Preoperative Weight Change Associated with Higher Likelihood of Complications After Hip and Knee Replacement

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Key Findings:

- Most patients who lost weight before hip or knee replacement had a higher likelihood of surgical site infection and mechanical failure than patients in the same starting BMI class whose weight remained stable. For infection, the likelihood increased with each level of loss, reaching more than six times as likely among overweight patients who lost 20% or more before knee replacement.
- For patients with starting BMI qualifying them as severely obese (BMI 40+), preoperative weight loss was not consistently associated with higher complication likelihood. The strongest association between weight loss and complications was among patients with a starting BMI of overweight (BMI 25-<30) or class 1 obesity (BMI 30-<35).
- Weight gain of 2% or more before surgery was also associated with an elevated complication likelihood across BMI classes, including a 37% higher likelihood of surgical site infection among overweight patients before hip replacement and a 30% higher likelihood among severely obese patients before knee replacement.

Hip and knee replacements, also known as total hip arthroplasty (THA) and total knee arthroplasty (TKA), are commonly performed surgical procedures intended to relieve pain and restore joint function by replacing damaged or diseased joints. Obesity is a well-established risk factor for complications following these procedures, including surgical site infections, mechanical failure of the implant, and the need for revision surgery.[1] As a result, many health systems and insurers require a certain BMI threshold to be eligible for surgery, and patients are frequently advised to lose weight before undergoing joint replacement. However, the evidence for preoperative weight loss as a strategy to reduce surgical complications is mixed. Some prior studies have found that patients who lost weight before joint replacement did not have improved infection or readmission rates compared to those whose weight remained stable,[2] and other studies reported that patients who lost weight before hip replacement and maintained that loss actually had a higher likelihood of deep surgical site infection.[3] With the growing use of GLP-1 receptor agonists for weight management, more patients might present for surgery after significant weight loss, making it increasingly important to understand how the magnitude of preoperative weight change relates to postoperative outcomes.

To understand how preoperative BMI changes across a range of starting weight categories relate to the risk of surgical site infections and mechanical failures after hip and knee replacement surgery, we studied more than one million adult patients who had one of these procedures between January 2017 and September 2025. We classified patients into five groups based on the percentage change in their BMI between a reading from the year prior to surgery and their BMI reading from within a month of the procedure: 2% or more gain, stable (within 2% change), 2% to less than 10% loss, 10% to less than 20% loss, and 20% or more loss. These weight change groups were further stratified by starting BMI class (overweight, obese class 1, obese class 2, and severely obese), comparing each weight change group to patients in the same class whose weight remained stable. We accounted for demographics, Area Deprivation Index based on most recently documented address, and relevant comorbidities (such as

diabetes, obstructive sleep apnea, cardiovascular disease, hypertension, and conditions suggesting immunosuppression).

Compared to patients in the same starting BMI class whose weight remained stable, the likelihood of surgical site infection after knee replacement increased with greater preoperative weight loss, with the steepest gradient among overweight (BMI 25-<30) and class 1 obesity (BMI 30-<35) patients, as seen in Figure 1. Among overweight patients, each level of additional weight loss corresponded to a progressively higher likelihood of infection, reaching more than six times as likely among those who lost 20% or more. Among patients with class 1 obesity, losses of 20% or more were associated with more than four times the likelihood. The gradient was less steep at higher starting BMI classes; among severely obese (BMI 40+) patients, losses of 20% or more were associated with only a 27% higher likelihood. Weight gain was also associated with modestly elevated likelihood across all BMI classes.

