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## National and State-Specific Sales and Prices for Electronic Cigarettes—U.S., 2012–2013

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### Abstract

**Introduction**—The growing market for electronic cigarettes (e-cigarettes) has been widely reported in the media, but very little objective data exist in the scientific literature, and no data have been published on state-specific trends in prices or sales. Our objective is to assess state-specific annual sales and average prices for e-cigarettes in the U.S.

**Methods**—Commercial retail scanner data were used to assess total dollar sales and average price per unit for disposable e-cigarettes, starter kits, and cartridge refills for selected states and the total U.S. during 2012–2013. Data were analyzed in 2014. Data were available for convenience stores (29 states) and food, drug, and mass merchandisers (44 states).

**Results**—In convenience stores, dollar sales increased markedly during 2012–2013: 320.8% for disposable e-cigarettes, 72.4% for starter kits, and 82% for cartridges. In food, drug, and mass merchandisers, dollar sales increased 49.5% for disposable e-cigarettes, 89.4% for starter kits, and 126.2% for cartridges. Average prices across all product categories increased in convenience stores and decreased in food, drug, and mass merchandisers. Sales and prices varied substantially across states included in the analyses.

**Conclusions**—Sales of all e-cigarette device types grew considerably in convenience stores and food, drug, and mass merchandisers during 2012–2013. The market for e-cigarettes is growing rapidly, resulting in dynamic sales and price changes that vary across the U.S. Continued state-specific surveillance of the e-cigarette market is warranted.

### Introduction

Electronic nicotine delivery systems (ENDS), including electronic cigarettes (e-cigarettes), are battery-powered devices that heat liquid in a cartridge to deliver an inhaled dose of nicotine and other additives. Although the impact of e-cigarettes on public health is unclear,<sup>1,2</sup> awareness and use has increased markedly since being introduced into the U.S. in 2007.<sup>3–6</sup> During 2011–2013, ever use of e-cigarettes increased from 1.4% to 3.0% among

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middle school students and from 4.7% to 11.9% among high school students.<sup>7</sup> Similarly, ever use of e-cigarettes has increased among adults, from 3.3% in 2010 to 8.5% in 2013, with higher prevalence among current (36.5%) and former (9.6%) cigarette smokers than never smokers (1.2%) in 2013.<sup>8</sup> Despite the low proportion of tobacco product sales accounted for by e-cigarettes, monitoring e-cigarette sales is warranted, given the rapid increase in e-cigarette use and the continuing decline in conventional cigarette sales.<sup>9</sup>

Several factors may be driving the surge in popularity of e-cigarettes. First,<sup>10</sup> e-cigarettes have been promoted as socially acceptable alternatives in situations where conventional tobacco smoking is not allowed.<sup>11,12</sup> Second, e-cigarettes have been promoted as safer alternatives to conventional tobacco products<sup>11</sup> and are used as a cessation aid by consumers.<sup>13</sup> There is, however, no conclusive scientific evidence that e-cigarettes promote long-term cessation, and the products are not currently approved by the U.S Food and Drug Administration (FDA) for smoking cessation.<sup>14</sup> Third, annual advertising expenditures for e-cigarettes across multiple channels tripled from \$6.4 million in 2011 to \$18.3 million in 2012, including advertising on TV,<sup>15</sup> where advertising of conventional cigarettes has been banned since 1971.<sup>16</sup> Smokers are particularly receptive to e-cigarette TV advertisements.<sup>17</sup> Increasing cigarette prices are associated with decreasing cigarette consumption,<sup>18</sup> and recent evidence suggests that e-cigarette sales are also price sensitive.<sup>19</sup> Fourth, e-cigarettes are available in numerous configurations, and many e-cigarettes contain interchangeable components, allowing users to modify the device and customize its performance.<sup>20</sup> Finally, e-cigarettes are available in a variety of flavors, including fruit, alcohol, and chocolate, which are banned in conventional cigarettes in the U.S.<sup>21</sup>

E-cigarettes may have lower potential harm to the individual user than smoked tobacco<sup>22</sup> and may aid in short-term smoking cessation<sup>23</sup>; however, concerns exist, including the potential for e-cigarettes to promote continued smoking of cigarettes among current smokers, promote relapse among former smokers, encourage uptake of e-cigarettes among nonsmokers, and renormalize smoking behaviors.<sup>24</sup> The current dearth of objective data on the effects of e-cigarettes on individuals, populations, and the environment presents a challenge for protecting the public's health.<sup>25,26</sup> On April 24, 2014, the FDA proposed to extend its tobacco regulatory authority to include e-cigarettes, but implementation could take several years.<sup>27</sup> However, some states have implemented policies to prevent youth access to e-cigarettes, avoid renormalization of tobacco use, and preserve clean indoor air standards. As of November 2014, a total of 40 states regulate youth access to e-cigarettes, and three states prohibit e-cigarette use in indoor areas of worksites, restaurants, and bars.<sup>28</sup> Currently, only two states tax e-cigarettes: Minnesota applies a tax to some e-cigarettes equal to 95% of the wholesale price,<sup>29</sup> and North Carolina applies a tax of 5 cents per milliliter of nicotine liquid.<sup>30</sup> Although the increasing market for e-cigarettes has been widely reported in the media,<sup>31–33</sup> very few data exist in the scientific literature documenting sales and prices of e-cigarettes in the U.S., and no data have yet been published on state-specific trends in these measures. To address this gap, this study assessed state-specific sales and prices of disposable e-cigarettes, starter kits, and replacement cartridges.

