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Short Communication

Trends in average days' supply of opioid medications in Medicaid and commercial insurance

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HIGHLIGHTS

- We examined trends in average days' supply of opioid medications for Medicaid and commercially insured population.
- Average days' supply for all drugs except morphine increased for both Medicaid and commercially insured population.
- More outreach education is needed to convince providers that opioids should be prescribed cautiously.

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ABSTRACT

Objectives: To calculate trends in adult average days' supply for six commonly prescribed opioids: hydrocodone, hydromorphone, morphine, oxycodone, oxymorphone, and tapentadol to assess whether physicians changed prescribing practices at the time of the intensifying epidemic.
Methods: We used 2005–2015 Truven Health MarketScan Commercial Claims and Encounters data to measure trends in opioid average days' supply among commercially insured individuals and 2005–2014 MarketScan Multi-State Medicaid data to measure trends in opioid average days' supply among Medicaid beneficiaries.
Results: For Medicaid, we found an increase in days' supply for all drugs except morphine. The largest percentage increase was for oxycodone, which increased 4.5 days (37%). Opioid days' supply for individuals with commercial insurance exhibited similar but steeper trends. The largest increase was also for oxycodone, which increased 6 days (56%). Between 2013 and 2015, when the opioid epidemic had begun to be widely publicized, there was no decline in the median days supplied for any of the opioids.
Conclusions: Our results find that days' supply of opioids are increasing despite public health campaigns and media attention on the risks of opioid prescribing. More effective interventions to curb opioid prescribing are needed to reverse these trends.

1. Introduction

Increasing abuse of opioid pain medications and mortality due to opioid overdose is a major public health concern (Dart, Surratt, Cicero, et al., 2015). In 2014, there were about 19,000 opioid-related deaths, representing a 20% increase from 2013 (CDC, 2016). Although there has not been a dramatic change in the amount of pain that Americans report over the past two decades, the number of opioid prescription drugs sold in the United States has nearly quadrupled since 1999 (CDC, 2016; Chang, Daubresse, Kruszewski, & Alexander, 2014; Daubresse, Chang, Yu, et al., 2013). An estimated 20% of patients presenting to physician offices with noncancer pain symptoms or pain-related diagnoses (including acute and chronic pain) receive an opioid prescription (Daubresse et al., 2013). In 2012, health care providers wrote 259 million prescriptions for opioid pain medication (Paulozzi, Mack, & Hockenberry, 2014).

In March 2016, the CDC issued opioid prescribing guidelines recommending that opioids should not be the first-line therapy for chronic pain because of their risks and limited evidence of long-term efficacy (Dowell, Haegerich, & Chou, 2016). Further, the CDC recommended that opioid prescribing for acute pain should not be provided "just in case" and should be limited to the expected duration of

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pain severe enough to require opioids (typically 3–7 days) to minimize unintentional initiation of long-term opioid use.

Guidelines for the number of pills prescribed (or days supplied) are intended to minimize unintentional or intentional diversion, which is a greater issue when there are leftover pills. In an effort to reduce the risks of addiction and diversion, states have implemented limits on the number of days supplied under a prescription (CDC, 2015). For example, Connecticut recently passed legislation limiting prescriptions for pain medications to a 7-day supply except for certain circumstances, such as chronic pain, cancer pan, and palliative care (Connecticut General Assembly, 2016).

Despite this legislation and the awareness that the provision of lengthy prescriptions may lead to abuse and diverted pills, little is known about the trends in days' supply of prescribed opioids. Reducing the number of pills prescribed is an important component of addressing the opioid epidemic, making it important to track trends in the number of days supplied for opioid medications. In this study, we use claims data to calculate trends in the average adult days' supply for six commonly prescribed opioids: hydrocodone, hydromorphone, morphine, oxycodone, oxymorphone, and tapentadol.

2. Materials and methods

2.1. Databases and sample population

We used two Truven Health MarketScan® Databases for this analysis: 1) 2005–2015 Commercial Claims and Encounters Database, which includes insurance claims from employees and their dependents covered by large, self-insured employers and by regional health plans; 2) 2005–2014 Multi-State Medicaid Database, which contains the pooled healthcare experience of approximately 6 million Medicaid enrollees. The sample population was limited to adults aged 18 to 64, excluding people who were diagnosed with cancer. Individuals dually eligible for Medicare and Medicaid were excluded from the Medicaid analysis. The Medicaid sample was 30% male and 70% female, and the average age was 40.5 years. The Commercial sample was 42% male and 58% female, with an average age of 46.2 years.

