy-level statement, not an individual treatment rule.

**4. Describe the methods — anything to watch for?**
The dominant caveat is confounding by indication: sicker, older patients may already be preferentially cemented (per Heckmann), yet the model attributes all cost/outcome differences to fixation alone, with no comorbidity adjustment. Outcomes are modeled, dislocation handling is simplified, revision causes are not separated, and several inputs are drawn from heterogeneous literature of varying vintage (implant improvement over time can bias results).

**5. Were hypotheses/purposes clearly stated?**
The purpose is explicit — estimate incremental costs and QALYs of an all-cemented vs all-cementless vs status-quo policy. It is decision-analytic rather than hypothesis-testing, but well specified.

**6. Key results — any counterintuitive findings?**
Switching the 11,339-patient registry cohort entirely to cemented fixation saved $5.0M and gained 1,356 QALYs over 5 years, was cost-effective in 92% of simulations, and 'dominated' the alternatives; national extrapolation suggested ~$126.6M annual savings and ~34,302 QALYs. The counterintuitive message: the 'faster and cheaper' cementless stem is actually costlier at the population level, driven by higher revision and dislocation. Exception: at age ≥85, high

baseline mortality means upfront surgical cost dominates and the cemented advantage attenuates.

**7. Strengths?**
Large registry denominator, rigorous PSA, fully transparent open code (GitHub) and CHEERS reporting, honestly wide uncertainty intervals (several cross zero), and a useful OR-time/ED-time resource analysis that engages the real reason surgeons cite for cementless (speed).

**8. Weaknesses?**
Confounding by indication with no comorbidity adjustment; modeled rather than empirical outcomes; uncertainty intervals that cross zero for several estimates (cost savings not guaranteed in every scenario); a 5-year horizon; dated utility/dislocation inputs; revision causes not modeled (periprosthetic fracture, the main cementless driver, only indirectly captured); and AJRR being a non-mandated subset.

**9. How does it fit with what is known, and what remains?**
It reinforces Okike (JAMA 2020), the Taylor RCT, the Lewis Cochrane review, AAOS/NICE guidance, and registry data (LROI) all favoring cemented fixation, and adds a US population-economic frame. Open questions: routine QALY capture in US surgical patients, causal/RCT confirmation that controls for comorbidity, and whether CMS reimbursement should account for differential revision risk.

**10. Would it change your practice?**
It strengthens the case for cemented femoral fixation in geriatric FNF (both HA and THA) — a guideline-concordant position you can cite in payer, bundle, and ASC cost-of-care discussions, and the mortality fear around cement is unsupported. For patients ≥85, individualize, since the economic benefit narrows. As a model with acknowledged confounding, it informs policy and supports clinical judgment rather than replacing per-patient decision-making.

### Validity and Bias

**Internal validity:** The model structure is sound and PSA appropriately propagates parameter uncertainty, but PSA cannot fix structural confounding by indication, which is the central internal-validity threat and is candidly acknowledged.

**External validity (generalizability):** US Medicare FNF only; explicitly not generalizable to osteoarthritis or younger patients; AJRR is a non-mandated registry subset (argued to be representative).

**Principal biases:** Confounding by indication (sicker patients cemented), input/publication bias from literature-derived parameters, and temporal bias as implants and complication rates improve over time.

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## Part 2 — Comparison to the Existing Literature

**Search method:** PubMed searched across three windows — the past 20 years (2006–2026), the past 2 years (2024–2026), and the trailing 30 days (29 May–29 June 2026). Citations below include DOIs (source: PubMed).

### Foundational / landmark context (20-year window)

The clinical foundation is the Parker Cochrane review of arthroplasty for proximal femoral fracture, the Taylor 2012 JBJS RCT (cementless associated with worse Oxford scores and

more complications, no mortality difference), Okike 2020 (JAMA, cementless vs revision), and Veldman 2017 (Bone Joint J meta-analysis of modern stems). Blythe's own 2020 Australian population cost-effectiveness analysis is the methodological precedent for this US extension.

## Past two years (2024–2026)

The Lewis Cochrane update (2022) and Ramsay (Bone Jt Open 2023) reaffirm no mortality penalty for cement. Moon 2023 (J Arthroplasty) compared hospital costs of cemented vs cementless stems for FNF; Ono 2024 (Medicine) meta-analyzed cemented vs cementless bipolar HA; and Burnett 2025 (J Arthroplasty) argued that cementless complication risk does not support current utilization — all directionally consistent with this paper.

## Trailing 30 days

The trailing-30-day window (to 29 June 2026) yielded a directly relevant new contribution: Chen 2026 (J Arthroplasty, 15 June 2026), 'A Contemporary Comparison of Modern Cementless to Cemented Femoral Stems for Treatment of Femoral Neck Fractures,' which updates the clinical comparison with contemporary stems. Abul 2025 (Acta Orthop Traumatol Turc) adds a CKD-subgroup comparison. Together they keep the cemented-favorable signal current.

## Where this paper sits in the literature

This is the first US Medicare population-level economic model on the question and complements the clinical/registry evidence and the brand-new 2026 contemporary clinical comparison. It converts a well-established clinical preference into a quantified payer argument — directly useful for bundle and reimbursement conversations — while remaining vulnerable to the confounding that only a comorbidity-adjusted or randomized analysis can resolve.

## Key comparator references


1. Veldman HD, et al. Cemented vs cementless hemiarthroplasty for displaced femoral neck fracture: systematic review and meta-analysis of current-generation stems. Bone Joint J 2017;99-B:421–431. doi:10.1302/0301-620X.99B4.BJJ-2016-0758.R1
2. Moon AS, et al. Differences in Hospital Cost With Cemented vs Cementless Femoral Stems in HA and THA for Femoral Neck Fracture. J Arthroplasty 2023. doi:10.1016/j.arth.2023.08.017
3. Ono Y, et al. Comparative outcomes of cemented vs cementless stems in bipolar hemiarthroplasty for femoral neck fractures. Medicine (Baltimore) 2024;103(41):e39946. doi:10.1097/MD.0000000000039946
4. Burnett RA, et al. Cementless Hemiarthroplasty Complication Risk Does Not Support Contemporary Utilization Patterns. J Arthroplasty 2025;40(8S1):S78–S83. doi:10.1016/j.arth.2025.03.067
5. Chen AF, et al. A Contemporary Comparison of Modern Cementless to Cemented Femoral Stems for Treatment of Femoral Neck Fractures. J Arthroplasty 2026 (Jun 15). doi:10.1016/j.arth.2026.06.005