

Comparison of Opioid Prescription Pattern Trends from 2010 to 2017 amongst DENTAC and selected Departments of the Carl R. Darnall Army Medical Center at Fort Hood, TX.

A Thesis

Presented to the Faculty of the Advanced Education in General Dentistry, Two-Year Program,  
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And the Uniformed Services University of the Health Sciences – Post Graduate Dental College  
In Partial Fulfillment of the Requirements for the Degree of  
Master of Science in Oral Biology

By

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Comparison of Opioid Prescription Pattern Trends from 2010 to 2017 amongst DENTAC and selected Departments of the Carl R. Darnall Army Medical Center at Fort Hood, TX.

A REPORT ON

An Observational Retrospective Cohort comparing opioid prescription pattern trends from 2010 to 2017 amongst DENTAC and the OBGYN, Emergency Room and Family Medicine Departments of the Carl R. Darnall Army Medical Center at Fort Hood, TX.

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## ABSTRACT

**Purpose:** The purpose of this Observational Retrospective Cohort is to compare opioid prescription patterns trends from January 1st 2010 to December 31st 2017 amongst the DENTAC, OBGYN, Emergency Room, and Family Medicine departments assigned to the Carl R. Darnall Army Medical Center, Ft. Hood TX. In addition, as a secondary outcome, the type of opioid prescribed will be explored during the same time frame.

**Methods:** An Observational Retrospective Cohort Longitudinal Archival Medical Chart Review was executed by a report collection from the Pharmacy Data Transaction Service (PDTS) Data analysis was developed with a Repeated Measures Analysis of Variance (ANOVA) in order to compare means across multiple variables based on repeated observations. By utilizing a mix of factors model, variables within each department (Test of Within-Subjects Effects) and between departments (Test of Between-Subjects Effects) were analyzed.

**Results:** The statistical analysis demonstrated no significant differences within the number of pills dispensed from the DENTAC and OBGYN departments. A moderate decrease in prescription patterns at the Emergency Department and extreme decrease at the Family Medicine Department was reported. No significant differences between the number of patients and number of prescriptions dispensed were found within each department over the 8-year period.

The statistical analysis showed significant differences between the Family Medicine and Emergency departments in comparison with the DENTAC and OBGYN departments. A substantial decrease in opioid pills dispensed has been proved in the Family Medicine and Emergency Departments. The DENTAC and OBGYN departments showed a constant linear factor from 2010 to 2016 indicating minimal changes in number of pills dispensed and revealing a small decrease of pills dispensed during 2017. The most common types of opioid medication prescribed in the four departments from 1st JAN-2010 to 31st DEC-2017 are Morphine Sulfate and Hydromorphone HCL.

**Conclusions:** In this study, the DENTAC AND OBGYN departments did not show a significant decrease in number of opioid pills and number of prescriptions dispensed compared to the Family Medicine and Emergency room departments. Overall, the Family Medicine department showed the most drastic change in opioid prescription patters from 1st JAN-2010 to 31st DEC-2017 at the Carl R. Darnall Army Medical Center, Fort Hood TX. The most common types of opioid medication prescribed in the same period of time within the four departments were characterized by morphine and hydromorphone components.

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### Disclaimer

The opinions or assertions contained herein are those of the author and are not to be construed as official or reflecting the view of the Department of Defense or the Uniformed Services

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## INTRODUCTION

The opioid crisis in the United States was declared a public health emergency in 2017 (8, 12, 20) In the last few decades, the treatment of chronic pain has expanded to the primary care setting. Many primary care providers have had little specific training in pain medicine and addiction and are unsure about how to safely prescribe opioids. In addition, the high prevalence of psychiatric comorbidity in those who abuse prescription drugs contributes to the complexity in treating pain. (5) In 2012, U.S. health care providers wrote more than 259 million prescriptions for opioids, twice as many as in 1998 (15) The non-therapeutic use of opioid analgesics increased markedly over the past fifteen years to the point where it is now regarded as a major public health concern. (1)

In 2015, approximately 12.5 million people misused prescription opioids, and approximately 2 million people demonstrated prescription opioid use disorder because of the high rates of opioid abuse, overdose, and death. (20) In 2016, the total number of opioid prescriptions in the United States was approximately 214.9 million, with an annual opioid prescribing rate of 66.5 prescriptions per 100 people. (20)

Chronic pain conditions and prescription drug abuse are becoming an important public health issue. Population-based studies reveal that more than 75 million Americans (about 25% of the entire population) have chronic or recurrent pain. Of these, 40% report the pain as having moderate to severe effect on their lives. (6) It is estimated that 90-95% of long-term opioid therapy is prescribed for non-cancer pain conditions (NCPC) and it has been previously reported that approximately 3% of the US general population without cancer uses opioids regularly for a month or more per year. (7)

Between 1980 and 2000, opioid prescribing at outpatient visits for chronic musculoskeletal pain doubled from 8% to 16% with the use of more potent opioids increasing from 2% to 9% (2) Among Medicaid fee-for service enrollees, the overall use of opioid pain medication increased 3-fold from 1996 to 2002 and varied widely from state to state. (2,7) Documented increases in treatment admissions, morbidity, and mortality related to opioids correlate with national increases in overall consumption levels of opioids. (3, 7) Opioids are also frequently for short-term pain management in emergency and clinical settings. (5)

The data available from the National Survey on Drug Use and Health indicates that approximately 4.5 million people 12 years or older reported nonmedical use of pain relievers, including taking more pills than prescribed and combining with other substances (8) In 2005, 1.5 million of the 108 million ER visits were associated with drug misuse or abuse, with most visits (55%) involving multiple drugs. Of these visits, more than one-third involved the nonmedical use of prescription or Over the Counter (OTC) drugs. (5) Opioids are the most prescribed medication of any drug category in the United States, exceeding 250 million prescriptions annually (8) Legitimate prescriptions, and the diversion (intentional or unintentional) of those prescriptions, constitute a major source of abuse (8)

Besides the drastic increases in the number of prescriptions written and dispensed, several other factors have likely contributed to the severity of the current opioid abuse problem, including lack of standards among health-care professionals for prescribing opiates, greater social acceptability for using medications for different purposes, and aggressive marketing by pharmaceutical companies (10)

The availability of prescription drugs has contributed to a dramatic increase in nonmedical use and abuse of these medications. Clinician awareness is essential in helping reduce prescription drug abuse while continuing to provide effective treatment. (5) Hall et al reported that a minority (44%) of persons dying from an opioid-related overdose had obtained their medications from a physician. (24)

President Donald Trump's Commission on Combating Drug Addiction and the Opioid Crisis entered this battle, making 56 recommendations to include The ACE Research Act (to promote research on innovative non-addictive pain medications) The Combat Addition Act (to train providers in acute pain management skills) The Creating Opportunities Act (to support drug monitoring programs), the Securing Opioids and Unused Narcotics Act (to safely dispose any unused medications) the Comprehensive Opioid Recovery Centers Act (to provide recovery support services) among others. (11, 13) Additionally, hundreds of local, regional, state, and federal interventions have been implemented. (4) The U.S. Office of National Drug Control Policy responded to the epidemic with numerous recommendations, including the need to evaluate current databases that measure the extent of prescription drug use, misuse, and toxicity. (19) Key topics addressed present and future strategies to combat drug abuse to include prescription drug monitoring programs, reducing prescriptions, public education, eliminating internet drug pharmacies, and the development of future drugs that are not only tamper resistant but also non-addictive. (6, 19)

National interventions to control the opioid crisis have been also considered in dentistry. The American Dental Association's (ADA) partnered with the National Institute of Health (NIH) to accelerate science that will lead to solutions to the opioid crisis through the NIH's Helping to End Addiction Long-Term Initiative. (21) Also, the ADA expressed support for several proposals that complement the ongoing efforts to keep prescription opioid pain medications from becoming a source of harm. (11) On March 26, 2018 the American Dental Association announced a new interim policy on opioids that includes mandatory continuing education, prescribing limits on opioid dosage and duration of no more than seven days for the treatment of acute pain, and mandated dentists to register with and utilize prescription drug monitoring programs. (11)

National surveillance data suggest that dentists follow primary care physicians as the second-leading prescribers of immediate-release opioids and, as such, dentists have been identified as having an important role in opioid abuse prevention efforts. (8) Researchers of previous studies have noted that dentists are often the first source of exposure to opioids for adolescents and young adults. Easy access to prescription opioids among these age groups can increase the likelihood of prescription opioid misuse (20) Providers need training on how to treat oral and dental pain with an opioid and this includes several factors, such as Health Care Provider experience, professional guidelines, the patient's own pain perception, and communication regarding the pain experience between patient and the treatment team, and individual pain assessment. (16)

Thanks in part to policies on opioids and treating dental pain adopted by the ADA, the rate of opioid prescriptions written by dentists has decreased considerably in recent years. In 1998, dentists were the top specialty prescribers of immediate-release opioids, accounting for 15.5% of all immediate-release opioid prescriptions. By 2009, the amount of opioid prescriptions written by dentists decreased to 8% of all opioid prescriptions in the United States, and by 2012, the latest year for which data is available, dentists prescribed 18.5 million prescriptions, accounting for 6.4% of all opioids prescribed in the United States (12, 20, 21)