2.2. Opioid drugs

We identified all oral or tablet forms of prescriptions filled for hydrocodone, hydromorphone, oxycodone, oxymorphone, tapentadol, and morphine by adults aged 18 to 64, excluding prescriptions to patients diagnosed with cancer and those with invalid information. These medications were chosen because (1) they are the most frequently prescribed opioid pain medicines; (2) they were available throughout the time period, thereby allowing trends to be examined; and (3) they were oral pills for which days supplied is relevant. We included combination drugs, which we grouped according to the opioid ingredient. For example, the hydrocodone group included hydrocodone/acetaminophen, hydrocodone/ibuprofen, hydrocodone/homatropine, and hydrocodone/chlorpheniramine.

2.3. Outcomes

The outcome measured was average days' supply of the six opioid drug groups. Medians and ranges also were calculated. For a sensitivity analysis, we limited the Medicaid sample to states that continuously contributed data to Medicaid MarketScan. The results of the sensitivity analyses, medians, and ranges are reported in the Appendix.

2.4. Statistical analysis

Two-sample *t*-tests were used to compare average days' supply in the final year for which data are available (i.e., 2014 or 2015 depending on insurance) to 2005. All analyses were conducted using SAS 9.4 (Cary, NC. USA).

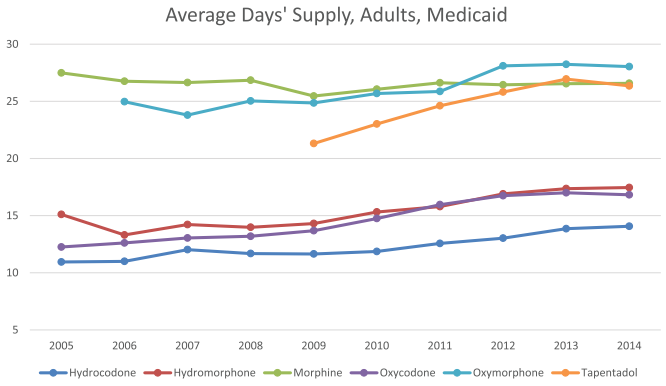

Fig. 1. Average days' supply for opioid medications in adults with Medicaid, 2005–2014. Source: Truven Health MarketScan Multi-State Medicaid data, 2005–2014. Notes: *The Medicaid states included in MarketScan varied by year.* The average sample size for each drug-year is presented in parentheses: hydrocodone (1,090,000), hydromorphone (31,000), morphine (90,000), oxycodone (865,000), oxymorphone (10,500), and tapentadol (6200). The difference in average days' supply in 2014 compared to the baseline year (2005) is statistically significant ($p < 0.05$) for all drugs.

3. Results

3.1. Medicaid

For Medicaid (Fig. 1), we found an increase in days' supply for all drugs except morphine. Over the study period, the largest percentage increase was for oxycodone days supplied, which increased 37%. The average days supplied increased for hydrocodone, hydromorphone, oxymorphone, and tapentadol by 29%, 16%, 12%, and 24%, respectively. However, average days' supply of morphine decreased by 3%. In terms of the absolute change in days' supply, oxycodone, hydrocodone, hydromorphone, oxymorphone, and tapentadol increased by 4.5, 4, 2.5, 3, and 5 days, respectively. The average days' supply of morphine decreased by one day. After 2013, when the opioid epidemic had begun to be widely publicized, there was no decline in the median days supplied for any of the opioids (Appendix, Fig. A1).

3.2. Commercial

The average opioid days' supply for patients covered by commercial insurance (Fig. 2) exhibited a similar but steeper increase. Over the study period, the largest percentage increase was for oxycodone, which increased by 56%. Hydrocodone, hydromorphone, oxymorphone, and tapentadol increased by 33%, 40%, 32%, and 40%, respectively. Average days' supply of morphine decreased by 4%. In terms of absolute change in days' supply, oxycodone, hydrocodone, hydromorphone, oxymorphone, and tapentadol increased by 6, 3.5, 5, 7, and 7.5 days, respectively. The average days' supply of morphine decreased by one day. Between 2013 and 2015, when the opioid epidemic had begun to be widely publicized, there was no decline in the median days supplied of any of the opioids, and one of the most widely prescribed (hydrocodone) increased (Appendix, Fig. A2).

