The Effect of Pharmaceuticals' Trade Promotions to Medical Professionals in Illinois Counties: Some Research Findings on Opioid Prescriptions

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Abstract

This paper shows that the target market for opioids are women, and people with less than a college education. It also lists the number of chronic pain sufferers in Illinois, county-wise. The market share for opioids in treating chronic pain is decreasing; OTC pain medications are replacing prescription opioids in treating pain. The relationship marketing practices of the pharma companies, for example, cash rewards to physicians, are also waning, becoming less compared to the 2010s. It is hoped that the data presented in this paper would help Illinois counties to gain greater attention to their opioid problem.
Keywords: Prescription Opioids, Prospects, Market analysis, Physicians behavior; Illinois.

1.0. Introduction

> ".. the taxpayer has paid a heavy price because of dishonest opioid marketing practices." **Department of Justice, Press Release, April 2, 2018**.

Pharmaceutical marketing[2] spending in the nation increased from $17.7 billion in 1997 to $29.9 billion in 2016; marketing to health professionals accounted for the largest share of the spending, it climbed from $15.6 billion to $20.3 billion (Bauchner, 2019). At the same time, opioid prescription rates in the nation increased at an annual compound growth rate of 2% during 2006 to 2012, and then declined during 2013 to 2018 at the annual compound rate of 8% per annum (Figure 1).

How could we explain the decline in opioid prescriptions? What is the role of the physician in patient's opioid purchase and use? What are the relationship marketing practices of the pharmaceutical companies that target physicians? How best to explain the relationship between opioid prescriptions and pharmaceutical companies' sales promotions? This paper attempts to address these and other similar questions.

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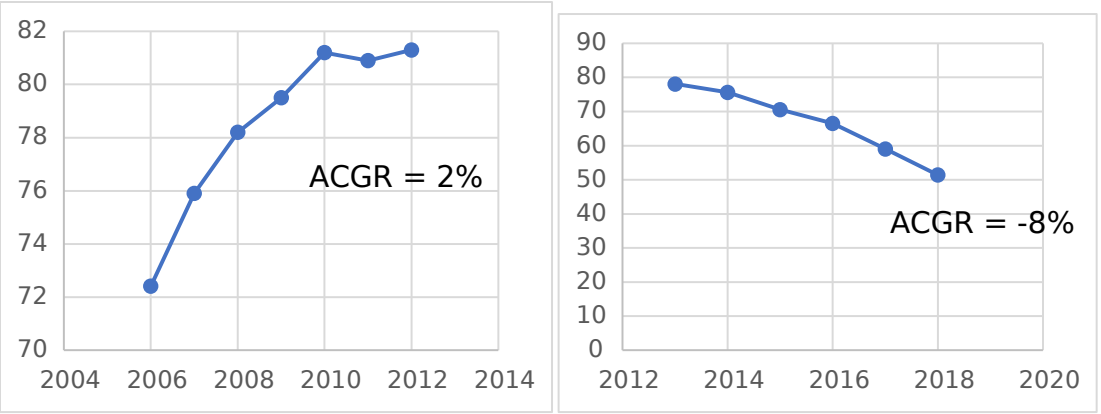
[2] The term marketing refers to integrated marketing communications, all the 4Ps of the marketing mix - pro
price, place and personal selling - are promoted.

Figure 1: Prescription Rates per 100 Persons: 2006 to 2012 and 2013 to 2018.



Source: https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html

2.0. Declines in Opioid Prescriptions

In business, sales depend on the marketing strategy adopted, the response of the customers, and the reaction of competitors. For prescription opioids, we know that sales are declining (Figure 1). If we consider the pharmaceutical industry's total marketing expenses they are on the rise: the annual compound growth rate of marketing expenses for the industry during 1997 to 2016 was 2.76%, calculated from data given in Bauchner (2019). The other two factors, customers' response to opioid medications and competitive intensity, are unknown. However, we could estimate the impact of the unknowns on prescription opioid sales using a simple model,

$$Sales = f(Number\ of\ Prospects, Market\ Penetration) \quad .$$

Consider sales, measured as prescription rate per 100 persons. Of the 87 Illinois counties for which time series data on opioid prescription rates are available, 20 counties registered growth in opioid prescription rates during 2006-2018. However, if we restrict the analysis to the 2013-2018 time period, only six of the counties had growth in opioid prescription rates (Appendix 1). In general, sales of prescription opioids are on the decline in Illinois (Table 1); the question is whether this is because of declining number of prospects.

