Nationwide Trends in Prescription Opioid Use Among Adults: A Pre-Public Health Emergency Perspective on the Opioid Crisis

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BACKGROUND

- Prescription opioid pain relievers have been among the most commonly misused medicines in the United States (US), and they pose a major public health concern along with significant economic burden on society.[1]
  - In 2017, nearly 17,000 people died due to prescription opioid overdose, with an age-adjusted rate of 5.2 per 100,000 people.[2]
- Based on a morbidity and mortality report, utilization of prescription opioids peaked in 2010 and then decreased in subsequent years. However, this utilization is considerably higher than that reported in 1999.[3]
- Although there is an overall decreasing trend of utilization of prescription opioids, they are prescribed for various conditions,[4] and the trend of prescription opioid utilization by various diagnostic conditions among adults in unknown.

OBJECTIVE

- To assess changes in utilization of prescription opioids among adults by various medical conditions over a period of 10 years in the US using a nationally representative database.

METHODS

Study Design, Data Source, and Patient Population

- A trend analysis was conducted using cross-sectional Medical Expenditure Panel Survey (MEPS) data from 2007 through 2016.
  - MEPS is a nationally representative survey of the US civilian noninstitutionalized population that collects personal- and household-level information on respondents' sociodemographic characteristics, health status, access to care, clinical diagnosis, and related charges and payments.
  - Utilization of prescription medicines is self-reported by MEPS survey participants and, after necessary permissions are obtained, detailed information on each prescription medication is obtained from the participant's pharmacies. Medications administered while hospitalized are not included.
- Prescription opioids received by adults were identified and were grouped by the conditions associated with each opioid prescription. Specifically, these diagnostic categories included cardiorespiratory, dental, ear-nose-throat, gastrointestinal, hematologic/oncologic, infection, neurologic and migraine, nontraumatic orthopedic, skin/dermatological, urogenital, and trauma.

Data Analyses

- Survey design methods were used to generate national estimates of prescription opioid use by year and for the five most frequent diagnostic categories associated with opioid prescriptions.
- The number of opioid prescriptions per 100 persons was computed for each year using the sum of the weighted national estimate of the number of opioid prescriptions for each year and the weighted national estimate of the number of adults in the specified year.
- Descriptive analyses were conducted to evaluate the trend in prescription utilization, and an interrupted time series analysis was conducted to evaluate the statistical significance of the observed trend in utilization.
  - In an interrupted time series analysis, the trend of the outcome of interest is evaluated before and after an intervention while controlling for the trend before the intervention.

DISCUSSION

- Findings from this study and other national reports suggest that the increased awareness of the opioid crisis in the US may have influenced the declining trend of opioid use before guidelines for prescribing opioids were released by the Centers for Disease Control and Prevention in 2016 and the declaration of a public health emergency in 2017.
- This study also highlights the most common conditions for which opioids are prescribed along with the number of prescriptions. The observed variation by diagnostic categories may suggest more directed interventions towards certain specialties, pending evaluation of data post-Centers for Disease Control and Prevention guideline and after declaration of a public health emergency.
- The diagnoses in MEPS are self-reported or parent-reported, which may not be accurate.
- Recall problems by respondents and an unwillingness to report conditions could limit the study findings.
- Some inherent problems with secondary data such as inaccuracy, missing data, and sampling errors, including nonresponse bias and interviewer effect, may affect the study findings.

RESULTS

- During the 10 years of data assessed, the total number of opioids prescribed in the US ranged from approximately 103 million in 2007 to approximately 156 million in 2014.
- Common medical conditions associated with opioid prescriptions were nontraumatic orthopedic (32.6%), trauma (16.9%), dental (7.2%), urogenital (6.4%), and neurologic and migraine (5.4%) (Figure 1).
- Opioid utilization increased from 2007 to a peak prevalence in 2014 (16.1%), then decreased to 13.3% in 2016 (Figure 2).
- Similarly, 64 opioid prescriptions per 100 persons were observed in 2014, which decreased to 48 prescriptions per 100 persons in 2016 (Figure 3).
- A decline in opioid prescriptions was observed from 2014 to 2016 across the common conditions, except dental, where an increase was observed from 2014 (12.1%) to 2016 (13.3%) (Figure 2).
- The number of prescriptions per 100 persons was greatest for nontraumatic orthopedic conditions, and the number of prescriptions decreased in 2015 and 2016 for all common conditions, except dental, where it remained stable at 1.5 prescriptions per 100 persons (Figure 3).
- The interrupted time series analysis did not show a statistically significant level of change after 2014; however, it did show a statistically significant decreasing trend after 2014 (P = 0.023).