The sensitivity analysis was conducted using the same states over time (Appendix, Fig. A3). Results revealed similar trends, with days' supply increasing for all drugs except oxymorphone. The largest increase was for oxycodone, which increased 66% (an increase of 7 days) over the study period. Average days' supply of hydrocodone, hydromorphone, morphine, and tapentadol increased by 52%, 28%, 1%, and 30%, respectively. The average days' supply of oxymorphone did not change. The absolute change in days' supply of hydrocodone,

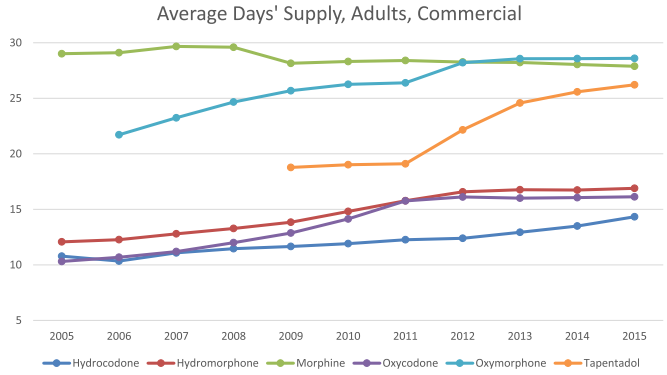

Fig. 2. Average days' supply for opioid medications in adults with commercial insurance, 2005–2015.
Sources: Truven Health MarketScan Commercial Claims and Encounters data, 2005–2015. Notes: The average sample size for each drug-year is presented in parentheses: hydrocodone (4,950,000), hydromorphone (145,000), morphine (251,000), oxycodone (2,550,000), oxymorphone (36,100), and tapentadol (75,200). The difference in average days' supply in 2015 compared to the baseline year (2005) is statistically significant ($p < 0.05$) for all drugs.

hydromorphone, morphine, and tapentadol increased 5, 4, 0.5, and 6 days, respectively. The interquartile ranges (IQR) for the Medicaid and commercially insured populations are presented in the Appendix (Tables A1 and A2).

4. Discussion

Despite national headlines describing the perils of opioid addiction, increased provider education about opioid prescribing, and regulations to restrict the number of pills prescribed, the days' supply of prescriptions for commonly prescribed opioids significantly increased in the last decade as well as more recently (from 2013 to 2014 or 2015). Given that there are > 250 million prescriptions for opioid pain medications a year, even an average one-day decrease in days supplied could have a significant effect on reducing the impact of opioids on public health (CDC, 2014).

These results suggest that more needs to be done to reduce opioid prescribing to only the short period necessary for acute pain. For example, evidence based provider outreach and education may help convey to providers and patients that, given the risks of abuse and lack of a strong evidence base for long-term efficacy, opioids should be prescribed sparingly. Future research should continue to track trends in opioid pain medication days supplied and should assess the impact of policies to reduce days supplied on opioid misuse, addiction, and overdose.

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Contributors

MMA, RM and TLM conceived the study, and interpreted the data. ABT performed the statistical analysis. RMH and ABT drafted the manuscript. MMA and RM designed the study and critically revised the manuscript.

Conflict of interest statement

The authors report no financial relationships with commercial interests and have no conflicts of interest relevant to this article to disclose.

Disclaimer

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Appendix

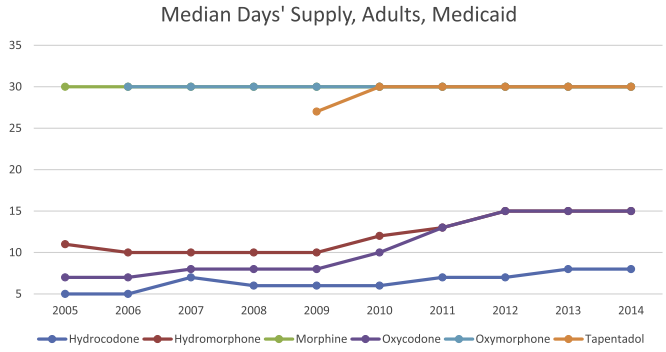

Fig. A1. Median days' supply for opioid medications in adults with Medicaid, 2005–2014.
Source: Truven Health MarketScan Multi-State Medicaid data, 2005–2014. Notes: *The Medicaid states included in MarketScan varied by year*. The average sample size for each drug-year is presented in parentheses: hydrocodone (1,090,000), hydromorphone (31,000), morphine (90,000), oxycodone (865,000), oxymorphone (10,500), and tapentadol (6200). Median days' supply for hydrocodone, hydromorphone, oxycodone, and tapentadol increased by 3, 4, 8, and 3 days, respectively. However, it did not change for oxymorphone and morphine.

