Opioid distribution trends (2006 – 2017) in the US Territories

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Background. The US mainland is experiencing an epidemic of opioid overdoses. Unfortunately, the US Territories (Guam, Puerto Rico, and the Virgin Islands) have often been overlooked in opioid pharmacoepidemiology research. This study examined common prescription opioids over the last decade.

Methods. The United States Drug Enforcement Administration's Automation of Reports and Consolidated Orders System (ARCOS) was used to report on ten medical opioids: buprenorphine, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, and oxymorphone, by weight from 2006 to 2017. Florida and Hawaii were selected as comparison areas.

Results. Puerto Rico had the greatest Territorial oral morphine mg equivalent (MME) per capita (421.5) which was significantly higher ($p < .005$) than the Virgin Islands (139.2) and Guam (118.9) but significantly lower than that of Hawaii (794.6) or Florida (1,509.8). Methadone was the largest opioid by MMEs in 2017 in most municipalities, accounting for 41.1% of the total in the Virgin Islands, 37.9% in Florida, 36.6% in Hawaii but 80.8% in Puerto Rico. Puerto Rico and Florida showed pronounced differences in the distribution patterns by pharmacies, hospitals, and narcotic treatment programs for opioids.

Conclusions. Continued monitoring of the US Territories is needed to provide a balance between appropriate access to these important agents for cancer related and acute pain while also minimizing diversion and avoiding the opioid epidemic which has adversely impacted the US mainland.

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17 Abbreviations: ARCOS: Automation of Reports and Consolidated Ordering System; MME:

18 morphine mg equivalents; NTP: narcotic treatment programs

19 Key Words**:** Puerto Rico, Guam, US Virgin Islands, Hawaii, Florida, MME, opiate, substance
20 abuse
21 Figures: 2; Tables: 2; Supplemental Tables: 2

26

27   **Abstract**

28   **Background**. The US mainland is experiencing an epidemic of opioid overdoses.

29   Unfortunately, the US Territories (Guam, Puerto Rico, and the Virgin Islands) have often been

30   overlooked in opioid pharmacoepidemiology research. This study examined common

31   prescription opioids over the last decade.

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33   and Consolidated Orders System (ARCOS) was used to report on ten medical opioids:

34   buprenorphine, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone,

35   morphine, oxycodone, and oxymorphone, by weight from 2006 to 2017. Florida and Hawaii

36   were selected as comparison areas.

37   **Results**. Puerto Rico had the greatest Territorial oral morphine mg equivalent (MME) per

38   capita (421.5) which was significantly higher ($p < .005$) than the Virgin Islands (139.2) and

39   Guam (118.9), but significantly lower than that of Hawaii (794.6), or Florida (1,509.8).

40   Methadone was the largest opioid by MMEs in 2017 in most municipalities, accounting for

41   41.1% of the total in the Virgin Islands, 37.9% in Florida, 36.6% in Hawaii but 80.8% in Puerto

42   Rico. Puerto Rico and Florida showed pronounced differences in the distribution patterns by

43   pharmacies, hospitals, and narcotic treatment programs for opioids.

44   **Conclusions**. Continued monitoring of the US Territories is needed to provide a balance

45   between appropriate access to these important agents for cancer related and acute pain while also

46   minimizing diversion and avoiding the opioid epidemic which has adversely impacted the US

47   mainland.

48
49

INTRODUCTION

50

51   Increasing rates of opioid prescriptions and overdoses in the past decade and a half have

52   led epidemiologists and lawmakers to refer to the current situation as an opioid epidemic. Almost

53   two-hundred people die each day in the United States (US) from overdoses (Sanger-Katz, 2018).