Figure 1. General Diagnostic Categories Associated With Opioid Prescriptions Among Adults in the US, 2007-2016
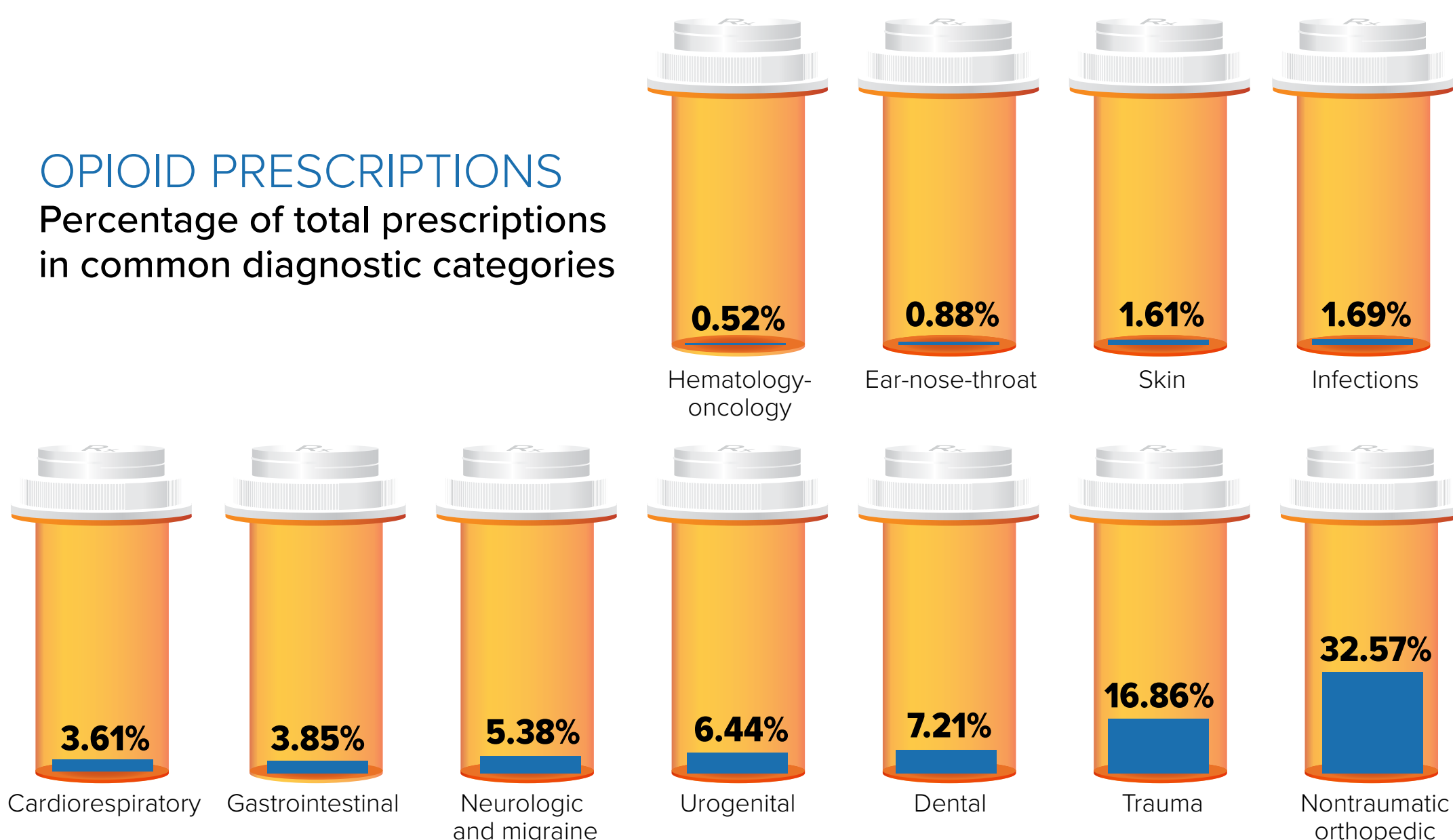

