

Chapter 4

Activities of the E-Cigarette Companies

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Introduction

This chapter focuses on the companies that are active in the production, distribution, or marketing of e-cigarettes in the United States and examines the potential influence of these companies on the use of e-cigarettes, particularly among youth and young adults. The e-cigarette marketplace is complicated by the fact that some brands and devices are owned by tobacco companies, while others are independently owned. This chapter will

refer to the e-cigarette companies as a whole but, when necessary, will distinguish between the e-cigarette brands that are owned by tobacco companies and others that are independently owned. The chapter covers manufacturing and price, marketing and promotional activities, the retail environments for e-cigarette products, exposure to marketing and receptivity to such activity, and the effects of e-cigarette marketing activities on consumer behavior.

Manufacturing and Price

As discussed in Chapter 1, although the concept of e-cigarettes was initially introduced in the 1960s, the first-generation version of e-cigarettes was not developed and commercialized until the mid-2000s (Grana and Ling 2014). In the short period since the first appearance of e-cigarettes, the exponential growth in awareness and use of these products (Centers for Disease Control and Prevention [CDC] 2015), the rapid product development (Zhu et al. 2014), and the rapid evolution of both the e-cigarette market and the industry itself (Huang and Chaloupka in press) have been unprecedented. E-cigarettes were recently named a “disruptive innovation” that may change the existing tobacco market and displace conventional (combustible) cigarettes in a foreseeable timeframe (Spielman and Azer 2013).

Consumer demand for a less harmful alternative to conventional cigarettes and the implementation of macro policies, such as those that restrict cigarette use or mandate clean indoor air, may influence the use of e-cigarettes (Pepper et al. 2014b; Rose et al. 2014). However, e-cigarette companies may play a critical role in shaping the market, affecting everything from the development and innovation of new products and brands to the manufacture, distribution, marketing, promotion, and pricing of the product—activities that parallel those in the cigarette industry.

This section describes and summarizes both the rapidly changing e-cigarette market and the activities of e-cigarette companies in the United States, providing a broad overview of the major players. These participants include the major tobacco companies and other manufacturers. The chapter also addresses how the companies influence the e-cigarette market in the United States, focusing on the impact of product development and innovation, distribution channels, product availability, and pricing strategies, as well as the role of e-cigarette trade organizations and partnerships.

Overview of the E-Cigarette Market in the United States

For 2014, the value of the e-cigarette market in the United States was estimated at \$2.5 billion: 40% (\$1.0 billion) was for cigarette-like e-cigarettes (cigalikes), and 60% (\$1.5 billion) was for tank-style e-cigarettes, mods, and other types of “vaporizers” (Wells Fargo Securities 2015a) (Table 4.1). The market was projected to grow to \$3.5 billion, a rise of 40%, in 2015 (Rose et al. 2014) (Table 4.2). Total sales of e-cigarettes in convenience, food, drug, and big-box stores (such as Walmart), which are tracked by commercial market research companies (such as Nielsen), were estimated to be \$900 million in 2014. There was an additional estimated \$500 million in online sales, and \$1.1 billion in sales in “vape shops” and other channels, which are not currently tracked by commercial market research companies (Table 4.1) (Wells Fargo Securities 2015b).

Distribution and Purchase Channels

E-cigarettes entered the U.S. market around 2006–2007, and since that time the distribution and purchase channels for these products have evolved greatly. Initially they were sold exclusively by Internet retailers, but then selling activity expanded to shopping mall kiosks and conventional retail outlets and, more recently, to “vape shops” and some pharmacies (Rose et al. 2014; Lee and Kim 2015).

Some companies operating in the U.S. market have their own manufacturing facilities in this country, but companies generally import parts or even complete products from abroad, almost exclusively from China (Barboza 2014). Manufacturers and importers distribute their products via a wide number of channels, such as the companies’

Table 4.1 Estimated e-cigarette market size in 2014 (\$ billion)

	Convenience, food, drug, and big-box stores	Online	Other channels (“vape shops” and other untracked retail channels)	Total
E-cigarettes	0.6	0.2	0.2	1.0
Vapors/tanks/mods	0.3	0.3	0.9	1.5
Total	0.9	0.5	1.1	2.5

Source: Wells Fargo Securities (2015a).