54   Lawmakers and healthcare administrators have developed several strategies to address opioid

55   misuse. These include removing pain as the fifth vital sign and the implementation of

56   prescription take back and drug disposal programs. Increased efforts have been made to change

57   the focus of patient care surveys and insurance reimbursement towards how pain is addressed, as

58   opposed to encouraging prescription of opioids. Prescription Drug Monitoring Programs

59   (PDMP) are integral in tracking prescription medications. PDMPs programs have been

60   incorporated since 1939 in California and subsequently across the United States. Currently, all

61   states (except Missouri), the District of Columbia, and Guam have operational PDMPs (PDMP

62   Training & Technical Assistance Center, 2018). The rates of opioid prescription vary by

63   geographic location and was possibly affected by the presence of an active PDMP (Curtis,

64   Stoddard, & Radeva, 2006).

65   There are pronounced disparities between the United States and the Territories. While

66   Medicaid federal spending is matched with the state spending level, to no limit, there is a cap on

67   the amount of money provided to the Territories (Nunez-Smith et al. 2011). The impact of the

68   Medicaid spending cap is overt, denying coverage of mandatory and optional services needed by

69   the patient population of the Territories. These healthcare services include preventative

70   screenings, home health nursing, rehabilitation centers, and hospice care, and others (Gutierrez,

71   2011). Importantly, the Territories are under the jurisdiction of the Food and Drug

72   Administration, Drug Enforcement Administration and the Centers for Disease Control and

73   Prevention. Puerto Rico, the most populated of the Territories, was included in an opioid

74   pharmacoepidemiology report although this investigation did not include opioids provided by

75   narcotic treatment programs (NTP) (Felix et al. 2016). Notably, when Puerto Ricans from the US

76   mainland were compared to Puerto Ricans on the islands, there was a higher prevalence of

77   substance use related consequences such as HIV and hepatitis among the island population

78   (Hautala et al. 2017). Although the Virgin Islands and American Samoa do not have PDMPs,

79   Guam has had an active program since 2013. Puerto Rico is making strides towards this goal and

80   passed PDMP legislation in 2016 and the program became operational in June, 2018.

81   Overall, given the few studies that have focused on the US Territories specifically and the

82   use and misuse of prescription of opioids (Battiste et al. 2017; Felix et al. 2016; Hautala et al.

83   2017), it is unclear whether these locations have been experiencing the same trends in opioid

84   prescriptions as the mainland US (Piper et al. 2018). The present study aimed to investigate the

85   temporal pattern in opioid distribution in the US Territories of Guam, Puerto Rico, the Virgin

86   Islands, and American Samoa. Florida and Hawaii were used in comparison due to their

87   geographic and demographic similarities to the Caribbean and Pacific islands, respectively

88   (Supplemental Table 1). We also examined the various distribution sources (i.e. pharmacy,

89   hospital, NTP) across locations to determine what facilities make opioids available. The results

90   also seek to inform whether prescription opioids are being distributed more on an outpatient or

91   inpatient basis or for pain versus addiction.

92   **MATERIALS AND METHODS**

93   **Data source.** The Automation of Reports and Consolidated Orders System (ARCOS) was used

94   to collect information on the distribution of prescription opioids and their respective distributors

95   from 2006 to 2017. ARCOS is a comprehensive drug reporting system that is administered by

96   the US Drug Enforcement Administration to track the distribution of controlled substances.

97   Manufacturers and distributors are required to report controlled substances transactions including

98   inventory, point of sale, and distribution of substances at the dispenser/retail level. ARCOS

99   tallies the cumulative and quarterly sale of controlled substances in grams and reflects the

100   distribution to pharmacies, hospitals, practitioners, mid-level practitioners, teaching institutions,

101   and Narcotic Treatment Programs (NTP). Nine opioids, oxycodone, oxymorphone, hydrocodone,

102   morphine, methadone, meperidine, fentanyl, codeine, and hydromorphone, were selected based

103   on reports of their being commonly abused (National Institute of Drug Abuse, 2018,

104   Supplemental Table 2). Buprenorphine was chosen due to its increasing use (Piper et al. 2018) in

105   treating an opioid use disorder although it is also employed for pain. Procedures were approved

106   by the IRB of the University of New England (#20180410-009).

