

Opioid Use in Total Hip Arthroplasty and Total Knee Arthroplasty Patients in the United States: 2009-2012

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BACKGROUND

In recent years, opioid misuse in the United States has become a rapidly growing public health issue that affects people of all races, education levels, and socioeconomic statuses. The number of fatal overdoses resulting from opioid misuse has nearly quadrupled since 1999 and more than half a million people have died in the last fifteen years from opioid-related overdoses.^{2,3} High doses of opioids, particularly those at or above a morphine-equivalent dosage (MED) of 50 milligrams per day, can double the risk of overdose.⁴

Opioids are commonly prescribed to patients experiencing joint issues to treat pain before surgical intervention and to manage pain during recovery. National projections estimate that in the coming decades, joint replacement surgeries will become some of the most common elective procedures due to the sharp increase in the aging population.⁵ As the U.S. population ages and joint replacement surgeries become more common, it is necessary to develop a better understanding of the relationship between opioid use and hip and knee replacement. This project aims to explore trends in prescription utilization by average MED among joint replacement patients using healthcare claims data from 2009 through 2012.



METHODS

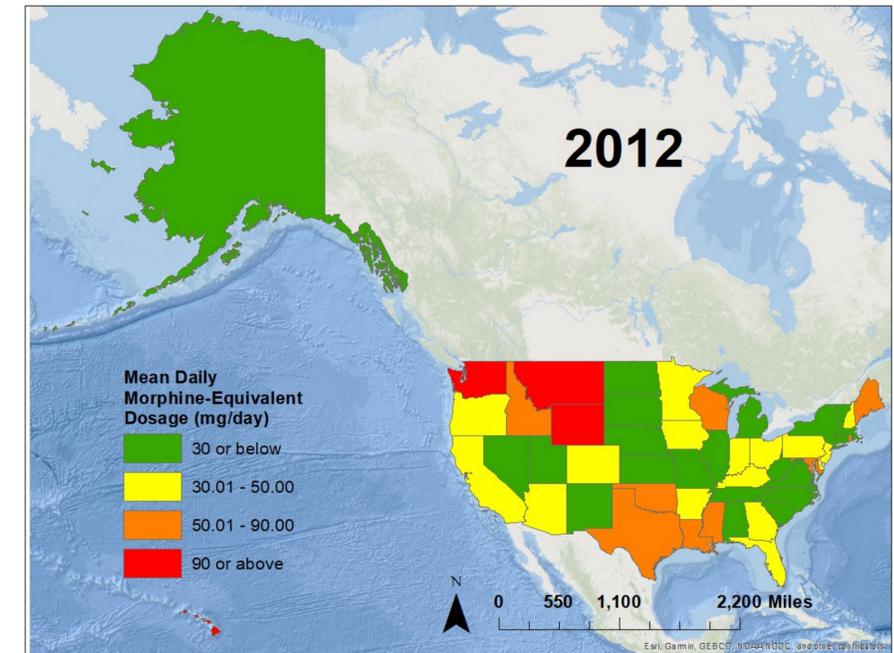
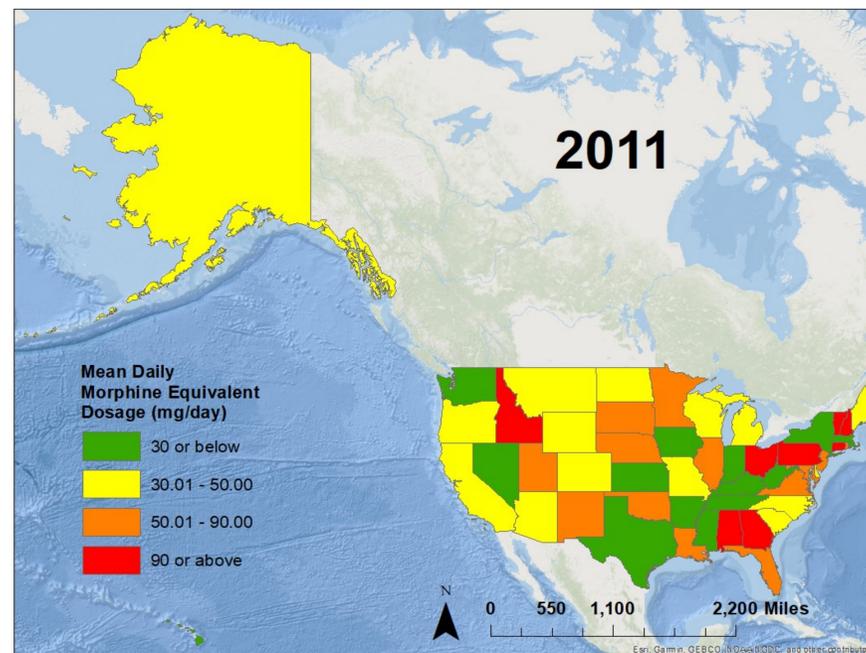
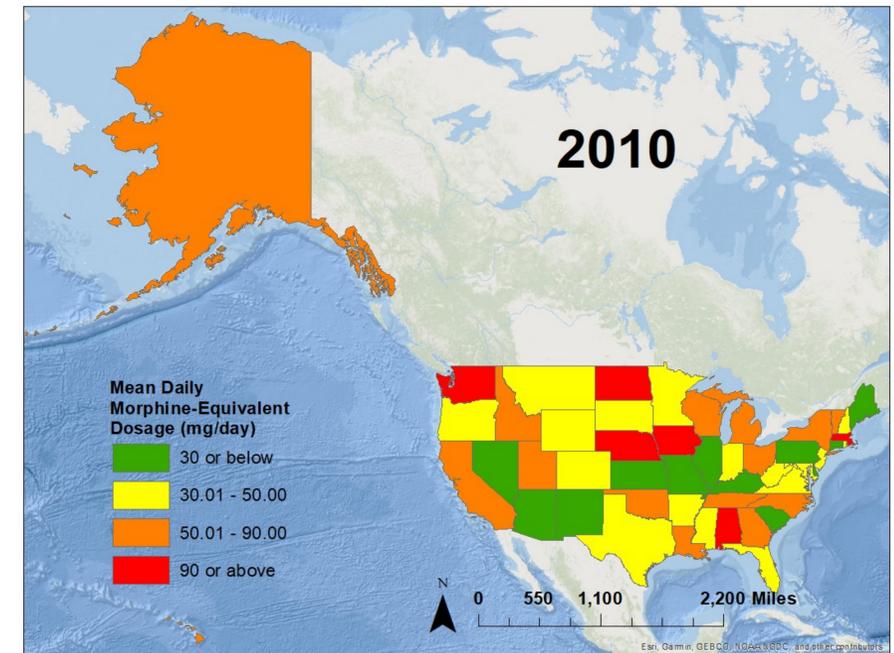
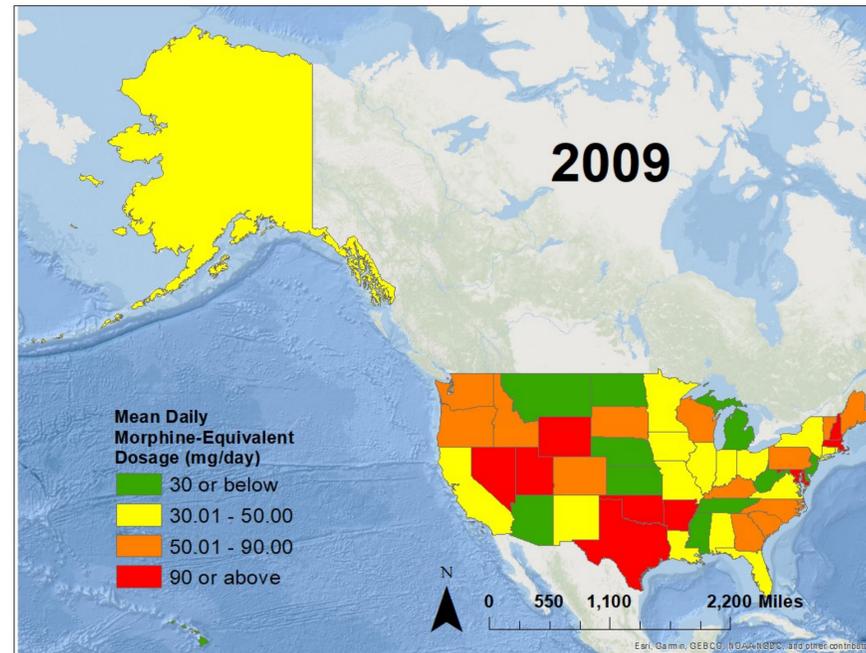
Prescription data from 125,019 total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients from 2009 through 2012 were gathered from Truven Health Analytics MarketScan Commercial Claims and Encounters research database. The selected population utilized 1,041,103 opioid prescriptions during the four year period. The mean daily morphine equivalent dosage was calculated for each prescription using the morphine-milligram equivalent conversion factor for each drug. Categories were grouped using the CDC recommended daily morphine-equivalent dosages. These data were then joined with state-level data from ArcGIS Online. Data management was conducted using SAS, and choropleth maps were created using ArcGIS.

