ing data at all or pooling data using network meta-analysis, we chose the latter; indeed network meta-analysis has been shown to potentially give more reliable results because of the integration of additional information. Although studies included in our review were from different sources, they were all randomized controlled trials and hence contrasts between treatment groups within each study should be comparable. In addition, we focused only on CP/CPSPS categories IIA and IIIB to reduce heterogeneity due to disease severity and focused on outcomes measured using National Institutes of Health Chronic Prostatitis Symptom Index scales to reduce heterogeneity due to measurement error. Nevertheless, we explored potential discrepancies in treatment effects between direct and network meta-analysis results using the standardized normal method (z). Directions of treatment effect for the 2 methods were identical for all 12 comparisons; moreover, the magnitude of the effects between the 2 methods were similar except for α-blocker vs placebo, where z was large and reached statistical significance (2.9380, P = .003). We believe that this is an example of increased precision of treatment effects due to the network method “borrowing” information from indirect comparisons.

Third, Jackson et al disagree that study data should be expanded using a Stata command so that it could be included in the meta-analysis, questioning how we could know the distribution of data. We only used this command for the treatment responsiveness outcome, which is a dichotomous outcome and does not need any assumption about distribution, normal or otherwise. We believe that using all available data, rather than omitting studies, is an advantage and will lead to more valid estimates.

Ammarin Thakkinstian, PhD
raatk@mahidol.ac.th
Section for Clinical Epidemiology and Biostatistics
Mahidol University
Bangkok, Thailand
John Attia, MD, PhD, FRCP, FRACP
Centre for Clinical Epidemiology and Biostatistics
University of Newcastle
Newcastle, Australia

Conflict of Interest Disclosures: Both authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.


©2011 American Medical Association. All rights reserved.

RESEARCH LETTER

Characteristics of Opioid Prescriptions in 2009

To the Editor: Opioid analgesics, while important for the treatment of pain, are associated with high rates of abuse. Most abusers report they obtained prescriptions on their own or medications from friends and relatives who had been prescribed opioids. We analyzed prescription practices in the United States to identify possible contributors to the high rate of opioid analgesic abuse. We paid particular attention to prescription practices in youth, for whom prescriptions of controlled medications, including opioids, have nearly doubled between 1994 and 2007.

Methods. The data were acquired through the Vector One: National (VONA) database from SDI Health (Plymouth Meeting, Pennsylvania). SDI receives prescription data from 35 015 of the 62 132 retail pharmacies in the United States. These pharmacies dispense nearly half of all retail prescriptions nationwide. Detailed information about SDI’s coverage statistics is proprietary. SDI receives 1.4 billion prescription claims per year representing 121 million unique patients. The sample is nationally representative. More detailed information about VONA can be obtained elsewhere. We analyzed opioid prescriptions in 2009 as a function of physician specialty (using SDI descriptors), patient age, duration of prescription, and whether the patient had filled a prior prescription (from the same or a different provider) for an opioid analgesic within the past month. We compared differences between prescriptions by age groups and by medical specialty using 2-sample t tests (SAS version 9.1; SAS Institute, Cary, North Carolina). To avoid a potential type I error when making multiple comparisons, we applied a Bonferroni correction and a more conservative significance level of P < .001. This research was exempt from 45 CFR part 46 requirements under 45 CFR 46.101(b)(4).

Results. There were 79.5 million prescriptions for opioid analgesics captured (39% of the estimated projection of 201.9 million opioid prescriptions dispensed in the US in 2009). Most prescriptions were for hydrocodone- and oxycodone-containing products (84.9%, 67.5 million) and issued for short treatment courses (19.1% for <2 weeks, 65.4% for 2-3 weeks). The percentage of prescriptions dispensed increased with age, from 0.7% in those aged 0 to 9 years to 28.3% in those 60 years and older. Of all opioid prescriptions, 11.7% (9.3 million) were for patients between 10 and 29 years old, while 45.7% (36.4 million) were for those between 40 and 59 years old. Overall, the main prescribers were primary care physicians (general practitioner/family medicine/osteopathic

See also pp 1315 and 1346.

(Reprinted) JAMA, April 6, 2011—Vol 305, No. 13 1299
physicians) with 28.8% (22.9 million) of total prescriptions, followed by internists (14.6%, 11.6 million), dentists (8.0%, 6.4 million), and orthopedic surgeons (7.7%, 6.1 million). For patients aged 10 to 19 years, dentists were the main prescribers (30.8%, 0.7 million), followed by primary care (13.1%, 0.3 million) and emergency medicine physicians (12.3%, 0.3 million) (FIGURE 1). All comparisons between specialties within an age group were significantly different from each other (P < .001), except general practitioners and emergency medicine physicians in the 0- to 9-year-old group (P = .34) and dentists and internists in the 30- to 39-year-old group (P = .06). For patients 40 years and older, primary care physicians were the main prescribers (30.4%, 17.9 million). On average, across all physician specialties included in this analysis, 56.4% (44.8 million) of opioid prescriptions were dispensed to patients who had already filled another opioid prescription within the past month (FIGURE 2).