107   **Statistical analysis.** Four analyses were completed: (1) the total oral morphine milligram

108   equivalent (MME) was calculated and converted to kg for all ten opioids and expressed per year

109   (2006 to 2017) for each territory; (2) percent change for each opioid relative to 2006; (3) the

110   MME per capita with US Census, American Community Survey, and other sources used to

111   determine population (Supplementary Figure 1); (4) total distribution to pharmacies, hospitals,

112   practitioners, and NTPs expressed as a percentage of the total. The oral MME was calculated to

113   correct for the relative potency of each opioid relative to morphine. The conversions were

114   completed using the following factors: buprenorphine (10), codeine (0.15), fentanyl base (75),

115   hydrocodone (1), hydromorphone (4), meperidine (0.1), methadone (12 from NTP and 8 from

116   other sources), morphine (1), oxycodone (1.5), and oxymorphone (3) (Piper et al. 2018). A

117   paired t-test compared the MME per capita by location for each year (2006-2017). Data analysis

118   and figures were completed with Systat, version 13.1 and GraphPad Prism, version 7.04.

119   **RESULTS**

120

121   Figure 1A shows the change in opioid distribution from 2006 to 2017 after conversion to

122   oral MME. Municipalities generally showed an inverted-U pattern with initial increases in the kg

123   of opioids distributed followed by decreases over time. Puerto Rico peaked in 2008, Florida in

124   2010, Hawaii in 2011, and Guam in 2013. There were MME increase of +4.2% in Puerto Rico,

125   +11.2% in the Virgin Islands versus decreases of -9.9% in Guam, -5.1% in Florida, and -6.9% in

126   Hawaii from 2016 to 2017. Figure 1B, with data expressed as a percentage of 2006, more clearly

127   illustrates the temporal pattern over the last decade with peaks in 2007 (+41.2%), 2008 (+7.2%),

128   and 2013 (+38.5%) for the Virgin Islands, Puerto Rico, and Guam, respectively. Figure 1C

129   shows the MME when corrected for population. The MME per person from 2006 to 2017 in

130   Florida (1,509.7 $\pm$ 107.5) was almost two-fold higher than Hawaii (794.6 $\pm$ 23.5, $t(11) = 7.94$, p

131     $< .0005$). Figure 1D illustrates that the MME per person in Puerto Rico (421.5 $\pm$ 20.3) was three-

132   fold, and significantly, elevated relative to the Virgin Islands (139.2 $\pm$ 5.8). Further, the Virgin

133   Islands had a higher MME than Guam (118.9 $\pm$ 4.1, $t(11) = 4.13$, $p < .005$) and American Samoa

134   (15.8 $\pm$ 1.4, $t(11) = 20.36$, $p < .0005$).

135   Table 1 expresses the percent change in each opioid in the three US Territories, Hawaii,

136   and Florida from 2006 to 2017. Meperidine showed large reductions in all municipalities.

137   Methadone exhibited uniform decreases across locations. Morphine, fentanyl, and codeine

138   quantities declined and buprenorphine and oxycodone increased in four of the five assessed

139   areas.

140   Table 2 shows that methadone was the most prevalent of the ten opioids by MME in the

141   majority of areas. Buprenorphine was in the top five in four of the six municipalities. Oxycodone

142   was consistently among the top three. Nationally, methadone from NTP (40.0%) and

143   buprenorphine accounted for almost half (49.6%) of the total opioid MME (Supplemental Figure

144   2).

145   The source of opioid distribution, by percent of the total MME, varied widely across

146   locations. NTPs were responsible for none (0.0%) in Guam versus over four-fifths (80.5%) in

147   Puerto Rico. Pharmacies were responsible for the preponderance of opioid distribution (> 60%)

148   except in Puerto Rico (16.6%) in 2017. NTPs were responsible for over three-quarters of

149   prescription opioids in Puerto Rico (Figure 2A) relative to less than one-third in Florida. There

150   were dynamic changes in pharmacy's MME while hospitals showed smaller fluctuations.