Table 4.2 Estimated e-cigarette market size in 2015 (\$ billion)

	Convenience, food, drug, and big-box stores	Online	Other channels (“vape shops” and other untracked retail channels)	Total
E-cigarettes	0.7	0.4	0.4	1.5
Vapors/tanks/mods	0.4	0.4	1.2	2.0
Total	1.1	0.8	1.6	3.5

Source: Wells Fargo Securities (2015a).

own e-commerce websites and/or retail outlets. In 2010, the most popular channels for selling e-cigarettes and their accessories directly to consumers were websites and third parties, such as retail outlets (Linarch Information Solutions 2012). Many e-cigarette manufacturers and importers, including the big-brand companies and those supplying products to “vape shops,” rely on distributors and retailers to deliver the products to the consumer (Linarch Information Solutions 2012).

The emergence of e-cigarette devices and products resulted from the endeavors of a few entrepreneurs and widespread Internet and television advertising (Grana et al. 2013; Rose et al. 2014). It is noteworthy that the product class took hold when e-commerce was rapidly expanding in the United States, and major social media platforms—such as Facebook (founded in 2004), YouTube (2005), and Twitter (2006)—were emerging. In such an environment, information about a new product like e-cigarettes could be rapidly disseminated across geographic boundaries, and new products and technologies could be speedily adopted. This process is partly reflected by the Google search volume of queries related to e-cigarettes; the volume of queries surpassed those for nicotine replacement therapy products and snus by 2008 (Ayers et al. 2011).

Manufacturers noticed the fast rise in consumer interest in e-cigarettes, so they quickly pushed to expand the sale of their products to brick-and-mortar retail stores. Sales of cigalikes and related products were first observed in Nielsen’s store-scanner database in 2007, and between 2009 and 2012, retail sales of e-cigarettes expanded to all major markets in the United States (Huang and Chaloupka

in press). This growth coincided with a surge in marketing expenditures by the e-cigarette companies across all media platforms (Kim et al. 2014; Kornfield et al. 2015). The products sold in these conventional channels were predominantly disposable and rechargeable cigalikes (Giovenco et al. 2015; Huang and Chaloupka in press), but retail stores started to carry tank-style e-cigarette devices as well (CSP Daily News 2014; Giovenco et al. 2015).

Today, e-cigarette brands, such as MarkTen (manufactured by Altria) and VUSE (manufactured by Reynolds American Inc.), are available in more than 70,000 retail stores across the country, and their availability is expanding rapidly (Wells Fargo Securities 2014b). E-cigarettes were more likely to be available in retail locations in neighborhoods with a higher median household income and a lower percentage of African American and Hispanic residents; these sales patterns are consistent with patterns of use of these products observed among youth, young adults, and adults more generally (see Chapter 2). Notably, the price of conventional cigarettes and the existence of comprehensive smokefree laws were inversely associated with the availability of e-cigarettes (Rose et al. 2014).

Through growth in their sales, tank-style e-cigarettes (also known as mods) and advanced personal vaporizers (APVs) have begun to play an increasingly important role in the e-cigarette market (Wells Fargo Securities 2015a). “Vape shops,” which provide a range of e-cigarette devices and products, have emerged as the primary retail channel for consumers seeking such products (Lee and Kim 2015). Unlike conventional retail outlets, “vape shops” sell a wide range of more complex and powerful tank-style e-cigarettes

and many different types of liquids for e-cigarette devices (e-liquids or e-juices) (Sussman et al. 2016).

