Defining “Doctor Shopping” with Dispensing Data: A Scoping Review

Chris Delcher, PhD,*,† Jungjun Bae, BS,*,† Yanning Wang, MS,‡ Michelle Doung, MS,§ David S. Fink, PhD,¶ and Henry W. Young II, MD

*Institute for Pharmaceutical Outcomes & Policy (IPOP), Department of Pharmacy Practice and Science, College of Pharmacy, University of Kentucky, Lexington, Kentucky, USA; †Department of Pharmacy Practice and Science, College of Pharmacy, University of Kentucky, Lexington, Kentucky, USA; ‡Department of Health Outcomes and Biomedical Informatics, College of Medicine, University of Florida, Gainesville, Florida, USA; §Department of Occupational Therapy, College of Public Health and Health Professions, University of Florida, Gainesville, Florida, USA; ¶Division of Translational Epidemiology, New York State Psychiatric Institute, New York, New York, USA; and †Department of Emergency Medicine, College of Medicine, University of Florida, Gainesville, Florida, USA

Funding sources: The authors received no specific funding for this work.

Correspondence to: Chris Delcher, PhD, Institute for Pharmaceutical Outcomes & Policy (IPOP), Department of Pharmacy Practice and Science, College of Pharmacy, University of Kentucky, 760 Press Avenue, Research Building 2, Ste 260, Lexington, KY 40536, USA. Tel: 859-562-2175; E-mail: chris.delcher@uky.edu.

Received on 30 July 2021; revised on 14 December 2021; Accepted on 14 December 2021

Abstract

Background. “Doctor shopping” typically refers to patients that seek controlled substance prescriptions from multiple providers with the presumed intent to obtain those medications for non-medical use and/or diversion. The purpose of this scoping review is to document and examine the criteria used to identify “doctor shopping” from dispensing data in the United States. Methods. A scoping review was conducted on “doctor shopping” or analogous terminology from January 1, 2000, through December 31, 2020, using the Web of Science Core Collection (seven citation indexes). Our search was limited to the United States only, English-language, peer-reviewed and US federal government studies. Studies without explicit “doctor shopping” criteria were excluded. Key components of these criteria included the number of prescribers and dispensers, dispensing period, and drug class (e.g., opioids). Results. Of 9,845 records identified, 95 articles met the inclusion criteria and our pool of studies ranged from years 2003 to 2020. The most common threshold-based or count definition was (P x D) (n = 12). Thirty-three studies used a 365-day detection window. Opioids alone were studied most commonly (n = 69), followed by benzodiazepines and stimulants (n = 2 and n = 2, respectively). Only 39 (41%) studies provided specific drug lists with active ingredients. Conclusion. Relatively simple P x D criteria for identifying “doctor shopping” are still the dominant paradigm with the need for ongoing validation. The value of P x D criteria may change through time with more diverse methods applied to dispensing data emerging.

Introduction

The drug-related mortality rate has increased exponentially in the United States since the 1980s: from about 6,100 deaths in 1980 to 70,630 in 2019 [1, 2]. Among fatal drug poisonings in 2019, nearly 49,860 involved an opioid (70.5%) with 14,139 (20%) involving a prescription opioid [2]. According to the National Survey on Drug Use and Health (NSDUH), among people aged 12 years and older reporting pain reliever misuse in 2020, 1.0% (90,000 people) obtained those prescriptions from more than one doctor [3]. Patients are known to have multiple opioid prescribing physicians providing appropriate care. For example, approximately 12% of Medicare beneficiaries, 2.7% of Medicaid enrollees, and...
1.3% of privately insured beneficiaries had four or more opioid prescribers in 2010 [4, 5]. However, at some point, the use of multiple prescribers and/or dispensers is deemed extreme and inappropriate especially when it involves addictive medications like opioids. For example, the US Department of Health and Human Services reported that 22,308 Medicare Part D beneficiaries had such extreme use in 2016 on the basis of an average daily MED greater than 120 mg for 3 months and had four or more prescribers and four or more pharmacies [6]. This behavior, known as “doctor shopping”, has been associated with an increased risk of opioid use disorder and fatal overdose [7–9]. Furthermore, patients involved in “doctor shopping” for opioids are at-risk of having co-occurring mental health disorders, alcohol dependence, and low socioeconomic status [10].