Comment. Our analysis identified questions for further investigation. For example, do the 11.7% of prescriptions issued to those aged 10 to 29 years signal a potential problem for this population, which is the most likely to abuse drugs and develop addiction? Another unknown is whether the percentage of opioid prescriptions (56%) that were filled by patients who had recently received another opioid prescription is justified or suggests the need to improve information infrastructures that could enhance the safety of prescribed opioid analgesics and minimize diversion. Our conclusions are limited because causal links with opioid diversion and abuse cannot be drawn from prescribing practices alone and our analysis cannot account for illegal prescriptions. Nonetheless, the recent increases in opioid prescriptions and associated increases in abuse and overdoses highlight the need for additional research to understand positive and negative effects of current prescribing practices.

Nora D. Volkow, MD
nvolkow@niaid.nih.gov
National Institute on Drug Abuse
National Institutes of Health
Bethesda, Maryland
Thomas A. McLellan, PhD
Center for Substance Abuse Solutions
University of Pennsylvania School of Medicine
Philadelphia
Jessica H. Cotto, MPH
Meena Karithanom, MPH
Susan R. B. Weiss, PhD
National Institute on Drug Abuse
National Institutes of Health

Author Contributions: Ms Cotto had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Volkow, McLellan, Weiss.
Acquisition of data: Cotto, Karithanom, Weiss.
Analysis and interpretation of data: Volkow, McLellan, Cotto, Karithanom, Weiss.

Figure 1. Percentage of Prescriptions Dispensed for Opioid Analgesics From Outpatient US Retail Pharmacies by Age and Physician Specialty, 2009

These unprojected data include new and refill prescriptions. Top 5 prescribers for each age group are shown. Age groups for individuals 40 years and older were combined because they shared the same top 5 prescribers. Note that percentages in each group do not sum to 100 because prescriptions from specialties other than the main prescribers are not shown. Opioids included codeine and combination noninjectable (USC 02232), morphine and opium noninjectable (USC 02222), morphine and opium injectable (USC 02221), codeine and combination injectable (USC 02231). ENT indicates ear, nose, and throat; GP/FM/DO, general practitioner/family medicine/osteopathic physicians; IM, internal medicine; and OB/GYN, obstetrics/gynecology. Included as primary care physicians are general practitioners, family practitioners, and osteopathic physicians; descriptors of the roles are those used by SDI Health.

Figure 2. New vs Continuing or Switch/Add-on Opioid Prescriptions Dispensed by US Retail Pharmacies as a Function of Specialty, 2009

Shown are unprojected data. Prior prescriptions (dispensed within the past month) could be from the same or a different prescriber or specialty. GP/FM/DO indicates general practitioner/family medicine/osteopathic physicians; IM, internal medicine.
Drafting of the manuscript: Volkow, McLellan, Cotto, Karithanom, Weiss.
Critical revision of the manuscript for important intellectual content: McLellan, Weiss.
Statistical analysis: Cotto, Karithanom.
Study supervision: Volkow, Weiss.
Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE
Form for Disclosure of Potential Conflicts of Interest and none were reported.
Additional Contributions: We kindly acknowledge Ruben Baler, PhD, National In-
stitute on Drug Abuse, for his editorial assistance and critical comments. He did
not receive compensation for his contribution besides his salary. This research was
carried out at the National Institute on Drug Abuse, National Institutes of Health
(NIH).
1. Fortuna RJ, Robbins BW, Caiola E, Joynt M, Halterman JS. Prescribing of con-
trolled medications to adolescents and young adults in the United States. Pediatrics.
2010;126(6):1108-1116.
3. Schramm-Sapyta NL, Walker QD, Caster JM, Levin ED, Kuhn CM. Are ado-
lescents more vulnerable to drug addiction than adults? evidence from animal models.
4. Grant BF, Dawson DA. Age of onset of drug use and its association with DSM-IV
drug abuse and dependence: results from the National Longitudinal Alcohol Epi-
Problems of Drug Dependence taskforce on prescription opioid non-medical use
6. CDC’s issue brief: unintentional drug poisoning in the United States. Injury Pre-
.cdc.gov/HomeandRecreationalSafety/Poisoning/brief.htm. Accessed March 10,
2011.

CORRECTIONS

Incorrect Sentence: In the Editorial titled “Antihypertensive Therapy for Prehy-
pertension: Relationship With Cardiovascular Outcomes,” published in the
March 2, 2011, issue of JAMA (2011;305[9]:940-941), the word “not” was
missing, resulting in an incorrect sentence. On the first page, the end of the
last sentence in column 2 should have read, “all-cause mortality compared
with those not receiving antihypertensive therapy.” This article was corrected
online.

Incorrect Values: In the Original Contribution entitled “Change in Disability
After Hospitalization or Restricted Activity in Older Persons,” published in the
November 3, 2010, issue of JAMA (2010;304[17]:1919-1928), incorrect values
were reported in some instances. Errors in calculations led to inflated values for
absolute risk, primarily for the transition from no disability to mild disability in
the presence of physical frailty, and were discussed in the results section of the
abstract, the “Results” and “Comment” sections of the text, Table 3, and the
eTable. These errors did not affect the conclusions or implications of the report.
The article and supplemental material have been corrected online.

The most stimulating challenge is one of mean de-
gree between an excess of severity and a deficiency
of it, since a deficient challenge may fail to stimulate
the challenged party at all, while an excessive chal-
lenge may break his spirit.

—Arnold J. Toynbee (1889-1975)