Table 1: Opioid Prescription Rates per 100 Persons in Illinois Counties: A Summary Analysis

	ACGR 2006-2018	ACGR 2013-2018
Growth Rate in Opioid Prescriptions, Total Illinois	-1%	-7%

(i) Three Counties with Highest Prescription Rates

County	Prescription Rate per 100, 2018 Data	ACGR 2006-2018	ACGR 2013-2018
Hardin	206.7	3%	-2%
Saline	177	-1%	-6%
Massac	131.4	8%	-0.2%

(ii) Three Counties with Lowest Prescription Rates

County	Prescription Rate per 100, 2018 Data	ACGR 2006-2018	ACGR 2013-2018
Greene	0.1	-44%	-106%*
Brown	0.1	NA	-101%*
Pope	5.5	NA	-7%

Note: * computed using 2014-2018 data; NA: data not available.

2.1. **Prospects**

The prospects, the target market for prescription opioids, are people suffering from chronic pain, pain that is ongoing and lasts longer than six months. According to the 2019 MRI-Simmons' Survey of the American Consumer[3], there are 8.539mil chronic pain sufferers in the nation, an increase of 1.66% per annum since 2017; this shows that decreases in opioid prescription rates are not because of lack of buyers of pain medications.

Women age 18+ are 32% more likely than the general population in that age group to suffer from chronic pain. Furthermore, the odds that the chronic pain sufferer is from a small, non-metro county rather than a large, metro county is 1.66 to 1. Table 2 profiles the target market for opioid prescriptions in Illinois; Appendix 2 breaks the numbers down by counties.

[3] See https://www.mrisimmons.com/solutions/national-studies/survey-american-consumer/

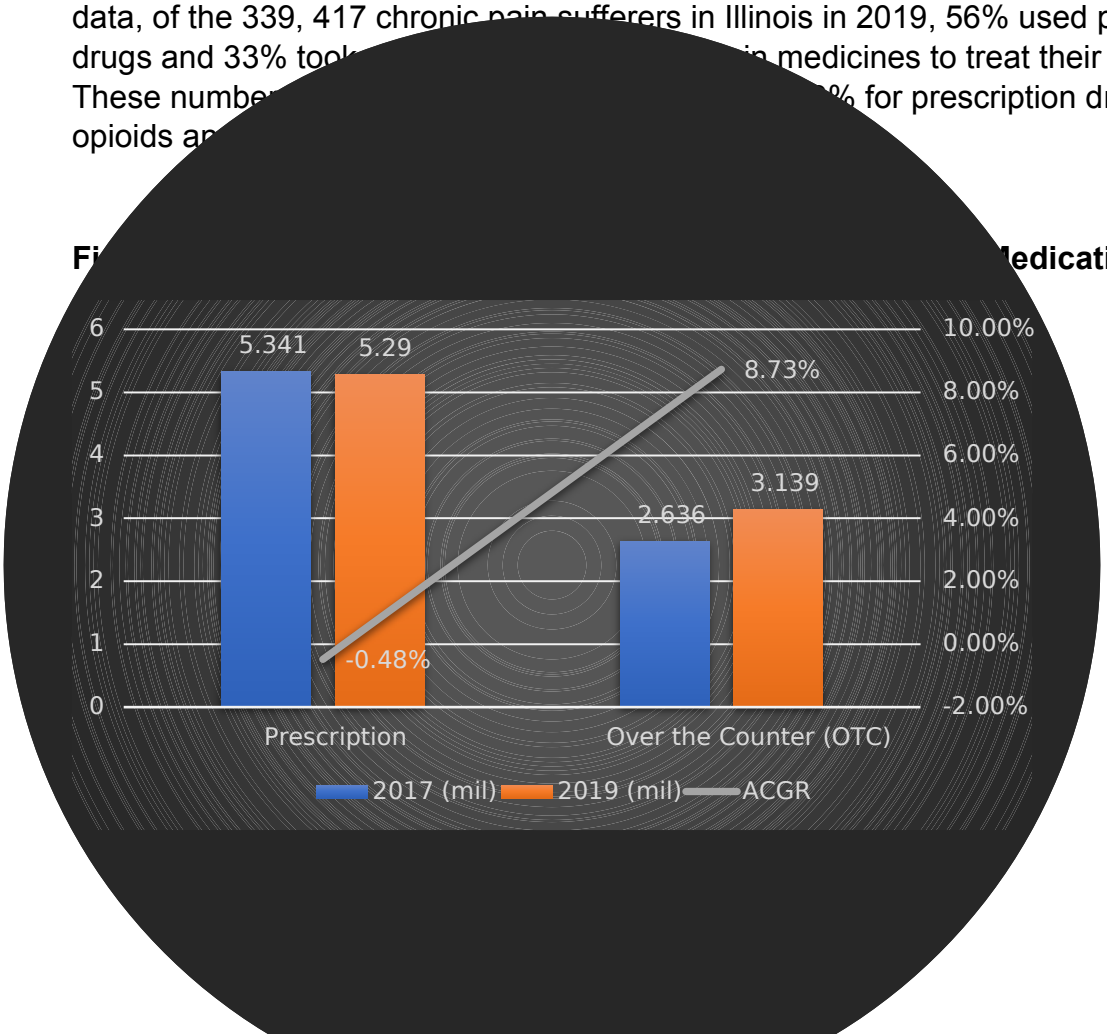
Table 2: Target Market for Opioids in Illinois: Profile of Chronic Pain Sufferers