Surgical Site Infection Likelihood After Knee Replacement

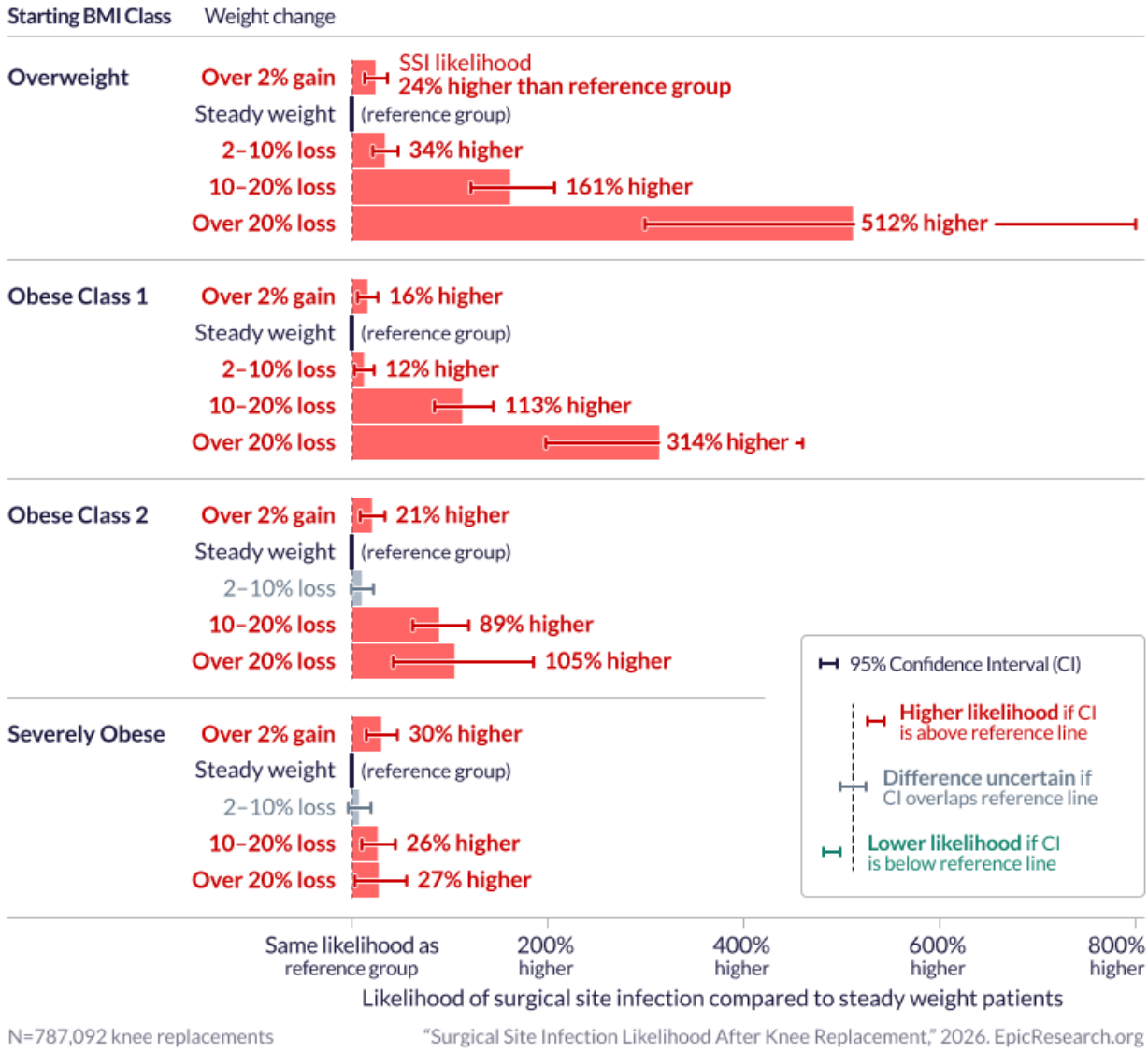

Figure 1. Adjusted likelihood of surgical site infection within 90 days of a knee replacement by starting BMI class and preoperative weight change

Compared to patients in the same BMI class whose weight remained stable, preoperative weight loss was also associated with higher likelihood of surgical site infection after hip replacement among overweight, class 1, and class 2 obesity patients, as seen in Figure 2. Among overweight patients, losses of 20% or more were associated with a 169% higher likelihood, and among class 1 obesity patients, a 152% higher likelihood. Among severely obese patients, however, preoperative weight loss was not associated with a statistically significant change in infection likelihood at any level of loss. Weight gain of 2% or more was associated with a modestly higher likelihood across all BMI classes, ranging from a 31% to 38% increase.

Surgical Site Infection Likelihood After Hip Replacement

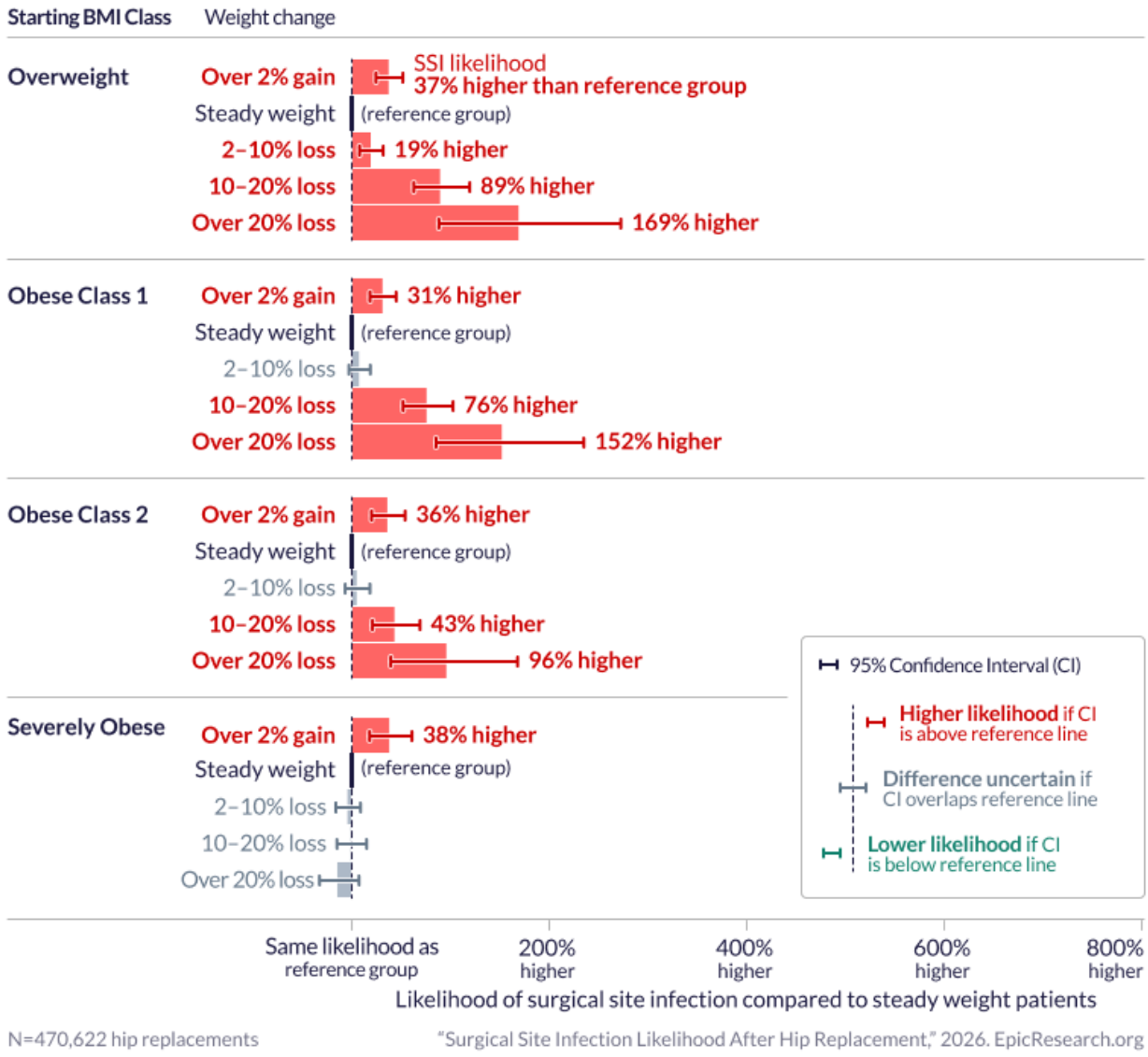

Figure 2. Adjusted likelihood of surgical site infection within 90 days of a hip replacement by starting BMI class and preoperative weight change.

