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Trends in the Distribution of Opioids in Puerto Rico, 1999–2013

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Abstract

Objective—Limited information has been published about opioid prescribing practices in Puerto Rico. The objective of this study was to create baseline trends of opioids distributed over a period of fourteen years in Puerto Rico.

Methods—We examined data from the U.S. Drug Enforcement Administration's Automation of Reports and Consolidated Orders System (ARCOS) for the period 1999–2013. ARCOS data reflects the amount of controlled substances legally dispensed. Analyses include the distribution of opioids (in morphine milligram equivalent kg per 10,000 persons) by year and entity (pharmacy, hospital, practitioner).

Results—The distribution of four drugs (fentanyl, hydromorphone, methadone, oxycodone) increased over 100% between 1999 and 2013. The distribution of two drugs (hydrocodone and meperidine) declined between 1999 and 2013. Oxycodone distribution grew from 0.13 MME kg grams per 10,000 persons in 1999 to 0.29 MME kg in 2013.

Conclusion—ARCOS data showed that the overall amount of opioid pain relievers distributed in Puerto Rico increased by 68% between 1999 and 2013. Currently, prescription opioid pain reliever overdose deaths in Puerto Rico do not appear to be skyrocketing as they are in the mainland U.S. However, the ongoing problem with prescription opioid pain reliever overdoses in certain areas should serve as a warning to monitor consumption of opioid pain relievers, as well as changes in prescription drug abuse, overdoses, and deaths.

Keywords

Prescription drugs; Overdose

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Opioids are medications that can be used to treat moderate-to-severe pain and are often prescribed following surgery, injury, or for pain related to health conditions such as cancer. Examples of these prescription medications include oxycodone (e.g., OxyContin, Percocet), hydrocodone (e.g., Vicodin), morphine, and codeine. In recent years, there has been an increase in the acceptance and use of prescription opioids for the treatment of chronic, non-cancer pain, such as back pain. Opioids are potentially addictive medications that have been associated with serious health outcomes. When abused, or combined with other drugs (especially those that depress respiration), outcomes can include overdose and death. Prescription opioids are reported to be abused in Puerto Rico, but to a lesser extent than cocaine, heroin, or marijuana (1, 2).

Based on survey data and treatment admissions, it appears that Puerto Rico has a lower rate of both prescription and illicit drug use and abuse than the U.S. mainland (3, 4). In 2010, there were 148 drug induced deaths in Puerto Rico (crude rate 4.0 per 100,000 persons), which is relatively low compared to the overall U.S. rate of 13.1 per 100,000 but comparable to the overall rate for Hispanic persons in the United States (5.5 per 100,000)(5).

While prescription opioid drug overdoses do not appear to be a public health crisis in Puerto Rico (2, 5), shifts in the availability of prescription drugs could signal an impending concomitant rise in adverse health outcomes including drug overdoses. The rapid increase in prescription drug-related overdose mortality in the mainland U.S. mirrored rising trends in distribution of those drugs (6). Limited information has been published about opioid pain reliever prescribing practices in Puerto Rico. The lack of availability of opioids for treating cancer pain in Latin America and the Caribbean (7,8) has been raised as a concern, however, data for Puerto Rico in particular was not available. Tracking the distribution of controlled substances can provide a baseline for public health action. The objective of this study was to create baseline trends of opioid pain relievers distributed between 1999–2013 in Puerto Rico. To our knowledge, no previous studies have provided this information.

Methods

The Automation of Reports and Consolidated Orders System (ARCOS) is an automated, comprehensive, mandatory reporting system that allows the U.S. Drug Enforcement Administration (DEA) to monitor certain controlled substances from the point of manufacture to the point of sale at the dispensing/retail level (9). Manufacturers must report inventories, acquisitions, and dispositions of all substances in Schedules I and II, and narcotic and Gamma-Hydroxybutyric Acid substances in Schedule III of the Controlled Substances Act. Data for this study for the years 1999–2013 were obtained by special request to the DEA and included distribution for these eight prescription opioid drugs: codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, and oxycodone. ARCOS tallies the cumulative sale of licit drugs in grams and reflects the amount legitimately distributed to pharmacies, hospitals, practitioners, and narcotic treatment centers. Drug acquisitions by narcotic treatment centers were excluded because these medications are used for substance abuse treatment.