Category	Measure
Number of chronic pain sufferers	339, 417
➢ Female	68%
➢ Age 45+	62%
➢ Less than college education	75%
➢ Race	
✓ White	80%
✓ Hispanic	10%
✓ African American	8%
✓ Other	2%

2.2. **Market Penetration**

If a mature market, that is, a market with little or no growth in customer numbers is not the reason for declining opioid prescription rates, then it should be competition from non-opioid, OTC drug makers that is causing the decline; this reasoning is supported by data, of the 339, 417 chronic pain sufferers in Illinois in 2019, 56% used prescription drugs and 33% too[illegible] medicines to treat their ailment. These numbe[illegible]% for prescription drugs including opioids an[illegible]

Fi[illegible]edications



In sum, opioid prescriptions are declining because the target market, chronic pain sufferers, are replacing opioids with other pain medications, mostly OTC drugs. The US government also has a part to play in this marketplace changes; the government is threatening doctors prescribing pain killers with criminal investigations, so physicians have curtailed their opioid prescribing (Horwitz and Higham, 2019). The next section further examines the role of physicians in opioid purchases.

3.0. **Role of the Physician in Patient's Opioid Purchase and Use**

Physician or the medical doctor is the 'decider' for the use of opioids to treat chronic pain in a patient, the patient is the user of the medicine. In general, chronic pain motivates the patient to visit a medical doctor to seek relief. The physician has an option to prescribe an OTC, for example, acetaminophen and aspirin, or stronger medications such as the antianxiety drug diazepam, or the opioid fentanyl.

If the doctor's evaluation of opioid medications is positive and stronger than her evaluation of other pain remedies, then opioids will be prescribed; concept evaluation is based on beliefs about the concept. For example, in the late 1990s, pharmaceutical companies and medical societies encouraged doctors to prescribe opioids for non-cancer pain, and promoted the belief that the risk of addiction to prescription opioids is low (Maegerich and Chou, 2016). These beliefs about prescription opioids, coupled with the fact that most primary care physicians are not prepared to critically evaluate new clinical knowledge (Kirchhoff, Hart, and Campbell, 2014), contributed to the exponential growth of prescription opioids during the 2000-2010 time period.

In general, opioid prescription rate at the county level is correlated with the proportion of primary care physicians in the county (r = 0.47; see Appendix 3 for data on physicians). Table 3 shows the initiators, influencers, and deciders of prescription drugs purchases and use; physician is the decider, and the Internet initiates and influences almost one-in-five patients to choose prescription medicines.

Table 3: Prescription Drugs: Initiators, Influencers and Deciders

	Role Played in Prescription Decision			
Source or Decision Participant	**Initiator**	**Influencer**	**Decider**	**Number of Cases: 207.274mil**
Doctor	Yes	Yes	Yes	45%
Pharmacist	Yes	Yes	No	11%
Mass-media advertising	Yes	Yes	No	11%
Friends & Family	Yes	Yes	No	12%
Internet including social media	Yes	Yes	No	18%
Medical journals	Yes	Yes	No	2%
Patient support groups	Yes	Yes	No	1%

