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Title

Trends in emergency physician opioid prescribing practices during the United States opioid crisis

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Abstract: Background

Prescription opioid related deaths have increased dramatically over the past 17 years. Although emergency physicians (EPs) have not been the primary force behind this rise, previous literature has suggested that EPs could improve their opioid prescribing practices. We designed this study to evaluate the trend in emergency department (ED) opioid prescriptions over time during the US opioid epidemic.

Methods

We conducted a retrospective cohort study from July 1, 2012 to June 30, 2018, evaluating all adult patients who presented to two study EDs for a pain-related complaint and received an analgesic prescription upon ED discharge. We compared these data to trends in lay media and medical literature regarding the opioid epidemic. We also evaluated the incidence of repeat ED visits based on the type of analgesic prescriptions provided.

Results

Opioid prescriptions decreased from 37.76% to 13.29% over the six year study period. This coupled with an increase in non-opioid medications from 6.12% to 11.33% and an increase in "no prescription" from 56.12% to 75.37%. This corresponded with an increase in the number of publications on the opioid epidemic within the lay-public and medical literature. Additionally, those patients that received no opiates were less likely to require a repeat ED visit.

Conclusions

ED physicians are prescribing less opiates, while increasing the amount of non-narcotic analgesic prescriptions. This may be in response to the literature suggesting that prescription opioids play a large role in the opioids crisis. This decrease in opioid prescriptions did not increase the need for repeat ED visits.

Suggested Reviewers: Knox Todd
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thought leader in ED pain management

Opposed Reviewers:

Trends in Emergency Physician Opioid Prescribing Practices During the United States Opioid Crisis

Brief Description:

This is a retrospective cohort study that investigates the trend in discharge prescriptions for pain management, including opioids and non-opioids, during the US opioid crisis. We compare discharge prescription trends to the escalating lay media publications and medical literature relating to the opioid epidemic. We also assess the incidence of ED bounce backs based on the type of pain medications prescribed.

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Trends in Emergency Physician Opioid Prescribing Practices During the United States Opioid Crisis

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Source of Support – This was an unfunded study

Keywords: Opiate crisis, opioid crisis, analgesia, addiction, prescription drugs

Running Head: Trends in ED Opioid Prescriptions

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Abstract:

Background

Prescription opioid related deaths have increased dramatically over the past 17 years. Although emergency physicians (EPs) have not been the primary force behind this rise, previous literature have suggested that EPs could improve their opioid prescribing practices. We designed this study to evaluate the trend in emergency department (ED) opioid prescriptions over time during the US opioid epidemic.

Methods

We conducted a retrospective cohort study from July 1, 2012 to June 30, 2018, evaluating all adult patients who presented to two study EDs for a pain-related complaint and received an analgesic prescription upon ED discharge. We compared these data to trends in lay media and medical literature regarding the opioid epidemic. We also evaluated the incidence of repeat ED visits based on the type of analgesic prescriptions provided.

Results

Opioid prescriptions decreased from 37.76% to 13.29% over the six year study period. This coupled with an increase in non-opioid medications from 6.12% to 11.33% and an increase in “no prescription” from 56.12% to 75.37%. This corresponded with an increase in the number of publications on the opioid epidemic within the lay-public and medical literature. Additionally, those patients that received no opiates were less likely to require a repeat ED visit.

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ED physicians are prescribing less opiates, while increasing the amount of non-narcotic analgesic prescriptions. This may be in response to the literature suggesting that prescription

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4 opioids play a large role in the opioids crisis. This decrease in opioid prescriptions did not
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11 **Keywords:**

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14 Opiate crisis, opioid crisis, analgesia, addiction, prescription drugs
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19 **Introduction:**