Multiple studies have been developed to compare and analyze opioid prescription patterns among different medical specialties to include dentistry. Chandrashekar and colleagues identified specific characteristics that would create differences in opioid prescription patterns. They found that the type of health care provider diagnosing dental issues is an important factor, concluding that nurse practitioners prescribed an opioid after a dental diagnosis for approximately 1 in every 4 patients receiving Medicaid. (16) Findings from a 2006 National Ambulatory Medical Care Survey study (3) showed a comparable opioid prescribing pattern between nurse practitioners and medical specialists and found similar results. (16) Volkow et Al studied multiple characteristics in opioid prescriptions during 2009 by analyzing medical and pharmacy Medicaid claims from data reports and concluded that dentists, unlike their primary care physician (28.8%), internist (14.6%), and orthopedic (7.7%) colleagues, prescribed opioid medication only 8% of the time. (18)

Similar results were found by Niodita et al. in opioid prescribing practices from 2010 through 2015 among dentists in the United States. The analysis of prescription rates and dosages, type of opioid drug prescribed, and type of dental visit concluded that dentists more frequently prescribe opioids in a large sample of people who are privately uninsured in the United States. (12)

In 2013, a Pew Research Center survey showed that only 16% of Americans believed that the United States was making progress in reducing prescription drug-abuse. (7) Multiple studies compare opioid prescription trends amongst different medical departments but they have largely relied on self-reported opioid drug use, (4) non-representative samples, (10) and have been non-characteristic of the military population. (10)

The use and abuse of prescribed controlled substances are of concern to the Department of Defense (DoD) because of their potential impact on military readiness, the health and well-being of military personnel and their families, and associated health care costs. Opioids are used in treating military veterans with post-traumatic stress disorder, mental health and substance abuse diagnoses and pain conditions like lower back pain and migraine headaches. (26) The growing rate of opioids prescribed to younger veterans has also been documented. (27) Unfortunately, the information on prescription drug use and abuse among active duty service members (ADSM) is scarce in contrast to the increased literature focused on opioid use and abuse in the civilian population (28)

The observation and evaluation of opioid prescription patterns within the Dental Health Activity (DENTAC) department and its comparison to opioid prescription trends with other departments (OBGYN, ER and Family medicine) is extremely useful in acquiring significant data that will provide a general assessment of opioid prescriptions patterns over an extended period of time. By comparing these figures within departments, and between departments, we can evaluate the effectiveness of measurements from our government, dental associations and local efforts in order to control pain in the safest way possible. As healthcare providers, our responsibility is to ensure that our service members receive the best treatment that maintains them in a high level of mental and physical health in order to remain deployable while successfully fulfill mission requirements.

## HYPOTHESES

The purpose of this study is to compare opioid prescription patterns trends from 1 January 2010 to 31 December 2017 among the DENTAC, OBGYN, Emergency Room, and Family Medicine departments assigned to the Carl R. Darnall Army Medical Center, Ft. Hood TX.

Primary research question: Did opioid prescriptions decrease at the Fort Hood DENTAC department from 2010 to 2017?

Secondary research question: How did opioid prescription trends from the Fort Hood DENTAC department compare to the Ft Hood OBGYN, ER and Family Medicine departments from 2010 to 2017?

Null Hypothesis #1: There are no changes in opioid prescription trends at the Ft Hood DENTAC department from 2010 to 2017.

Null Hypothesis #2: There are no significant differences between opioid prescription trends between the Ft Hood DENTAC department and the Fort Hood OBGYN, ER and Family Medicine departments from 2010 to 2017.

In addition, as a secondary outcome, the type of opioid prescribed will be explored from January 1st 2010 to December 31st 2017 amongst the DENTAC, OBGYN, Emergency Room, and Family Medicine departments. This finding will provide a baseline to determine which opioids that are mostly prescribed during this period of time.

## MATERIALS AND METHODS

### STUDY DESIGN

An Observational Retrospective Cohort Longitudinal Archival Medical Chart Review was executed by a report collection from the Pharmacy Data Transaction Service (PDTs), a centralized information repository that builds a common patient medication profile for all Department of Defense (DoD) and that includes specific data from the Pharmacy Department of the Carl R. Darnall Army Medical Center at Fort Hood TX.

### DATA ACQUISITION AND MANAGEMENT

Only authorized personnel from the General Dynamics Information Technology Department of the Pharmacy Analytics Support Section (PASS) located in San Antonio TX were granted access to the CHCS/AHLTA data repository system. These personnel were not be part of the study team.

The information collected was a raw data summary obtained by a providers MEPRs codes search and it was limited to number of pills, number of prescriptions and number of patients without including any personal identifiable Information.

The data was arranged in an Excel spreadsheet format, with a different page for Grouping Variable using the specific providers MEPRs codes and classified in the corresponding department (DENTAC, ER, OBGYN and Family Medicine). Within each page, the repeated measurement variables (number of prescriptions, number of pills and number of patients) were displayed and collected every three months (quarterly) from 1 January 2010 to 31 December 2017.

This excel spreadsheet document was kept on a government computer assigned to the pharmacy personnel. The computer was password and CAC-card protected, and the system was firewall protected. There were no planned linkages with external databases. Data was transferred by the pharmacy personnel to the principal investigator by encrypted email and secured against intentional or unintentional loss of confidentiality, integrity, or availability.

## STATISTICAL ANALYSIS

The data analysis was conducted by the principal investigator in conjunction with the biostatistics analysis department at the Carl R Darnall Hospital. Data from the excel spreadsheet (Table 1) document was imported into IBM SPSS Statistics software for data analysis.


Methods and Measurements Data analysis was developed with a Repeated Measures Analysis of Variance (ANOVA) in order to compare means across multiple variables based on repeated observations. By utilizing a mix of factors model, variables within each department (Test of Within-Subjects Effects) and between departments (Test of Between-Subjects Effects) were analyzed.

Table 1. Grouping Variable Data by Departments (1<sup>st</sup> Jan-2010 to 31<sup>st</sup> Dec-2017)

	DT #pres	DT #pills	DT #patie	OB#pres	OB #pills	OB #patien	ER #prescri	ER #pills	ER #patien	FM #prescr	FM #pills	FM #patien
(2010) Jan-Mar	1363	26595	1236	333	9049	291	21	233	21	1683	66345	41
(2010) April-Jun	1056	19578	966	233	6011	109	34	395	33	1530	61647	1002
(2010) Jul-Sep	911	16532	834	357	9999	318	373	7416	358	1622	66407	1142
(2010) Oct-Dec	840	15007	761	291	8316	242	625	15222	601	1438	64051	1046
(2011) Jan-Mar	825	15007	752	274	8756	235	509	13050	478	1695	83997	1106
(2011) April-Jun	890	17918	793	132	3463	120	28	10474	456	1986	88846	1143
(2011) Jul-Sep	863	16918	781	191	4763	152	559	13052	544	1769	82771	1067
(2011) Oct-Dec	1039	24962	916	184	4898	159	259	5386	252	1433	74033	880
(2012) Jan-Mar	1356	33568	1166	329	6551	254	366	7543	360	1577	94180	899
(2012) April-Jun	1163	26005	1044	305	8043	269	390	7194	388	1754	86969	994
(2012) Jul-Sep	1234	29496	1094	253	6568	226	326	6182	316	1687	80470	961
(2012) Oct-Dec	1167	26573	1035	263	7341	225	332	7619	311	1399	65954	765
(2013) Jan-Mar	1172	24198	1015	310	8320	251	312	6214	291	1280	60703	686
(2013) April-Jun	1226	26474	1060	264	6777	226	252	5876	236	1081	54703	601
(2013) Jul-Sep	1142	28256	1008	305	8223	230	230	4801	212	682	40634	452
(2013) Oct-Dec	1076	27805	929	372	9990	304	189	4130	182	974	47690	518
(2014) Jan-Mar	1050	21143	919	265	8041	213	210	4937	199	773	37054	516
(2014) April-Jun	1091	22975	910	364	9840	310	201	4068	195	814	40295	527
(2014) Jul-Sep	844	16153	760	320	8061	267	223	5049	226	616	32360	446
(2014) Oct-Dec	863	18455	768	263	7789	211	138	2442	136	712	36087	482
(2015) Jan-Mar	1091	21318	968	272	9682	207	122	2241	119	734	37107	525
(2015) April-Jun	1037	19725	917	266	7381	225	86	1366	86	692	32661	490
(2015) Jul-Sep	1094	20283	983	297	8882	261	102	1520	101	503	23521	336
(2015) Oct-Dec	1151	21750	1011	254	7076	214	123	1936	122	463	21227	329
(2016) Jan-Mar	1272	25598	1115	236	6841	207	127	1887	126	500	24891	353
(2016) April-Jun	1291	24823	1135	246	6767	216	103	1645	100	474	22850	332
(2016) Jul-Sep	1239	23208	1110	264	7884	228	113	1816	110	455	21215	338
(2016) Oct-Dec	1084	18221	971	233	7742	205	118	1698	116	428	20263	311
(2017) Jan-Mar	1424	26394	1299	192	5095	170	127	2919	123	481	21846	331
(2017) April-Jun	1366	23412	1250	178	6305	158	88	1251	84	412	19231	266
(2017) Jul-Sep	1249	21239	1135	184	4411	172	102	1603	102	330	13531	236
(2017) Oct-Dec	1024	16955	932	170	4132	155	160	2921	156	319	12597	226

A split-plot or mixed- model ANOVA was used for multiple comparisons and interactions among the explanatory variables with the within-subjects factors (dependent variable) being the be number of prescriptions, number of pills, and number of patients and the different departments (DENTAC, OBGYN, ER and Family Medicine) as the between-subjects factors (categorical variables or subject groups).