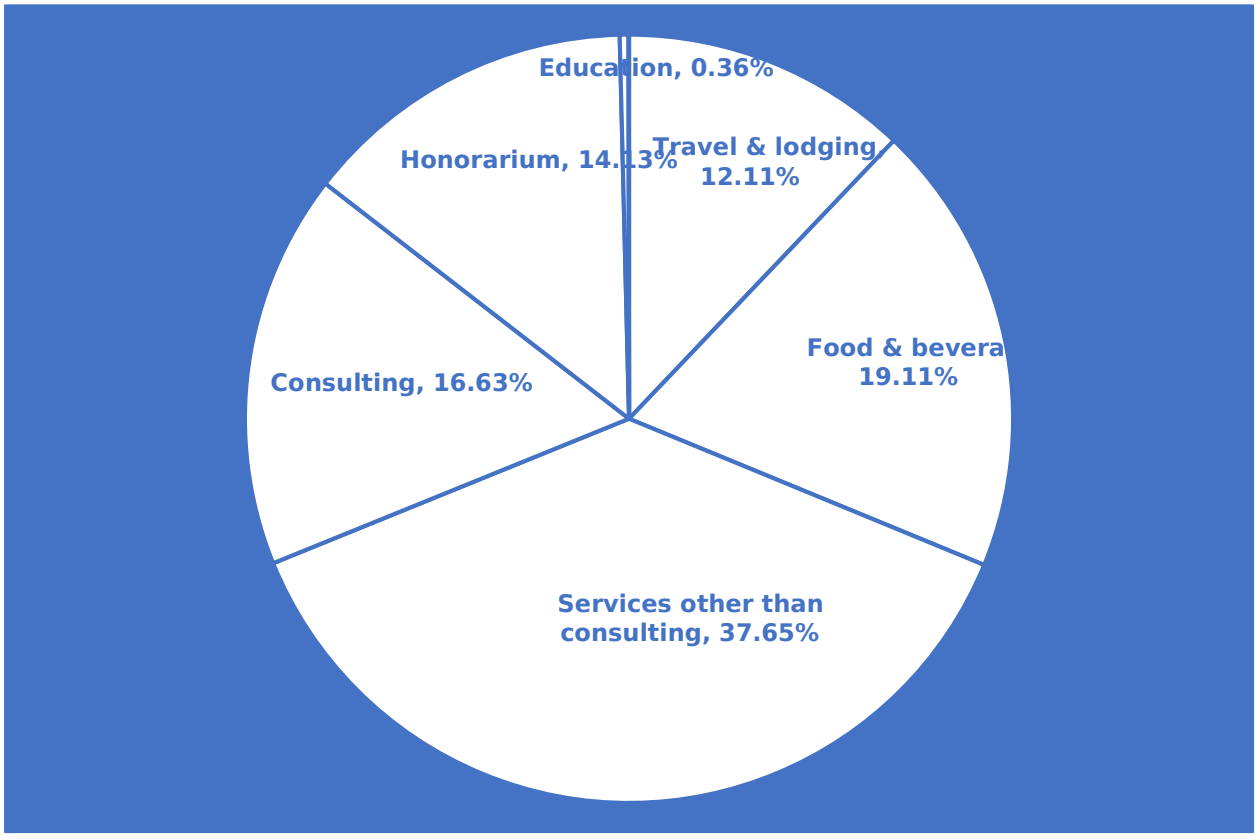
Source: 2019 data from MRI-Simmons Survey of American Consumer.

4.0. **Relationship Marketing Practices of Pharmaceutical Companies**

Promotions are designed to “move sales forward” more rapidly than would otherwise occur. Promotions by pharmaceutical companies are for “personal relationship maintenance”, reward physicians who are the preferred contacts of target customers so the physicians can prescribe more of the manufacturer’s brand. The reward is most often some form of cash payment, for example, for the physician’s conference travel.

The open payment data from the Center for Medicare and Medicaid Services show that during 2015 Illinois physicians received cash payments amounting to $52.028mil from pharma companies, as part of their personal relationship maintenance program. AbbVie Inc., a biopharma company based in Chicago, IL, paid the most; physicians in Effingham County[4] benefitted the most from pharma companies’ relationship marketing practices. Appendix 4 lists county-wise payments; Figure 3 shows the major categories of cash awards from pharma for specialists in pain medicine during 2018.

Figure 3: Nature of Payment to Specialists in Pain Medicine in Illinois, 2018 Data



Note: Total payments are estimated to be $346, 751 for 81 physicians.

[4] The County has three family medicine physicians and one internal medicine practitioner, see https://www.idfpr.com/applications/professionprofile/default.aspx.

6.0. **Opioid Prescriptions: Responses to Sales Promotions**

The purpose of relationship marketing is to influence demand for the product, and consequently we model pharmaceutical companies' "personal relationship maintenance" spending on opioid prescription rates. A single period, county-level model of the form:

$\Delta P_t = \alpha + \beta \Delta M_{\ t}$ is posited,

where P = opioid prescription rate, and M = relationship marketing expenses.

Change scores were computed using 2016-2017 data obtained from the CDS and CMS data repositories. The parameters were estimated using OLS.

Table 4 shows the results of the analysis; there is no correlation between pharma firms' relationship marketing practices and opioid prescriptions; the beta coefficient for pharma forms' sales promotion doesn't differ from zero.

Table 4: Results of the Single-Period, Sales Promotion Model: Effects on Opioid Prescriptions

Multiple R	0.06668142			
R Square	0.004446412			
Adjusted R Square	-0.005509124			
Standard Error	16.28702065			
Observations	102			
ANOVA				
	df	*SS*	*MS*	*F*
Regression	1	118.4754415	118.4754	0.446627
Residual	100	26526.70417	265.267	
Total	101	26645.17961		
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-4.899831498	1.632314661	-3.00177	0.00339
X Variable 1	-0000006.7	1.00985E-06	-0.6683	0.505481

7.0. **Summary and Conclusion**

Chronic pain is the reason for an individual to need prescription opioid medications. In the 1990s, doctors were persuaded to treat pain as a serious medical issue, pain was recognized as the fifth vital sign (Lopez, 2016). Pharmaceutical companies marketed

drugs like OxyContin to physicians using relationship marketing, physicians were awarded cash awards as incentives to prescribing the drug (Institute of Medicine, 2011).

