# THA TKA Readmission Attachment 1: Summary of Empirical Evidence

In 2010, there were 168,000 THAs and 385,000 TKAs performed on Medicare beneficiaries 65 years and older (National Center for Health Statistics, 2010). There is an increasing trend in both procedures, with some projecting that annual TKA and THA volume will reach more than 3 million and 500,000 by 2030 respectively (Kurtz et al., 2007; Kurtz et al., 2014). Although these procedures dramatically improve quality of life, they are costly. In 2005, annual hospital charges totaled $3.95 billion and $7.42 billion for primary THA and TKA, respectively (Kurtz et al., 2007). These costs are projected to increase significantly for both THAs and TKAs by 2020 (Kurtz et al., 2014). Medicare is the single largest payer for these procedures, covering approximately two-thirds of all THAs and TKAs performed in the US (Ong et al., 2006). Combined, THA and TKA procedures account for the largest procedural cost in the Medicare budget (Bozic et al., 2008).

Since THAs and TKAs are commonly performed and costly procedures, it is imperative to address quality of care. Readmissions increase costs associated with THA and TKA and affect the quality, and potentially, the quantity of life for patients. Although readmissions following elective THA and TKA are relatively rare, the results can be devastating.

The variation in readmission rates across hospitals indicates there is room for quality improvement and targeted efforts to reduce these readmissions could result in better patient care and potential cost savings (Navathe et al, 2017; Cyriac et al., 2016; Borza et al., 2019; Sodhi et al., 2019). Measurement of patient outcomes allows for a comprehensive view of quality of care that reflects complex aspects of care such as communication between providers and coordinated transitions to the outpatient environment. These aspects are critical to patient outcomes and are broader than what can be captured by individual process of care measures.

The THA/TKA hospital-specific risk-standardized readmission rate (RSRR) measure is thus intended to inform quality-of-care improvement efforts, as individual process-based performance measures cannot encompass all the complex and critical aspects of care within a hospital that contribute to patient outcomes.

Figure 1: THA/TKA Logic Model



ReferencesBongartz, T., Halligan, C.S., Osmon, D.R., Reinalda, M.S., Bamlet, W.R., Crowson, C.S., Hanssen, A.D., Matteson, E.L. (2008). Incidence and Risk Factors of Prosthetic Joint Infection After Total Hip or Knee Replacement in Patients with Rheumatoid Arthritis. *Arthritis & Rheumatology, 59*(12), 1713-1720. <https://doi.org/10.1002/art.24060> Borza, T., Oerline, M.K., Skolarus, T.A., Norton, E.C., Dimick, J.B., Jacobs, B.L., Herrel, L.A., Ellimoottil, C., Hollingsworth, J.M., Ryan, A.M., Miller, D.C., Shahinian, V.B., Hollenbeck, B.K. (2019). Association Between Hospital Participation in Medicare Shared Savings Program Accountable Care Organizations and Readmission Following Major Surgery. *Annals of Surgery,* 269(5), 873‐878. <https://doi.org/10.1097/sla.0000000000002737>   
  
Bozic, K.J., Grosso, L.M., Lin, Z., Parzynski, C.S., Suter, L.G., Krumholz, H.M., Lieberman, J.R., Berry, D.J., Bucholz, R., Han, L., Rapp, M.T., Bernheim, S., Drye, E.E. (2014). Variation in Hospital-Level Risk-Standardized Complication Rates Following Elective Primary Total Hip and Knee Arthroplasty. *Journal of Bone and Joint Surgery American Volume, 96*(8), 640‐647. <https://doi.org/10.2106/jbjs.l.01639> Bozic, K.J., Rubash, H.E., Sculco, T.P., Berry, D.J. (2008). An Analysis of Medicare Payment Policy for Total Joint Arthroplasty. *Journal of Arthroplasty, 23*(6 Suppl 1), 133-138. <https://doi.org/10.1016/j.arth.2008.04.013> Browne, J.A., Cook, C., Hofmann, A.A., Bolognesi, M.P. (2010). Postoperative Morbidity and Mortality Following Total Knee Arthroplasty with Computer Navigation. *Knee, 17*(2), 152-156. <https://doi.org/10.1016/j.knee.2009.08.002> Cram, P., Vaughan-Sarrazin, M.S., Wolf, B., Katz, J.N., Rosenthal, G.E. (2007). A Comparison of Total Hip and Knee Replacement in Specialty and General Hospitals. *Journal of Bone and Joint Surgery American Volume, 89*(8), 1675-1684. <https://doi.org/10.2106/jbjs.f.00873> Cyriac, J., Garson, L., Schwarzkopf, R., Ahn, K., Rinehart, J., Vakharia, S., Cannesson, M., Kain, Z. (2016). Total Joint Replacement Perioperative Surgical Home Program: 2-Year Follow-Up. *Anesthesia & Analgesia, 123*(1), 51-62. <https://doi.org/10.1213/ane.0000000000001308>  
  