Compared to patients in the same BMI class whose weight remained stable, preoperative weight loss showed associations with mechanical failure after knee replacement that was dependent on starting BMI. Among patients with an overweight BMI, losses of 20% or more were associated with a 128% higher likelihood, and among class 1 obesity patients, a 102% higher likelihood. Among severely obese patients,

greater weight loss corresponded to a lower likelihood of mechanical failure, though not statistically significantly. Losses under 10% showed little meaningful association for any BMI class.

Mechanical Failure Likelihood After Knee Replacement

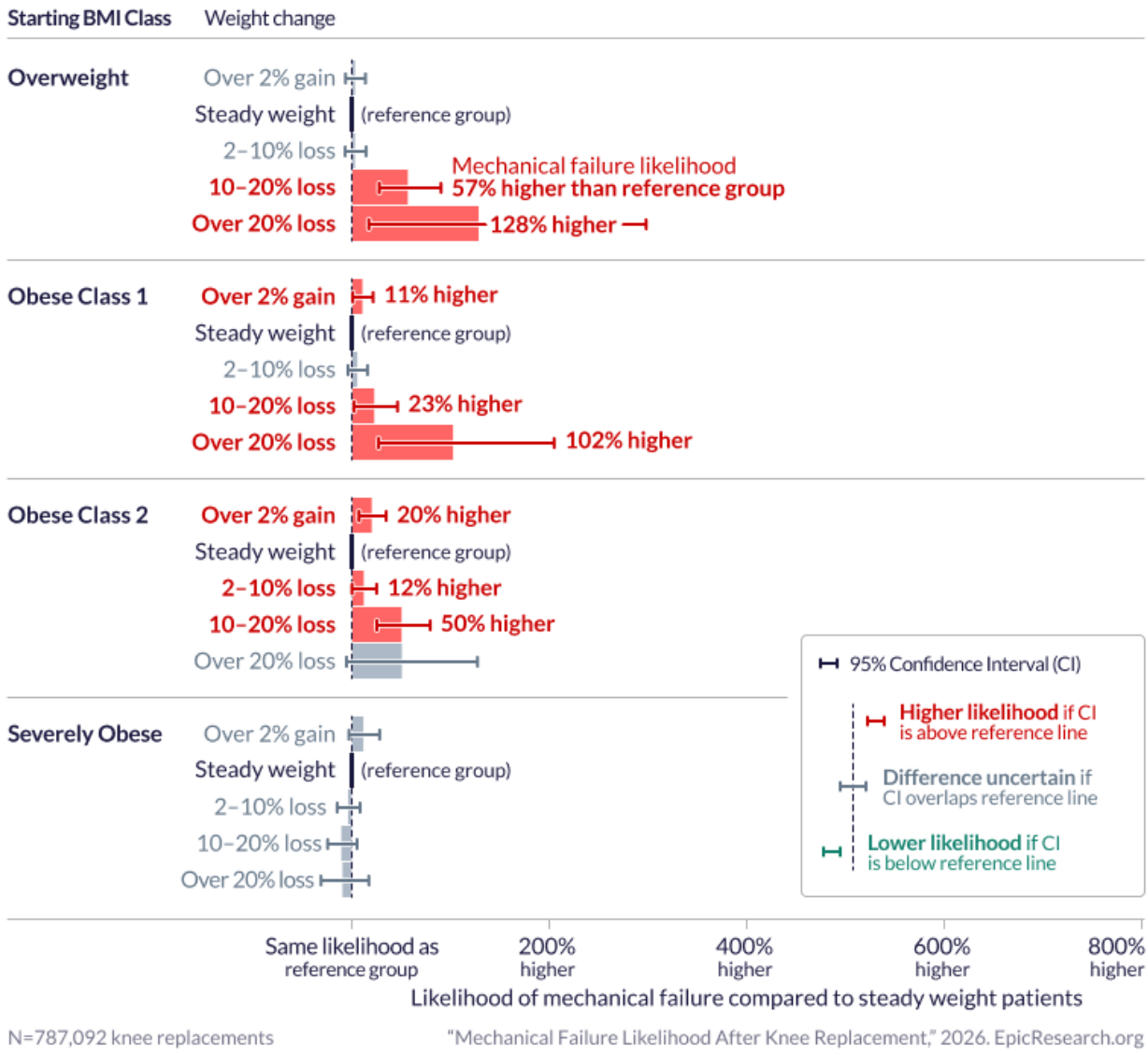

Figure 3. Adjusted likelihood of mechanical failure within 90 days of a knee replacement by starting BMI class and preoperative weight change

Compared to patients in the same BMI class whose weight remained stable, the relationship between preoperative weight change and mechanical failure after hip replacement was the most variable of the four outcomes. Among overweight patients, losses of 10–20% were associated with a 103% higher likelihood and losses of 20% or more with a 138% higher likelihood, as seen in Figure 4. Among class 1 obesity patients, losses of 20% or more were associated with a 169% higher likelihood. Among severely obese patients, weight loss was not associated with higher mechanical failure likelihood at any level.