As prescription opioid addiction grew (see Athiyaman, 2020), prosecutions of “pill mills” increased (Horwitz and Higham, 2019) and doctors began prescribing fewer of these drugs (Figure 1). President Trump wants to see the number of opioid prescriptions cut by one-third within three years (Schallhorn, 2018).

This paper highlights the prospects or the target market for opioids are women, and people with less than a college education. It also lists the number of chronic pain sufferers in Illinois, county-wise; the number of chronic pain sufferers are increasing at the rate of 1.66% per annum. In line with the Trump administration’s expectations, the market share for opioids in treating chronic pain is decreasing; OTC pain medications are replacing prescription opioids in treating pain. The relationship marketing practices of the pharma companies, the cash rewards to physicians, are also decreasing. It is hoped that the data presented in this paper would help Illinois counties to gain greater attention to their opioid problem.

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Appendix 1: Annual Compound Growth Rate of Prescription Opioids per 100 Persons: Illinois Counties

County	2018 Prescription Rate	Growth 2006-2018	Growth 2013-2018
Adams	95.5	0.3%	-8.4%
Alexander	NA	NA	NA
Bond	41.9	-3.1%	-10.9%
Boone	40.4	-1.4%	-6.7%
Brown	0.1	NA	-100.6%
Bureau	26.5	2.8%	-4.4%
Calhoun	0	NA	NA
Carroll	30.1	4.1%	7.3%
Cass	17.5	-11.4%	-13.1%
Champaign	51.5	-1.3%	-6.8%
Christian	62.9	-2.6%	-8.6%
Clark	51	-4.2%	-9.4%
Clay	55.3	2.4%	-11.2%
Clinton	25.9	4.2%	-6.8%
Coles	76	-1.2%	-9.1%
Cook	32.5	-2.1%	-7.0%
Crawford	21	1.6%	-9.9%
Cumberland	NA	NA	NA
DeWitt	63.2	3.0%	-8.4%
Dekalb	48.7	-0.3%	-5.2%
Douglas	25.8	0.8%	8.9%
DuPage	37.9	-2.3%	-6.6%
Edgar	66.2	-1.4%	-14.4%
Edwards	70.1	NA	0.5%
Effingham	54.2	-6.2%	-16.0%
Fayette	48.3	-0.3%	-8.6%
Ford	0	NA	NA
Franklin	106.1	2.5%	-6.5%
Fulton	69.8	0.9%	-3.5%
Gallatin	30	-7.3%	NA
Greene	0.1	-44.0%	-105.9%
Grundy	73.6	-0.9%	-3.0%
Hamilton	NA	NA	NA
Hancock	16.7	-5.9%	-17.0%
Hardin	206.7	3.2%	-2.3%
Henderson	NA	NA	NA
Henry	49.1	-0.4%	-5.6%
Iroquois	47.5	-2.0%	-7.5%

Jackson	77.8	-2.6%	-8.9%
Jasper	34.2	-4.8%	-6.4%
Jefferson	89.3	-1.1%	-7.2%
Jersey	100.3	8.3%	-2.6%
Jo Daviess	17.9	-5.5%	-20.3%
Johnson	24.5	NA	NA
Kane	33.6	-2.5%	-6.5%
Kankakee	66.6	-1.0%	-5.8%
Kendall	41.9	-3.0%	-7.9%
Knox	85	-1.5%	-6.5%
La salle	70.6	-1.6%	-5.6%
Lake	42.3	-2.0%	-6.7%
Lawrence	74.9	-1.6%	-9.1%
Lee	58.9	0.9%	-4.1%
Livingston	63.6	-0.5%	-5.8%
Logan	61.7	-1.6%	-8.4%
Macon	76.1	-1.1%	-7.7%
Macoupin	30.1	-2.2%	-7.1%
Madison	85.7	-1.8%	-7.0%
Marion	107.2	-0.8%	-4.7%
Marshall	40.7	-0.1%	19.6%
Mason	42.3	-2.2%	-9.8%
Massac	131.4	8.2%	-0.2%
McDonough	66.9	0.0%	-3.7%
McHenry	52.1	-1.5%	-6.9%
Mclean	46.4	-1.9%	-6.8%
Menard	20.4	NA	NA
Mercer	15.4	-6.7%	-19.3%
Monroe	65.4	1.3%	-5.4%
Montgomery	95.5	-0.9%	-6.7%
Morgan	96.7	-1.0%	-4.8%
Moultrie	27.7	1.2%	-7.9%
Ogle	19.7	4.4%	-5.0%
Peoria	60.2	-2.6%	-8.0%
Perry	40.8	-7.0%	-20.1%
Piatt	22.9	-1.8%	-11.7%
Pike	38.5	-3.3%	6.2%
Pope	5.5	NA	-7.5%
Pulaski	54.9	NA	-4.0%
Putnam	24.3	NA	NA
Randolph	51.5	0.9%	-3.1%