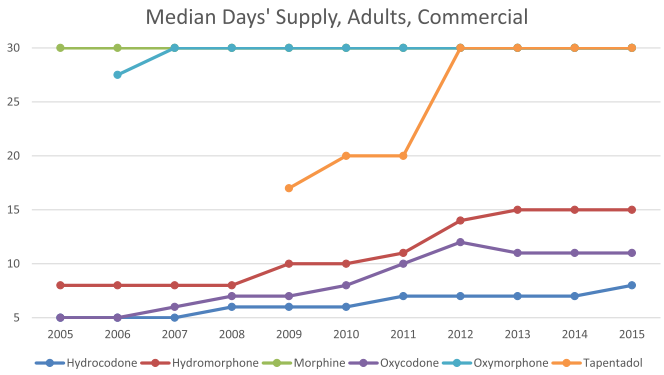

Fig. A2. Median days' supply for opioid medications in adults with commercial insurance, 2005–2015.
Sources: Truven Health MarketScan Commercial Claims and Encounters data, 2005–2015. Notes: The average sample size for each drug-year is presented in parentheses: hydrocodone (4,950,000), hydromorphone (145,000), morphine (251,000), oxycodone (2,550,000), oxymorphone (36,100), and tapentadol (75,200). Median days' supply for hydrocodone, hydromorphone, oxycodone, oxymorphone, and tapentadol increased by 3, 7, 6, 2.5, and 13 days, respectively. However, it did not change for morphine.

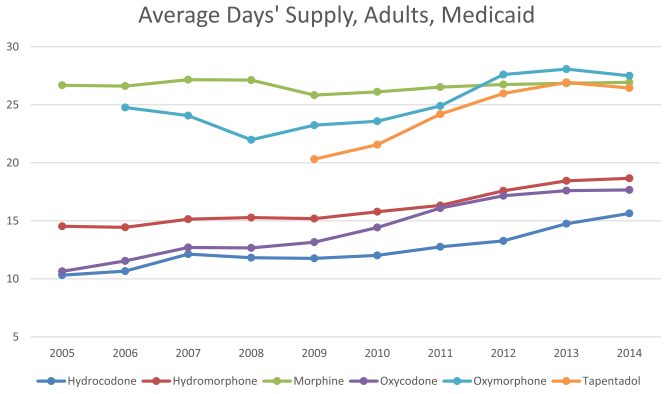

Fig. A3. Average days' supply for opioid medications in adults with Medicaid, 2005–2014.
Source: Truven Health MarketScan Multi-State Medicaid data, 2005–2014. Notes: *The Medicaid states included in MarketScan are same throughout the study*. The average sample size for each drug-year is presented in parentheses: hydrocodone (553,960), hydromorphone (14,815), morphine (44,805), oxycodone (350,740), oxymorphone (900), and tapentadol (1821). The difference in average days' supply in 2014 compared to the baseline year (2005) is statistically significant ($p < 0.05$) for all drugs.

Table A1

The interquartile range for opioid medications in adults with medicaid, 2005–2014.
Source: Truven Health MarketScan Multi-State Medicaid data, 2005–2014. Notes: The Medicaid states included in MarketScan varied by year. The average sample size for each drug-year is presented in parentheses: hydrocodone (1,090,000), hydromorphone (31,000), morphine (90,000), oxycodone (865,000), oxymorphone (10,500), and tapentadol (6200).

Medications	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014	
	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%
Hydrocodone	3	15	3	15	3	20	3	20	3	20	3	20	4	25	3	30	4	30	3	30
Hydromorphone	5	30	5	23	5	25	5	25	5	27	5	30	5	30	6	30	7	30	7	30
Morphine	30	30	30	30	30	30	30	30	25	30	28	30	30	30	28	30	28	30	28	30
Oxycodone	3	20	3	25	4	25	4	25	4	30	4	30	5	30	5	30	5	30	5	30
Oxymorphone			17.5	30	17	30	20	30	20	30	25	30	25	30	30	30	30	30	30	30
Tapentadol									10	30	15	30	20	30	28	30	30	30	29	30

Table A2

The interquartile range for opioid medications in adults with commercial insurance, 2005–2015.
Sources: Truven Health MarketScan Commercial Claims and Encounters data, 2005–2015. Notes: The average sample size for each drug-year is presented in parentheses: hydrocodone (4,950,000), hydromorphone (145,000), morphine (251,000), oxycodone (2,550,000), oxymorphone (36,100), and tapentadol (75,200).

Medications	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015	
	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%	25%	75%
Hydrocodone	3	15	3	13	3	15	4	15	4	15	4	16	4	20	4	20	4	25	4	30	4	30
Hydromorphone	4	18	4	20	5	20	5	22	5	25	5	30	5	30	5	30	5	30	5	30	5	30
Morphine	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Oxycodone	3	15	3	15	3	15	4	20	4	25	4	30	5	30	5	30	5	30	5	30	5	30
Oxymorphone			13	30	15	30	16	30	20	30	23	30	25	30	30	30	30	30	30	30	30	30
Tapentadol									8	30	7	30	7	30	10	30	18	30	25	30	28	30

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