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23 The ongoing opioid epidemic in the United States is one of the most serious and deadly health
24 crises currently facing this country. Overdose is the number one killer of Americans under the
25 age of 50, and this trend has continued to increase every year since data collection began in the
26 year 2000.¹ In 2016 alone, there were 32,445 deaths involving prescription opioids, which
27 translates to approximately 89 deaths per day, and is an increase of almost 10,000 deaths from
28 the year before.² In 2017, the Center for Disease Control (CDC) reported a total of 72,000 drug
29 overdose deaths, attributable mostly to an increase in synthetic opioids such as fentanyl.³ This
30 amounts to a death toll higher than the peak yearly death totals for HIV, motor vehicle accidents
31 or gun deaths. Further, this staggering figure is expected to be an underestimation due to as many
32 as one in five death certificates omitting the type of drug overdose. Analysis shows that two
33 distinct, but interrelated, trends are responsible for the large numbers of opioid deaths: a 17-year
34 increase in deaths from prescription opioid overdoses, and a recent surge in illicit opioid
35 overdoses due to heroin and synthetic opioids such as fentanyl.
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4 Extensive research from the CDC shows that prescription opioid related overdose deaths have
5 increased dramatically in the past 17 years in parallel with increased opioid prescribing practices.
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7 In addition to the 32,445 deaths involving prescription opioids in 2015, over 2.1 million U.S.
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9 adults had a substance use disorder associated with prescription opioid medications. These costs,
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11 due to overdose and abuse, have an economic impact of approximately \$78.5 billion each year in
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13 the U.S.⁴ Reasons for this increase are numerous, but research has shown it is primarily due to an
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15 increase in the use of opioids to treat non-cancer pain, one of the most frequent reasons for visits
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17 to the emergency department. As this crisis has unfolded, public and media coverage of the
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19 epidemic has increased in parallel, quickly becoming a premier topic for discussion in both the
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21 medical community and lay public.
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31 To further analyze the 17 year increase in prescription related deaths, a study from 2012 showed
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33 that among persons aged 12 or older, 54% received opioid pain medications from a friend or
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35 relative for free, 19.7% received them through a prescription from a doctor (higher than the
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37 17.3% in 2010), and 10.9% bought them from a friend or relative.⁵ This demonstrates that
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39 approximately 85% of all opioid drug use stems from medications that were originally prescribed
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41 by a health care provider. Further data from the CDC shows that while the number of opioid
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43 prescriptions peaked in the year 2010, they are still three times as high as they were in 1999.
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45 Additionally, opioid prescribing practices vary wildly depending on geographic location, with
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47 average per capita amounts of prescribed opioids totaling approximately six times higher in the
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49 top prescribing counties vs low prescribing counties.⁴ Even within the same hospital Emergency
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51 Department (ED), opioid prescription rates vary wildly between so-called high intensity
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53 prescribers and low intensity prescribers (24.1% vs 7.3%).⁶ This suggests a lack of data and
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4 therefore consensus regarding opioid prescription guidelines in the U.S., resulting in inconsistent
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6 practicing patterns amongst physicians. Attempts by the American College of Emergency
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8 Physicians (ACEP) to create guidelines have been limited by the small number of studies
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10 focused on ED opioid prescribing, making it difficult for their recommendations to be accepted
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12 as anything more than suggestions.⁷⁻⁸
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19 Despite patients receiving approximately 85% of their opioids from health care providers, the
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21 contribution from the emergency department and ED physicians is unclear. A 2017 study
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23 suggests that of the opioid pain medications prescribed in the ED, approximately 10% were
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25 associated with inappropriate prescribing indications and that approximately 42% may ultimately
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27 be misused.⁹ A separate study showed that 29% of patients with opioid addictions were first
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29 exposed in the ED and suggests that ED opioid prescriptions may contribute to the development
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31 of addiction in some patients.¹⁰ In contrast, a recent comprehensive retrospective analysis
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33 concluded that while opioid prescribing for non-cancer pain increased significantly between
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35 1996 and 2012, the majority of this growth was attributable to office visits and refills of
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37 previously prescribed opioids. The authors additionally showed that ED contribution to the
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39 opioid epidemic was modest and declining and that efforts to further decrease opioid prescription
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41 should focus on office-based settings.¹¹⁻¹² Another study looking at prescription drug deaths
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43 showed that ED physicians provide fewer prescriptions to patients who end up dying from
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45 prescription drugs compared to other specialties, but that emergency physicians still account for
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47 a significant proportion of prescribing providers.¹³ Clearly, more research is needed to
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49 understand the ultimate effect of ED opioid prescriptions on addiction and overdose.
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4 In this study, we intend to elucidate the prescribing practices of emergency medicine physicians
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6 in two urban, academic emergency departments during a 5-year time span to help determine
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8 trends in opioid medication prescription. We additionally intend to suggest that decreasing the
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10 amount of opioid medication prescriptions at ED discharge may decrease the ED return rate,
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12 reducing the overall healthcare burden on Emergency Departments across the US and providing
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14 further justification for decreased ED opioid prescriptions. Finally, we intend to show how
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16 public and media perception of the opioid epidemic has paralleled the medical community's
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18 efforts to research and understand the ever-worsening crisis facing the United States. Ultimately,
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20 we hope that the results of this study will aid in the understanding of how ED prescribing
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22 practices have changed in response to the opioid epidemic, and we hope that this understanding
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24 will inform further emergency medicine efforts in the fight against opioid abuse and opioid
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26 related deaths.
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36 **Methods:**