Richland	76.1	-1.8%	-7.5%
Rock island	66.3	-0.5%	-5.5%
Saline	177	-0.6%	-5.6%
Sangamon	73.9	-2.3%	-8.6%
Schuyler	31.4	-10.3%	-26.0%
Scott	NA	NA	NA
Shelby	29.1	-2.1%	-6.5%
St. Clair	59.8	-1.0%	-6.4%
Stark	NA	NA	NA
Stephenson	68.4	0.9%	-5.6%
Tazewell	72.8	-1.1%	-7.0%
Union	119.6	-0.3%	-5.9%
Vermilion	71.9	-2.5%	-8.4%
Wabash	68.5	-3.5%	-12.4%
Warren	60.7	-0.9%	-3.7%
Washington	28.4	12.5%	21.5%
Wayne	64.3	0.4%	-7.9%
White	75.6	-1.5%	-7.9%
Whiteside	47.4	-2.0%	-9.2%
Will	44.8	-1.7%	-5.8%
Williamson	121.5	-2.4%	-5.2%
Winnebago	77.4	-1.4%	-6.8%
Woodford	24.1	1.0%	3.6%
Total IL	52.57	-2%	-7%

Note: Color-coded numbers highlight counties that had positive growth rates in opioid prescription rates. Data on prescription rates were obtained from the CDC; ACGRs are author's computations.

Appendix 2: Estimates of Chronic Pain Sufferers in Counties by Gender, Age, and Race

County	Chronic Pain, Total Number	Men	Women	Age 18-24	Age 25-34	Age 35-44	Age 45-54	Age 55-64	Age 65+	Asian
Adams	1773	559	1217	329	525	760	189	119	192	271
Alexander	176	54	123	21	46	78	46	11	18	24
Bond	471	158	304	75	142	211	63	39	48	79
Boone	1361	440	913	233	364	585	225	105	136	251
Brown	197	86	86	27	51	88	43	15	28	41
Bureau	901	286	614	154	242	429	106	57	83	136
Calhoun	133	43	88	18	38	70	15	7	11	19
Carroll	406	131	273	63	105	213	44	23	35	56
Cass	334	108	224	39	75	187	64	22	37	56
Champaign	5778	1877	3852	1507	2179	1413	320	1043	729	811
Christian	912	302	597	135	227	474	129	57	94	152
Clark	421	134	286	74	110	201	48	26	42	66
Clay	359	115	244	58	103	162	51	22	34	54
Clinton	1015	344	648	201	288	389	144	64	123	172
Coles	1479	461	1024	282	556	493	153	219	165	194
Cook	139421	43553	96479	35483	33861	40774	23358	10449	20227	25575
Crawford	532	184	331	101	145	201	92	33	60	90
Cumberland	289	93	194	47	78	133	42	17	30	46
De Witt	433	140	290	74	125	199	49	25	43	70
DeKalb Illinois	2803	899	1892	597	1069	852	236	439	346	421
Douglas	508	161	346	79	130	206	118	35	55	89
DuPage	24530	7766	16765	7897	5901	5810	2332	1768	2806	4354
Edgar	477	151	326	83	118	224	68	27	46	75
Edwards	173	55	118	34	47	74	21	10	16	28
Effingham	891	286	600	190	207	392	99	62	103	139
Fayette	598	211	365	71	152	292	133	42	67	97
Ford	356	113	243	58	95	168	50	21	34	56

Franklin	1049	329	724	154	358	413	174	64	107	172	
Fulton	980	336	618	161	303	396	155	61	103	168	
Gallatin	141	44	98	19	43	67	21	8	13	22	
Greene	358	117	236	44	98	184	61	23	36	58	
Grundy	1281	412	862	238	408	540	114	89	149	256	
Hamilton	220	70	151	34	70	96	29	13	21	34	
Hancock	494	158	335	94	129	233	47	27	44	71	
Hardin	118	41	74	15	33	53	26	7	9	23	
Henderson	193	61	131	27	47	106	26	11	15	23	
Henry	1318	422	890	255	349	554	178	83	124	211	
Iroquois	761	240	521	110	204	391	101	45	71	115	
Jackson	1660	543	1100	373	625	474	143	282	206	217	
Jasper	252	82	169	49	54	120	34	14	25	39	
Jefferson	1025	345	660	165	321	394	185	67	113	171	
Jersey	600	188	414	111	179	257	63	48	57	90	
Jo Daviess	609	197	408	113	167	278	63	31	45	84	
Johnson	362	137	202	50	111	142	81	25	40	58	
Kane	13307	4281	8956	3029	3432	3912	2681	1018	1531	2640	
Kankakee	2893	916	1977	459	933	1200	417	247	318	482	
Kendall	2974	948	2020	765	864	879	318	208	394	733	
Knox	1414	463	936	227	436	602	205	118	135	212	
LaSalle	2979	977	1967	469	901	1314	422	199	319	464	
Lake	18104	5854	12125	5181	4354	5056	2211	1549	1844	3256	
Lawrence	457	168	265	64	114	205	103	31	55	86	
Lee	951	333	585	155	287	408	138	59	102	153	
Livingston	987	328	643	133	252	525	145	67	107	152	
Logan	819	258	564	134	249	352	116	65	92	140	
Macon	2867	880	2016	511	864	1202	358	213	302	443	
Macoupin	1237	393	843	196	377	574	142	78	121	196	
Madison	7109	2229	4904	1491	2217	2661	689	489	850	1172	