## Methods

### Data Source

Data were from a custom-designed database of retail scanner data provided by Information Resources, Inc. The data contain dollar and unit sales in convenience stores (C-stores) and food, drug, and mass merchandisers combined (FDMs) for 2012 and 2013. Dollar and unit sales are reported at the item level, defined by a Universal Product Code (UPC). Information compiled for each item includes UPC, brand name, product type, and number of items per unit (e.g., a single unit might contain three disposable e-cigarettes). Dollar and unit sales were calculated for the total U.S. and states with sample sizes sufficient for precise estimation, yielding 29 states with C-store data and 44 with FDM data. Estimates did not include Walmart, Sam's Club, Costco, or venues that generally do not use scanners, such as small grocery stores, tobacco shops, or "vape shops."<sup>34</sup> For a general description of scanner data, see Adhikari et al.<sup>35</sup>

### Measures and Methods

The data were stratified into three product categories: (1) disposable e-cigarettes; (2) starter kits; and (3) cartridge refills (Appendix Figure 1, available online). Disposable e-cigarettes have a nonrechargeable battery, and the entire unit is discarded after the e-liquid solution is depleted. Disposable e-cigarette data were standardized so that one unit equaled one disposable e-cigarette. Starter kits contain all the items a new e-cigarette user needs to begin using refillable e-cigarettes, including a rechargeable battery and charger, a refillable e-cigarette, and one or more refills. All starter kits were treated as a single unit, irrespective of package contents. A cartridge is a replaceable component of an e-cigarette that contains the e-liquid solution. A cartridge refill may consist of the tank of e-liquid alone, but may also include an atomizer used to vaporize the e-liquid. Because scanner data cannot reliably separate cartridge-only refills from cartridge-atomizer combinations, all refills were combined into a single category labeled "cartridge refills" and standardized so that each individual cartridge equaled a single unit.

For each product category, total dollar sales and average price in U.S. dollars per standardized unit were calculated for the entire U.S. and each state in 2012 and 2013. To obtain total annual dollar sales, dollar sales for all items within each category were summed. To obtain average price per (standardized) unit, total dollar sales were divided by total standardized unit sales. Relative percentage change in dollar sales and average price per unit were calculated as the change in sales or price from 2012 to 2013. Average dollar sales and prices, SDs, coefficients of variation, and minimum and maximum values were calculated across states. FDM estimates for Wyoming in 2012 were excluded because data were not available prior to the fourth quarter of 2012. All analyses were conducted in 2014 using Stata, version 13.

## Results

Tables 1 and 2 report annual dollar sales for disposable e-cigarettes, starter kits, and cartridge refills in C-stores and FDMs, respectively. Sales of disposable e-cigarettes

increased in all 29 states with C-stores, while sales of starter kits and cartridge refills increased in 26 states. Across states, the average change in C-store sales was 345.7% for disposable e-cigarettes (minimum=39.7% [South Carolina], maximum=708.5% [Arkansas]), 110.3% for starter kits (minimum=-16.9% [Arizona], maximum=505.0% [Colorado]), and 166.0% for cartridge refills (minimum=-30.7% [Arizona], maximum= 939.6% [Colorado]). Colorado recorded the largest increase in sales of starter kits (505.0%) and cartridge refills (939.6%) in C-stores. Arizona experienced a decline in sales of starter kits (-16.9%) and cartridge refills (-30.7%), as did Texas (-5.4% for starter kits, -14.1% for cartridge refills) and Oklahoma (-3.7% for starter kits, -16.4% for cartridge refills).

In FDMs, sales of disposable e-cigarettes, starter kits, and cartridge refills increased in all 43 states in our sample. The average increase in FDM sales was 56.1% for disposable e-cigarettes (minimum=10.7% [Massachusetts], maximum=282.5% [Minnesota]), 111.9% for starter kits (minimum=24.6% [Maine], maximum=1,148.5% [Minnesota]), and 173.8% for cartridge refills (minimum=32.2% [Oklahoma], maximum=1,870.9% [Minnesota]). Minnesota experienced the maximum growth in FDM sales in all product categories. Sales of disposable e-cigarettes generally increased more slowly in FDMs than in C-stores.