Between-Subjects Factors			
		Value Label	N
Departments	1	Dentac	32
	2	OBGYN	32
	3	Family Medicine	32
	4	Emergency Room	32



Within-Subjects Factors	
Measure: MEASURE_1	
charac	Dependent Variable
1	Prescrip
2	Pills
3	Patients

Since unequal samples were acquired from the four different departments an estimated marginal means study was developed to the unweighted means by accounting for each mean in proportion to its sample size. The variance among the four sample means (DENTAC, OBGYN, ER and Family Medicine) was computed with the sum of the squared deviations between the four sample means and the overall mean to obtain the total amount of dispersion among the sample means (Table 2)

### Descriptive Statistics

	Departments	Mean	Std. Deviation
Number of prescriptions	Dentac	1109.16	169.157
	OBGYN	262.50	59.582
	Family Medicine	1009.25	538.007
	Emergency Room	217.13	153.309
	Total	649.51	504.906
Number of pills	Dentac	22392.00	4637.683
	OBGYN	7281.16	1745.456
	Family Medicine	48004.25	25463.946
	Emergency Room	4815.19	3858.209
	Total	20623.15	21573.455
Number of patients	Dentac	986.66	149.971
	OBGYN	219.69	51.895
	Family Medicine	604.59	321.481
	Emergency Room	223.13	149.300
	Total	508.52	371.871

Table 2. Estimated marginal means analysis to determine variance on sample size.

A factorial repeated measure of variance is determined by the combination between subjects and within subjects and therefore assumptions of homogeneity of intercorrelations within factors are estimated.

A between-subjects effects analysis displayed the variation attributed to "Groups" and "residual" variation. Since the significance (P-value) is low ( $P < 0.05$ ) it has been determined significant differences between groups. (Table 3)

### Tests of Between-Subjects Effects

Measure: MEASURE\_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2.024E+10	1	2.024E+10	330.940	.005	.727
groups	1.335E+10	3	4450913866	72.769	.005	.638
Error	7584441594	124	61164851.57			

Table 3. Displays the variation attributed to "Groups" and "residual" variation.

Table 4 shows the within-subjects effects analysis, it displays the variation attributed to *factor* (#prescriptions, #patients and # of pills) in relationship with the *group* (DENTAC, OBGYN, ER and Family Medicine Departments) and their *residual* variation. The *factor* and *group* P value is low ( $P < 0.05$ ) concluding that there is significant difference within the subjects. The Sphericity value determines the variances of differences and it has been adjusted by two methods, Greenhouse-Geisser (Epsilon: 0.391) and Huynh-Feldt (Epsilon: 0.418) in order to correct the univariate results.

#### Test of Within-Subjects Effects

Source of variation		Sum of Squares	DF	Mean Square	F	P
Factor	Sphericity assumed	1336.200	3	445.400	50.52	<0.001
	Greenhouse-Geisser	1336.200	1.174	1138.414	50.52	<0.001
	Huynh-Feldt	1336.200	1.255	1065.113	50.52	<0.001
Group x Factor interaction	Sphericity assumed	156.200	3	52.067	5.91	0.004
	Green house- Geisser	156.200	1.174	133.079	5.91	0.033
	Huynh-Feldt	156.200	1.255	124.510	5.91	0.03
Residual	Sphericity assumed	211.600	24	8.817		
	Greenhouse-Geisser	211.600	9.39	22.535		
	Huynh-Feldt	211.600	10.036	21.084		

Table 4

Table 5 displays the within- subjects factors analysis (1 = #pills, 2 = #prescriptions, 3 = #patients) The mean, standard error and confidence interval have been determined. A Bonferroni correction for multiple comparisons is applied for confidence interval adjustment (95%)

charac	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	649.508	25.963	598.120	700.895
2	20623.148	1159.079	18329.007	22917.289
3	508.516	17.163	474.545	542.487

Table 5.

#### TREND ANALYSIS.

The within-subjects analysis demonstrated no significant differences within the number of pills dispensed from the DENTAC (Fig 1) and OBGYN (Fig 2) departments. A moderate decrease in prescription patterns at the Emergency Department ( $p < 0.05$ ) (Fig 3) and an extreme decrease at the Family Medicine Department ( $p < 0.05$ ) (Fig 4) was reported. No significant differences between the number of patients and number of prescriptions dispensed were found within each department over the 8-year period. (Fig 5-8)