Accurately identifying patients as “doctor shoppers” has important medical and legal implications. State prescription drug monitoring programs (PDMPs), national insurers, health plans and other entities commonly use controlled substance dispensing data to identify and (sometimes) proactively report on patients [11]. In a therapeutic medical context, this information gives healthcare providers an opportunity to intervene on unrecognized problematic opioid use and address gaps in continuity of care thus improving health outcomes for their patients. Although there is a high degree of confidence among healthcare providers that these administrative reports are effective [12], the ability of prescribers and dispensers to accurately identify patients with an opioid use disorder (OUD) and differentiate patients with OUD from patients with other complex medical needs is unclear. Even routine healthcare utilization like use of different prescribers in the same medical practice can increase risk scores using administrative data [13]. Unfortunately, negative outcomes can include patient dismissal from practice or refusal to prescribe when “doctor shopping” is suspected [14, 15]. In many states, patients designated as potential “doctor shoppers” can be questioned by law enforcement for breaking laws “to obtain a narcotic drug, or procure or attempt to procure the administration of a narcotic drug . . . by fraud, deceit, misrepresentation, or subterfuge.” [16] Yet, despite the widespread use of dispensing data as a proxy signal for emerging or existent opioid use disorder and the clear medical and legal ramifications [17], it is unclear whether there is consistency in the criteria used to identify “doctor shopping” in the United States.

The goal of the current study was therefore to: (1) synthesize the available definitions of “doctor shopping” previously used within the United States; and (2) building upon this literature, to identify and catalog important components of “doctor shopping” definitions in support of future efforts to identify problematic prescription drug patterns in administrative records. To these ends, we conducted a scoping review of the literature on “doctor shopping.”

**Methods**

**Data Sources and Literature Search**

This scoping review was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). We conducted the review to systematically document the criteria used to define “doctor shopping” using dispensing data as the primary data source in the published study. The following research question guided this review: Do the definitions of “doctor shopping” suggest scientific consensus? Are components of the definitions well-documented and replicable? To be included in our review, studies needed to have at least the following components in their definitions: use of dispensing data, a patient’s distinct count of prescribers and/or pharmacies (e.g., 5 or more prescribers AND 5 or more dispensers [written in notation as $P \geq 5 \land D \geq 5$]), drug class specifications (e.g., opioids), and a measurement time frame over which the behavior is screened (e.g., 90 days). Prescriber and dispenser counts with a Boolean relationship were standardized to facilitate direct comparisons (i.e., greater than four prescribers ($P > 4$) became five or more prescribers ($P \geq 5$)). Descriptive statistics are provided at both the study and criteria levels (i.e., multiple criteria are sometimes found in a single study). Studies were primarily limited to English-language, peer-reviewed literature conducted in the United States. We chose to include documents published by key US federal agencies that promulgate “doctor shopping” definitions in national reports (e.g., the US Government Accountability Office). State managed PDMPs routinely use “doctor shopping” algorithms, but there is no central repository of their definitions [18]; therefore, we only included PDMP definitions if they were referenced in a peer-reviewed publication.

We searched the Web of Science Core Collection for titles and abstracts of relevant articles published from January 1, 2000, through December 31, 2020. Web of Science Core Collection includes seven major indexes [19]. An initial search was conducted on September 30, 2020, and a follow-up search was made on June 25, 2021. Our search strategy (developed by C.D./J.B.) used search terms from a published review on prescription drug misuse (2000–2013) that used 46 different terms describing people who may be misusing prescription drugs including multiple variants of “doctor shopper.” We do note that many of these terms can be stigmatizing [20]. We modified by adding studies of patients multiple provider episodes known as high- or super-utilizers [17, 21].

This strategy cast a wide net to avoid missing definitions when papers used colloquial variants of the term “doctor shopping” or otherwise included comparable populations. Likewise, we included opioids, benzodiazepines, stimulants and other controlled substances in our search to identify “doctor shopping” even when it involved drug classes other than opioids. The final search results were imported into Zotero and duplicates were removed by
Identifying “Doctor Shopping”

JB. Our search terms are presented in Supplementary Data Table 1. JB/MD reviewed abstracts and CD resolved questions of eligibility and data extraction. CD/ JB developed and iteratively modified the data charting tool using Microsoft Excel spreadsheet. JB/MD independently extracted study information, resolved any disagreement through discussion and confirmed the accuracy of the final data set. “Doctor shopping” parameters and studies are summarized in Supplementary Data Table 2.