Nationally, disposable e-cigarettes was the highest-selling category, accounting for \$323,696,000 in sales in C-stores in 2013, a 320% increase from 2012 (\$76,927,000), and \$52,667,000 in sales in FDMs, a 49.5% increase from 2012 (\$35,230,000). Sales of starter kits increased by 72.4% in C-stores, from \$40,245,000 to \$69,381,000, while sales in FDMs increased by 89.4%, from \$16,170,000 to \$30,630,000. For cartridge refills, sales in C-stores grew by 82.0%, from \$72,942,000 to \$132,738,000, while sales in FDMs grew 126.2%, from \$14,516,000 to \$32,843,000. Along with sales volume, the number of brands and product UPCs in the scanner data also increased. In the first quarter of 2012, there were 52 brands and 324 UPCs nationally. By the fourth quarter of 2013, these numbers had increased to 77 brands and 628 UPCs.

Tables 3 and 4 demonstrate that the direction and magnitude of price changes from 2012 to 2013 varied by state, product, and retail channel. In C-stores (Table 3), 12 states experienced price increases, while 17 states experienced price decreases for disposable e-cigarettes (mean=0.1%, minimum=-14.2% [Michigan], maximum= 23.5% [Massachusetts]). Average prices for starter kits increased in 26 states and decreased in three states (mean=18.8%, minimum=-12.3% [Colorado], maximum= 64.1% [Arkansas]). Average prices for cartridge refills increased in 16 states and decreased in 13 states (mean=-0.3%, minimum=-25.5% [Massachusetts], maximum= 25.9% [South Carolina]).

In FDMs (Table 4), prices for disposable e-cigarettes fell in all states except Minnesota, where the average price rose 23.5% (mean=-5.9%, minimum=-15.0% [New Hampshire]). FDM prices for starter kits rose in ten states and fell in 33 states (mean=-1.5%, minimum=-26.3% [Colorado], maximum=56.0% [Florida]). FDM prices for cartridge refills increased in ten states, stayed constant in one state, and decreased in 32 states (mean=-2.1%, minimum=-13.2% [New Mexico], maximum=7.2% [New Jersey]).

In 2013, the national average price for a disposable e-cigarette was \$8.03 in C-stores, an increase of 0.5% from the 2012 average of \$7.98, and \$8.96 in FDMs, a decrease of 6.6% from \$9.59 in 2012. The national average price of a starter kit increased 18% in C-stores, from \$22.31 to \$26.32, but decreased 1.4% in FDMs, from \$37.77 to \$37.25. In 2013, a single cartridge refill cost \$3.02 in C-stores, a 5.5% increase from \$2.86 in 2012, and \$2.94 in FDMs, a 2.3% decrease from \$3.01.

## Discussion

This study is the first state-level report of sales and prices for e-cigarettes in the U.S. During 2012–2013, sales of all e-cigarette product categories increased substantially in both C-stores and FDMs in nearly every state for which data are available. Nationally, sales of disposable e-cigarettes, starter kits, and cartridge refills totaled almost \$642 million in 2013 in C-stores and FDMs combined, a 150% increase from 2012. Disposable e-cigarettes accounted for 59% of total sales (\$376,363,000), followed by cartridge refills (\$165,581,000, 26%) and starter kits (\$100,011,000, 16%). The fastest-growing category was disposable e-cigarettes. Across states, price levels were similar, but the direction and magnitude of price changes varied by state, category, and retail channel. Nationally, average prices either declined, or increased modestly, with the exception of an 18% price increase for starter kits in C-stores.

The spectrum of ENDS devices continues to evolve,<sup>12,20,36</sup> and advertising is proliferating.<sup>15</sup> In addition to e-cigarettes, new ENDS devices are being developed and marketed. Although these new products are functionally similar to current e-cigarettes, they are marketed as being distinctive.<sup>32</sup> The dynamic marketplace presents a challenge for public health surveillance and evaluation. E-cigarettes may be beneficial to the public's health if they lead to complete, long-term substitution by established smokers. Conversely, e-cigarettes could cause net population harm if their design or ingredients are unsafe; if they delay or diminish the likelihood a smoker will quit; lead to long-term dual use of both e-cigarettes and cigarettes, relapse among former smokers, or regular use of e-cigarettes or conventional tobacco products among young people or others who otherwise would not have smoked or become addicted to nicotine; or expose nonsmokers to aerosolized nicotine or other harmful constituents.