Analyses include: overall distribution of eight drugs in kilograms (kg; converted from grams), as well as crude rates (morphine milligram equivalents (MME) distribution in kg per 10,000 persons). Puerto Rico population numbers used to calculate rates were obtained from the U.S. Census. Data by entity (pharmacy, hospital, practitioner) were not available for the year 2000, so analyses by entity uses 2001–2013 data. No personal identifying information was available in the database, and the study did not require human subjects review.

Results

Table 1 lists the total kgs distributed as well as crude rates for the eight drugs included in the analyses (codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine and oxycodone) by year. It also captures percent change between 1999 and 2013 in this distribution. The distribution of four drugs (fentanyl, hydromorphone, methadone, oxycodone) increased over 100% between 1999 and 2013. The distribution of two drugs (hydrocodone and meperidine) declined between 1999 and 2013. The distribution of codeine remained relatively level. Methadone had the largest percentage increase in distribution, although the 1999 rate was negligible (<.01 MME kg per 10,000 persons). Oxycodone distribution grew from 0.13 MME kg per 10,000 persons in 1999 to .29 MME kg in 2013.

Figure 1 displays rate (MME per 10,000 persons) of kg distribution by year for each of the eight drugs in a line graph. Oxycodone had the highest distribution in MME kg per 10,000 persons from 2001–2013. Both oxycodone and fentanyl distribution declined notably in 2008, but rebounded by 2010. We are not able to determine the nature of this drop with the data at hand. Hydromorphone and methadone distribution remained low throughout the time period.

Figure 2 breaks down the distribution (rate in MME kg per 10,000 persons) of the eight drugs studied by entity (i.e., pharmacy, hospital and practitioner). The bulk of drugs were distributed through pharmacies. Distribution to hospitals and practitioners was relatively stable between 1999 and 2013. Distribution to pharmacies was quite variable between 2006 and 2010, but there was a substantial increase between 2001 and 2013.

Discussion

Our analyses present trends in the distribution of prescription opioid pain relievers in Puerto Rico. ARCOS data showed that the overall amount of opioid pain relievers distributed in Puerto Rico increased by 68% between 1999 and 2013. Nonetheless, the overall distribution of these selected opioids in MME kg per person in 2013 is substantially lower than at the national level in the mainland U.S.(6).

The rise in opioid-related overdoses in the mainland U.S. relates closely to increased prescribing of these drugs during the past decade (10). The supply of pain medication must be such that there is enough for appropriate treatment for patients with pain. Treatment for cancer pain and end of life care is especially important, but the supply of prescription drugs may be limited by cost in lower income countries (11). López-Negrón and Monsanto-Planadeball found that prescription drug expenditures comprised nearly one-fifth of the

personal expenditures of the elderly in Ponce, Puerto Rico (12). Thus, availability and monitoring must find the balance between appropriate care, affordability, and overuse/abuse.

Puerto Rico has several substance abuse prevention initiatives. The Puerto Rico Mental Health and Anti-Addiction Services Administration (Administración de Servicios de Salud Mental y Contra la Adicción) ensures the provision of mental health and substance use disorder prevention, treatment, and rehabilitation services. The agency administers services including ambulatory care, mental health centers, peer counseling, and methadone treatment. Puerto Rico uses Programa de Salones Especializados en Sustancias Controladas, or Drug Courts, which seek to rehabilitate individuals and reduce recidivism related to the abuse of controlled substances by providing addiction treatment services.