The rise of “vape shops” can be attributed to a number of factors. First, in the past, most of these establishments offered a wide range of e-cigarettes and e-liquids, allowed users to sample different types of flavored e-liquids at no cost, and permitted the trial use of various types of e-cigarettes. Most of these establishments sell products made by independent companies, as opposed to products manufactured by the major conventional tobacco companies (Kamerow 2014; Sussman et al. 2016). As a result, “vape shops” can serve as an information hub where consumers can easily obtain knowledge about (and gain experience with) a wide range of e-cigarettes and related products (Sussman et al. 2016). However, the information provided may be misleading or misinterpreted (Cheney et al. 2016). Second, unlike traditional retail outlets, “vape shops” are usually equipped to provide consumers with individualized information about how e-cigarette products can be used to best satisfy the user’s preferences; this capability may be important as e-cigarette products become more diversified and sophisticated. Because of the diversity of these products, some of these establishments provided free samples of different flavored e-liquids and allowed trial use of different e-cigarettes before actual purchase in an attempt to compete with traditional retail outlets. Under the deeming rule published in May 2016, free samples of e-liquids containing nicotine were banned (*Federal Register* 2016). Third, “vape shops” serve as a place for e-cigarette users to socialize.

Some “vape shops” also host various events, including competitions (also known as cloud chasing), that build loyal customer bases by creating a sense of community and camaraderie among customers (Sussman et al. 2014; Cheney et al. 2015; Lee and Kim 2015). Additionally, a 2015 study of “vape shop” owners found that customers view the owners as important sources of health information, which could include information related to cessation (Cheney et al. 2016). However, the owners reported (a) obtaining their information from YouTube or industry sources but finding the research hard to understand and (b) looking for government sources but not finding them.

Estimates of the number of “vape shops” in the United States have varied greatly due to the lack of a clear definition of what constitutes such an establishment. The low end of these estimates puts the number around 3,500 (Klein 2013; Lee and Kim 2015), while intermediate estimates indicate that there are about 6,000–15,000 “vape shops” in this country (Bour 2015; Wells Fargo Securities 2015b). One high estimate is that in 2014 there were as many as 35,000 such shops in the United States (Kamerow 2014).

Product Evolution

E-cigarette products have evolved and diversified rapidly since they entered the U.S. market (see Chapter 1). Detailed information about different types of e-cigarette products has been presented elsewhere (Grana et al. 2014). Over time, with consolidation of e-cigarette companies and technological improvements, the manufacturing process has become more standardized, enabling the production of e-cigarette products with a more effective and more consistent dose and delivery of nicotine and flavorings, and a more consistent generation of aerosol (Goniewicz et al. 2013a,b; Farsalinos and Polosa 2014; Saitta et al. 2014).

Many e-cigarette manufacturers make multiple types of e-cigarette products. For example, the NJOY brand has not only disposable and rechargeable cigalikes but also tank-style e-cigarette devices, which are larger than cigalikes and include options for refills and batteries. In addition, NJOY sells a variety of flavored e-liquids, although in California, flavors appealing to minors (e.g., strawberry and cookies and cream) are prohibited (*State of California v. Sottera, Inc.* 2010). Within each product type, there are many different brands, albeit the brands are often very similar. For example, NJOY, blu, Logic, Mystic, and many other brands of rechargeable e-cigarettes differ very little from each other with regard to the flavors and types of products offered (e.g., cigalike, tank style) (Zhu et al. 2014). A study examining the growth of brands and flavors between 2012 and 2014 found that older brands were more likely to involve cigalikes, while newer brands were more likely to offer tank-style devices and mods (Zhu et al. 2014).

As tank systems and mods become more popular, the distinction between a closed system and an open system becomes more important. In a closed system, components cannot be customized. In this case, the e-liquid is “locked in”; the amounts of e-liquid, level of nicotine, and flavors are dictated by the manufacturer. Because users cannot mix their own e-liquids or refill the cartridges or tanks, there is less risk of spillage, nicotine overdose, and accidental ingestion. In addition, users cannot change the power source, adjust the voltage, or customize the atomizers. Many brands offer only closed-system devices (e.g., Vype, Vapestick, and FIN). Most cigalikes are closed systems, sold primarily online or in conventional retail outlets, and are favored by the larger e-cigarette companies, likely because of the high profit margins from the e-liquid refill cartridges and the nature of the distribution paths.