OPIOID PRESCRIPTIONS
Percentage of total prescriptions in common diagnostic categories

Category	%
Hematology-oncology	0.52%
Ear-nose-throat	0.88%
Skin	1.61%
Infections	1.69%
Cardiorespiratory	3.61%
Gastrointestinal	3.85%
Neurologic and migraine	5.38%
Urogenital	6.44%
Dental	7.21%
Trauma	16.86%
Nontraumatic orthopedic	32.57%

Figure 2. National Trend on Prevalence (%) of Prescription Opioids Overall and by the 5 Most Common Diagnostic Categories, 2007-2016
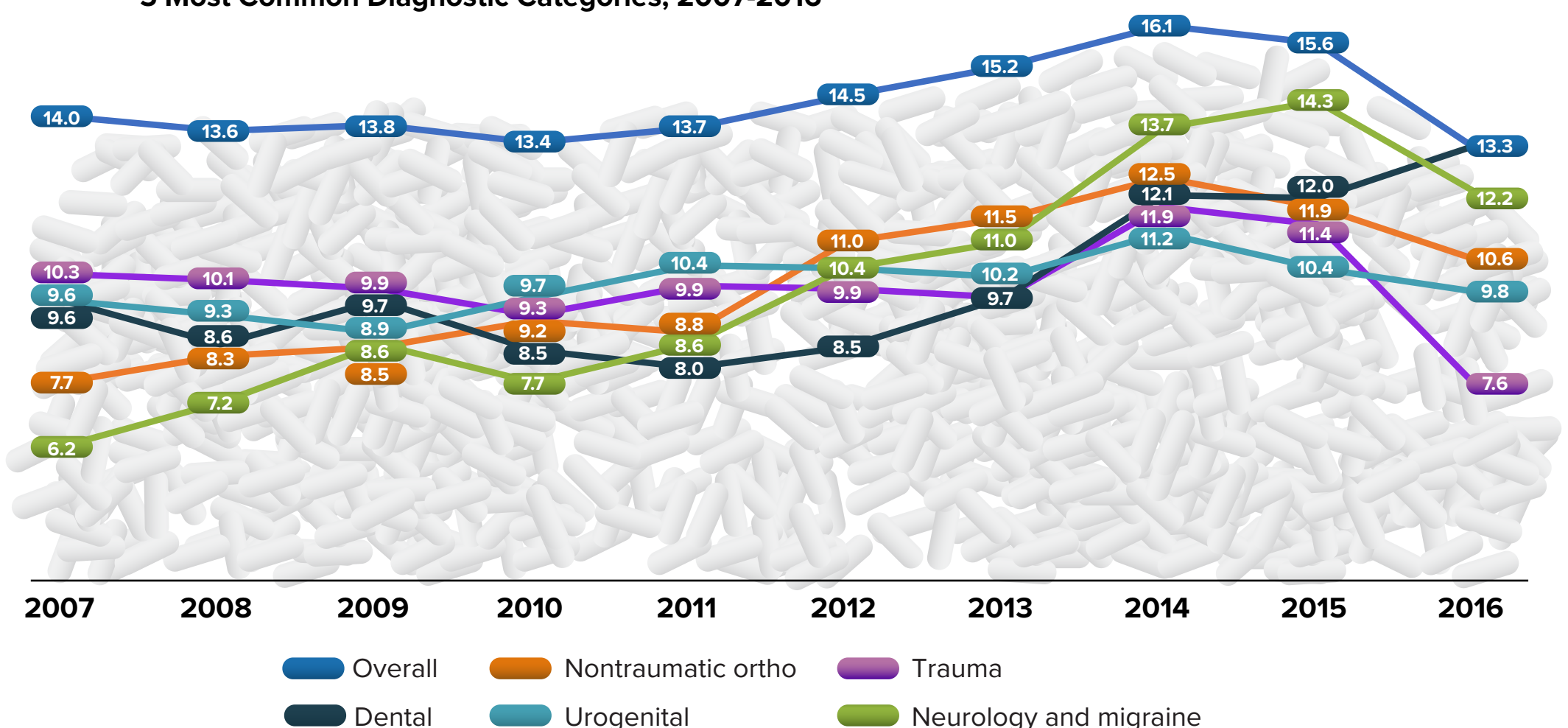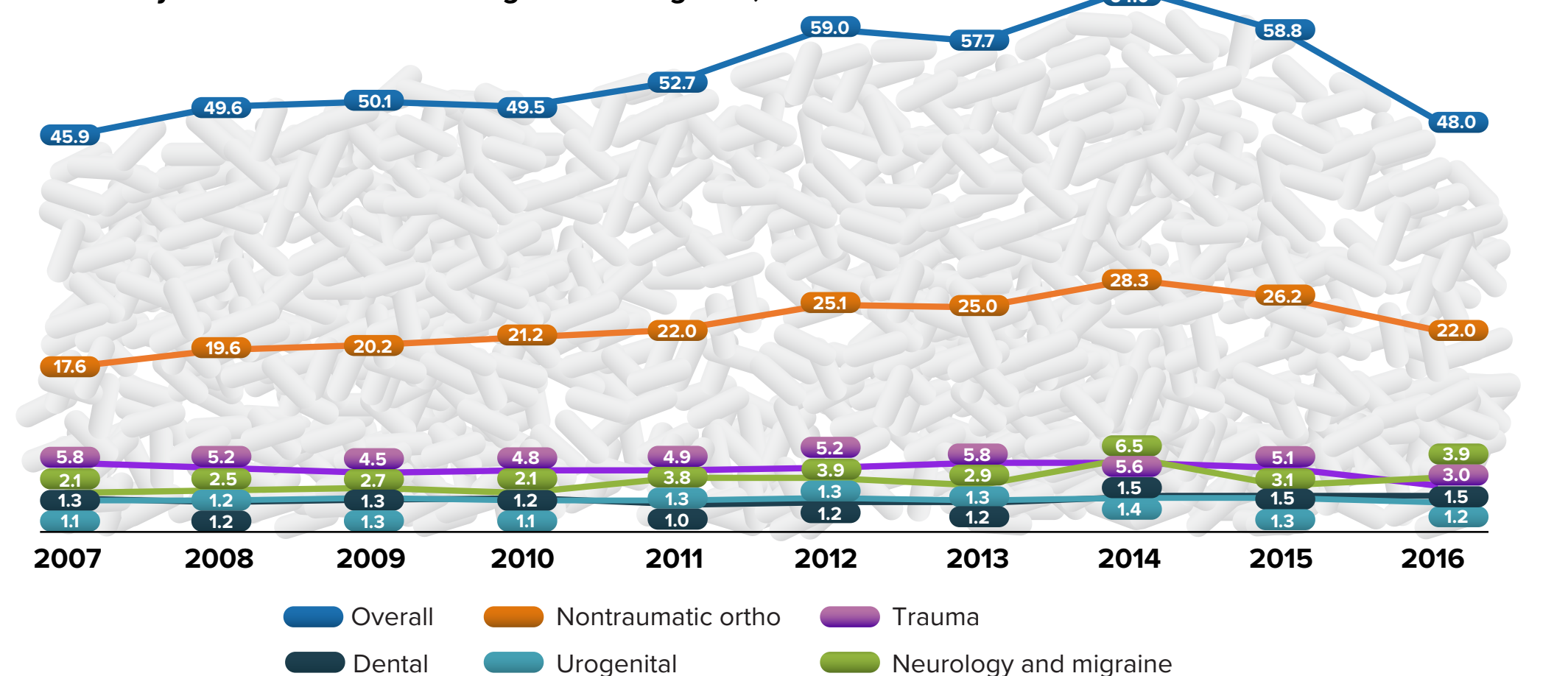

Legend: Overall, Nontraumatic ortho, Trauma, Dental, Urogenital, Neurology and migraine

Figure 3. Number of Opioid Prescriptions per 100 People, Overall and by the 5 Most Common Diagnostic Categories, 2007-2016

Legend: Overall, Nontraumatic ortho, Trauma, Dental, Urogenital, Neurology and migraine

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