151   Practitioners exceeded hospitals from 2008 to 2010 in Florida (Figure 2B). The entire US,

152   including the Territories (Figure 2C) generally reported a similar pattern as Florida

153   (Supplemental Figure 3).

154

155
156 **DISCUSSION**
157
158   This study identified dynamic changes in prescription opioids from 2006 to 2017 in the

159 US Territories of Guam, Puerto Rico, American Samoa and the Virgin Islands and the quantities

160 distributed by business activity relative to Florida and Hawaii. The total MME of ten opioids

161 (Figure 1) showed an inverted-U pattern over the last dozen years with elevations followed by

162 declines. The total MME per capita was calculated for each location and Puerto Rico's was only

163 one-quarter that of Florida. American Samoa, Guam, and the Virgin Islands were significantly

164 lower than Puerto Rico which is congruent with ARCOS data that focused more narrowly on

165 2016 (Piper et al. 2018).

166   It is reasonable to speculate that the recent de-escalation of opioid distribution resulted

167 from heightened awareness of the opioid addiction crisis the country has been experiencing over

168 the past decade (Presidents Commission, 2017). This decline can also be seen in Table 1 which

169 examines the percentage changes between 2006 and 2017 where some opioids saw a decrease in

170 their distribution. This was particularly true for meperidine. Concern about the metabolite

171 normeperidine which has a long-half life, is biologically active, and can cause altered mental

172 status, psychosis, myoclonus, and seizures, have prompted several organizations to discourage

173 use of meperidine (Dobbins, 2010). In contrast, buprenorphine showed pronounced elevations

174 which likely results from increasing use to treat an opioid use disorder. Prescription opioid use

175 reflects a confluence of factors including restrictions in supply, changing demands due to

176 prescribing guidelines and patient expectations, and pharmacoeconomic factors which reflect

177 patent expirations and finite health care resources. Morphine, fentanyl, and methadone are on the

178 United Nations List of Essential Medications and were prominent in the Territories and States.

179   One of the most striking findings in this report was that Puerto Rico's most abundant

180   prescription opioid by morphine equivalents from 2006 to 2017 was methadone. The

181   preponderance of methadone in Puerto Rico indicates that the residents in this location are

182   accessing the six NTPs. Conversely, opioid use for pain is modest relative to the mainland US

183   (Piper et al. 2018), resulting in a heightened proportion from NTP. These findings should be

184   interpreted with caution and not be used to stigmatize Puerto Rico. Guam and American Samoa

185   do not have a NTP. Methadone is an evidence based treatment for an opioid use disorder

186   (Faggiano et al. 2003). Nationally, methadone accounted for 46.9% of the MME which was

187   twice as much as the next largest opioid, oxycodone and six times more than hydrocodone. A

188   recent review indicated that methadone represented only 1% of all opioid prescriptions

189   (Manchikanit et al. 2018). An underappreciation for the importance of methadone on a

190   population level results from a variety of factors including: 1) a well-intentioned regulation (42

191   CFR Part 2) that prevents methadone as part of opioid use disorder treatment from being entered

192   into PDMPs and other barriers to access of this information; 2) use of outdated and low MME

193   conversion factors in pharmacoepidemiology research (Guy et al. 2017); and 3) the separate

194   administration system of NTPs in the US results in many fewer health care providers, relative to

195   buprenorphine, having direct experience with methadone. Others have called for the

196   reconsideration of 42 CFR Part 2 (President's Commission, 2017) as this regulation is an

197   obstacle to physicians and pharmacists knowing which opioid pharmacotherapies, and the dose,

198   their patients may be receiving. Future legal innovations in the Territories could result in more

199   complete methadone reporting than currently occurs in the states.

200   Puerto Rico has seen implementation of policies and programs for mental health and

201   substance abuse (Leff et al. 2017). Compared to the other locations, methadone was not as

202   prevalent in Guam where oxycodone, morphine, and fentanyl were more common. The data

203   appears to support earlier work (Curtis et al. 2006; Felix et al. 2016; Piper et al. 2018) in that the

204   differences in opioid distribution varied by location. Although the Virgin Islands and Guam,

205   having the smaller populations compared to Puerto Rico, were found to have similar abundance

206   of opioid distribution, these locations are obviously not located near each other geographically.