Open systems, in contrast, allow for personalization and customization: Users can mix their own e-liquid, choosing different e-liquid bases, flavors, and nicotine concentration levels. Users can also adjust the voltage, customize the atomizers, and/or modify the aesthetics and

shapes/sizes of their devices (Popken 2014; Richtel 2014c; Lee and Kim 2015). Tanks and mods/APVs are open systems sold primarily in “vape shops” or online. While research has demonstrated that more-experienced e-cigarette users prefer open system mods (Farsalinos et al. 2014), one analyst has suggested that closed systems may better facilitate consistent and enforceable product and manufacturing standards (Wells Fargo Securities 2014a).

Beyond the increased variety over time of products, their components, and related products (including accessories such as carriers, lanyards, stickers, and sleeves), the products continue to appeal to consumers through the incorporation of increasingly complex technologies—including location tracking; Bluetooth connectivity; social networking functions and integration with users’ social media accounts; and entertainment functions, such as playing music and videos (Bauld et al. 2014; Brown and Cheng 2014; Honig 2014).

The terminology for e-cigarettes has also expanded. Terms such as e-cigars, e-hookahs, vaping pens, hookah pens, and personal vaporizers are used interchangeably (or preferentially) by some users (Richtel 2014b). In addition, the spectrum of use has broadened, as some e-cigarettes that involve open systems are also used for the aerosolization of marijuana and cannabis oil (Bryan 2014; Morean et al. 2015) and could be adapted for other illicit substances (see Chapter 2).

Worldwide, more than 95% of e-cigarettes sold are thought to have been manufactured in China (Jourdan 2014), most in one city—Shenzhen (Barboza 2014). A few large manufacturers (e.g., Joyetech, Kimree, and First Union) dominate the market (see Appendix 4.1 for descriptions of the major e-cigarette manufacturers).¹ Most of these manufacturers provide supplies to many different e-cigarette companies, including American companies marketing conventional cigarettes, as well as independent e-cigarette companies. Some companies (e.g., Gamucci) have an exclusive manufacturer in Shenzhen.

Some e-cigarette companies have begun to locate their manufacturing base in the United States. Reynolds American, for example, has a factory in Tobaccoville, North Carolina, to manufacture its VUSE brand and strongly emphasizes this location as part of its marketing strategy (CSP Daily News 2015). White Cloud, another U.S.-based company, moved its cartridge-filling production from China to Tarpon Springs, Florida, in May 2014 (McConnell 2014), and the U.S.-based brand Mistic has announced plans to move its manufacturing from China to Greenville, North Carolina (Bettis 2014).

Evolution of Market Share in the E-Cigarette Market

Although the e-cigarette market in the United States has changed significantly since its emergence, these changes have not been studied extensively. This section documents market share by brand for e-cigarette sales in retail outlets tracked by Nielsen, using data from the forthcoming study by Huang and Chaloupka (in press) and supplemented with data from industry reports issued by a number of investment banks. These data, available in Appendix 4.5, clearly show the dynamic changes in the e-cigarette market, and these changes are important to understand in terms of access to and marketing of these products to youth and young adults.