Fig 1. DENTAC OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

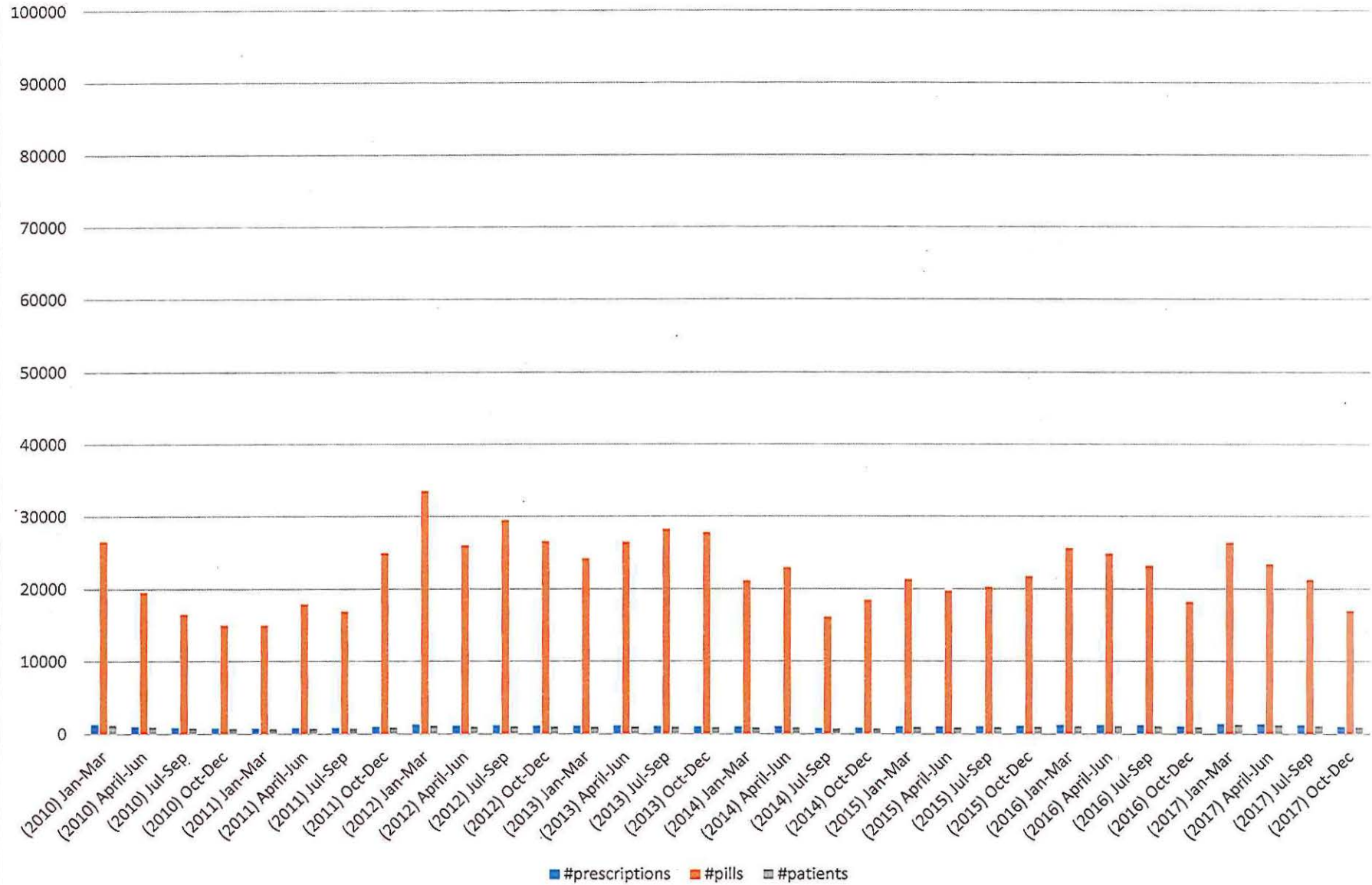


Fig 2. OBGYN OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

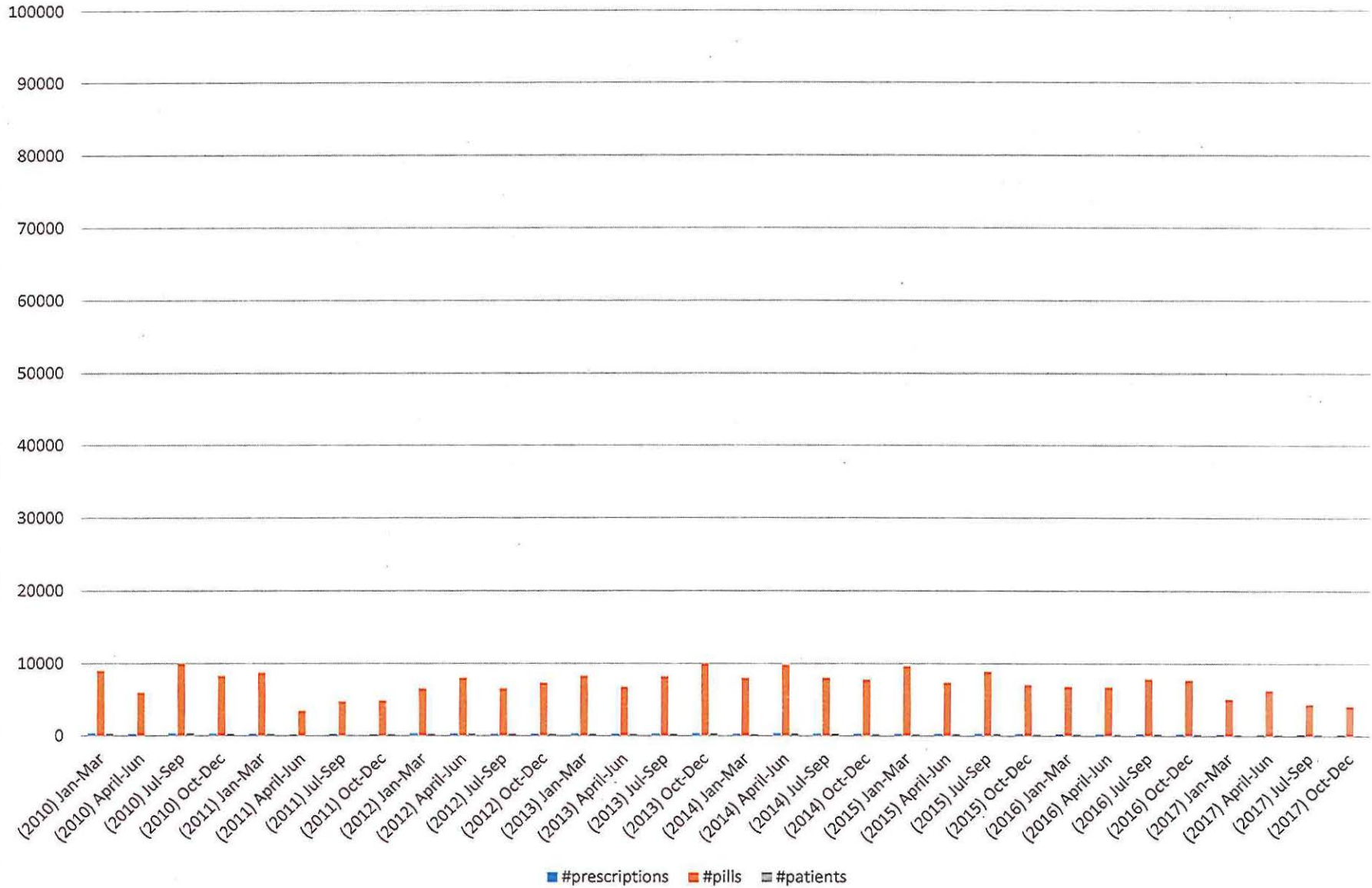


Fig 3. EMERGENCY ROOM OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