207   However, the Virgin Islands does have a notable distribution of opioids from NTPs indicating

208   increased efforts towards addressing opioid use disorders.

209   It is noteworthy that Florida showed more dynamic changes in total opioid volumes over

210   the past decade than Hawaii. Florida had 250 active pill mills and a law to close them was

211   enacted in 2011 (Chang, Lyapustina, Rutkow, et al. 2016). One-twentieth of prescribers were

212   responsible for two-thirds of the volume of opioids in Florida (Chang et al. 2016). Florida also

213   led the US in direct dispensing of controlled substances by physicians but this dubious practice

214   underwent a pronounced decline since 2010 (Hansen and Netherland, 2016).

215   Ethnicity is a key consideration in opioid pharmacoepidemiology. Whites that visit

216   emergency rooms in the mainland US are more likely to be prescribed opioids, particularly

217   morphine and hydromorphone, than non-whites (Pletcher et al. 2008). Nationally representative

218   surveys have determined that non-Hispanics whites both used heroin and misused nonmedical

219   prescription opioids prior to initiating heroin more frequently than non-whites (Martins, Sarvet,

220   Santaella-Tenorio, et al. 2017). Further study is necessary to determine if non-white ethnicity, or

221   associated variables, are similarly protective against opioid misuse in the US Territories or if the

222   dynamic of being in a "majority-minority" community (Supplemental Table 1) impacts these

223   associations.

224   Our research on the US Territories had a few limitations and caveats. Because we

225   focused on the prescription opioids reported to be the most highly used and misused, Schedule

226   IV agents like tramadol, which is also not monitored by ARCOS, was not reported. Tapentadol

227   did become available until 2008 and has an unusual mechanism of action (Kögel, De Vry,

228   Tzschentke, et al. 2011). As a result, the MME reported in Figure 1 may be an underestimate.

229   The data obtained from ARCOS includes opioids which are reported to the DEA. There is a

230   probability that some opioids may be obtained from sources not recorded in this dataset (e.g.

231   from mail-order pharmacies outside of the investigated municipalities) (Khandelwai, Duncan,

232   Rubinstein, et al. 2012). Figure 1C/D should be interpreted based on the recognition that the

233   MME per capita was based on population estimates for non-Census years which may

234   overestimate the denominator for 2017 in Puerto Rico following hurricane Maria due to

235   migration (Kishere, et al. 2018). ARCOS also does not provide patient level data or the

236   indications the opioids were being distributed which should be the topic of further investigation.

237   Further public policy studies to further understand the origins of the changes observed including

238   the pronounced fiscal constraints in health care spending in Puerto Rico are needed.

239   **CONCLUSION**

240   In conclusion, this study characterized trends in opioid distribution in the US Territories

241   of Guam, Puerto Rico, and the Virgin Islands. The distribution of prescription opioids in US

242   Territories is different than the US mainland in scale but less so for the temporal pattern. Overall,

243   the US Territories had significantly lower distribution of opioids than Florida and Hawaii.

244   Among the Territories, Puerto Rico had the highest average MME per capita with the

245   preponderance of its distribution coming from NTPs. These differences between Territories and

246   States regarding opioid use may be related to cultural and socioeconomic factors, healthcare

247   disparities, public health policies as well as illicit drug availability. Given the large impact and

248   attention on the opioid epidemic in the mainland US, it is also likely these trends are a secondary

249   effect for the Territories. However, given the lack of active PDMPs, with the exception of Guam,

250   there should continue to be improvements in surveillance of controlled substances in these

251   locations. The US Territories have a population primarily consisting of racial minorities and

252   therefore typically underserved and underrepresented in medicine. The opioid epidemic has had

253   a greater impact on White populations (Hansen and Netherland, 2018) and has been described as

254   at least partially iatrogenic (Piper et al. 2018). Ironically, health care disparities could, in this

255   very narrow context, protect the US Territories from an escalation from prescription opioids to

256   heroin and illicit fentanyl. Further research needs to identify the specific sociocultural factors

257   impacting these Territories and how they are interrelated with prescription opioid use and abuse.