We supplemented our scoping review with national trends that are directly or indirectly associated with “doctor shopping” to provide additional context. Opioid dispensing rates per 1,000 population were obtained from the US Centers for Disease Control and Prevention [22]. The source where pain relievers were obtained for most recent misuse among past year misusers aged by age group was obtained from the Substance Abuse and Mental Health Services Administration [3]. “Doctor shopping” rates per 100,000 state population were obtained from the Prescription Behavioral Surveillance System [23].

Results

The flowchart of our literature review is shown in Figure 1. Of 9,845 studies identified, 95 met the inclusion criteria with publication years ranging from 2003 to 2020. Figure 2 shows the count of studies per year from 2008 (n = 1) to 2019 (n = 19) with overlaid contextual data (see figure note). A single study can apply multiple “doctor shopping” definitions to the same study population and we found 173 instances where these definitions were used of which 72 were distinct on just the number prescribers, dispensers and time frames before even taking drug types and other parameters into consideration.

Most studies used a priori criteria while others used empirical methods to identify “doctor shopping” [24–29]. For example, McDonald (2013) used a finite mixture model to estimate that 10 or more prescribers were likely associated with “doctor shopping” [28]. One study hybridized a priori (a range and combination of thresholds from P ≥ 4 ∧ D ≥ 4 to P ≥ 6 ∧ D ≥ 6 within 3 months) and empirical thresholds (i.e., patients exceeding an average patient-to-prescriber travel distance and being in the top 1% of recipients for the number of times that they geographically “hopped” prescribers) to identify “doctor shopping” [30]. Figure 3 shows the threshold counts of prescribers, dispensers and their Boolean relationships found in our review. Of 148 a priori and hybrid thresholds, the most prevalent (18) definition of “doctor shopping” included ≥ 4 prescribers AND ≥ 4 dispensers. Among those 18 instances, a 1-year time frame was the most common (n = 10), followed by 6 months (n = 3) and 3 months (n = 5).

Of the 95 studies, 40 studies (42%) defined “doctor shopping” with thresholds of at least ≥ 2 prescribers AND ≥ 3 dispensers [6, 8, 23, 30–66], 26 studies (27%) did not restrict the number of prescribers (i.e., ≥ 1) [8, 33, 52, 55, 63, 67–87], and 43 studies (45%) did not restrict the number of dispensers [4, 5, 7, 8, 32, 33, 41, 52, 55, 63, 69–71, 74, 76, 77, 79–105].

Of historical note, the earliest study identified by our search examined “pharmacy shopping” for benzodiazepines defined as “filling a prescription for the same benzodiazepine from two different pharmacies within seven days” which was a definition associated with a dose escalation [75]. The first study to publish a definition for opioids used an “overlap” approach: ≥ 2 different sustained-release or long-acting opioids for ≥ 90 consecutive days. According to the study’s authors, this criteria would have identified 5 enrollees out of hypothetical healthcare plan with 500,000 members [74].

One year was the most commonly used time period to determine “doctor shopping” (n = 33; range: 1 week [67, 68, 75, 78] to 48 months [4–7, 27–29, 33, 34, 35, 37, 49, 50, 52, 55, 56, 58, 60, 63, 71, 72, 74, 80, 82, 88, 89, 91, 93, 94, 98, 101, 102, 105, 106]. There were 39 definitions applied to populations at the national-level [4–6, 25, 26, 27, 29, 32–38, 42, 43, 46, 47, 50, 54, 64, 65, 71–74, 77, 83, 87, 93, 95, 98, 101, 105, 107–111] with 26 distinct state populations found. The most frequently studied states included California (n = 11) [23, 51, 57, 60, 61, 88, 90, 91, 103, 112, 113], Oregon (n = 7) [27, 70, 82, 84, 85, 99, 100], New York (n = 6) [41, 67, 68, 78, 90, 96], and Massachusetts (n = 6) [48, 49, 76, 86, 89, 96]. Eight studies made state by state comparison available [23, 25, 40, 51, 53, 57, 67, 68]. There were three studies that conducted spatial analyses of “doctor shopping” rates at the zip code level in Arkansas [30], Massachusetts [76], and Texas [45]. Only one study (2008) made all county-level “doctor shopping” rates per 1,000 residents available [25]. Most studies (n = 55; 58%) used all payer insurance populations [7, 8, 23, 25, 27–32, 34, 35, 37, 38, 40–42, 45–49, 51–54, 57–62, 64, 70, 76, 79–81, 84, 86–89, 91, 92, 97, 99, 100, 103, 107–109, 111–113], followed by Medicaid (n = 21; 22%) [5, 24, 39, 50, 55, 56, 63, 65, 67, 68, 72, 75, 78, 82, 84, 85, 90, 94, 96, 101, 102], Medicare (n = 10; 11%) [4, 6, 43, 71, 77, 83, 87, 93, 95, 104], private (n = 11; 12%) [5, 26, 33, 36, 50, 69, 74, 95, 98, 101, 105, 110], Veteran Affairs (n = 1; 1%) [73] and Workers Compensation (n = 1; 1%) [44].