Marion	1014	322	692	161	311	441	144	65	107	158	
Marshall	326	105	220	51	91	167	31	20	28	46	
Mason	377	123	252	57	89	202	52	21	33	57	
Massac	390	121	272	54	121	167	70	22	35	66	
McDonough	904	287	616	180	355	293	70	172	86	102	
McHenry	7969	2567	5356	1941	2327	2625	780	571	794	1454	
McLean	4637	1456	3193	1247	1508	1314	270	660	541	758	
Menard	331	104	227	67	89	144	33	19	30	55	
Mercer	424	137	283	69	116	214	42	24	37	66	
Monroe	892	283	609	204	271	338	58	52	86	151	
Montgomery	800	273	505	112	219	382	137	51	89	127	
Morgan	949	307	635	149	270	469	103	83	99	143	
Moultrie	378	118	261	62	98	163	71	23	41	61	
Ogle	1364	440	916	241	410	561	186	87	133	228	
Peoria	4862	1514	3375	1119	1431	1581	610	375	617	812	
Perry	595	218	347	78	163	279	117	45	66	101	
Piatt	436	140	295	100	109	181	37	25	42	71	
Pike	424	137	284	58	115	218	62	27	43	64	
Pope	126	44	78	17	43	50	23	6	9	16	
Pulaski	153	48	106	18	50	70	27	8	16	22	
Putnam	158	51	106	25	49	76	15	8	15	21	
Randolph	909	336	524	115	230	452	182	56	106	155	
Richland	426	137	287	84	115	164	66	27	43	65	
Rock Island	3889	1238	2644	732	1207	1473	529	280	435	621	
Saline	655	206	450	108	218	236	115	42	71	98	
Sangamon	5249	1615	3682	1289	1448	1787	529	357	601	878	
Schuyler	201	73	119	34	57	89	28	10	17	34	
Scott	136	43	93	18	35	80	13	8	12	22	
Shelby	589	189	397	91	139	334	57	35	56	87	
St. Clair	6903	2136	4818	1477	2041	2482	837	503	822	1207	

Stark	149	48	99	27	37	69	20	9	12	23	
Stephenson	1230	384	851	207	386	534	142	78	108	178	
Tazewell	3556	1135	2412	762	1004	1427	334	214	395	628	
Union	466	152	310	84	130	189	74	26	48	71	
Vermilion	2067	666	1390	296	523	1025	350	139	227	330	
Wabash	309	98	212	63	94	113	39	21	32	45	
Warren	465	146	320	85	149	176	63	46	43	74	
Washington	383	125	254	74	116	157	39	22	39	60	
Wayne	440	141	296	73	118	197	70	25	43	69	
White	380	120	259	61	112	172	50	21	39	55	
Whiteside	1509	482	1023	242	449	679	200	94	147	239	
Will	17422	5594	11749	4177	4764	5915	2015	1354	1892	3534	
Williamson	1807	585	1208	350	589	678	203	110	207	314	
Winnebago	7519	2364	5172	1359	2146	2994	1191	524	844	1258	
Woodford	1003	322	676	238	257	404	76	71	97	166	

Note: Author's estimates based on MRI-Simmons Survey of the American Consumer, 2019.

Appendix 3: Physicians in Illinois Counties

County	Total No. of Physicians	Number of Family Medicine Practitioners
Adams	264	21
Alexander	5	0
Bond	46	1
Boone	511	22
Brown	11	5
Bureau	113	5
Calhoun	4	1
Carroll	16	4
Cass	4	1
Champaign	796	50
Christian	39	4
Clark	41	4
Clay	12	2
Clinton	71	3
Coles	141	14
Cook	1000	687
Crawford	26	1
Cumberland	99	1
DeKalb	260	17
De Witt	20	1
Douglas	6	1
DuPage	1000	136
Edgar	1	0
Edwards	40	1
Effingham	5	0
Fayette	17	2
Ford	3	0
Franklin	64	8
Fulton	57	4
Gallatin	11	2
Greene	28	2
Grundy	124	6
Hamilton	0	0
Hancock	24	3
Hardin	5	1
Henderson	13	1
Henry	64	4
Iroquois	48	5