Puerto Rico has also begun the process to enact legislation to establish a Prescription Drug Monitoring Program (PDMP) to address prescription drug abuse and diversion. PDMPs are state-run electronic databases used to track the prescribing and dispensing of controlled prescription drugs to patients (13). They are designed to monitor prescribing for suspected abuse or diversion and can give a prescriber critical information regarding a patient's prescription history. This information can help prescribers identify high-risk patients who would benefit from early interventions. The Programa de Monitoría de Recetas de Medicamentos Controlados is expected to be housed in the Department of Justice, and is projected to use an electronic system to collect data on controlled substances under schedules II, III, IV & V (14).

One limitation of the ARCOS data is an over-representation of drug consumption because unknown quantities are used for veterinary purposes, and the system includes amounts re-ordered to replace drugs stolen from pharmacies. ARCOS data had certain gaps; in particular we were not able to obtain a breakdown of distribution by entity for 1999 and 2000, and in addition, codeine distribution was not available in 2000 and fentanyl, hydromorphone, and morphine were not available in 2012. This study examined different parts of the distribution chain of the licit opioid supply and did not directly assess individual use of prescription opioid pain relievers. Despite these limitations, we know of no other published reports on the legal distribution of opioids in Puerto Rico.

Conclusion

The ongoing problem with prescription opioid pain reliever overdoses in other parts of the world should serve as a warning to public health practitioners to monitor consumption of opioid pain relievers, as well as changes in prescription drug abuse, overdose, and death. Continued surveillance of all prescriptions drugs is a prudent measures to track use, but also to identify emerging trends, such as the misuse/abuse of xylazine found in recent studies in Puerto Rico (15). Effective measures to address prescription drug overdoses will likely need to be multifaceted and involve a wide range of stakeholders engaged in surveillance, improvement of clinical practice, as well as policy changes. Capacity to understand drug use patterns and studies of risk factors can be enhanced by examining the prescription histories of people who die from prescription drug overdoses to determine the specific factors, such as abuse, that might have contributed to their death.

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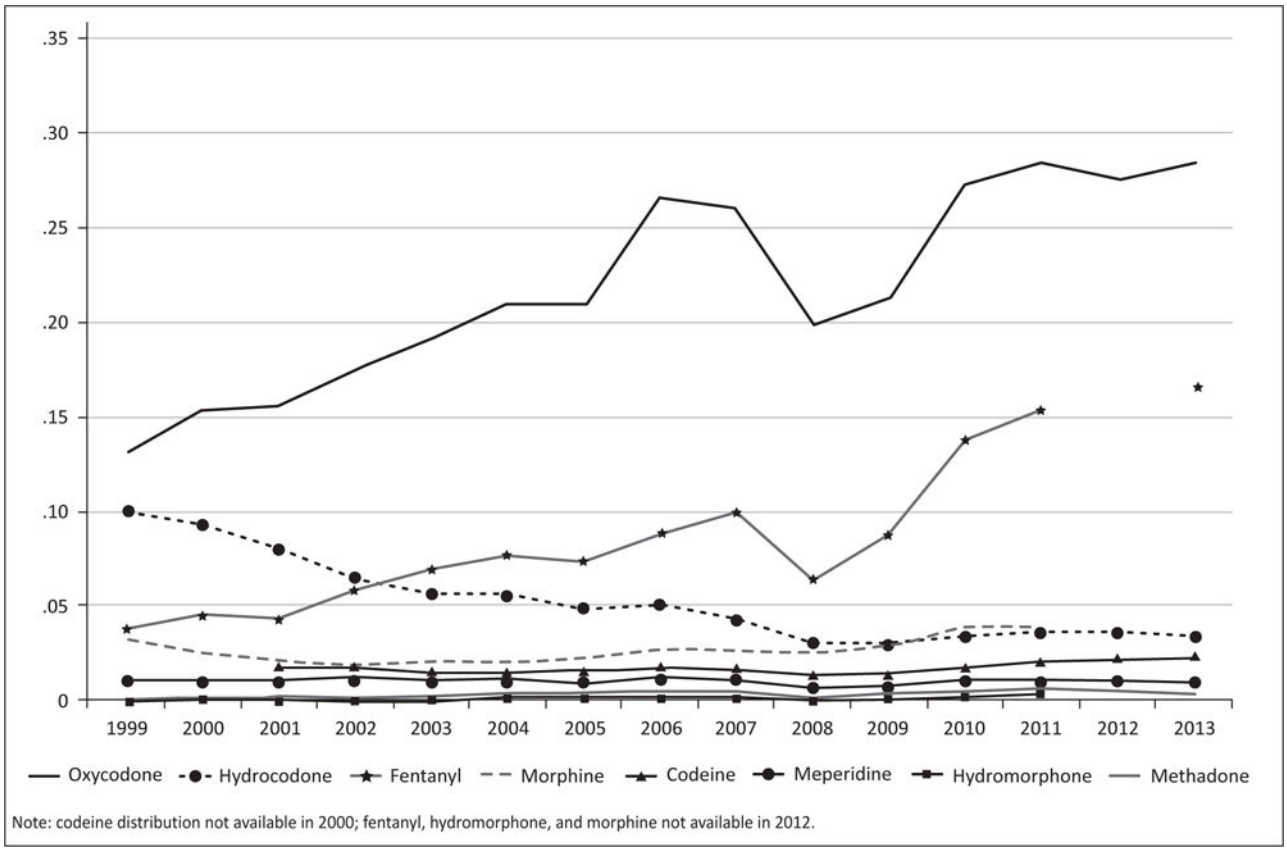