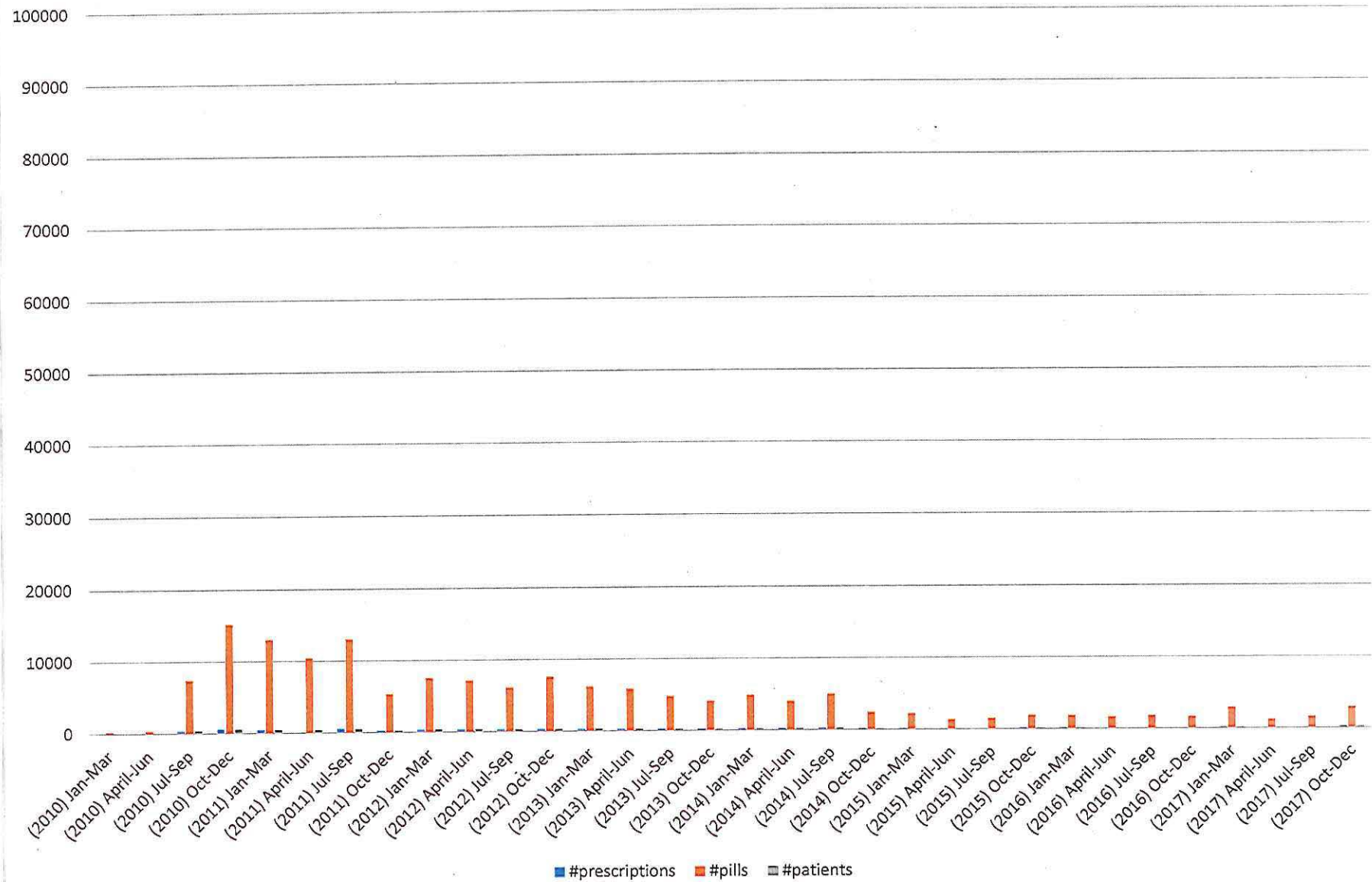


Fig 4. FAMILY MEDICINE OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

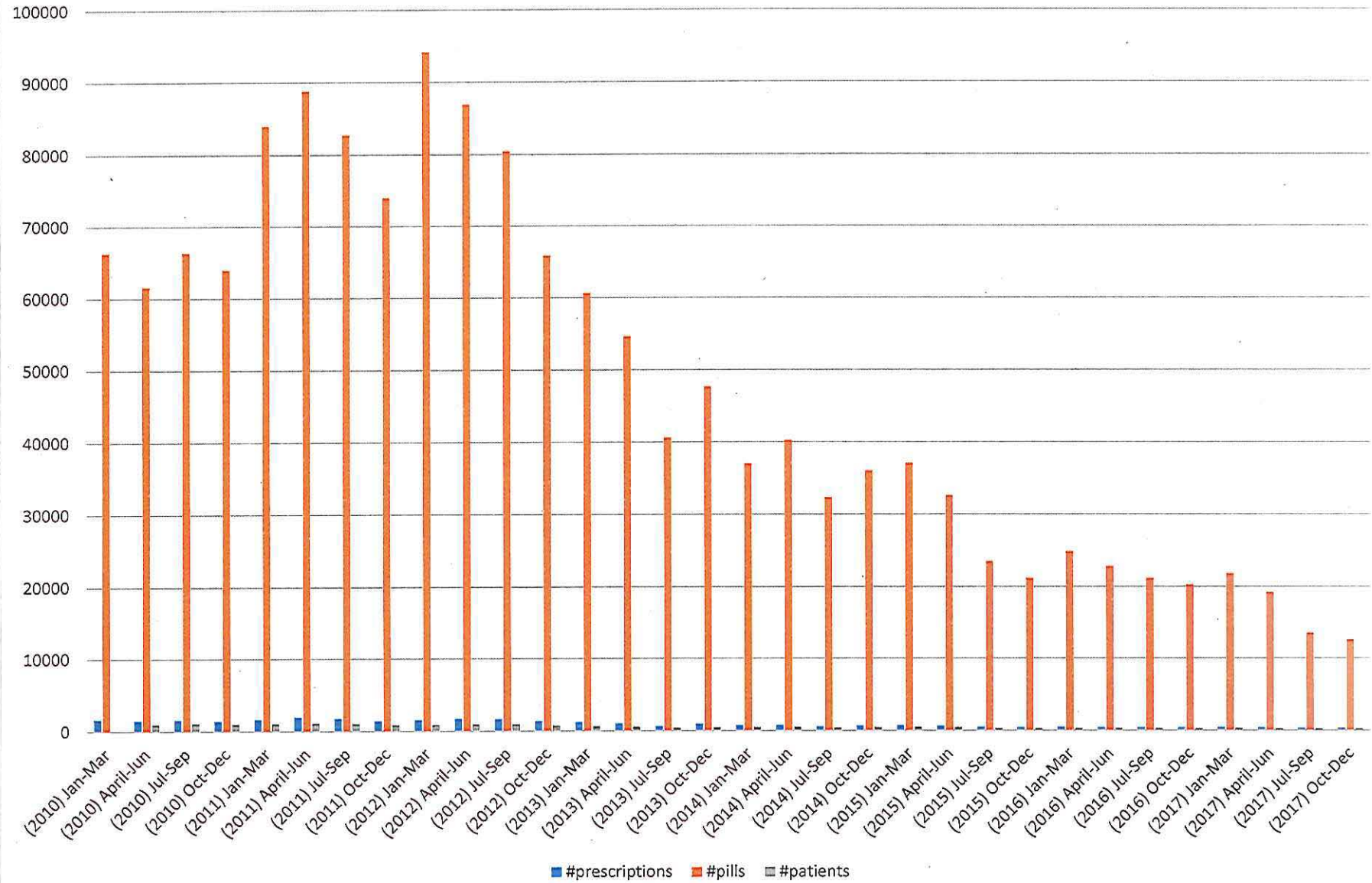


Fig 5. DENTAC OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

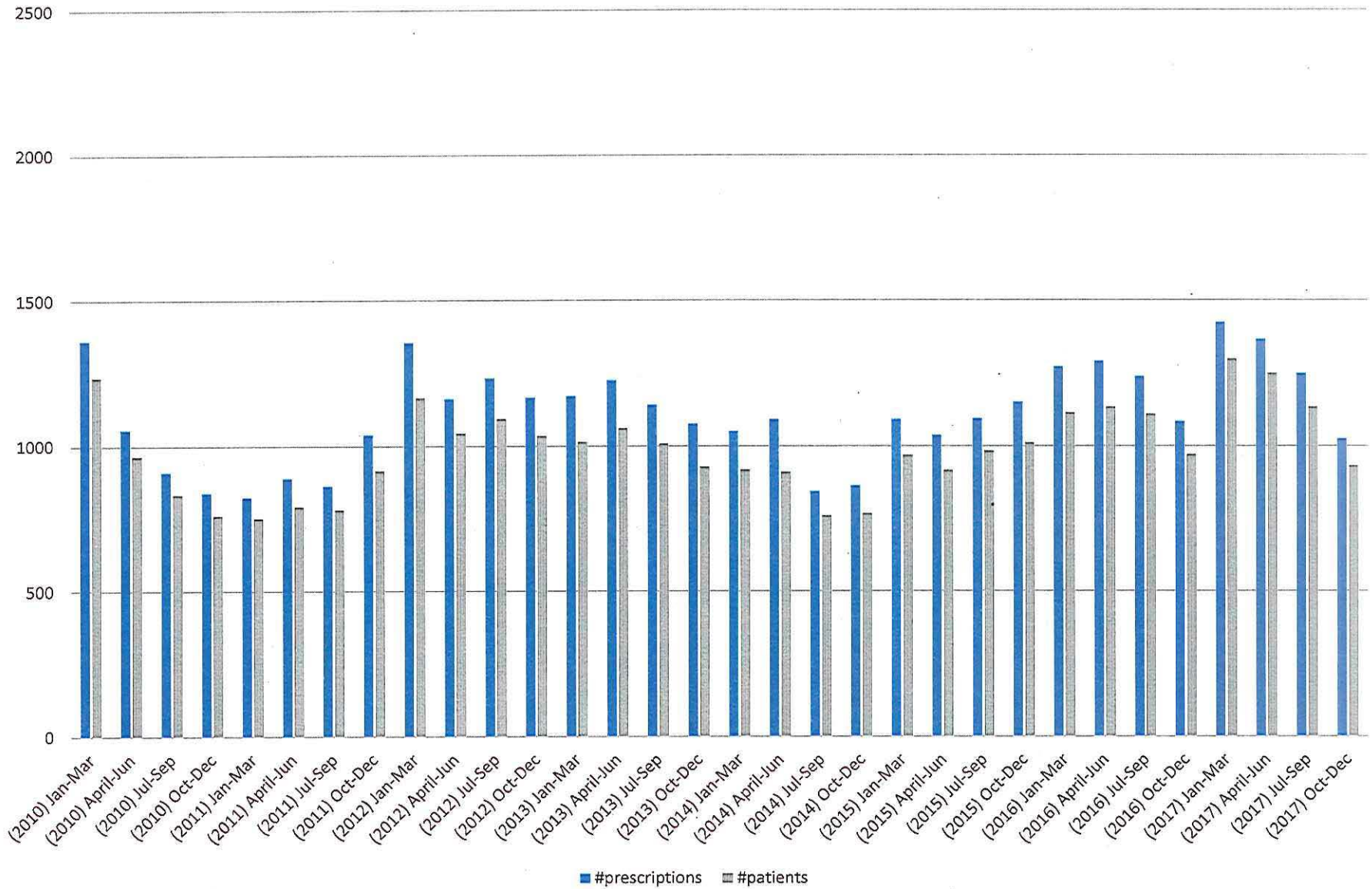