Mechanical Failure Likelihood After Hip Replacement

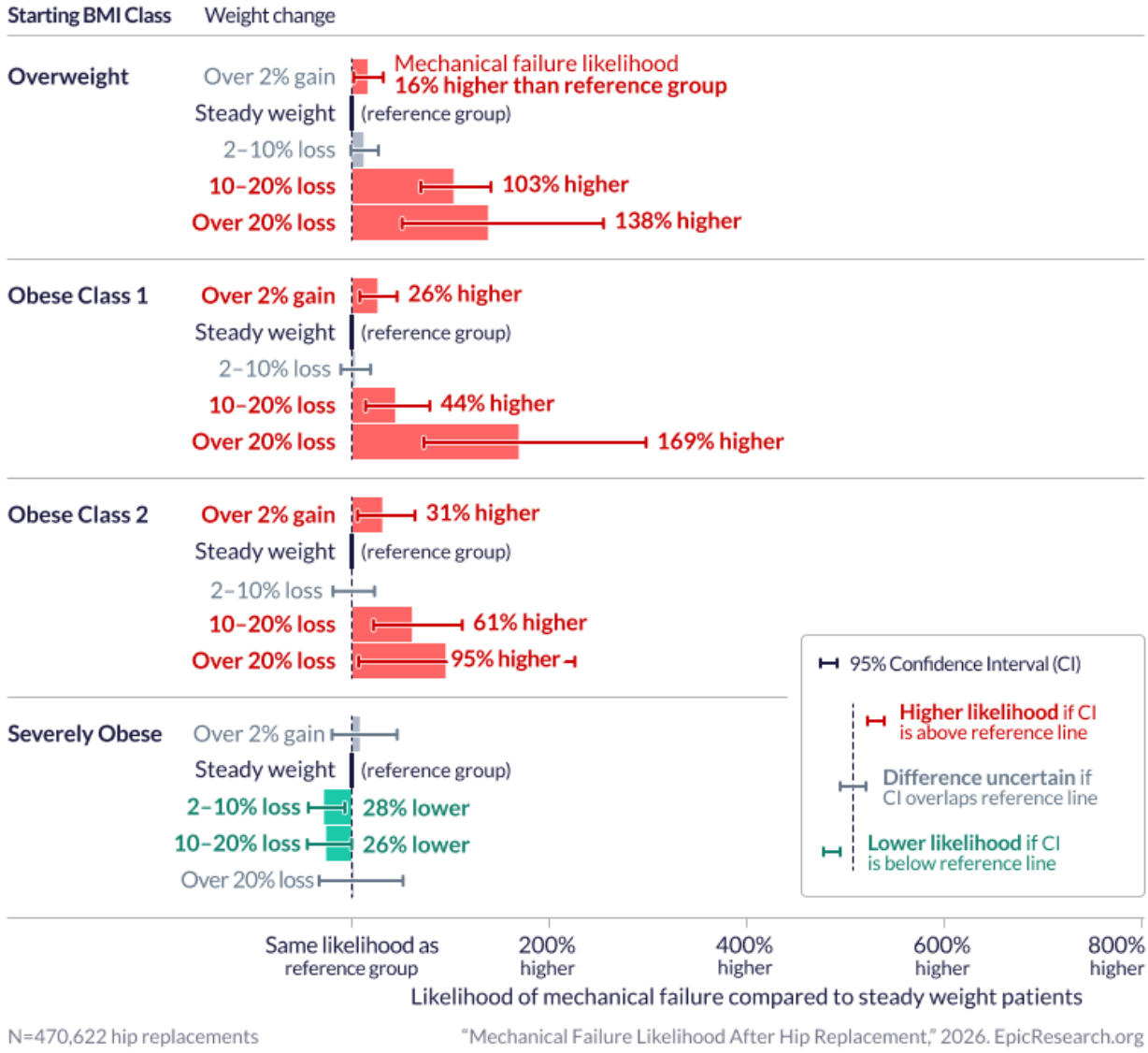

Figure 4. Adjusted likelihood of mechanical failure within 90 days after a hip replacement by starting BMI class and preoperative weight change.

This study measured the association between preoperative weight change and surgical complications but cannot distinguish whether weight loss itself influenced outcomes or whether it reflects underlying factors, such as illness, frailty, or nutrition status, which might independently affect surgical risk. Additionally, obesity carries well-established risks beyond those studied here.[1,3]

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 2,000 hospitals and more than 47,000 clinics from all 50 U.S. states, Canada, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Kerkhoffs GM, Servien E, Dunn W, Dahm D, Bramer JA, Haverkamp D. The influence of obesity on the complication rate and outcome of total knee arthroplasty: a meta-analysis and systematic literature review. J Bone Joint Surg Am. 2012;94(20):1839-1844. doi:10.2106/JBJS.K.00820
2. Seward MW, Grimm JA, Hannon CP, Bedard NA, Berry DJ, Abdel MP. Weight Loss Before Total Hip Arthroplasty Was Not Associated with Decreased Postoperative Risks. J Bone Joint Surg Am. 2025;107(8):849-857. doi:10.2106/JBJS.24.01110
3. Inacio MC, Kritz-Silverstein D, Raman R, et al. The risk of surgical site infection and re-admission in obese patients undergoing total joint replacement who lose weight before surgery and keep it off post-operatively. Bone Joint J. 2014;96-B(5):629-635. doi:10.1302/0301-620X.96B5.33136

Data Definitions

Term	Definition
Study period	1/1/2017 to 9/30/2025

Study population: inclusion	Patients:
	• With a **total knee replacement** or **hip replacement**
	• If a patient has multiple, the first of each type was used
	• At least 18 years old as of the surgery date
	• At least two BMI readings prior to their surgery
	  ○ The first BMI must be 25 or greater and taken between 6 and 12 months prior to the surgery. If there were multiple, we used the one earliest in the window.
	  ○ Another BMI reading must be within one month prior to the surgery. If there are multiple, we used the one closest to the surgery date.
	  ○ Both BMIs must be in the range 6 to 200.
	• With a **face-to-face encounter** between 90 days and 365 days after the procedure