Sixty-nine studies focused on opioids-only to define doctor shopping [4–6, 23, 25–31, 33–35, 37, 39–44, 47–50, 53–57, 61, 63–66, 69–73, 76, 77, 80, 82–89, 91, 92, 94–99, 101–104, 107–111, 113]. Chilcoat (2016) provides estimates that examine changes in “doctor shopping” rates pre-post reformulation of Oxycontin to its abuse deterrent version in 2010 [36]. We did not classify this study as “opioid-only,” for example, since the study also involved benzodiazepines.

We reiterate that “doctor shopping” criteria was not limited to opioids and studies frequently examined opioids combined with other medications such as:
benzodiazepines only (n = 4; 4%) [8, 32, 36, 74]; benzodiazepines and stimulants only (n = 4; 4%) [59, 81, 100, 112], and other medications such as muscle relaxants [62]. Of those studies not including opioids, five studies identified doctor shopping using benzodiazepines only [67, 68, 75, 78, 105] and 2 studies used stimulants for ADHD medications only [38, 46]. High dosage (n = 4; 4%) [6, 43, 50, 65] and overlapping prescriptions (n = 16; 17%) [29, 32, 34–39, 42, 46, 47, 50, 64, 83, 105, 109] were used to define thresholds across multiple drug classes. Other drug schedules used were: schedule II only (n = 12; 13%) [34, 35, 39, 46–49, 52, 73, 91, 107, 113], schedule IV only (n = 5; 5%) [67, 68, 75, 78, 105], schedule II-III (n = 6; 6%) [6, 71, 82, 87, 88, 103], schedule II-IV (n = 38; 40%) [4, 5, 7, 8, 23, 25, 28, 29, 31, 36, 40–42, 44, 45, 50, 51, 56, 59–62, 64, 72, 81, 83–86, 90, 93, 94, 96, 100, 101, 109, 111, 112] and schedule II-V (n = 4; 4%) [66, 80, 89, 102]. Thirty studies did not include drug schedules with the manuscript [24, 26, 27, 30, 32, 33, 37, 38, 43, 53–55, 57, 58, 63, 65, 69, 70, 74, 76, 77, 79, 92, 95, 97–99, 104, 108, 110]. Only 39 (41%) studies provided drug lists with active ingredients [4, 5, 7, 25, 28, 29, 33, 34, 36, 38, 39, 46, 47, 49–51, 56, 60, 61, 73, 75, 81–86, 88, 90, 91, 93, 94, 101, 102, 105, 106, 109, 112, 113]. We did not reach out to authors to obtain this information.

Of 87 studies of opioids or multiple drug classes, 22 excluded cancer diagnoses [5, 6, 26, 33, 39, 43, 56, 65, 72, 74, 76, 77, 82, 92–96, 101, 103, 107, 111], 30 excluded buprenorphine [5, 7, 23, 27, 31, 33, 34, 36, 39, 40, 42–44, 50, 60, 62, 70, 73, 82, 84–86, 88, 90, 91, 93, 96, 106, 112, 113], and 9 excluded methadone [33, 34, 36, 42, 47, 73, 93, 96, 106]. Eighty-seven studies had information to provide direct or indirect prevalence

Discussion

There is no consensus in the criteria used to identify “doctor shopping”. We demonstrated this by scoping 20 years of research that uses such criteria with dispensing data. Opioids tended to be the focus of this literature yet even opioids were frequently described in vague terms such as “high-dose” or “opioids used to treat opioid use disorder” without further specifying dose cut-offs or specific formularies. Studies using drug schedules to define “doctor shopping” often did not include specific drug lists which is problematic for replication. Furthermore, drug schedules even for the same medication can change through time (e.g., hydrocodone changed from III to II) [114]. At a minimum, drug lists should be provided and standardized notation (akin to what we have introduced here) should be considered by future researchers.

