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Appendix Table I. Healthcare Common Procedure Coding System (HCPCS) codes for corticosteroid and hyaluronic acid injections.

HCPCS Codes	Drug Name	Drug Type
J1020, J1030, J1040, J2920, J2930	Methylprednisolone	Corticosteroid
J3300, J3301, J3302, J3303	Triamcinolone	Corticosteroid
J0702, J0704	Betamethasone	Corticosteroid
J1094, J1100	Dexamethasone	Corticosteroid
J1720	Hydrocortisone	Corticosteroid
J7322, J7325, Q4084	Synvisc or Synvisc-One (Genzyme)	Hyaluronic acid
J7321, Q4083	Hyalgan (Fidia) or Supartz (Smith & Nephew)	Hyaluronic acid
J7323, Q4085	Euflexxa (Ferring)	Hyaluronic acid
J7324	Orthovisc (DePuy Synthes)	Hyaluronic acid
J7326	Gel-One (Zimmer Biomet)	Hyaluronic acid
J7327	Monovisc (DePuy Synthes)	Hyaluronic acid
J7328	Gelsyn-3 (Bioventus)	Hyaluronic acid
J7320	GenVisc 850 (OrthogenRx)	Hyaluronic acid
J7317	Sodium hyaluronate	Hyaluronic acid

Appendix Table II. International Classification of Diseases (ICD) 9th and 10th Edition Codes for Identification of hip, knee, and shoulder pathology, as well as bursitis.

	ICD-9	**ICD-10**
Hip Indications	715.15, 715.25, 715.35, 715.95, 716.65, 716.85, 716.95, 718.05, 718.15, 718.85, 718.95, 719.45, 719.55, 719.65, 719.85, 719.95, 736.30, 736.39, 755.63, 843.8, 843.9	M12.25, M12.85, M13.15, M13.85, M16., M21.85, M24.05, M24.15, M24.25, M24.35, M24.45, M24.55, M24.65, M24.85, M25.35, M25.55, M25.65, M25.85, Q65.89, S73.10, S73.19, M05.15, M05.25, M05.35, M05.45, M05.55, M05.65, M05.75, M05.85
Knee Indications	715.16, 715.26, 715.36, 715.96, 716.16, 716.56, 716.66, 716.86, 716.96, 717.0, 717.1, 717.2, 717.3, 717.4, 726.6, 726.69, 729.31, 736.6, 836.0, 836.1, 836.2, 844.1, 844.2, 844.3, 844.8, 844.9	M02.86, M05.06, M05.16, M05.26, M05.36, M05.46, M05.56, M05.66, M05.76, M05.86, M06.06, M06.26, M06.36, M06.86, M07.66, M08.06, M08.26, M08.46, M08.86, M08.96, M10.06, M10.16, M10.26, M10.36, M10.46, M11.06, M11.16, M11.26, M11.86, M12.06, M12.16, M12.26, M12.36, M12.46, M12.56, M12.86, M13.16, M13.86, M14.66, M14.86, M17., M21.06, M21.16, M21.26, M22., M23., M24.36, M24.46, M24.56, M24.66, M25.06, M25.16, M25.26, M25.36, M25.46, M25.56, M25.66, M25.76, M25.86, M67.36, M67.46, M67.5, M67.86, M70.4, M70.5, M71.2, M71.46, M71.56, M71.86, M76.50, M92.40, M93.26, M94.26, Q68.2, Q74.1, S83.
Shoulder Indications	715.11, 715.21, 715.31, 719.41, 726.0, 726.1, 726.2, 831., 840.	M02.81, M05.01, M05.11, M05.21, M05.31, M05.41, M05.51, M05.61, M05.71, M05.81, M06.01 , M06.21, M06.31, M06.81, M07.61, M08.01, M08.21, M08.41, M08.81, M08.91, M10.01, M10.11, M10.21, M10.31, M10.41, M11.01, M11.11, M11.21, M11.81, M12.01, M12.11, M12.21, M12.31, M12.41, M12.51, M12.81, M13.11, M13.81, M14.61, M14.81, M19.01, M19.11, M19.21, M24.31, M24.41, M24.51, M24.61, M25.01, M25.11, M25.21, M25.31, M25.41, M25.51, M25.61, M25.71, M25.81, M67.31, M67.41, M67.81, M71.41, M71.51, M71.81, M75., M93.21, M94.21, S43., S46.
Any Bursitis	726.5, 726.8, 726.9	M70.6, M70.7, M70., M71., M75., M76., M77.

Appendix Table III. Diagnosis codes for the progressively less specific osteonecrosis outcome measures.

	ICD-9	**ICD-10**
ONFH	733.42	M87.05, M87.15, M87.25, M87.35, M87.85
ONFH + unspecified osteonecrosis	733.40, 733.42	M87.00, M87.10, M87.20, M87.30, M87.80, M87.05, M87.15, M87.25, M87.35, M87.85, M87.9
ONFH + unspecified osteonecrosis + other osteonecrosis	733.40, 733.42, 733.49	M87.05, M87.15, M87.25, M87.35, M87.85, M87.00, M87.10, M87.20, M87.30, M87.80, M87.9, M87.08, M87.09, M87.188, M87.19, M87.28, M87.29, M87.38, M87.39, M87.88, M87.89
Any osteonecrosis	733.4	M87.

COVARIATE-ADJUSTED COX MODELS

To further increase the robustness of our results, we performed a sensitivity analysis where we repeated our Cox-regression analysis while controlling for all available covariates. That is, we implemented a multivariable Cox proportional-hazards model to assess the difference in the risk of ONFH between CSIs and HAIs while controlling for age, sex, geographic region, Charlson Comorbidity Index, smoking status, alcohol use disorder, systemic lupus erythematous, injection indication, year of injection, time in the database prior to injection, and time in the database following injection. As no patients in either group had acute lymphocytic leukemia or Sickle Cell Disease, these were not controlled for in this model. Conclusions remained unchanged as there was no significant difference in adjusted risk of ONFH between patients undergoing CSI and HAI (adjusted HR 1.04, 95% CI 0.59-1.84, p=0.89).

Two additional model building techniques were used to further assess the stability of this result. For each, the drug type treatment term (i.e., CSI vs. HAI) was forced into the model. First, stepwise regression (SLENTRY = 0.99 and SLSTAY = 0.995) was performed and model AICs were observed. The model with the lowest AIC included drug type, alcohol use disorder, and sex. With this model, conclusions remained unchanged, as there was no significant difference in adjusted risk of ONFH between patients undergoing CSI and HAI (adjusted HR 1.05, 0.60-1.85, p=0.87). Second, we used backwards stepwise regression with SLENTRY = 0.99 and SLSTAY = 0.20. The final model again included drug type, alcohol use disorder, and sex, and the results were again unchanged with no significant difference in adjusted risk of ONFH between patients undergoing CSI and HAI (adjusted HR 1.05, 0.60-1.85, p=0.87).