Huddleston, J.I., Maloney, W.J., Wang, Y., Verzier, N., Hunt, D.R., Herndon, J.H. (2009). Adverse Events After Total Knee Arthroplasty: A National Medicare Study. *Journal of Arthroplasty, 24*(6, Supplement 1), 95-100. <https://doi.org/10.1016/j.arth.2009.05.001> Khatod, M., Inacio, M., Paxton, E.W., Bini, S.A., Namba, R.S., Burchette, R.J., Fithian, D.C. (2008). Knee Replacement: Epidemiology, Outcomes, and Trends in Southern California: 17,080 Replacements From 1995 Through 2004. *Acta Orthopaedica, 79*(6), 812-819. <https://doi.org/10.1080/17453670810016902> Kurtz, S., Ong, K., Lau, E., Mowat, F., Halpern, M. (2007). Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030. *Journal of Bone and Joint Surgery American Volume, 89*(4):780-5. <https://doi.org/10.2106/jbjs.f.00222> Kurtz, S., Ong, K.L., Lau, E., Bozic, K.J., Berry, D., Parvizi, J. (2010). Prosthetic Joint Infection Risk After TKA in the Medicare Population. *Clinical Orthopaedics and Related Research, 468*(1), 52-6. <https://doi.org/10.1007/s11999-009-1013-5> Kurtz, S.M., Ong, K.L., Lau, E., Bozic, K.J. (2014). Impact of the Economic Downturn on Total Joint Replacement Demand in the United States: Updated Projections to 2021. *Journal of Bone Joint Surgery American Volume, 96*(8), 624-630. <https://doi.org/10.2106/jbjs.m.00285> Mahomed, N.N., Barrett, J.A., Katz, J.N., Phillips, C.B., Losina, E., Lew, R.A., Guadagnoli, E., Harris, W.H., Poss, R., Baron, J.A. (2003). Rates and Outcomes of Primary and Revision Total Hip Replacement in the United States Medicare Population. *Journal of Bone and Joint Surgery American Volume, 85*(1), 27-32. <https://doi.org/10.2106/00004623-200301000-00005> National Center for Health Statistics. (2010). *National Hospital Discharge Survey: 2010 Table, Procedures by Selected Patient Characteristics - Number by Procedure Category and Age.* Centers for Disease Control and Prevention. [http://www.cdc.gov/nchs/data/nhds/4procedures/2010pro4 numberprocedureage.pdf](http://www.cdc.gov/nchs/data/nhds/4procedures/2010pro4%20numberprocedureage.pdf) Navathe, A.S., Troxel, A.B., Liao, J.M., Nan, N., Zhu, J., Zhon, W., Emanuel, E.J. (2017). Cost of Joint Replacement Using Bundled Payment Models. Journal of the American Medical Association Internal Medicine, *177*(2), 214-222. <https://doi.org/10.1001/jamainternmed.2016.8263> Ong, K.L., Mowat, F.S., Chan, N., Lau, E., Halpern M.T., Kurtz, S.M. (2006). Economic Burden of Revision Hip and Knee Arthroplasty in Medicare Enrollees. *Clinical Orthopaedics and Related Research, 446*, 22-28. <https://doi.org/10.1097/01.blo.0000214439.95268.59> Sodhi, N., Mont, M.A., Cleveland Clinic Orthopaedic Arthroplasty. (2019). Does Patient Experience After a Total Knee Arthroplasty Predict Readmission? *Journal of Arthroplasty*, 34(11), 2573‐2579. <https://doi.org/10.1016/j.arth.2019.04.044> Solomon, D.H., Chibnik, L.B., Losina, E., Huan, J., Fossel, A.H., Husni, E., Katz, J.N. (2006). Development of a Preliminary Index That Predicts Adverse Events After Total Knee Replacement. *Arthritis & Rheumatology, 54*(5), 1536-1542. <https://doi.org/10.1002/art.21772> Soohoo, N.F., Farng, E., Lieberman, J.R., Chambers, L., Zingmond, D.S. (2010). Factors That Predict Short-Term Complication Rates After Total Hip Arthroplasty. *Clinical Orthopaedics and Related Research, 468*(9), 2363-2371. <https://doi.org/10.1007/s11999-010-1354-0>