Even the relatively simple prescriber and dispenser threshold criteria resulted in many variants in the literature. A one-increment change in this threshold (e.g., four instead of five prescribers) can have large relative impacts at the population-level. For example, in California, Katz (2016) showed that modifying the criteria from the four to five level identified nearly 2.5 times more “doctor shopping” patients (2,748 and 1,149, respectively) [49]. Using administrative data to characterize patient motivations and the veracity of painful conditions is challenging, and we found that validation is still needed [115]. We did find three studies that attempted to validate...
"doctor shopping" in some manner. One study trained a model to match pharmacists recommendations ("lock-in," "prescriber alert," or "no action") to "shopping behavior" scores [24]. Two papers from the Opioid Post-Marketing Research Consortium showed little association between doctor shopping and opioid abuse/ misuse in both a claims-based study and survey [108, 110]. Furthermore, we identified no papers on outcomes for patients dismissed from practice as a result of being identified as a "doctor shopper." This should be an area of priority research. Still, it is encouraging to see that a diverse set of algorithms are emerging that move beyond simple threshold counts but must be critically evaluated (e.g., composite risk scoring using overlapping drug utilization windows, dosage considerations, spatial analysis, vulnerable population exclusions, multiple drug classes and prescriber network analysis).

For example, Young et al. (2019) recommend a measure that they term "doctor hopping" into PDMPs. The method involves top-percentile ranking of patients in the same zip code based on the number of times they geographically bypass nearer opioid prescribers for more distant ones (using zip code center points) in Arkansas [30]. We assume that this study excludes buprenorphine prescriptions (authors not explicit) because patients with "doctor hopping" flags are compared against their high MME calculations from CDC's MME conversion table which excludes buprenorphine. If PDMPs adopt this measure and do not carefully consider patients with OUD, they risk identifying legitimate patients known to travel long distances to find a buprenorphine prescriber especially in rural areas with limited accessibility and/or provider willingness to treat [116, 117].

With respect to PDMPs, research and anecdotal discussions with healthcare providers show that there is widespread belief among PDMP users that their PDMPs reduce "doctor shopping" and effectively facilitate communication about "doctor shopping" [12, 118, 119]. However, two recent papers found that requiring providers to access their PDMPs was only modestly or not associated with "doctor shopping" [120, 121]. It is clear that "doctor shopping" is declining in prevalence to the point of being a relatively rare behavior; as we and others have reported [4, 101, 121–123]. Formally estimating the prevalence of "doctor shopping" was beyond the scope of this review but all-payer data from Strickler et al. (2019) identified a combined estimate of 9,544 patients (2017) from Kentucky, Ohio, and West Virginia, putting the prevalence in these high-risk states at approximately 0.55% of the general population [40, 124].

We did not find any research suggesting that "doctor shopping" criteria are adjusted through time to account for declining prevalence akin to modifying a diagnostic test to avoid false positives. Indeed, there is some publicly reported evidence that high false positive rates are occurring. Approximately, 9% (63/684) of patients’ identified as a "doctor shopper" in Florida had a physician or law enforcement officer receive a “proactive report” to this effect [125]. In other words, 91% of patients identified by the PDMP’s screening criteria did not warrant a final report (likely at the expense of extensive and costly manual record review by PDMP staff). This high apparent "false positive" rate suggests that while the existing criteria are relatively easy for PDMP’s to apply to dispensing data, there is significant room for improvement and refinement of these criteria.

Our review shows that $P \times D$ thresholds are commonly used to identify "doctor shopping" in research but some argue that they are "obsolete" as stand-alone data points in real-world clinical practice [122, 123]. There are calls for the creation and triangulation of multiple administrative measures to better characterize this complex behavior in practice [126].

Limitations
Our scoping reviewed relied on the Web of Science Core Collection which identified all papers from two other reviews of this topic that used MedLine and additional papers not found by the other researchers. We did not examine health or legal outcomes (if reported) associated with "doctor shopping" nor could we include the criteria that state PDMPs use to identify "doctor shopping" in practice which likely change through time. A central repository of state PDMP criteria would be very helpful for future research on opioid policy. Our scoping review did not include studies from other countries and our conclusions on the effectiveness of identifying “doctor shopping” may vary depending on the country setting.

Conclusion
“Doctor shopping” identification using dispensing data varies and currently relies heavily on simplistic prescriber and dispenser utilization counts. These criteria, found in the research and used every day in practice to complement medical judgement need validation, on-going evaluation and triangulation with additional signals of problematic opioid use.

Supplementary Data
Supplementary data are available at Pain Medicine online.

References