Fig 6. OBGYN OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

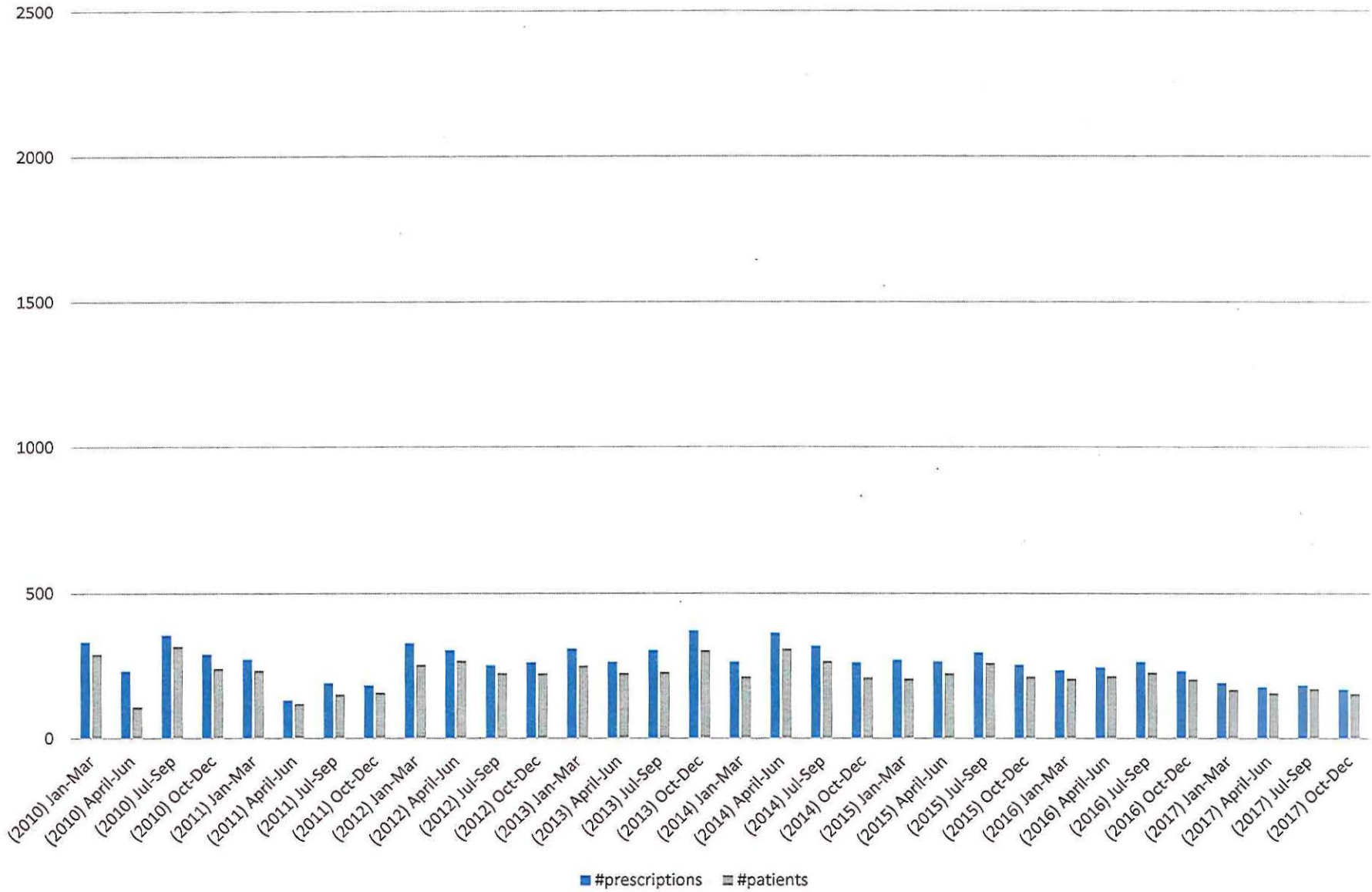


Fig 7. FAMILY MEDICINE OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017

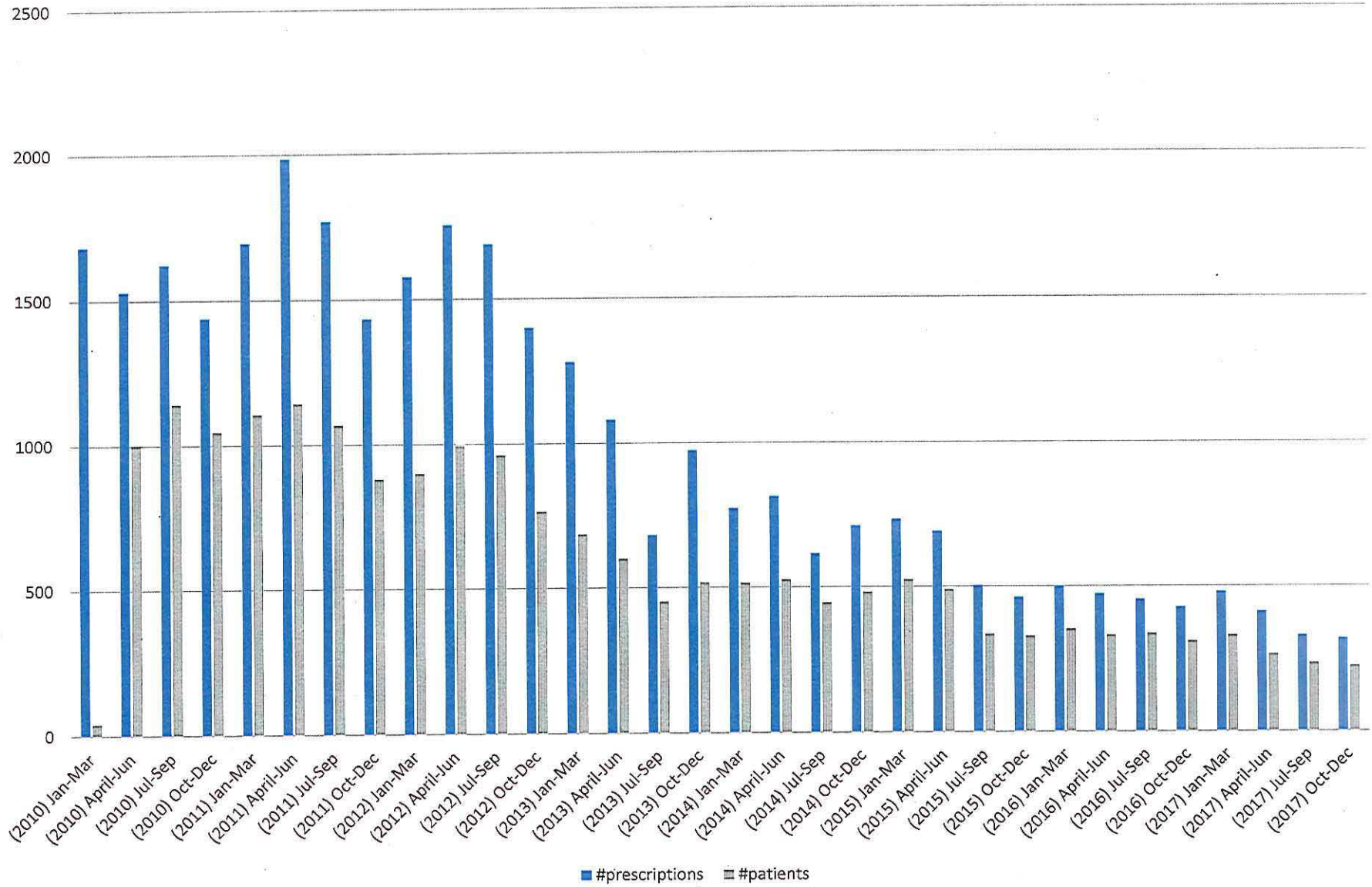
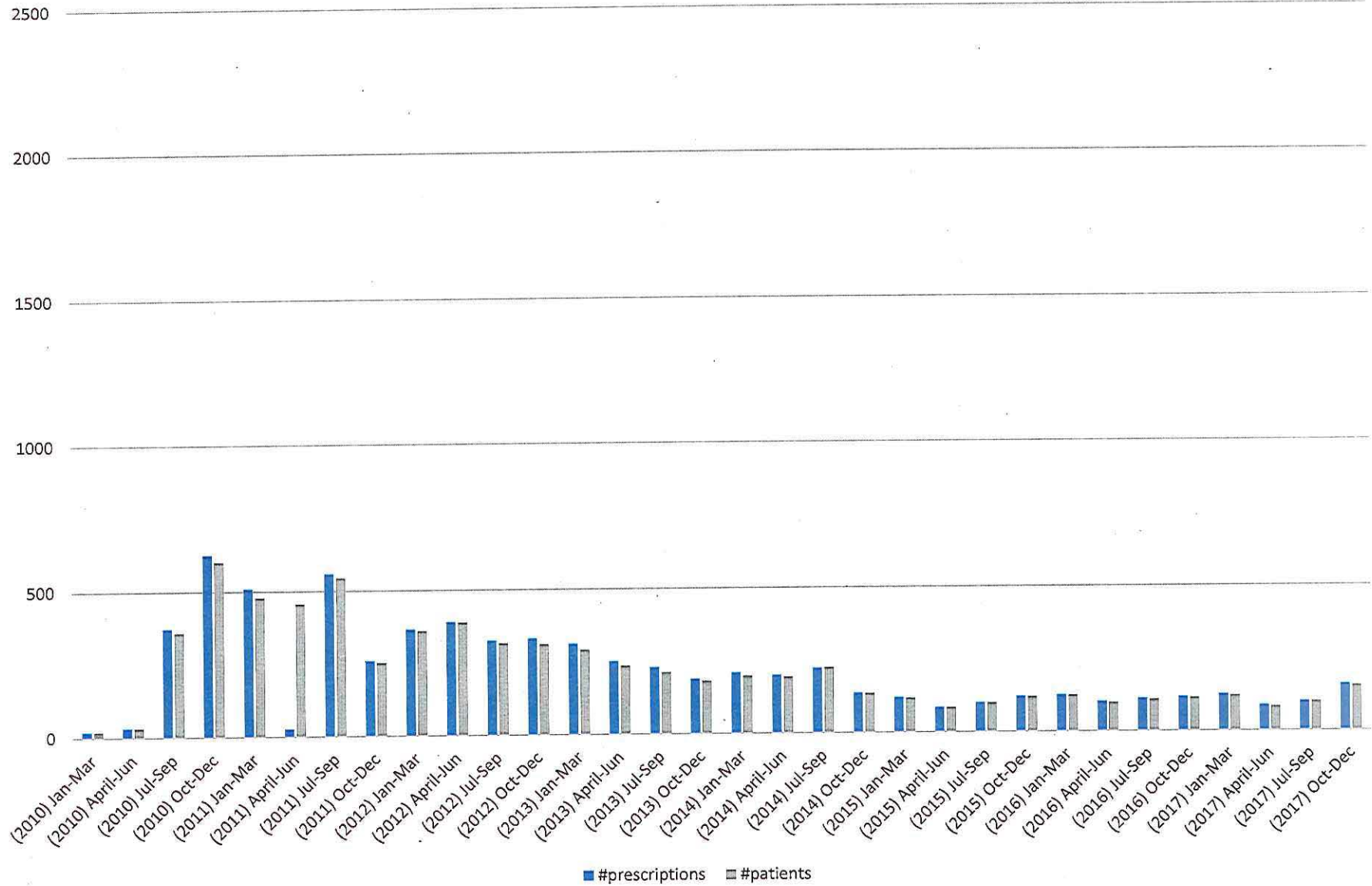