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40 This is a retrospective cohort study conducted from July 1, 2012 to June 30, 2018. All patients 18
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42 years or older who presented to two urban, academic medical centers between July 1, 2012 and
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44 June 30, 2018 for pain-related chief complaints were included in the study. We included all
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46 genders, ethnic backgrounds, and patients with all health statuses in this investigation. We
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48 excluded patients who left without being seen after triage or expired in the ED. Charts were
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50 obtained through the an electronic medical records database and accessed based on ED chief
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52 complaint, ED diagnoses, and pain medications prescribed at discharge from the emergency
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54 department. The number of pain medications prescribed at discharge per month were compiled
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4 into graphs and separated by name and category. “Opioid medications” include codeine-
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6 acetaminophen, hydrocodone-acetaminophen, oxycodone, oxycodone-acetaminophen,
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8 hydromorphone, morphine, fentanyl and tramadol. “Over the counter” (OTC) medications
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10 include acetaminophen only, ibuprofen, and naproxen.
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16 To quantify the medical community, media, and lay public reaction to the opioid epidemic, three
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18 different metrics were used and analyzed. For the medical community response, the search term
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20 “opioid epidemic” was entered into the PubMed database and the number of articles written per
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22 year were collected via the “Results by Year” feature and normalized to the most popular year
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24 with the maximum value of 100. To quantify lay public perception, the identical search term
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26 “opioid epidemic” was entered into the Google Trends webtool with the number of searches per
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28 month also normalized to the most popular year with the maximum value of 100. For media
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30 perception, the number of New York Times articles published on “Prescription Drug Abuse”
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32 were additionally quantified and normalized to the most popular year with the maximum value of
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34 100. The results were normalized to a value of 100 for the most popular year in order to make
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36 each metric directly comparable.
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45 **Results:**

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50 Overall, opioid medications prescribed at discharge decreased from 37.76% of pain-related ED
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52 visits to 13.29% in the span of six years ranging from July 2012 to June 2018. This corresponded
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54 with an increase in over the counter only medications from 6.12% to 11.33% and an increase in
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56 no pain medications prescribed from 56.12% to 75.37% during this same time period (Figure 1).
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4 This trend continued when pain-related visits were stratified by the location of pain including
5 back pain-related visits, abdominal pain-related visits, and headache and migraine pain-related
6 visits (Figure 2). Opioid pain medications prescribed at discharge decreased from 61.26% to
7 24% for back pain-related visits, 36.33% to 14.39% for abdominal pain-related visits, and
8 27.27% to 5.48% for headache and migraine pain-related visits while OTC medications
9 increased from 8.11% to 24%, 3.06% to 6.06%, and 2.27% to 11.64% for these same groups,
10 respectively. We also found that the ED revisit rate for pain-related visits decreased from 8.8%
11 to 6.1%, 14.4% to 9.3%, and 27.4% to 17.6% for opioid medications prescribed at discharge vs
12 over-the-counter medications at 3, 7, and 30 days, respectively (Figure 3).
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28 Analysis of the medical community, media, and lay public perception of the opioid epidemic
29 revealed a gradual, then sudden, increase in the number of articles and searches performed on the
30 topic (Figure 4). The PubMed data spans from 1947 to 2018 with several years containing no
31 results. The most popular year for scholarly articles published containing the term “opioid
32 epidemic” was 2018, and this number is expected to rise further as data was only collected
33 through June of 2018. Google Trends data, which serves as a surrogate for the lay public
34 perception of the opioid crisis, shows the number of persons who searched for the term “opioid
35 epidemic” since Google began collecting data in 2004. The search term “opioid epidemic” began
36 to increase in popularity in 2015 and reached its peak in 2017, although this number is expected
37 to be higher in 2018. The New York Times (NYT) data, which was collected from the NYT
38 website on a page containing articles published pertaining to “Prescription Drug Abuse,” shows
39 articles were first published in 1990 and continued to rise in popularity until hitting a peak in
40 2017. As with the PubMed and Google Trends data, this number is expected to be higher in
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4 2018. Results from this data collection show that all three metrics used to measure perception of
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6 the opioid epidemic continue to rise from the early 2000s until hitting a peak in 2017.
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11 **Discussion:**
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16 The prescriber data shown in Figure 1 supports the trend of emergency medicine physicians
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18 decreasing the number of opioid medications prescribed at discharge in order to combat the
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20 increasing prevalence of opioid abuse and overdose deaths plaguing the United States. We can
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22 see that this decrease in opioid medications corresponded with an increase in both over-the-
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24 counter medications prescribed such as acetaminophen and ibuprofen as well as no medications
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26 prescribed at all. This leads to several interesting conclusions. Firstly, despite a decline in the
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28 number of opioid medications prescribed, we have not noticed a corresponding decrease in the
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30 number of opioid overdose deaths in this same time period. Although our study uses regionally
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32 sourced data, this is true nationally as well, as opioid prescriptions have been continuously
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34 declining nation-wide since 2011 with no decrease in opioid overdose deaths.¹⁴ In addition, a
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36 2016 study analyzing medical examiner reports of prescription drug related deaths showed that
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38 out of the 4.5% of all providers who wrote a prescription resulting in patient death, emergency
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40 medicine physicians gave the lowest number of prescriptions per provider at 1.6, compared to
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42 pain management which was the highest at 12.9.¹³ These findings suggest that other measures
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44 will need to be taken to reduce the number of opioid overdose deaths beyond simply reducing
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46 ED physician opioid prescriptions.
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4 One potential explanation for this result is the extraordinary surge in illicit synthetic opioids,
5 such as fentanyl, replacing prescription opioids as the main culprit for overdose related deaths.
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9 Not only has the quantity of Americans abusing opioid medications increased, but the potency
10 has increased as well, as more and more users mix high strength fentanyl with heroin.¹⁵
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14 Additionally, while several studies highlight a known pathway of emergency department opioid
15 prescriptions resulting in increased addiction rates for opioid naïve patients, decreasing ED
16 physician prescriptions will have no effect on those who have already developed opioid use
17 disorders, as these patients obtain the majority of their medications in office-based settings.^{6,11,16}
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21 Data also suggest that the overwhelming majority of patients who overdose on prescription
22 medications are chronic users.¹³ Additional measures, such as providing treatments for opioid
23 addiction, will be necessary to provide assistance to this cohort. One study shows that patients
24 provided buprenorphine, one of several medications approved to treat opioid addiction, in the
25 emergency department were twice as likely to be in treatment one month later versus those who
26 were handed informational pamphlets.¹⁷
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41 Secondly, the decline in opioid medications seems to mirror the medical and lay public's
42 concerns for over-prescription of opioid pain medications. We can see that the medical
43 community began to take substantial interest in the opioid epidemic beginning in the year 2012,
44 the same year in which the results of this study were first collected. The lay public's perception
45 of this issue lagged by several years as expected, as the search term "opioid epidemic" did not
46 begin to rise in popularity substantially until 2016. Interestingly, the media's coverage, using the
47 New York Times as surrogate, shows increased reporting on this topic starting in the 2000s,
48 which coincides with the Joint Commission's decision on introducing standards for pain
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4 management.¹⁸ This recommendation was in stark contrast to physician opinions at the time, who
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6 were concerned with the side effect profile of these medications despite a widely cited 1980
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8 article suggesting addiction was rare when used for short term pain.¹⁹ In addition, several
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10 scientific and policy reports from the 1990s specifically highlighted U.S. Emergency
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12 Departments as culprits in the “oligoanesthesia” epidemic.²⁰⁻²² It is possible that, in addition to
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14 the Joint Commission’s recommendations and various policy reports, media coverage of both
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16 patient pain and the reluctant use of opioids by physicians are partially responsible for increased
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18 prescribing practices.
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26 Finally, our data show that decreasing opioid prescriptions at discharge does not have an adverse
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28 effect on the ED return rate as shown in Figure 3. In fact, decreasing opioid prescriptions at
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30 discharge actually reduces the ED bounce back rate for all measured time intervals. This is
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32 important for several reasons. First, it suggests that decreasing the number of opioid medications
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34 does not cause patients to return to the ED earlier due to poorly or under-treated pain. Further, it
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36 shows that decreasing opioid prescriptions can reduce the overall healthcare burden by
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38 decreasing the number of patients who return to the ED within 30 days. This correlates with
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40 recent findings that reducing opioid use in other areas of medicine, such as during the
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42 perioperative period, corresponds with faster recovery times and better overall outcomes.²³ By
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44 reducing the number of opioid prescriptions at discharge, not only is there a reduction in the
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46 number of patients at risk for opioid use disorder, but also a reduction in the number of patients
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48 who have to return to the ED within 30 days, decreasing otherwise burgeoning healthcare costs.
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51 Further research will need to be conducted to show the exact cause for the reduced return rate,
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4 but hypotheses include faster recovery times with less adverse events, as shown in other areas of
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7 medicine.