258   Although additional data regarding emergency room visits and overdoses are needed from the

259   US Territories, Florida and other states might benefit from reflecting on whether having

260   extremely low prescription opioid use has had population level benefits for the US Territories.

261   **Acknowledgements**

262   Thanks to pharmacy faculty at the University of Puerto Rico and Olapeju M. Simoyan, MD for

263   feedback about this project. The first four authors are listed in alphabetical order.

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383 **Figure Captions**

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385

386 **Figure 1**. Total distribution of ten opioids (buprenorphine, codeine, fentanyl, hydrocodone,

387 hydromorphone, meperidine, methadone, morphine, oxycodone, and oxymorphone), uncorrected

388 for population (A), expressed as a percent change in weight relative to 2006 (B), and corrected

389 for population (C) in morphine mg equivalents (MME) between 2006 and 2017 by location as

390 reported to the US Drug Enforcement Administration's Automation of Reports and Consolidated

391 Ordering System. D) Mean ($\pm$SEM) MME/capita in the US Territories. [P]$p < .0005$ versus Puerto

392 Rico, [V]$p < .0005$ versus the US Virgin Islands.

393

394 **Figure 2**. Percent of the total oral morphine mg equivalent (MME) for ten opioids

395 (buprenorphine, codeine, fentanyl base, hydrocodone, hydromorphone, meperidine, methadone,

396 morphine, oxycodone, and oxymorphone) by business activity as reported by the US Drug

397 Enforcement Administration's Automation of Reports and Consolidated Ordering System for

398 Puerto Rico (A), Florida (B), and the United States and Territories (C).

399

Figure 1

Total distribution of ten opioids from 2006 to 2017.

Total distribution of ten opioids (buprenorphine, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, and oxymorphone), uncorrected for population (A), expressed as a percent change in weight relative to 2006 (B), and corrected for population (C) in morphine mg equivalents (MME) between 2006 and 2017 by location as reported to the US Drug Enforcement Administration's Automation of Reports and Consolidated Ordering System . D) Mean (+ SEM) MME/capita in the US Territories. [P]p < .0005 versus Puerto Rico, [V]p < .0005 versus the US Virgin Islands.