Figure 1.

Rate (morphine milligram equivalent kg per 10,000 persons) of distribution of opioids, Puerto Rico, Automation of Reports and Consolidated Orders System, 1999–2013

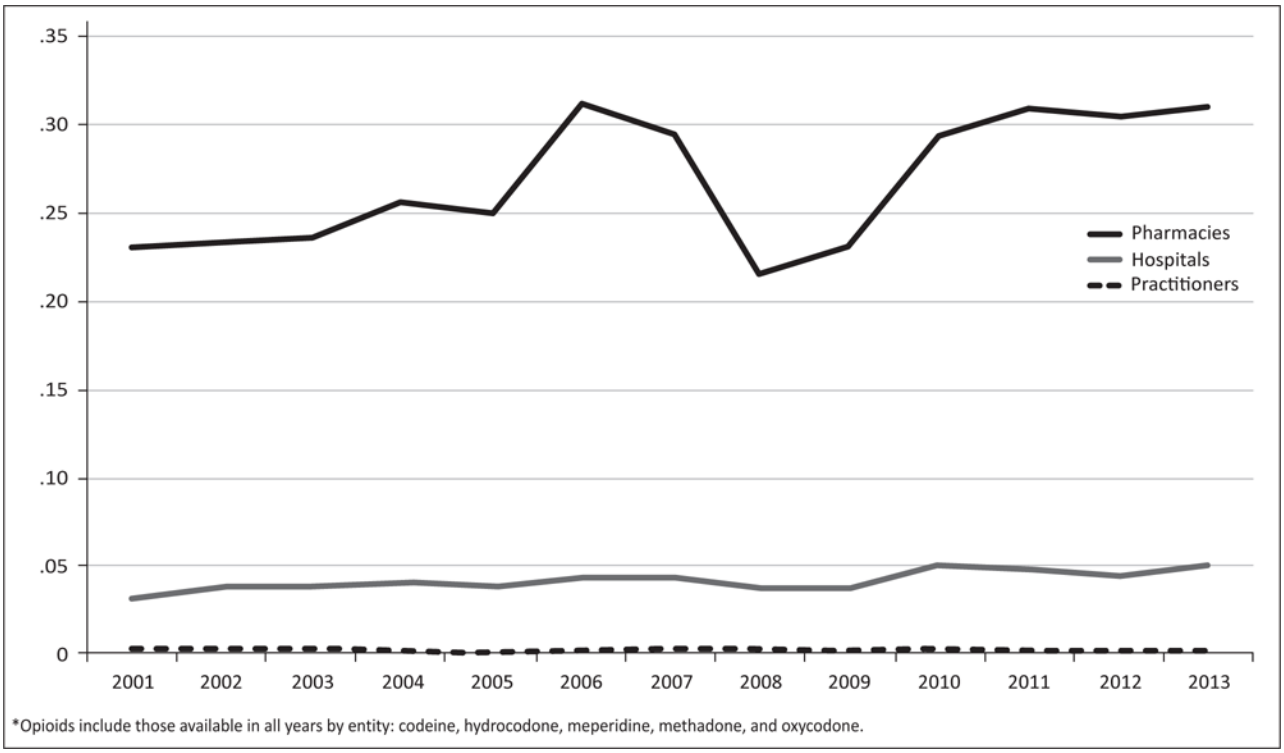

Figure 2.

Rate (morphine milligram equivalent kg per 10,000 persons) of distribution of opioids* to Pharmacies, Hospitals and Practitioner Offices, Puerto Rico, Automation of Reports and Consolidated Orders System, 2001–2013

Table 1

Distribution of opioids in Puerto Rico, total kgs and rate (morphine milligram equivalent kg per 10,000 persons), Automation of Reports and Consolidated Orders System, 1999–2013

	Codeine		Fentanyl		Hydrocodone		Hydromorphone		Meperidine		Methadone		Morphine		Oxycodone	
Year	Total kg	Rate	Total kg	Rate	Total kg	Rate	Total kg	Rate	Total kg	Rate	Total kg	Rate	Total kg	Rate	Total kg	Rate
1999	56.59	.02	.20	.04	38.79	.10	.05	.00	43.53	.01	.01	.00	12.52	.03	34.39	.13
2000	na	na	.24	.05	35.82	.09	.04	.00	42.35	.01	.04	.00	9.70	.03	38.75	.15
2001	48.28	.02	.22	.04	30.55	.08	.02	.00	37.21	.01	.12	.00	8.04	.02	39.91	.16