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11 **Limitations:**

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16 The retrospective nature has its inherent limitations. By using chief complaint and discharge
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18 diagnosis as search and classification criteria, patients who had pains in the anatomic regions
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20 studied, but had a different chief complaint or discharge diagnosis may not have been included in
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22 the study database despite having the desired clinical criteria as other that were included. Follow
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24 up and return data are limited to those who returned to this two-hospital health system. Whether
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26 patients opted to follow up or subsequently be seen at other emergency departments could not be
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28 determined. Additionally, there are limitations in determining media and public perception of the
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30 opioid epidemic, as each metric used was only a surrogate for true awareness and discussion. For
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32 example, while the New York Times is a good representation of media perception of the topic, it
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34 is only one publication out of thousands and may not be entirely representative of all media
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36 publications on the topic.
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45 **Conclusion:**

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49 The current opioid crises facing the United States continues to be one of the most serious
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51 epidemics in modern healthcare. In this manuscript, we show that there has been a decline in the
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53 number of opioid medications prescribed in our two study emergency departments, which
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55 corresponds with the professional (medical) and public concern over opioid over-prescription.
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59 Our data also show that decreasing opioid prescriptions at discharge from the ED may decrease
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4 the bounce back rate and serve as a potential method for reducing healthcare costs and overall
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6 burden in the ED. Although further prospective research is needed to elucidate how emergency
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8 physicians' practice patterns truly affect the opiate crisis, our study suggests that we may be
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10 moving in a positive direction.
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Figure 1