Despite the increase in e-cigarette sales reported here, e-cigarettes represent a negligible portion of total U.S. tobacco product sales. Analysis of retail scanner data for the fourth quarter of 2013 reveals that e-cigarette sales accounted for only 0.95% of total tobacco product sales (including both combustible and smokeless tobacco products) in C-stores and 1.19% of total tobacco product sales in FDMs. Nevertheless, the projected long-term growth in market share for e-cigarettes requires ongoing monitoring.<sup>37–39</sup>

A large body of evidence shows that exposure to pro-tobacco advertising affects knowledge and attitudes about tobacco product use.<sup>37,38</sup> Accordingly, restrictions on tobacco advertising in the U.S. include bans on broadcast and outdoor advertising, restrictions on event sponsorship and magazine advertising, and other prohibitions.<sup>39</sup> With the exception of e-cigarettes that are marketed for therapeutic purposes, advertising for e-cigarettes is

currently unrestricted. Although current e-cigarette advertising expenditures are a fraction of the more than \$8 billion the tobacco industry spends annually on advertising and promotion,<sup>40</sup> e-cigarette advertising is focused on traditional mass media channels, such as television,<sup>15</sup> with the potential to reach large numbers of susceptible youth and adults.

The Family Smoking Prevention and Tobacco Control Act of 2009 gave the FDA the authority to regulate tobacco products, including the ability to propose requirements and restrictions on manufacturing, marketing, and distribution.<sup>41</sup> In 2010, the U.S. Court of Appeals held that e-cigarettes and other products made or derived from tobacco may be regulated as tobacco products under the Act, unless they are marketed for therapeutic purposes, in which case they are regulated as drugs or devices.<sup>42</sup> On April 24, 2014, FDA's Center for Tobacco Products proposed deeming regulations to expand its jurisdiction to e-cigarettes.<sup>27</sup> Although the proposed regulations affect product manufacturing, marketing, sales, and labeling, implementation could take several years.

The data presented here suggest at least two broad areas for future research. First, although much is known about the elasticity of demand for conventional tobacco products, little is known about determinants of demand for e-cigarettes, especially among youth and young adults. One published study estimated the relationship between e-cigarette prices and sales. The authors found sales of e-cigarettes fell sharply in response to rising e-cigarette prices.<sup>19</sup> More research is needed on state and regional variation in e-cigarette price elasticity and on changes in demand as the e-cigarette market matures and stabilizes. Several factors in addition to prices are likely contributors to the growth in e-cigarette sales, including changing consumer preferences, rapid proliferation of new products and advertising, an evolving regulatory landscape, and alternative uses, such as vaporizing tetrahydrocannabinol liquid. Although the relationship between sales of e-cigarettes and prices of conventional tobacco products is only beginning to be explored, price differentials may lead to increases in e-cigarette market share to the point where ENDSs are a "disruptive technology" that make cigarettes obsolete.<sup>43</sup> In particular, the average cost of an e-cigarette replacement cartridge is less than the cost of a single pack of cigarettes in every state,<sup>9</sup> providing an economic incentive for current smokers to switch to e-cigarettes. In addition, differences in sales and prices were noted between C-stores and FDMs. The differences may have to do with pricing, promotion, and marketing differences for e-cigarettes within the stores or the purchasing preferences of consumers who discriminate between C-stores and FDMs for different purchases. Future research should attempt to clarify the causes of these differences.

A second major area for future research is on the effects of policies regulating e-cigarettes. E-cigarettes not advertised for therapeutic purposes are currently unregulated at the federal level, and most state laws are intended to prevent youth access to e-cigarettes or extend conventional smoke-free air laws to include e-cigarettes.<sup>28</sup> Currently, only two states, Minnesota and North Carolina, tax e-cigarettes or nicotine liquid. The effectiveness of these and future state and local policies on e-cigarette use warrants ongoing research and evaluation.



## Limitations

This study has some limitations. First, the sales figures reported here underestimate the total size and growth of the e-cigarette market because the data do not include sales from Walmart, Sam's Club, Costco, tobacco specialty shops, online sources, or "vape shops."<sup>34</sup> Data from these outlets were either not available from Information Resources, Inc. or were not eligible to be included in the creation of the custom state-level data set used here. The changes in sales and prices observed here may be attributable, in part, to consumers moving to or from retail channels not captured in this data set rather than overall change in the market for e-cigarettes. Second, scanner data do not capture the full range of ENDS products currently available. In particular, premium tank systems and e-hookahs are likely not captured by these data. The range of products in the scanner data will improve over time as new UPCs are identified and added to the data set. Third, the scanner data are unable to distinguish between cartridge refills and cartomizers. Thus, any changes in the popularity of these two products are unobservable. Despite these limitations, this study provides insight into the rapidly growing e-cigarette market in the U.S., as well as state sales and price differences.