Jackson	301	16
Jasper	1	0
Jefferson	196	10
Jersey	33	1
Jo Daviess	23	4
Johnson	5	0
Kane	855	31
Kankakee	269	10
Kendall	227	9
Knox	125	8
Lake	1000	53
La Salle	146	11
Lawrence	15	1
Lee	138	10
Livingston	47	2
Logan	20	5
McDonough	70	6
McHenry	472	11
McLean	452	23
Macon	300	24
Macoupin	218	20
Madison	517	20
Marion	26	0
Marshall	12	3
Mason	1	0
Massac	12	2
Menard	5	1
Mercer	18	1
Monroe	49	5
Montgomery	10	3
Morgan	86	3
Moultrie	1	0
Ogle	98	11
Peoria	1000	43
Perry	44	1
Piatt	4	2
Pike	16	3
Pope	43	3
Pulaski	0	0
Putnam	5	0
Randolph	65	5

Richland	1	0
Rock Island	467	10
St. Clair	560	30
Saline	5	0
Sangamon	999	41
Schuyler	4	0
Scott	3	0
Shelby	19	2
Stark	1	0
Stephenson	110	5
Tazewell	171	13
Union	61	3
Vermilion	171	8
Wabash	21	1
Warren	7	0
Washington	56	2
Wayne	31	3
White	21	1
Whiteside	11	0
Will	1000	34
Williamson	273	13
Winnebago	574	22
Woodford	49	4

Appendix 4: Pharma Firms' Payments to Physicians in Illinois Counties

County	Total $ Payments	Payment per 100 Persons ($)	Rank
Adams	105651	204	14
Alexander	2386	47	37
Bond	1667	12	68
Boone	11123	28	48
Brown	141	2	86
Bureau	6805	26	51
Calhoun	180	5	83
Carroll	948	8	73
Cass	545	6	82
Champaign	442738	263	10
Christian	16007	60	33
Clark	801	7	78
Clay	120	1	92
Clinton	2470	8	71
Coles	45453	105	24
Cook	32398308	797	3
Crawford	1141	7	76
Cumberland	646	8	75
De Witt	5006	40	41
DeKalb	52122	64	31
Douglas	527	4	85
DuPage	4794529	670	4
Edgar	5016	36	42
Edwards	10	0	95
Effingham	5083455	19575	1
Fayette	4156	24	53
Ford	1640	16	64
Franklin	5654	18	56
Fulton	4982	17	61
Gallatin		0	97
Greene	836	8	72
Grundy	161641	433	8
Hamilton	151	2	88
Hancock	289	2	90
Hardin	444	13	67
Henderson	19	0	94
Henry	8615	22	54
Iroquois	1279	6	81
Jackson	113898	235	13

Jasper	740	10	70
Jefferson	33090	111	23
Jersey	7589	43	38
Jo Daviess	309	2	91
Johnson	227	2	89
Kane	1014481	262	11
Kankakee	111818	133	19
Kendall	5007	6	80
Knox	62041	150	18
LaSalle	54561	63	32
Lake	1973677	374	9
Lawrence	923	7	77
Lee	14982	54	34
Livingston	5216	18	58
Logan	38	0	96
Macon	127006	152	17
Macoupin	8601	24	52
Madison	154910	75	27
Marion	11862	40	40
Marshall	1030	11	69
Mason	99	1	93
Massac	4611	41	39
McDonough	1057	4	84
McHenry	299521	129	20
McLean	232517	172	16
Menard		0	97
Mercer	2164	18	60
Monroe	32243	124	22
Montgomery	7261	31	45
Morgan	9866	36	43
Moultrie	1818	16	63
Ogle	5760	14	65
Peoria	722308	510	7
Perry	4701	27	50
Piatt	1752	14	66
Pike	2263	18	57
Pope		0	97
Pulaski		0	97
Putnam	3246	70	30
Randolph	4767	18	59
Richland	4395	35	44

Rock Island	110302	97	25
Saline	9482	50	35
Sangamon	1248214	816	2
Schuyler	452	8	74
Scott		0	97
Shelby	2927	17	62
St. Clair	255874	127	21
Stark	0	0	97
Stephenson	16882	47	36
Tazewell	30243	29	47
Union	3784	28	49
Vermilion	46893	78	26
Wabash	2798	31	46
Warren	321	2	87
Washington	8124	73	28
Wayne	2770	22	55
White	7987	72	29
Whiteside	248990	566	6
Will	902881	178	15
Williamson	350205	665	5
Winnebago	567565	259	12
Woodford	1807	6	79

Source: CMS, Open Payment Data. https://openpaymentsdata.cms.gov/