Study population: exclusion	Patients with: • A **pregnancy or birth** between 90 days to 1 year before the surgery • An **amputation** before through the 90 days after surgery • A **revision** on the same date with their index surgery
Exposures	Percentage of BMI change between readings: • 2%+ gain • +/- 2% • 2-<10% loss • 10-<20% loss • 20%+ loss
Outcomes	**SSI** within 90 days of the surgery **Mechanical failure** within 90 days of the surgery
Adjustment factors	Evaluated sex **Area Deprivation Index** quintiles Age • 18-34 • 35-49 • 50-64 • 65-74 • 75+ **Race and ethnicity**: Flag for is Black and is Hispanic Starting BMI classification • Overweight: 25-<30

	• Obese class 1: 30 to <35 • Obese class 2: 35 to <40 • Severely obese: 40+ Comorbidities preceding observation end date (billing, encounter, or problem list diagnosis): • Diabetes: ICD-10-CM code E08*-E13* • Obstructive sleep apnea: ICD-10-CM code G47.3* • CVD: ICD-10-CM code I20*-I26*, I30*-I49*, I51*, I70*-I79* • Essential hypertension: ICD-10-CM code I10 • Conditions that would suggest **immunosuppression**
Immunosuppression	Cancer: ICD-10-CM code C* HIV: ICD-10-CM code B20* Cystic fibrosis: ICD-10-CM code E84* Splenectomy: ICD-10-CM code Z90.81 Transplant: SNOMED code 77465005
Total knee replacement	A procedure with ICD-10-PCS code 0SRC069, 0SRC06A, 0SRC06Z, 0SRC07Z, 0SRC0J9, 0SRC0JA, 0SRC0JZ, 0SRC0KZ, 0SRD069, 0SRD06A, 0SRD06Z, 0SRD07Z, 0SRD0EZ, 0SRD0J9, 0SRD0JA, 0SRD0JZ, 0SRD0KZ, ICD-9-CM (procedure) code 81.54, CPT code 27447, or SNOMED CT code 265172001, 392237008, 443681002, 443682009, 444463001, 609588000, 713687000, 1201734006, 1217702001, 1220622006, 1222566006, 1222567002, 1222568007, 1222569004, 1222570003, or 1287945008 OR a procedure with a name resembling the following pattern: '*knee*' AND ('*arthroplasty*' OR '*replace*') AND NOT ('*partial*' OR '*hemiarthroplasty*' OR '*revise*' or '*revision*') Excluding procedures with a type of 'Surgical History Procedure,' '*Unknown,' '*Deleted,' '*Unspecified,' and '*Not Applicable'
Hip replacement	A procedure with ICD-10-PCS code 0SR9019, 0SR901A, 0SR901Z, 0SR9029, 0SR902A, 0SR902Z, 0SR9039, 0SR903A, 0SR903Z, 0SR9049, 0SR904A, 0SR904Z, 0SR9069, 0SR906A, 0SR906Z, 0SR907Z, 0SR90J9, 0SR90JA, 0SR90JZ, 0SR90KZ, 0SRB019, 0SRB01A, 0SRB01Z, 0SRB029, 0SRB02A, 0SRB02Z, 0SRB039, 0SRB03A, 0SRB03Z, 0SRB049, 0SRB04A, 0SRB04Z, 0SRB069, 0SRB06A, 0SRB06Z, 0SRB07Z, 0SRB0J9, 0SRB0JA, 0SRB0JZ, or 0SRB0KZ, ICD-9-CM (procedure) code 81.51, CPT code 27130, or SNOMED CT code 15163009, 52734007, 265157000, 265160007, 314491003, 426618001, 426904006, 443435007, 770606008, 1230048008, 1231410001, 1231411002, 1231412009, 1231413004, 1231414005, or 1231415006 OR a procedure with a name resembling the following pattern: '*hip*' AND ('*arthroplasty*' OR '*replace*') AND NOT ('*partial*' OR '*hemiarthroplasty*' OR '*revise*' or '*revision*') Excluding procedures with a type of 'Surgical History Procedure,' '*Unknown,' '*Deleted,' '*Unspecified,' and '*Not Applicable'
Pregnancy or birth	A pregnancy episode, documented birth, or a billing or encounter diagnosis with ICD-10-CM code O*
Amputation	A diagnosis with ICD-10-CM code Z89.2*, Z89.6*, S78.011A, S98.011A, S78.012A, S98.012A, S78.019A, S98.019A, S78.021A, S98.021A, S78.022A, S98.022A, S78.029A, S98.029A, S78.111A, S98.111A, S78.112A, S98.112A, S78.119A, S98.119A, S78.121A, S98.121A, S78.122A, S98.122A, S78.129A, S98.129A, S78.911A, S98.131A,