2002	47.02	.02	.30	.06	25.09	.07	.02	.00	43.66	.01	.17	.00	7.37	.02	45.34	.18
2003	39.22	.02	.36	.07	21.87	.06	.03	.00	42.33	.01	.22	.00	8.17	.02	49.50	.19
2004	39.61	.02	.40	.08	21.76	.06	.03	.00	46.31	.01	.45	.00	7.98	.02	54.61	.21
2005	42.47	.02	.38	.07	18.96	.05	.12	.00	39.48	.01	.56	.00	8.78	.02	54.89	.21
2006	47.18	.02	.47	.09	19.68	.05	.12	.00	47.70	.01	.77	.01	10.52	.03	70.09	.27
2007	44.57	.02	.52	.10	17.36	.04	.12	.00	44.85	.01	.60	.00	10.22	.03	68.64	.26
2008	34.08	.01	.34	.06	12.29	.03	.06	.00	26.90	.01	.27	.00	10.08	.03	52.52	.20
2009	36.89	.01	.47	.09	11.70	.03	.13	.00	31.54	.01	.50	.00	11.21	.03	56.67	.21
2010	43.47	.02	.69	.14	12.55	.03	.16	.00	40.92	.01	.66	.01	14.65	.04	68.08	.27
2011	51.73	.02	.76	.16	13.12	.04	.24	.00	40.04	.01	.69	.01	14.11	.04	69.95	.28
2012	52.78	.02	na	na	12.91	.04	na	na	37.52	.01	.64	.01	na	na	67.28	.28
2013	57.20	.02	.80	.17	12.44	.03	.34	.00	38.11	.01	.48	.00	13.44	.04	68.98	.29
Percent Change																
1999–2013	1.1%		293.1%		−67.9%		614.1%		−12.5%		1125.7%		7.4%		100.6%	

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