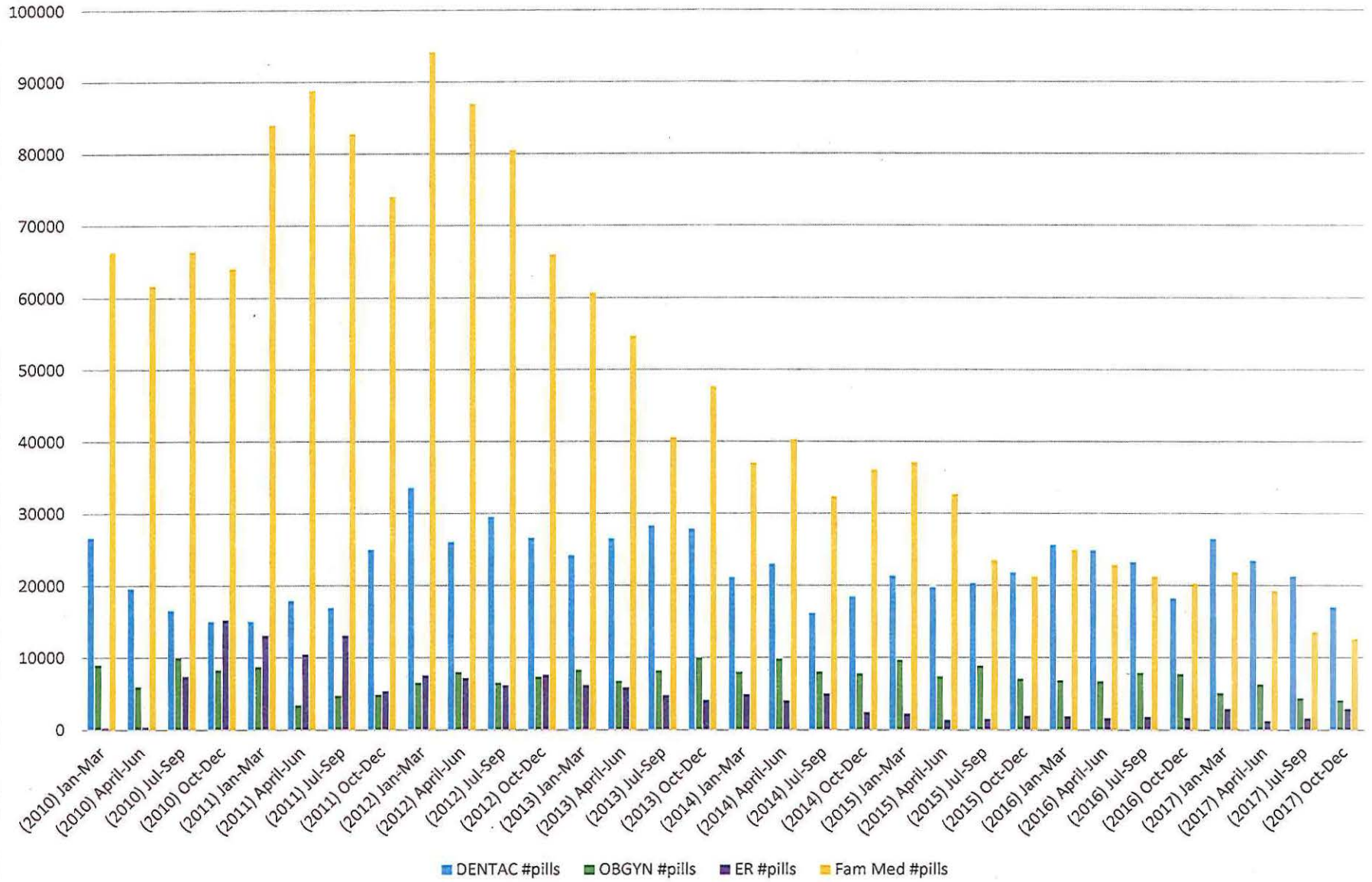
Fig 8. EMERGENCY ROOM OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017



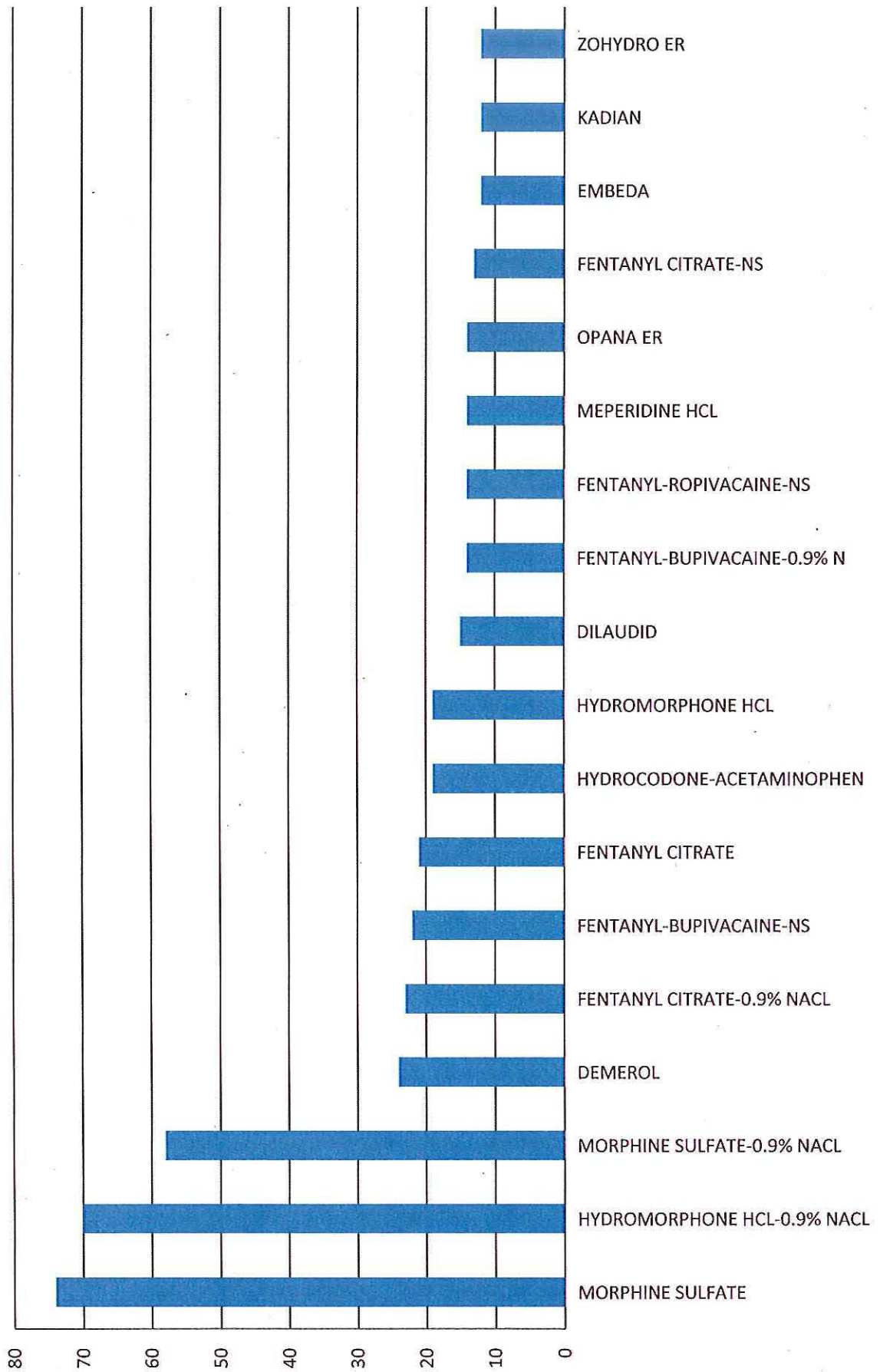
The between subjects analysis indicates significant differences between the Family Medicine and Emergency departments in comparison with the DENTAC and OBGYN departments ( $p < 0.05$ ) A substantial decrease in opioid pills dispensed has been proved in the Family Medicine and Emergency Departments (95% confidence interval) The DENTAC and OBGYN departments showed a constant linear factor from 2010 to 2016 indicating minimal changes in number of pills dispensed and revealing a small decrease of pills dispensed during 2017 (Figure 9)

Table 10 displays the most common types of opioid medication prescribed in the four departments from 1<sup>st</sup> JAN-2010 to 31<sup>st</sup> DEC-2017.

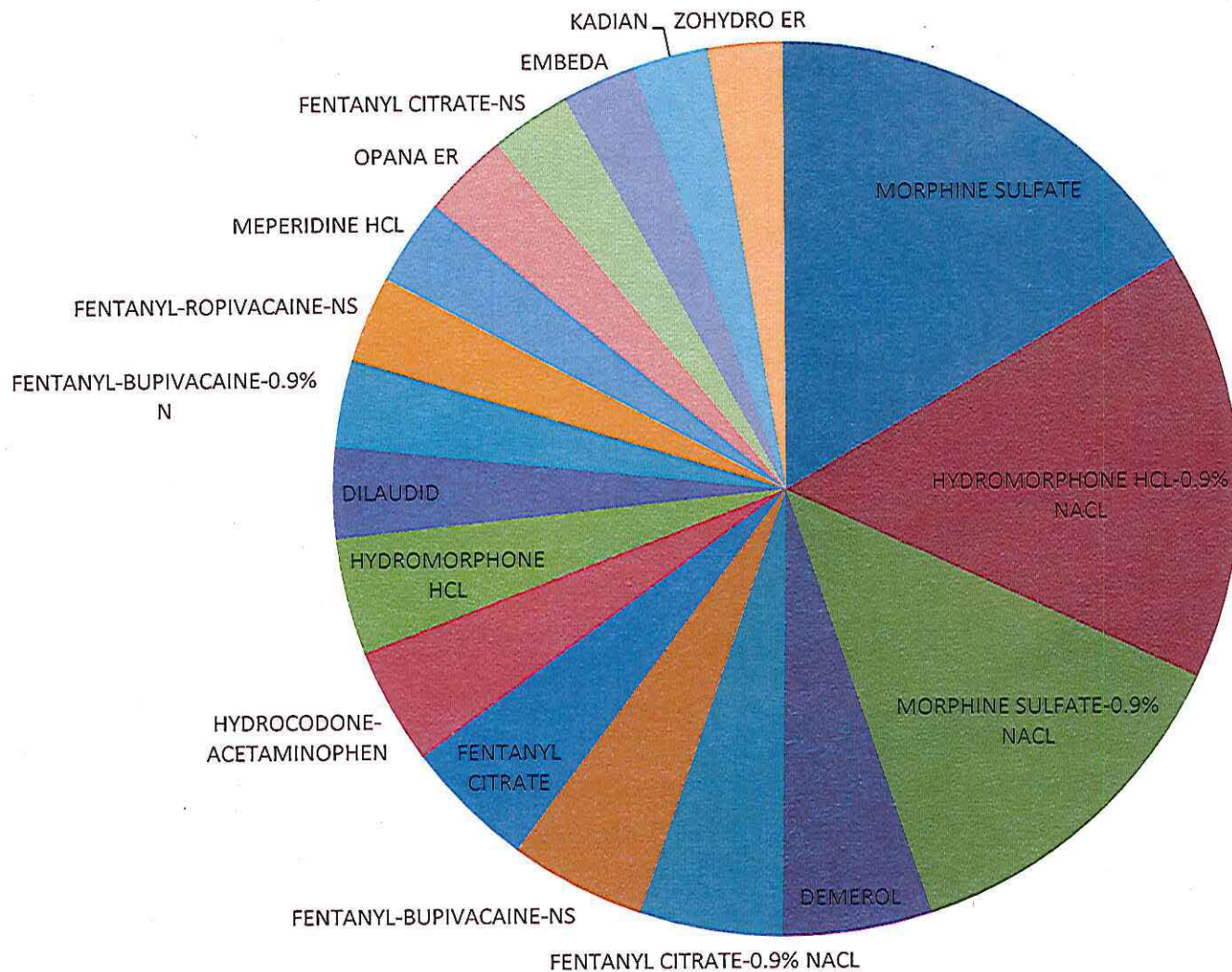
Fig 9. PILLS OPIOID PRESCRIPTION TRENDS BY QUARTERS  
FROM JAN 1ST-2010 TO DEC 31ST-2017