	S78.912A, S98.132A, S78.919A, S98.139A, S78.921A, S98.141A, S78.922A, S98.142A, S78.929A, S98.149A, S88.011A, S98.211A, S88.012A, S98.212A, S88.019A, S98.219A, S88.021A, S98.221A, S88.022A, S98.222A, S88.029A, S98.229A, S88.111A, S98.311A, S88.112A, S98.312A, S88.119A, S98.319A, S88.121A, S98.321A, S88.122A, S98.322A, S88.129A, S98.329A, S88.911A, S98.911A, S88.912A, S98.912A, S88.919A, S98.919A, S88.921A, S98.921A, S88.922A, S98.922A, S88.929A, or S98.929A or a procedure with ICD-10-PCS code 0Y6[23478CDFGHJ]* or 0X6[012389BCDF]*
Revision	A procedure with ICD-10-PCS code 0SW900Z, 0SW903Z, 0SW904Z, 0SW905Z, 0SW907Z, 0SW908Z, 0SW909Z, 0SW90BZ, 0SW90JZ, 0SW90KZ, 0SW930Z, 0SW933Z, 0SW934Z, 0SW935Z, 0SW937Z, 0SW938Z, 0SW93JZ, 0SW93KZ, 0SW940Z, 0SW943Z, 0SW944Z, 0SW945Z, 0SW947Z, 0SW948Z, 0SW94JZ, 0SW94KZ, 0SW9X0Z, 0SW9X3Z, 0SW9X4Z, 0SW9X5Z, 0SW9X7Z, 0SW9X8Z, 0SW9XJZ, 0SW9XKZ, 0SWB00Z, 0SWB03Z, 0SWB04Z, 0SWB05Z, 0SWB07Z, 0SWB08Z, 0SWB09Z, 0SWB0BZ, 0SWB0JZ, 0SWB0KZ, 0SWB30Z, 0SWB33Z, 0SWB34Z, 0SWB35Z, 0SWB37Z, 0SWB38Z, 0SWB3JZ, 0SWB3KZ, 0SWB40Z, 0SWB43Z, 0SWB44Z, 0SWB45Z, 0SWB47Z, 0SWB48Z, 0SWB4JZ, 0SWB4KZ, 0SWBX0Z, 0SWBX3Z, 0SWBX4Z, 0SWBX5Z, 0SWBX7Z, 0SWBX8Z, 0SWBXJZ, 0SWBXKZ, 0SWC00Z, 0SWC03Z, 0SWC04Z, 0SWC05Z, 0SWC07Z, 0SWC08Z, 0SWC09Z, 0SWC0JC, 0SWC0JZ, 0SWC0KZ, 0SWC30Z, 0SWC33Z, 0SWC34Z, 0SWC35Z, 0SWC37Z, 0SWC38Z, 0SWC3JC, 0SWC3JZ, 0SWC3KZ, 0SWC40Z, 0SWC43Z, 0SWC44Z, 0SWC45Z, 0SWC47Z, 0SWC48Z, 0SWC4JC, 0SWC4JZ, 0SWC4KZ, 0SWCX0Z, 0SWCX3Z, 0SWCX4Z, 0SWCX5Z, 0SWCX7Z, 0SWCX8Z, 0SWCXJC, 0SWCXJZ, 0SWCXKZ, 0SWD00Z, 0SWD03Z, 0SWD04Z, 0SWD05Z, 0SWD07Z, 0SWD08Z, 0SWD09Z, 0SWD0JC, 0SWD0JZ, 0SWD0KZ, 0SWD30Z, 0SWD33Z, 0SWD34Z, 0SWD35Z, 0SWD37Z, 0SWD38Z, 0SWD3JC, 0SWD3JZ, 0SWD3KZ, 0SWD40Z, 0SWD43Z, 0SWD44Z, 0SWD45Z, 0SWD47Z, 0SWD48Z, 0SWD4JC, 0SWD4JZ, 0SWD4KZ, 0SWDX0Z, 0SWDX3Z, 0SWDX4Z, 0SWDX5Z, 0SWDX7Z, 0SWDX8Z, 0SWDXJC, 0SWDXJZ, 0SWDXKZ, or CPT 27487, ICD-9-CM (procedure) code 0.70, 0.71, 0.72, 0.73, 0.80, 0.81, 0.82, 0.83, 0.84, or 81.53, or SNOMED CT code 8271002, 16117008, 29712008, 45538008, 62402000, 179295006, 179306002, 280462001, 428622003, 735194005, 735196007, 768498005, 768847008, 768879004, 1222612005, 1222787003, 1230047003, 1230060009, 1230110000, 1230209004, 1231408003, 1231409006, or 1287786008
SSI	A billing or encounter diagnosis with ICD-10-CM T81.4*, T84.[567]*, A49.02, or B95.62 or SNOMED code 58126003
Mechanical failure	A billing or encounter diagnosis with ICD-10-CM T84.0[123569][23]*, T84.1[129][4567]*, T84.4* or SNOMED code 271578000
Race and ethnicity	Separate, non-exclusive flags for Black and Hispanic based on patient's self-reported race and ethnicity that were mapped to standards.
Area Deprivation Index (ADI)	*ADI Funding acknowledgment:* *This project was supported by the National Institute on Aging of the National Institutes of Health under Award NumberRF1AG057784 (PI: Kind), the National Institute On Minority Health And Health Disparities of the National Institutes of Health under Award Number R01MD010243 (PI: Kind); the University of Wisconsin School of Medicine and Public Health (UWSMPH) Center for Health Disparities Research and the Department of Medicine.*

	Content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or of the University of Wisconsin.
Face-to-face encounter	Encounter of type “Emergency”, “Office Visit”, “Well Child”, “Follow-up”, “Telemedicine”, “Urgent Care”, “Walk-in”, “Routine Prenatal”, “Postpartum Visit”, “Fetal Care Consult”, “Hospital Outpatient Visit”, “Hospital Outpatient Visit to Inpatient”, “Inpatient Admission”, or “Emergency to Inpatient”
Model specifications	Logistic regression
Limitations	The data do not capture information about hospital infection control practices or which patients were screened for outcomes like surgical site infection. Mechanical failures may occur beyond the 90-day observation window used. Importantly, the study measures overall BMI change without distinguishing between muscle and fat loss and does not account for the method of weight loss (for example, whether patients used GLP-1 medications, underwent bariatric surgery, or pursued dietary interventions). Patients who lost a substantial amount of weight before surgery may differ from other patients in ways not fully captured by the adjustment variables, including underlying illness severity or frailty.