## Conclusions

We used a novel state-level retail scanner data set to estimate sales and prices for e-cigarettes in C-stores and FDMs. The findings reveal that e-cigarette sales grew rapidly, whereas average prices generally stayed constant or fell. Disposable e-cigarettes are the fastest-growing product category. These results describe e-cigarette sales and prices prior to widespread implementation of e-cigarette regulations. As such, they can be considered a baseline against which to measure change resulting from implementation of e-cigarette regulations or other factors. Continued monitoring of e-cigarettes is warranted, given the potential public health impact of these products at the individual and societal levels.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Appendix

### Supplementary data

Supplementary data associated with this article can be found at, <http://dx.doi.org/10.1016/j.amepre.2015.05.003>.

Annual Dollar Sales (Thousands) for Disposable E-Cigarettes, Starter Kits, and Cartridge Refills, Convenience Stores

Table 1

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Total U.S.	76,927	323,696	320.8	40,245	69,381	72.4	72,942	132,738	82.0
Northeast									
Massachusetts	1,432	9,394	556.2	241	626	159.1	225	802	256.1
New York	3,836	20,361	430.8	1,493	4,119	175.9	3,032	14,344	373.1
Pennsylvania	2,771	14,318	416.7	1,310	2,169	65.6	2,315	4,313	86.3
South									
Alabama	3,105	8,267	166.2	714	2,447	242.6	1,714	3,259	90.1
Arkansas	389	3,149	708.5	416	644	54.8	151	331	119.8
Florida	6,117	26,853	339.0	1,995	3,658	83.4	3,063	7,633	149.2
Georgia	2,836	14,070	396.1	1,041	4,270	310.1	1,761	4,250	141.4
Kentucky	769	2,874	273.9	571	1,676	193.7	699	1,534	119.5
Louisiana	679	4,405	548.9	395	895	126.5	502	970	93.4
Maryland	1,370	4,818	251.6	661	1,172	77.3	805	1,114	38.4
North Carolina	2,522	8,501	237.1	863	2,085	141.6	1,061	3,992	276.1
Oklahoma	809	2,927	261.8	553	532	-3.7	1,036	867	-16.4
South Carolina	3,930	5,488	39.7	784	1,398	78.4	535	2,573	380.7
Tennessee	1,198	3,364	180.9	308	668	116.9	327	1,215	271.9
Texas	3,962	16,705	321.7	1,549	1,466	-5.4	2,280	1,958	-14.1

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Virginia	1,660	12,187	634.3	491	1,514	208.4	1,027	3,282	219.5
Midwest									
Illinois	3,413	16,849	393.6	1,953	3,034	55.3	2,825	4,328	53.2
Indiana	2,733	6,244	128.5	1,742	3,489	100.2	1,868	3,928	110.3
Iowa	761	2,995	293.7	560	1,131	101.9	840	1,260	50.0
Michigan	1,400	7,536	438.4	747	1,234	65.2	775	1,519	96.0
Missouri	1,888	5,651	199.3	1,432	1,695	18.4	1,750	2,233	27.6
Ohio	2,148	8,219	282.6	2,730	4,564	67.2	5,608	8,710	55.3
Wisconsin	945	3,424	262.3	552	863	56.5	569	894	57.2
West									
Arizona	677	4,541	570.9	732	608	-16.9	1,103	764	-30.7
California	6,771	37,793	458.2	3,162	3,506	10.9	4,017	4,795	19.3
Colorado	720	4,894	579.4	433	2,622	505.0	262	2,727	939.6
Nevada	457	1,886	313.0	193	292	50.8	214	696	225.2
Oregon	3,347	5,273	57.5	652	1,594	144.4	424	2,925	589.9
Washington	893	3,445	285.7	398	455	14.4	767	1,033	34.7
Mean	2,191	9,187	345.7	989	1,877	110.3	1,433	3,043	166.0
SD	1,642	8,181	169.1	746	1,273	108.6	1,290	2,978	203.9
CV (%)	75	89	49	75	68	98	90	98	123
Minimum	389	1,886	39.7	193	292	-16.9	151	331	-30.7

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Maximum	6,771	37,793	708.5	3,162	4,564	505.0	5,608	14,344	939.6

Note: Sales are presented in 1,000s of U.S. dollars and are not adjusted for inflation. Mean, SD, CV, minimum, and maximum are calculated across states (n=29). CV, coefficient of variation, calculated as  $(|SD/|Mean|) \times 100$ .