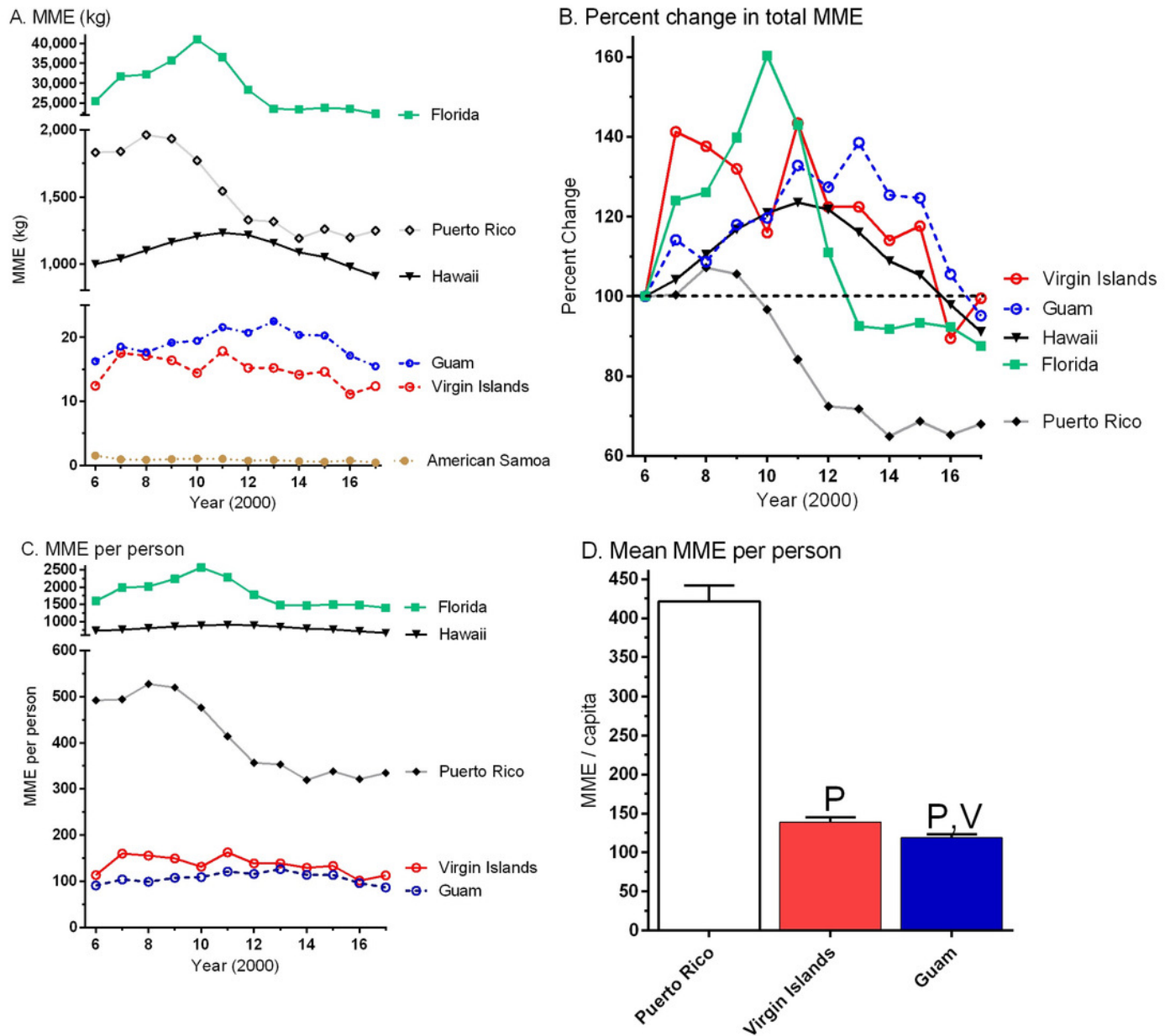
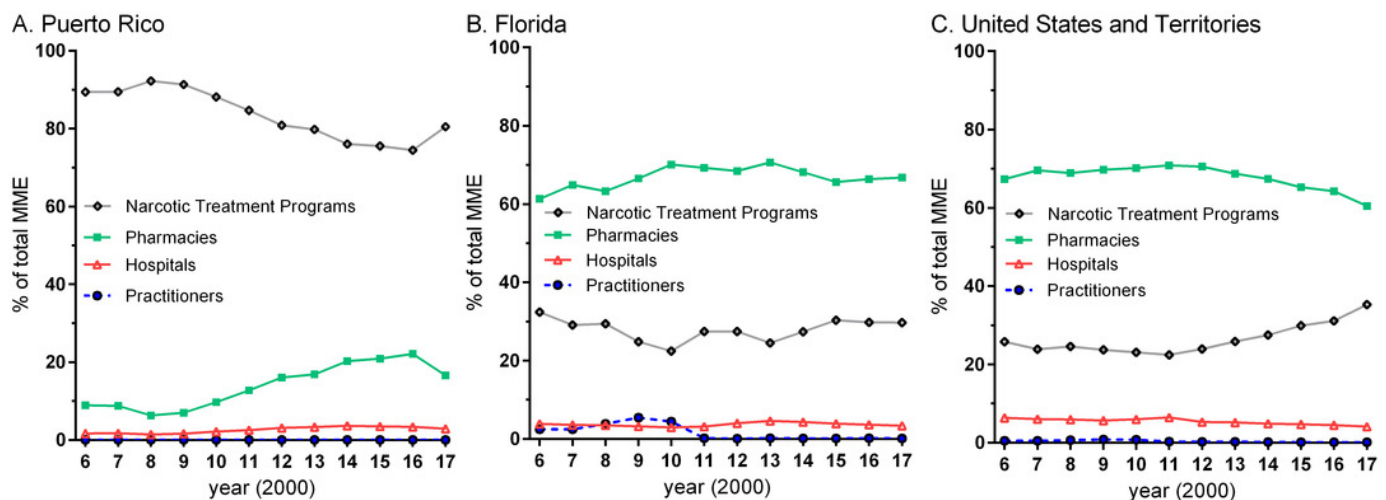