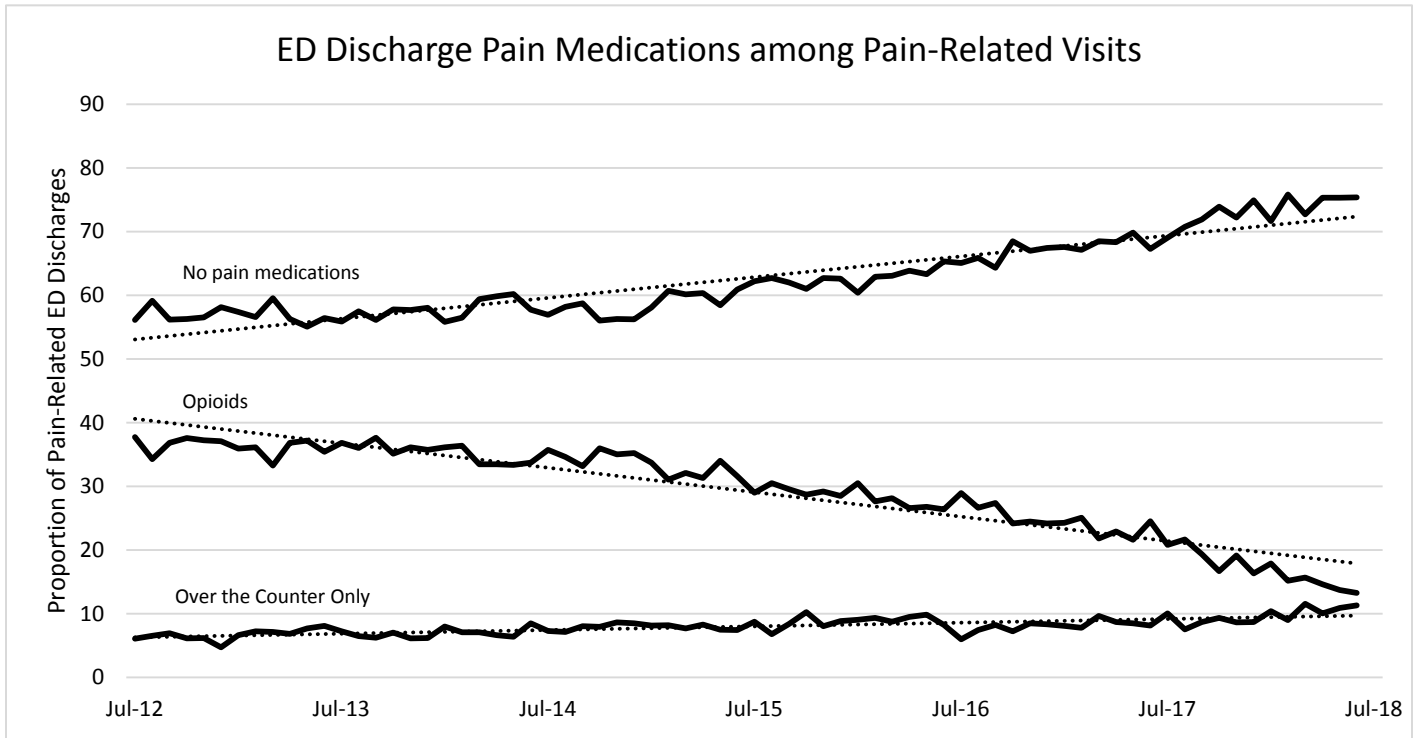
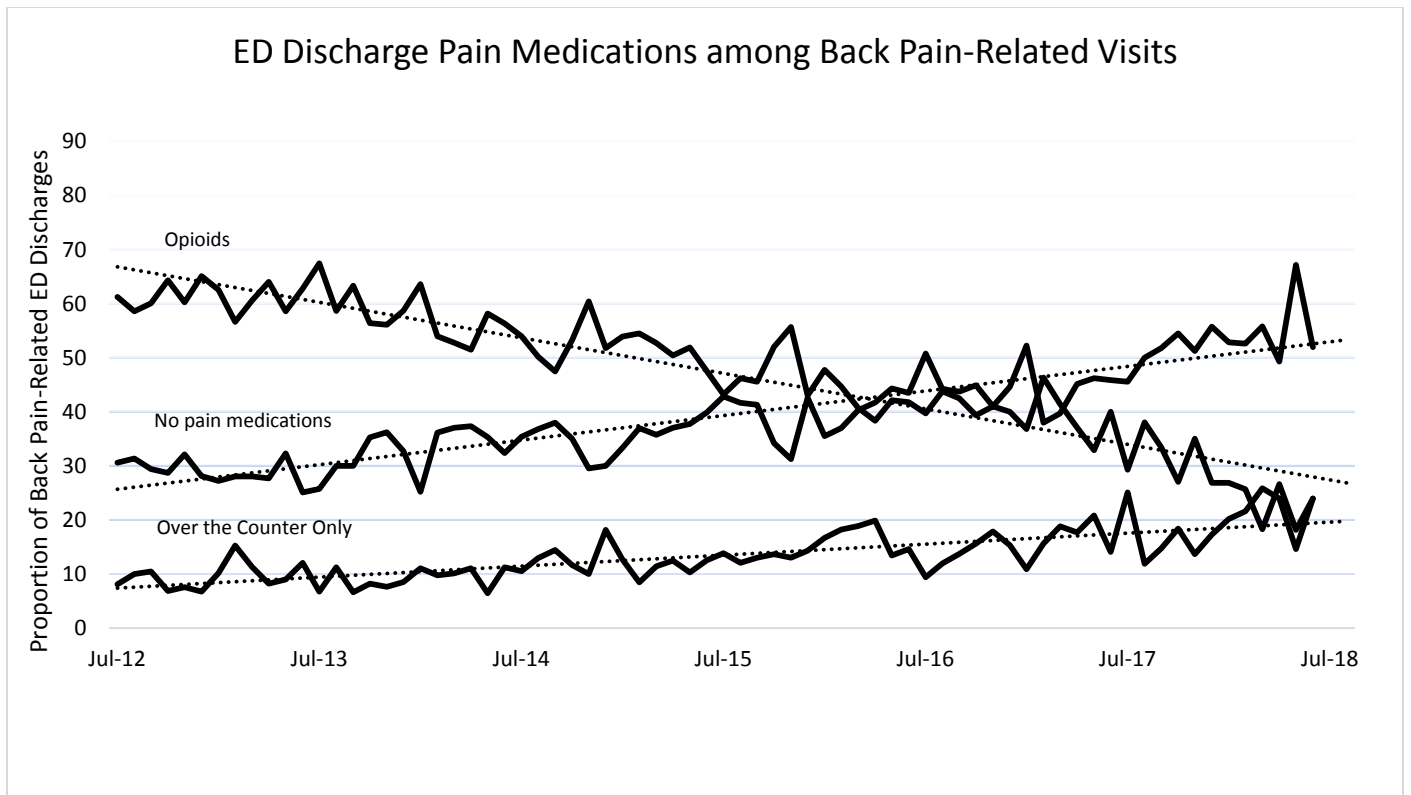