**Table 2**  
Annual Dollar Sales (Thousands) for Disposable E-Cigarettes, Starter Kits, and Cartridge Refills, FDMS

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refill		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Total U.S.	35,230	52,667	49.5	16,170	30,630	89.4	14,516	32,843	126.2
Northeast									
Connecticut	459	697	51.8	219	331	50.8	234	437	86.7
Maine	144	220	52.5	85	106	24.6	40	92	130.7
Massachusetts	605	670	10.7	213	311	46.1	210	416	97.8
New Hampshire	205	423	106.8	117	254	118.3	86	267	209.7
New Jersey	1,345	2,137	58.9	529	896	69.5	491	1,378	180.8
New York	1,787	3,202	79.2	689	1,230	78.6	531	1,361	156.6
Pennsylvania	953	1,685	76.7	643	975	51.6	455	1,094	140.3
Rhode Island	131	196	49.6	47	102	119.0	40	120	201.3
Vermont	41	59	42.1	25	40	57.3	16	33	109.4
South									
Alabama	577	675	17.0	179	403	125.0	124	405	226.9
Arkansas	383	558	45.7	122	383	213.2	82	332	304.8
Delaware	231	417	80.7	82	215	161.1	67	252	277.0
Florida	4,624	6,633	43.4	847	2,822	233.4	962	2,941	205.7
Georgia	1,265	1,708	35.1	476	1,029	116.3	349	1,132	223.9
Kentucky	520	737	41.9	403	558	38.6	324	542	67.2



Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refill		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Louisiana	820	1,248	52.1	189	677	257.4	145	560	285.3
Maryland	391	729	86.3	297	474	59.7	247	537	117.0
Mississippi	314	369	17.4	102	232	128.1	71	205	189.7
North Carolina	944	1,379	46.1	584	792	35.7	531	851	60.4
Oklahoma	469	545	16.1	307	426	38.9	307	406	32.2
South Carolina	571	795	39.2	350	474	35.2	325	528	62.3
Tennessee	1,095	1,563	42.8	627	947	51.2	569	941	65.3
Virginia	651	1,088	67.0	491	821	67.4	406	966	138.0
West Virginia	157	243	54.3	116	161	38.9	56	160	183.8
Midwest									
Illinois	2,227	3,485	56.5	1,156	1,795	55.3	1,063	2,004	88.5
Indiana	628	884	40.8	516	684	32.7	464	706	51.9
Kansas	282	386	37.0	190	323	69.9	153	289	88.6
Michigan	795	1,063	33.7	523	685	31.1	540	784	45.2
Minnesota	156	596	282.5	52	651	1,148.5	26	518	1,870.9
Missouri	713	1,099	54.2	473	808	70.6	427	825	93.3
Nebraska	187	276	47.7	118	210	77.8	108	200	86.1
Ohio	1,033	1,511	46.3	768	1,201	56.3	717	1,551	116.3
South Dakota	55	79	44.6	47	95	102.5	40	66	63.5
Wisconsin	792	1,150	45.1	385	693	79.8	390	786	101.2

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refill		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
West									
Arizona	1,041	1,794	72.3	526	933	77.6	552	1,069	93.4
California	2,352	3,328	41.5	1,390	2,107	51.5	1,227	2,254	83.7
Colorado	634	1,135	79.1	461	1,035	124.5	401	1,208	200.9
Idaho	76	126	64.5	65	110	71.0	63	133	109.4
Nevada	355	538	51.5	186	308	65.5	210	347	65.3
New Mexico	317	467	47.4	87	285	229.2	80	279	247.3
Oregon	287	456	58.9	225	397	76.4	190	407	114.6
Utah	138	202	46.8	89	189	111.5	78	163	108.7
Washington	597	895	49.9	406	664	63.4	406	773	90.2
Wyoming	—	60	—	—	82	—	—	78	—
Mean	729	1,080	56.1	358	634	111.9	321	691	173.8
SD	810	1,194	40	303	559	172	285	620	274
CV (%)	111	111	72	85	88	153	89	90	158
Minimum	41	59	10.7	25	40	24.6	16	33	32.2
Maximum	4,624	6,633	282.5	1,390	2,822	1148.5	1,227	2,941	1,870.9

Note: Sales are presented in 1,000s of U.S. dollars and are not adjusted for inflation. Sales estimates for Wyoming prior to quarter 4 2012 are not available. Mean, SD, CV, minimum, and maximum are calculated across states excluding Wyoming (n=43), except for the 2013 sales estimate (n=44).

CV, coefficient of variation, calculated as  $(SD/|Mean|) \times 100$ ; FDMs, food, drug, and mass merchandisers.