RESULTS

The four maps illustrated an overall decrease in the mean daily morphine-equivalent dosage of prescriptions utilized by THA and TKA patients between 2009 and 2012. In 2009, 25 states exceeded a mean daily MED of greater than 50 milligrams, which the CDC classifies as a high-risk daily dose. By 2012, only 20 states exceeded this category, while 30 states had a mean MED of below 50 mg. The following tables shows the number of states within each categories over the course of four years

Table 1. Number of states per daily MED category, 2009-2012

Year	30 or below	30.01-50.00	50.01-90.00	90.01 or above
2009	12	16	13	9
2010	12	17	15	6
2011	14	15	3	8
2012	21	16	9	4



DISCUSSION

This exploration of MarketScan data indicates an overall decrease in the mean daily MED prescribed to TKA and THA patients between the years 2009 and 2012. These findings are consistent with reports from the CDC, which indicated a peak in prescribed MED per capita in 2010 following a significant decrease by 2015.⁶ This is likely due to increasingly stringent opioid-prescribing regulations that were implemented in order to reduce opioid misuse and published recommendations for MED prescribing. The primary strength of this project is the large number of prescriptions reported and analyzed, but it is limited by the fact that the data is only reflective of past trends. Further research should examine more current trends to ensure that this reduction in average prescribed MED is remaining low among TKA and THA patients.

SOURCES

- Rudd, R. A. (2017). Increases in Drug and Opioid-Involved Overdose Deaths United States, 2010-2015 (vol 65, pg 1445, 2016). *Mmwr-Morbidity and Mortality Weekly Report*, 66(1), 35-35.
- Cicero, T. J., Ellis, M. S., Surratt, H. L., & Kurtz, S. P. (2014). The Changing Face of Heroin Use in the United States A Retrospective Analysis of the Past 50 Years. *Jama Psychiatry*, 71(7), 821-826. doi:10.1001/jamapsychiatry.2014.366
- AHRQ Study: Joint Replacement To Become the Most Common Elective Surgical Procedure in the Next Decades. Content last reviewed February 2016. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/news/newsletters/e-newsletter/503.html>
- Dowell, D., Haegerich, T. M., & Chou, R. (2016). CDC Guideline for Prescribing Opioids for Chronic Pain - United States, 2016. *Mmwr Recommendations and Reports*, 65(1), 1-49.
- 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. *J Bone Joint Surg Am*, 89(4), 780-785. doi:10.2106/jbjs.f.00222
- Guy GP Jr., Zhang K, Bohm MK, et al. Vital Signs: Changes in Opioid Prescribing in the United States, 2006-2015. *MMWR Morb Mortal Wkly Rep* 2017;66:697-704. DOI: <http://dx.doi.org/10.15585/mmwr.mm6626a4>

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