Table 1. Surgical Site Infection Likelihood After Knee Replacement

	Overweight			Obese Class 1			Obese Class 2			Severely Obese		
Term	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high
BMI Trend > 2% Gain	1.24	1.13	1.36	1.16	1.06	1.27	1.21	1.09	1.34	1.30	1.15	1.47
BMI Trend 2-10% Loss	1.34	1.22	1.47	1.12	1.03	1.23	1.10	1.00	1.22	1.07	0.97	1.20
BMI Trend 10-20% Loss	2.61	2.21	3.07	2.13	1.84	2.45	1.89	1.62	2.19	1.26	1.10	1.44
BMI Trend >= 20% Loss	6.12	3.99	9.00	4.14	2.98	5.60	2.05	1.42	2.85	1.27	1.03	1.56
Sex Male	1.51	1.41	1.63	1.41	1.31	1.51	1.46	1.35	1.58	1.22	1.12	1.33
Age In Years [35,49]	1.55	1.25	1.90	1.55	1.28	1.85	1.34	1.10	1.61	1.26	1.07	1.47
Age In Years [65,74]	0.64	0.59	0.71	0.77	0.71	0.84	0.92	0.84	1.00	0.96	0.87	1.05
Age In Years [18,34]	1.43	0.89	2.18	1.89	1.08	3.05	1.16	0.49	2.31	1.80	0.94	3.11
Age In Years 75+	0.65	0.59	0.72	0.84	0.76	0.92	1.07	0.95	1.20	1.28	1.12	1.47
SVI [.2,.4)	1.08	0.95	1.22	1.07	0.95	1.21	1.12	0.97	1.30	1.06	0.92	1.24
SVI [.4,.6)	1.14	1.01	1.29	1.18	1.05	1.33	1.23	1.07	1.41	1.13	0.97	1.31
SVI [.6,.8)	1.18	1.04	1.33	1.14	1.02	1.28	1.31	1.15	1.50	1.31	1.14	1.51
SVI >=.8	1.30	1.15	1.47	1.32	1.17	1.48	1.30	1.13	1.50	1.33	1.16	1.54
SVI Other	1.32	0.95	1.79	1.24	0.89	1.67	1.25	0.86	1.76	1.08	0.70	1.58
Is Hispanic	0.92	0.75	1.11	0.87	0.72	1.05	0.88	0.71	1.08	0.76	0.59	0.96
Is Black	0.97	0.84	1.11	0.86	0.76	0.97	0.77	0.67	0.88	0.69	0.60	0.78
Diabetes	1.31	1.21	1.42	1.24	1.16	1.34	1.20	1.10	1.30	1.23	1.14	1.34
OSA	1.17	1.08	1.28	1.16	1.08	1.25	1.15	1.06	1.25	1.17	1.07	1.28
CVD	1.55	1.42	1.69	1.52	1.41	1.65	1.48	1.35	1.62	1.69	1.54	1.86

Hypertension	1.40	1.26	1.55	1.45	1.30	1.62	1.33	1.16	1.52	1.32	1.13	1.54
Immunosuppression	1.07	0.99	1.17	1.08	0.99	1.17	0.95	0.86	1.05	1.00	0.90	1.11

Table 2. Surgical Site Infection Likelihood After Hip Replacement

	Overweight			Obese Class 1			Obese Class 2			Severely Obese		
Term	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high
BMI Trend > 2% Gain	1.37	1.25	1.52	1.31	1.19	1.45	1.36	1.20	1.54	1.38	1.18	1.61
BMI Trend 2-10% Loss	1.19	1.08	1.32	1.07	0.97	1.19	1.05	0.93	1.18	0.95	0.84	1.09
BMI Trend 10-20% Loss	1.89	1.63	2.19	1.76	1.52	2.03	1.43	1.21	1.69	0.99	0.85	1.15
BMI Trend >= 20% Loss	2.69	1.88	3.72	2.52	1.85	3.35	1.96	1.39	2.68	0.85	0.67	1.07
Sex Male	1.18	1.10	1.27	0.98	0.91	1.06	0.91	0.82	1.00	0.76	0.69	0.84
Age In Years [35,49]	1.35	1.13	1.60	1.50	1.27	1.77	1.30	1.08	1.55	1.25	1.06	1.47
Age In Years [65,74]	0.72	0.65	0.80	0.80	0.73	0.88	0.82	0.74	0.92	0.86	0.77	0.96
Age In Years [18,34]	2.09	1.48	2.87	2.39	1.67	3.32	2.24	1.45	3.33	1.80	1.13	2.73
Age In Years 75+	0.71	0.64	0.79	0.77	0.69	0.85	0.80	0.69	0.91	0.94	0.80	1.11
SVI [.2,.4)	1.15	1.01	1.32	1.08	0.95	1.23	1.03	0.87	1.21	1.06	0.90	1.25
SVI [.4,.6)	1.35	1.19	1.54	1.16	1.01	1.32	1.13	0.96	1.33	0.99	0.84	1.17
SVI [.6,.8)	1.37	1.20	1.56	1.12	0.98	1.27	1.24	1.07	1.45	1.02	0.87	1.20
SVI >=.8	1.55	1.36	1.77	1.32	1.16	1.50	1.34	1.15	1.57	1.15	0.98	1.36
SVI Other	1.25	0.88	1.74	1.42	1.02	1.93	1.24	0.80	1.85	1.09	0.69	1.65
Is Hispanic	1.09	0.86	1.36	0.87	0.68	1.11	0.93	0.69	1.23	0.79	0.56	1.09
Is Black	0.73	0.63	0.84	0.72	0.63	0.82	0.66	0.56	0.77	0.70	0.60	0.81
Diabetes	1.34	1.23	1.45	1.22	1.13	1.32	1.24	1.13	1.37	1.16	1.05	1.28
OSA	1.16	1.07	1.27	1.14	1.05	1.23	1.12	1.02	1.24	1.14	1.03	1.26
CVD	1.55	1.42	1.70	1.61	1.48	1.77	1.57	1.42	1.75	1.53	1.37	1.70
Hypertension	1.39	1.26	1.55	1.29	1.15	1.45	1.09	0.95	1.27	1.14	0.97	1.34
Immunosuppression	1.07	0.98	1.16	1.03	0.94	1.13	1.14	1.02	1.27	1.01	0.89	1.14

Table 3. Mechanical Failure Likelihood After Knee Replacement

	Overweight			Obese Class 1			Obese Class 2			Severely Obese		
Term	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high
BMI Trend > 2% Gain	1.03	0.94	1.14	1.11	1.01	1.22	1.20	1.07	1.35	1.12	0.97	1.28
BMI Trend 2-10% Loss	1.03	0.93	1.14	1.06	0.96	1.16	1.12	1.00	1.25	0.96	0.85	1.08