**Fig 10.a OPIOID DRUG CLASS (DENTAC, OBGYN, FAM MED, ER DEPARTMENTS) FROM JAN 1ST-2010 TO DEC 31ST 2017.**



**Fig 10.b OPIOID DRUG CLASS (DENTAC, OBGYN, FAM MED ER DEPARTMENTS) FROM JAN 1ST-2010 TO DEC 31ST 2017**



## RESULTS

The samples collected in this study demonstrated no significant differences within the number of pills dispensed from the DENTAC and OBGYN departments from 1 JAN 2010 to 31 DEC 2017. On the contrary, a substantial decrease in opioid pills dispensed was detected in the Family Medicine and Emergency Departments.

Within our samples, a moderate decrease in prescription patterns at the Emergency Department and an extreme decrease at the Family Medicine Department was identified. No significant differences between the number of patients and number of prescriptions dispensed were found within each department over the 8-year period.

The most common types of opioid medication prescribed in the same period of time within the four departments were characterized by morphine and hydromorphone components.

## DISCUSSION

In October 2017, the US Department of Health and Human Services declared the opioid crisis a public health emergency (33) with more than 100 opioid-related overdose deaths occurring daily and more than 11 million people misusing prescription opioids, an estimated cost to the United States \$506 billion annually (34)

The impressive response to the epidemic is heartening, but the effect of programs to control the crisis is not yet known, especially in the military population. (7) Some local and state interventions have described a reduction in the abuse and diversion of prescription opioids after the enactment of state legislation. (19) Navigating the complexity of treatment guidelines provided by the Federation of State Medical Boards, the US Drug Enforcement Agency (DEA), and other health organization can be confusing and intimidating. The difficulties in measuring pain, fear of regulatory issues, and legal risks are additional barriers to providing appropriate pain management. (6)

One aspect of the 5-part US Department of Health and Human Services Opioid strategy is to increase the availability of “better data” that will improve our understanding of the opioid epidemic. Consequently, dental researchers have sought to understand the factors related to opioid prescribing by oral health care professionals (8,12)

According to the American Dental Association (ADA), in the late 1900s dentists were the top specialty prescribers of opioids, accounting for 15.5% of all US opioid prescriptions. In 2012, this had been reduced to 6.4%. However, this was probably because of the nature of dental practice in that there is a predominance of short-term, lower dose prescribing. When specifically compared with family physicians, dentists had higher odds of prescribing an opioid for short term pain. (31) In this study, the DENTAC did not showed a significant decrease in number of opioid pills and number of prescriptions dispensed compared to the Family Medicine and Emergency room departments.

In agreement with the ADA report, the DENTAC accounted for the most opioid prescriptions dispensed at the Carl R. Darnall Army Medical Center at Fort Hood TX.

The ADA policy recommends prescription limits and continuing education for dental professionals with prescribing authority. Specifically, in this policy the ADA supports mandatory continuing education for prescribing opioids and other controlled substances, statutory limits on opioid dosage and duration and dentists registering with and use PDMPs to promote the appropriate use of opioids and to deter misuse and abuse. (31) This study shows that although these policies have been implemented, the DENTAC has not decreased the number of opioids prescriptions and pills dispensed during the analyzed period of time. This could be explained by the fact that this study only includes prescription trends from 2010 to 2017, excluding possible drastic changes in later years by applications like the use of long-acting anesthetic agents and non-dependent pain controlled substance prescription programs.

In this study, the most common types of opioid medication prescribed within the four departments from 1st JAN-2010 to 31st DEC-2017 were characterized by morphine and hydromorphone components. In 2011 it was reported that dentists (including dental specialties) prescribed 12% of immediate-release opioids that also contain acetaminophen (eg Vicodin, Percocet and Tylenol 3) behind only family physicians, who prescribed 15% of immediate-release opioids. (8, 12) Immediate release opioid analgesics are the most commonly misused prescription opioids with 5% through 23% of dispensed doses used non-medically (3) McCauley et Al described hydrocodone and acetaminophen as the predominant opioid prescribed by dentists in their study, accounting for 76% of all prescriptions, followed by oxycodone and acetaminophen (12%) and codeine and acetaminophen (7%) (14) Further studies that analyze specific DENTAC opioid drug class prescription patterns are recommended.

The results achieved in this study are not without limitations. Since the information collected was a raw data summary obtained by a providers MEPRs codes search by departments, this does not account for the fact that providers from a specific department may prescribe opioids while rotating through other departments, at the same time there was no specification in the proportion of opioid prescriptions provided based on specific diagnoses or difference between pre-procedural and post-procedural prescriptions. Also, the population is not identified by patient age, sex, race and ethnicity, making this an especially important area of future research (16)

## CONCLUSION

In this study, the DENTAC AND OBGYN departments did not showed a significant decrease in number of opioid pills and number of prescriptions dispensed compared to the Family Medicine and Emergency room departments. Overall, the Family Medicine department showed the most drastic change in opioid prescription patters from 1st JAN-2010 to 31st DEC-2017 at the Carl R. Darnall Army Medical Center, Fort Hood TX

This study suggest that there is progress in combating the abuse of prescription opioid analgesics. Although significant differences were found between departments, all of them showed decrease in opioid prescription trends over the studied period of time.

The most common types of opioid medication prescribed in the same period of time within the four departments were characterized by morphine and hydromorphone components.

The opioid prescribing practices of dental professionals is an understudied area of research that merits greater attention. A greater understanding of the depth and complexity of the issues of opioid prescribing will enable knowledge translation to facilitate the construction of more effective policies and eventual solutions to the problem.

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MCXI-QCD

January 15, 2019

MEMORANDUM FOR CPT ASTRAUSKAS ANGELICA BEDOYA

SUBJECT: Determination of Research Not Involving Human Subjects

PROTOCOL TITLE: Comparison of Opioid Prescription Pattern Trends from 2010 to 2017 amongst a Military Population

CRDAMC PROTOCOL #: 18-27

1. The Carl R. Darnall Army Medical Center (CRDAMC) Human Protections Administrator (HPA) received the above-referenced project dated 12/19/2018 10:38:27 AM CST for applicability of human subjects protections regulations.
2. The primary objective of the study is to compare opioid prescription patterns trends from January 1<sup>st</sup> 2010 to December 31<sup>st</sup> 2017 amongst different departments assigned to Fort Hood, TX.
3. The HPA has concluded that the study is Research Not Involving Human Subjects (RNIHS) and is not subject to review by the Institutional Review Board (IRB). The HPA also determined that the HIPAA privacy rule is not applicable to this study.
4. This opinion is based on the regulation 32 CFR 219 and DoDI 3216.02. Federal regulation 32 CFR 219.102(f) defines a human subjects as a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information. This study does not meet the criteria above and would therefore not be considered human subjects research.
5. Because the study investigators will not see, use, record, or disclose any individually identifiable health information or protected health information as part of this study, HIPAA regulations do not apply (DoD 6025.18-R1.1.20 and DL1.1.28).
6. In the event there is a change to the above-described project that may affect its determination, please submit a modification form in EIRB (<https://eirb.csd.disa.mil>). The CRDAMC HPA will re-evaluate the project if necessary.
7. **You must submit a closure report** when your protocol is completed in accordance with CRDAMC policies. This report may be in the format of a publication (abstract or journal manuscript) or a brief summary.

MCXI-QCD

SUBJECT: Determination of Research Not Involving Human Subjects

8. Note that all research records must be maintained by the PI for at least 3 years after study closure, before being destroyed. The files will be maintained in the Department where the research occurred. Refer to your Departmental SOPs for further guidance.

9. You are reminded that **publication clearance through the CRDAMC PAO is required for all materials** (e.g., manuscript, abstract, posters) being submitted for publication/presentation.

10. The POC for this review is the CRDAMC HPA at [rachell.l.jones.civ@mail.mil](mailto:rachell.l.jones.civ@mail.mil) or (254) 553-9779.

Signature applied by Rachell Leanne Jones  
on 01/15/2019 01:10:44 PM CST

Rachell L. Jones, Ph.D.  
Human Protections Administrator