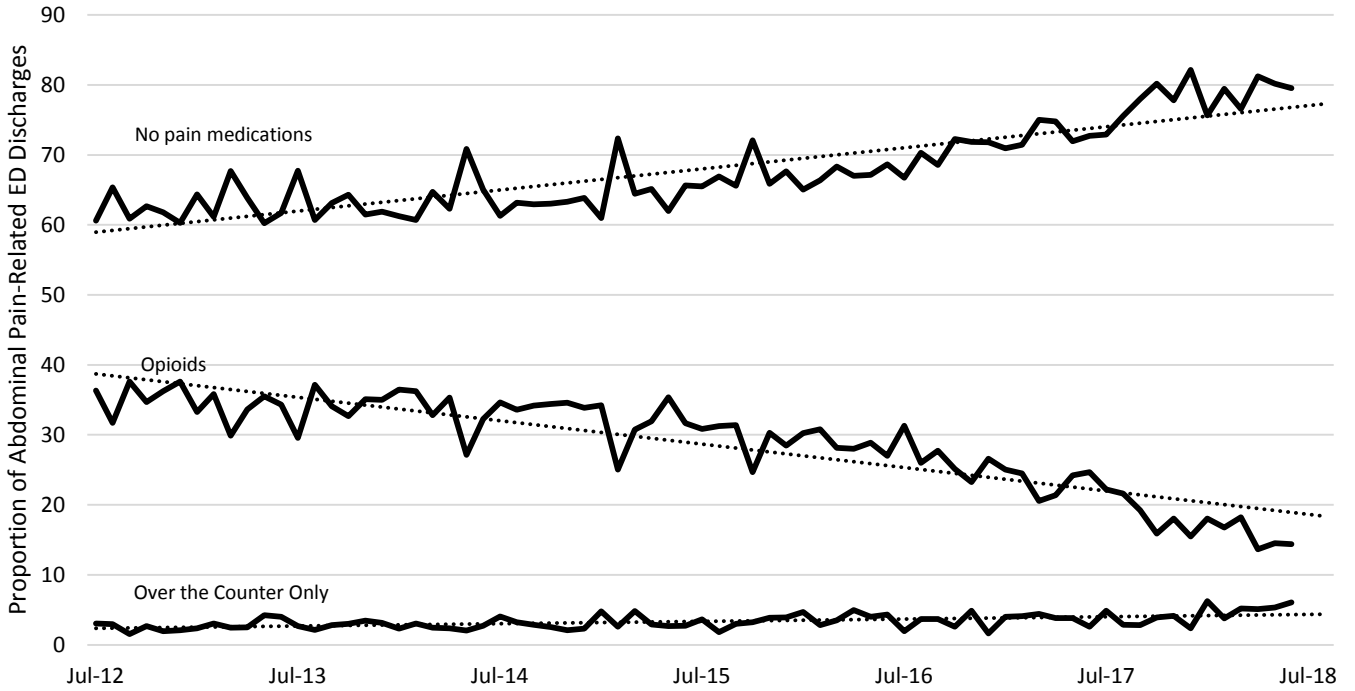