BMI Trend 10-20% Loss	1.57	1.28	1.90	1.23	1.02	1.46	1.50	1.25	1.80	0.89	0.76	1.05
BMI Trend >= 20% Loss	2.28	1.17	3.98	2.02	1.27	3.05	1.51	0.95	2.27	0.91	0.69	1.17
Sex Male	1.05	0.96	1.13	1.02	0.95	1.10	1.07	0.97	1.17	0.92	0.82	1.02
Age In Years [35,49]	1.22	0.94	1.57	1.44	1.17	1.74	1.17	0.92	1.46	0.85	0.67	1.05
Age In Years [65,74]	0.87	0.79	0.97	0.93	0.85	1.02	1.12	1.01	1.24	1.35	1.21	1.50
Age In Years [18,34]	1.48	0.89	2.30	1.87	1.06	3.04	1.44	0.63	2.80	1.24	0.49	2.54
Age In Years 75+	0.89	0.79	0.99	1.08	0.98	1.20	1.46	1.29	1.66	2.05	1.76	2.38
SVI [.2,.4)	1.13	0.99	1.28	1.06	0.93	1.20	1.07	0.92	1.25	1.26	1.06	1.51
SVI [.4,.6)	1.00	0.88	1.15	1.13	1.00	1.28	1.07	0.92	1.25	1.17	0.98	1.40
SVI [.6,.8)	1.10	0.97	1.25	1.01	0.90	1.15	1.06	0.92	1.23	1.24	1.05	1.47
SVI >=.8	1.15	1.00	1.31	1.11	0.98	1.26	1.10	0.95	1.28	1.27	1.07	1.51
SVI Other	0.92	0.60	1.34	0.81	0.54	1.18	1.17	0.78	1.70	1.27	0.79	1.95
Is Hispanic	0.89	0.71	1.11	0.84	0.68	1.02	0.79	0.61	1.01	0.85	0.63	1.12
Is Black	1.21	1.05	1.40	1.24	1.10	1.39	1.18	1.04	1.34	1.32	1.16	1.50
Diabetes	1.08	0.98	1.18	1.08	1.00	1.17	1.05	0.96	1.15	1.13	1.03	1.25
OSA	1.26	1.15	1.38	1.17	1.08	1.26	1.11	1.02	1.22	1.21	1.10	1.34
CVD	1.17	1.07	1.27	1.18	1.09	1.28	1.30	1.18	1.43	1.29	1.16	1.44
Hypertension	1.19	1.08	1.33	1.23	1.10	1.38	1.13	0.99	1.31	1.19	1.00	1.42
Immunosuppression	1.04	0.94	1.14	0.98	0.89	1.07	0.95	0.85	1.06	0.98	0.87	1.11

Table 4. Mechanical Failure Likelihood After Hip Replacement

	Overweight			Obese Class 1			Obese Class 2			Severely Obese		
Term	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high	OR	CI low	CI high
BMI Trend > 2% Gain	1.16	1.02	1.32	1.26	1.08	1.46	1.31	1.06	1.64	1.08	0.80	1.46
BMI Trend 2-10% Loss	1.12	0.99	1.27	1.03	0.89	1.19	1.00	0.81	1.23	0.72	0.56	0.93
BMI Trend 10-20% Loss	2.03	1.70	2.41	1.44	1.14	1.79	1.61	1.22	2.12	0.74	0.55	1.00
BMI Trend >= 20% Loss	2.38	1.51	3.55	2.69	1.73	3.98	1.95	1.07	3.26	1.02	0.67	1.52
Sex Male	0.89	0.81	0.98	0.93	0.82	1.04	0.87	0.74	1.03	0.77	0.63	0.95
Age In Years [35,49]	1.41	1.08	1.82	1.17	0.86	1.56	1.18	0.80	1.68	1.37	0.96	1.90
Age In Years [65,74]	1.05	0.92	1.21	1.07	0.92	1.24	1.17	0.97	1.43	1.04	0.83	1.30
Age In Years [18,34]	1.48	0.80	2.49	1.43	0.67	2.67	2.69	1.23	5.12	1.85	0.64	4.17
Age In Years 75+	1.60	1.39	1.83	1.51	1.29	1.77	1.37	1.09	1.72	1.42	1.05	1.90
SVI [.2,.4)	1.08	0.92	1.27	1.06	0.88	1.29	1.08	0.80	1.45	1.27	0.90	1.81
SVI [.4,.6)	1.25	1.06	1.46	1.00	0.82	1.22	1.29	0.97	1.72	1.23	0.87	1.75
SVI [.6,.8)	1.18	1.01	1.39	1.24	1.03	1.49	1.52	1.16	2.01	1.14	0.81	1.62
SVI >=.8	1.50	1.28	1.76	1.17	0.96	1.43	1.55	1.17	2.06	1.39	0.99	1.96
SVI Other	1.30	0.84	1.92	1.45	0.88	2.25	0.86	0.30	1.95	1.31	0.48	2.91

Is Hispanic	1.32	0.99	1.73	1.20	0.83	1.67	1.20	0.74	1.86	0.95	0.48	1.68
Is Black	0.70	0.57	0.85	0.76	0.61	0.94	0.69	0.52	0.91	0.86	0.64	1.14
Diabetes	1.22	1.10	1.36	1.19	1.05	1.34	1.10	0.93	1.30	1.30	1.06	1.58
OSA	1.06	0.94	1.18	1.03	0.91	1.16	1.06	0.90	1.25	1.08	0.88	1.32
CVD	1.41	1.26	1.58	1.35	1.18	1.54	1.62	1.34	1.97	1.51	1.21	1.89
Hypertension	1.23	1.08	1.40	1.20	1.01	1.44	1.10	0.85	1.43	1.26	0.91	1.81
Immunosuppression	1.06	0.95	1.17	1.10	0.97	1.25	1.24	1.03	1.49	1.10	0.86	1.39