Figure 2

Oral morphine mg equivalent (MME) for ten opioids.

Percent of the total oral morphine mg equivalent (MME) for ten opioids (buprenorphine, codeine, fentanyl base, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, and oxymorphone) by business activity as reported by the US Drug Enforcement Administration's Automation of Reports and Consolidated Ordering System for Puerto Rico (A), Florida (B), and the United States and Territories (C).

Percent change in opioids by weight (g) from 2006 to 2017

Percent change in opioids by weight (g) from 2006 to 2017 as reported by the US Drug

Enforcement Administration's Automation of Reports and Consolidated Ordering System

Table 1. Percent Change in opioids by weight (g) from 2006 to 2017 as reported by the US Drug Enforcement Administration's Automation of Reports and Consolidated Ordering System.						
Opioid	Florida	Puerto Rico	Hawaii	Guam	US Virgin Islands	United States & Territories
buprenorphine	+955.69%	+1,654.05%	+750.67%	-57.48%	+73.62%	+1,058.16%
codeine	-24.90%	+8.58%	-39.16%	-54.59%	-33.85%	-13.91%
fentanyl	-12.48%	+23.77%	-30.13%	-0.89%	-39.07%	-24.28%
hydrocodone	-37.53%	-87.06%	-9.17%	-37.48%	-29.12%	-9.13%
hydromorphone	+135.92%	+140.55%	+16.40%	+104.91%	+120.62%	+55.72%
meperidine	-87.86%	-63.58%	-86.75%	-71.71%	-82.78%	-83.21%
methadone	-41.15%	-38.80%	-35.44%	-26.16%	-7.86%	+5.18%
morphine	+26.43%	-23.80%	-29.70%	-14.41%	-6.23%	-5.16%
oxycodone	+3.67%	-27.68%	+17.51%	+41.59%	+85.11%	-31.92%

Positive change by >10%	
Negative change by >10%	

Opioids, ranked by percent of total morphine mg equivalent, in 2017.

Opioids, ranked by percent of total morphine mg equivalent of ten opioids as reported by the US Drug Enforcement Administration's Automation of Reports and Consolidated Ordering System in 2017.

Table 2. Opioids, ranked by percent of total morphine mg equivalent of ten opioids as reported by the US Drug Enforcement Administration's Automation of Reports and Consolidated Ordering System in 2017.							
Rank	Florida	Puerto Rico	Hawaii	Guam	US Virgin Islands	American Samoa	United States & Territories
1	meth 37.9%	meth 80.7%	meth 36.6%	oxy 33.2%	meth 41.1%	codeine (47.8%)	meth (46.9%)
2	oxy 27.5%	bup 8.0%	oxy 28.6%	mor 25.8%	oxy 25.5%	oxy (20.6%)	oxy (20.9%)
3	bup 8.4%	oxy 6.1%	mor 9.6%	fentanyl 20.1%	hyd 9.4%	mor (20.5%)	bup (9.6%)
4	fentanyl 7.8%	fentanyl 3.5%	bup 8.7%	meth 8.9%	fentanyl 8.5%	fentanyl 8.2%)	hyd (7.7%
5	mor 7.0%	mor 0.7%	hyd 7.7%	codeine 4.6%	bup 5.1%	hyd 1.9%	fentanyl (6.9%)

2   bup: buprenorphine, hyd: hydrocodone, meth: methadone, mor: morphine, oxy: oxycodone