Figure 1. ED Discharge Pain Medications among Pain-Related visits from July 2012 to June 2018 by Category

Figure 2



ED Discharge Pain Medications among Abdominal Pain-Related Visits



ED Discharge Pain Medications among Headache and Migraine Pain-Related Visits

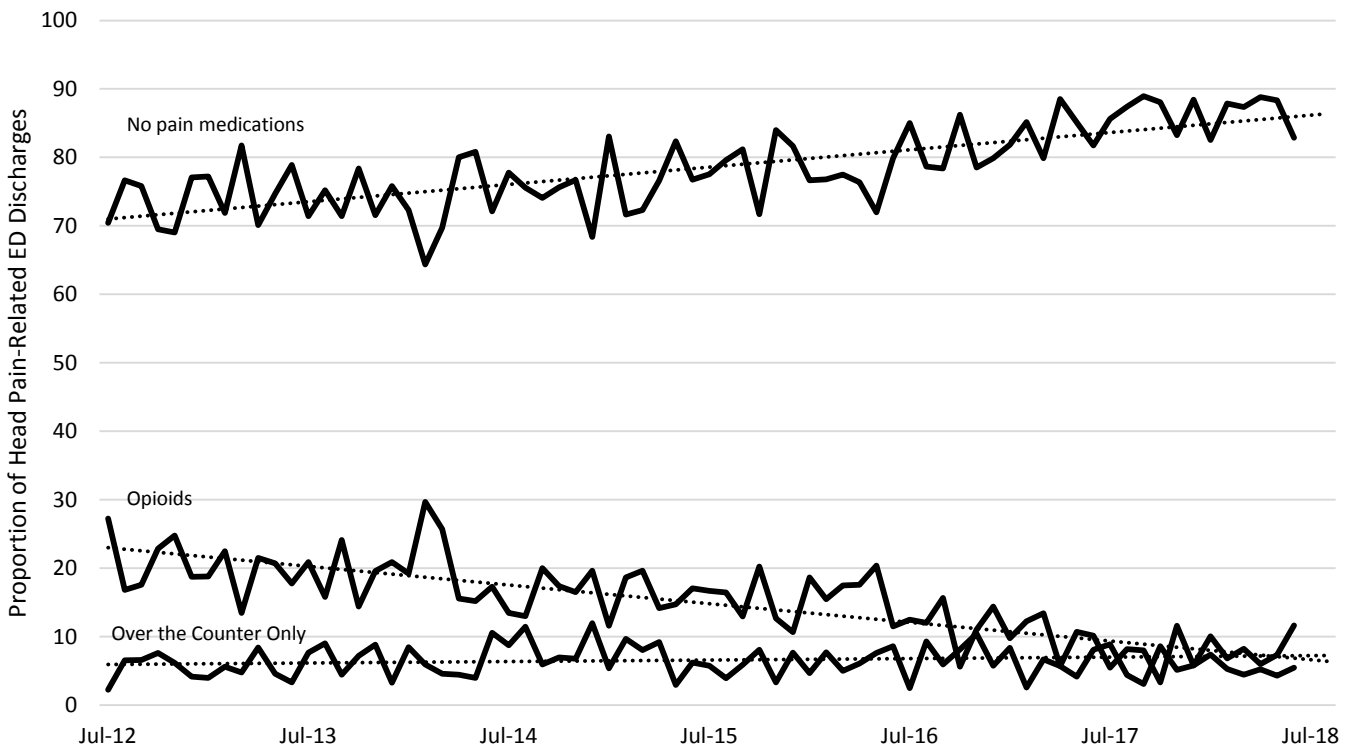


Figure 2. ED Discharge Pain Medications Stratified by Location of Pain