**Table 3**  
Average Price Per Disposable E-Cigarette, Starter Kit, and Cartridge Refills, Convenience Stores

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Total U.S.	7.98	8.03	0.5	22.31	26.32	18.0	2.86	3.02	5.5
Northeast									
Massachusetts	5.95	7.35	23.5	25.08	26.51	5.7	3.83	2.85	-25.5
New York	8.38	7.98	-4.8	22.83	25.31	10.8	3.64	3.71	1.9
Pennsylvania	8.16	8.19	0.3	20.13	24.79	23.2	2.54	2.56	0.8
South									
Alabama	8.92	8.53	-4.3	25.24	33.78	33.9	3.12	3.15	0.7
Arkansas	8.34	8.96	7.4	25.24	41.43	64.1	2.70	3.08	14.1
Florida	8.14	8.04	-1.3	23.76	29.95	26.0	3.58	3.48	-2.9
Georgia	8.22	8.79	7.0	22.86	27.10	18.6	2.73	2.84	4.2
Kentucky	9.19	8.97	-2.5	23.73	32.32	36.2	2.85	2.78	-2.4
Louisiana	9.10	9.08	-0.2	21.74	28.25	29.9	3.05	3.28	7.7
Maryland	8.36	8.95	7.0	24.72	35.54	43.7	3.07	3.00	-2.2
North Carolina	7.96	8.09	1.6	24.54	29.31	19.4	3.44	3.47	0.7
Oklahoma	8.82	8.09	-8.3	16.95	20.57	21.3	3.07	2.59	-15.7
South Carolina	7.78	7.33	-5.8	21.14	27.22	28.7	2.78	3.49	25.9
Tennessee	8.28	8.13	-1.9	23.48	26.92	14.7	2.93	3.19	9.0
Texas	7.97	8.39	5.2	19.78	22.60	14.3	3.39	3.13	-7.7

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Virginia	8.22	8.08	-1.7	21.64	27.64	27.7	3.52	2.67	-24.0
Midwest									
Illinois	7.37	6.53	-11.4	28.16	30.94	9.9	3.27	3.11	-4.9
Indiana	9.00	8.79	-2.4	27.79	29.13	4.8	2.75	2.87	4.4
Iowa	9.39	8.49	-9.5	26.26	28.70	9.3	3.20	2.98	-6.6
Michigan	9.32	7.99	-14.2	21.54	21.33	-1.0	2.60	2.36	-9.2
Missouri	8.95	7.74	-13.5	28.47	28.01	-1.6	2.72	2.73	0.4
Ohio	8.42	8.33	-1.1	17.26	21.68	25.6	2.11	2.16	2.4
Wisconsin	7.71	8.70	12.8	23.91	31.83	33.1	3.11	2.89	-7.0
West									
Arizona	9.08	8.37	-7.8	21.24	22.28	4.9	2.62	2.85	8.7
California	7.82	8.36	6.9	20.04	24.63	22.9	2.99	2.84	-5.1
Colorado	8.52	8.71	2.3	20.07	17.61	-12.3	2.95	2.99	1.3
Nevada	8.12	8.84	8.8	23.82	24.90	4.5	2.88	2.92	1.2
Oregon	8.44	8.43	-0.2	23.78	25.48	7.2	2.59	3.19	23.1
Washington	8.00	8.92	11.5	17.60	21.22	20.5	3.49	3.39	-2.9
Mean	8.34	8.32	0.1	22.86	27.14	18.8	3.02	2.98	-0.3
SD	0.69	0.57	8.4	3.04	5.01	15.6	0.39	0.35	11.1
CV (%)	8	7	7193	13	18	83	13	12	3,355
Minimum	5.95	6.53	-14.2	16.95	17.61	-12.3	2.11	2.16	-25.5

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Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Maximum	9.39	9.08	23.5	28.47	41.43	64.1	3.83	3.71	25.9

Note: Average prices (in U.S. dollars) reflect nominal price and are not adjusted for inflation. Mean, SD, CV, minimum, and maximum are calculated across states (n=29).  
 CV, coefficient of variation, calculated as  $(SD/|Mean|) \times 100$ .

**Table 4**

Average Price Per Disposable E-Cigarette, Starter Kit, Cartridge Refill, FDMs

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Total U.S.	9.59	8.96	-6.6	37.77	37.25	-1.4	3.01	2.94	-2.3
Northeast									
Connecticut	9.54	8.75	-8.2	43.40	37.24	-14.2	2.96	2.95	-0.3
Maine	9.13	8.50	-6.9	27.80	25.89	-6.9	2.92	2.75	-5.8
Massachusetts	9.79	8.65	-11.6	44.64	35.55	-20.4	2.98	2.87	-3.8
New Hampshire	9.51	8.08	-15.0	38.05	33.47	-12.0	2.95	2.73	-7.4
New Jersey	9.48	8.51	-10.3	35.88	32.10	-10.5	2.89	3.10	7.2
New York	9.74	9.40	-3.5	34.45	33.19	-3.7	2.97	2.94	-1.1
Pennsylvania	9.07	8.72	-3.9	29.23	28.04	-4.1	2.79	2.84	2.0
Rhode Island	9.46	8.74	-7.6	33.40	32.28	-3.4	2.87	2.86	-0.3
Vermont	9.24	8.54	-7.6	27.33	23.86	-12.7	2.91	2.71	-6.7
South									
Alabama	9.31	8.68	-6.7	25.63	35.13	37.1	2.85	2.92	2.3
Arkansas	9.68	8.85	-8.6	29.47	41.46	40.7	2.98	2.75	-7.9
Delaware	9.32	8.64	-7.2	36.61	35.47	-3.1	2.82	2.85	1.0
Florida	9.74	8.92	-8.5	26.70	41.66	56.0	3.39	2.95	-13.1
Georgia	9.48	8.88	-6.3	26.15	33.65	28.7	3.12	2.97	-4.8
Kentucky	9.17	8.68	-5.3	34.83	33.99	-2.4	2.78	2.95	6.2



Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Louisiana	9.70	9.01	-7.1	26.73	38.38	43.6	3.30	2.94	-10.9
Maryland	9.12	8.69	-4.7	33.70	31.90	-5.3	2.85	2.83	-0.9
Mississippi	9.54	8.82	-7.6	27.86	38.72	39.0	3.17	2.85	-10.1
North Carolina	9.52	8.88	-6.8	41.27	34.35	-16.8	2.94	2.86	-2.8
Oklahoma	9.71	9.17	-5.5	48.92	45.89	-6.2	2.89	2.83	-2.0
South Carolina	9.59	8.94	-6.8	43.47	37.64	-13.4	2.95	2.91	-1.4
Tennessee	9.64	8.87	-8.1	45.20	38.31	-15.2	3.00	2.96	-1.2
Virginia	9.39	8.69	-7.4	38.78	33.81	-12.8	2.93	2.88	-1.6
West Virginia	8.56	8.25	-3.6	26.84	26.01	-3.1	2.74	2.83	3.2
Midwest									
Illinois	9.71	9.00	-7.3	49.43	43.39	-12.2	2.97	2.96	-0.3
Indiana	9.58	8.92	-6.9	43.69	40.52	-7.3	2.98	2.97	-0.4
Kansas	9.28	8.95	-3.6	51.53	39.68	-23.0	3.00	3.01	0.4
Michigan	9.43	8.94	-5.2	38.91	36.41	-6.4	2.96	2.91	-1.7
Minnesota	9.39	11.60	23.5	38.01	40.63	6.9	3.07	3.09	0.7
Missouri	9.70	8.92	-8.1	48.57	42.27	-13.0	3.00	2.99	-0.5
Nebraska	9.32	8.95	-4.0	50.77	42.73	-15.8	2.99	2.98	-0.6
Ohio	9.40	8.83	-6.0	38.08	32.49	-14.7	2.96	2.73	-7.7
South Dakota	9.31	8.88	-4.7	51.60	44.00	-14.7	2.99	2.97	-0.9
Wisconsin	9.59	8.80	-8.2	53.53	42.28	-21.0	3.00	2.96	-1.1

Geographic area	Disposable e-cigarettes			Starter kits			Cartridge refills		
	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
West									
Arizona	9.57	8.88	-7.2	49.81	41.97	-15.7	3.00	2.99	-0.5
California	9.63	9.06	-5.9	44.43	37.60	-15.4	2.97	2.94	-0.9
Colorado	9.68	9.10	-6.0	44.82	33.01	-26.3	3.03	3.05	0.7
Idaho	9.47	9.07	-4.2	37.50	38.33	2.2	3.04	3.02	-0.5
Nevada	9.90	9.36	-5.4	45.32	41.19	-9.1	3.04	3.04	0.1
New Mexico	9.76	9.12	-6.5	28.91	41.80	44.6	3.45	2.99	-13.2
Oregon	9.52	8.95	-6.0	39.99	34.04	-14.9	2.97	2.95	-0.5
Utah	9.70	9.27	-4.5	38.31	41.69	8.8	3.01	3.01	0.0
Washington	9.53	8.92	-6.3	36.98	33.90	-8.3	2.99	2.98	-0.3
Wyoming	—	9.01	—	—	40.86	—	—	3.05	—
Mean	9.48	8.92	-5.9	38.41	36.75	-1.5	2.99	2.92	-2.1
SD	0.25	0.48	5.1	8.38	5.14	20.9	0.14	0.10	4.5
CV (%)	3	5	87	22	14	1,412	5	3	215
Minimum	8.56	8.08	-15.0	25.63	23.86	-26.3	2.74	2.71	-13.2
Maximum	9.90	11.60	23.5	53.53	45.89	56.0	3.45	3.10	7.2

Note: Averages prices (in U.S. dollars) reflect nominal price and are not adjusted for inflation. Sales estimates for Wyoming prior to quarter 4, 2012 are not available. Mean, SD, CV, minimum, and maximum are calculated across states excluding Wyoming ( $n=43$ ), except for the 2013 price estimate ( $n=44$ ).

CV, coefficient of variation, calculated as  $(SD/|Mean|) \times 100$ ; FDMs, food, drug, and mass merchandisers.