Figure 3

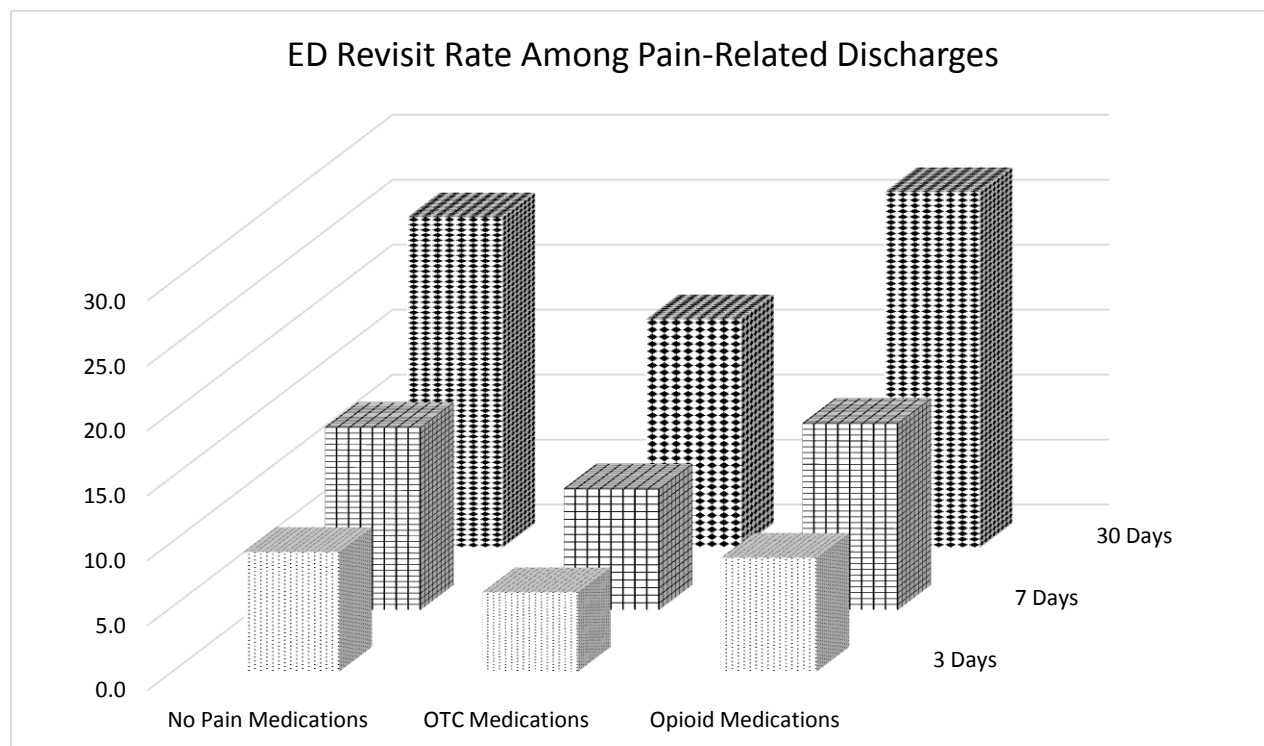


Figure 3. ED Revisit Rate Among Pain-Related Discharges for No Medications, OTC Medications, and Opioid Medications at 3, 7, and 30 days

Figure 4

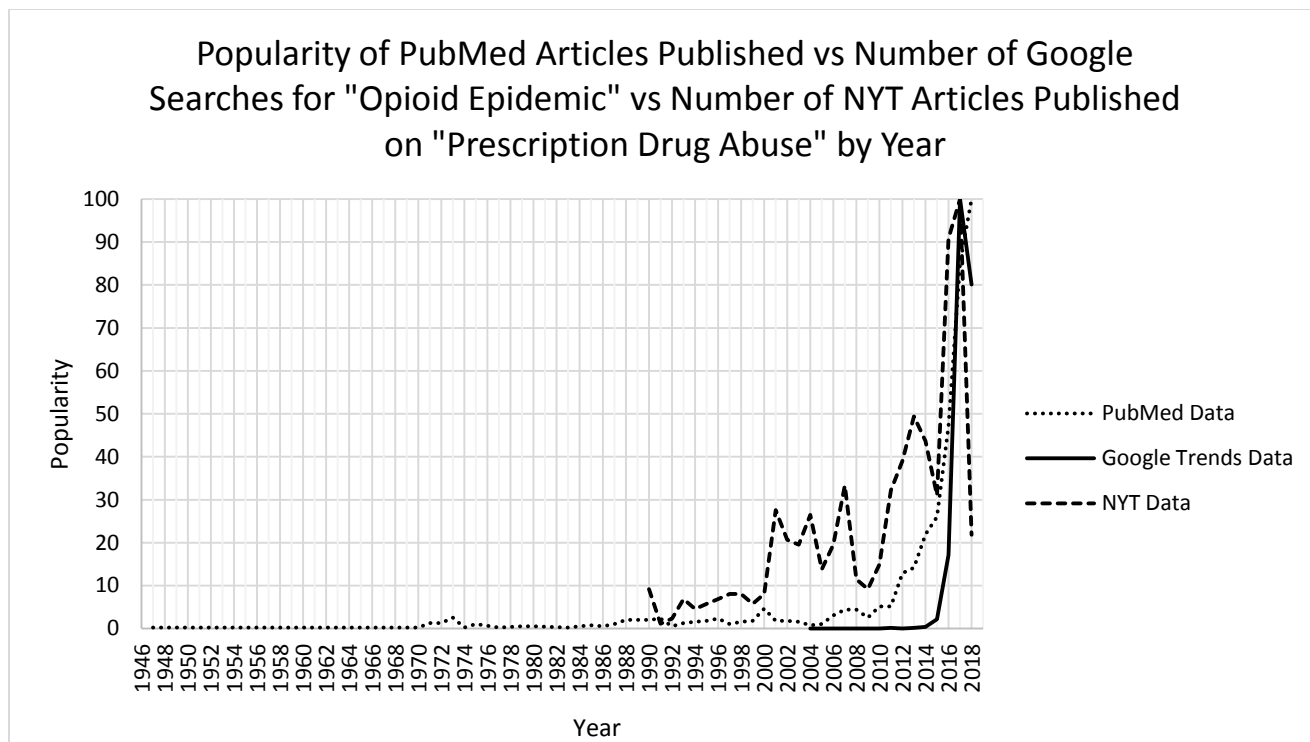


Figure 4. Popularity of PubMed Articles Published vs Number of Google Searches vs Number of New York Times Articles Published by Year