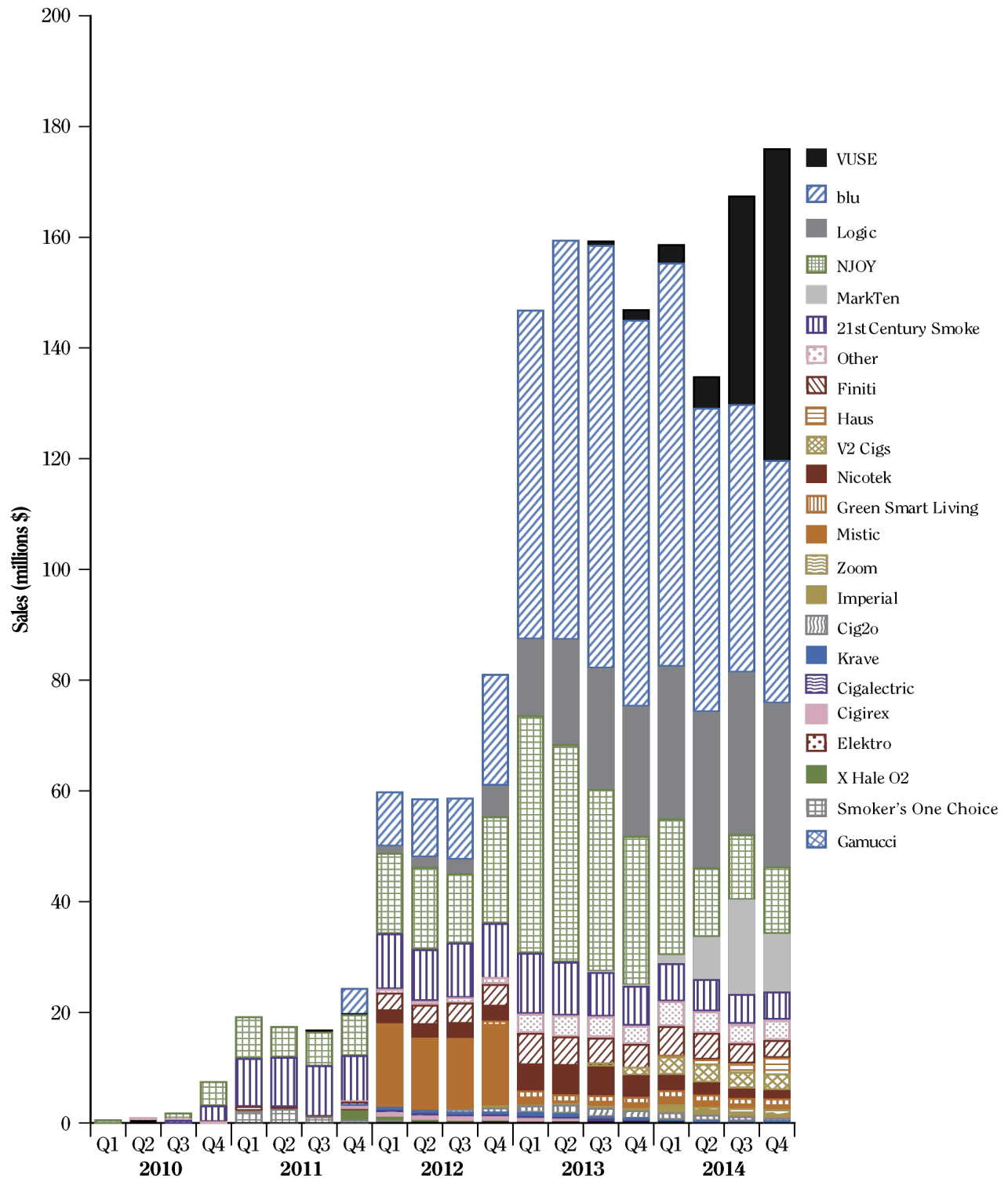
E-Cigarette Sales in Tracked Retail Outlets

Total sales of e-cigarettes in tracked retail channels have surged exponentially since 2010, increasing from only a few million dollars per quarter in 2010 to more than \$170 million in the last quarter of 2014 (Figure 4.1). Although Reynolds American’s VUSE brand did not enter the market until late 2013, its sales climbed rapidly in 2014 because of heavy promotion and price discounts. At the end of 2014, VUSE had become the market leader with the highest quarterly sales at \$56 million. Blu (owned by Lorillard and thus now by Imperial Tobacco) was the market leader for most of 2013 and 2014, with an average \$60 million in quarterly sales. During this time the number of its distribution points rose from 60,000 to more than 150,000 because of its acquisition by Lorillard and subsequent marketing and promotion efforts.

After doubling every year between 2010 and 2013 (Figure 4.2) in the tracked retail channels, rates of increase in the sales of e-cigarettes decelerated significantly, with total sales actually declining in the second quarter of 2014. The deceleration may reflect, in part, the shift away from cigalikes to tank-style devices, mods, and other e-cigarette products among users; the sales of these devices are not tracked as well, which makes it difficult to know the true trends in sales (see Tables 4.1 and 4.2).

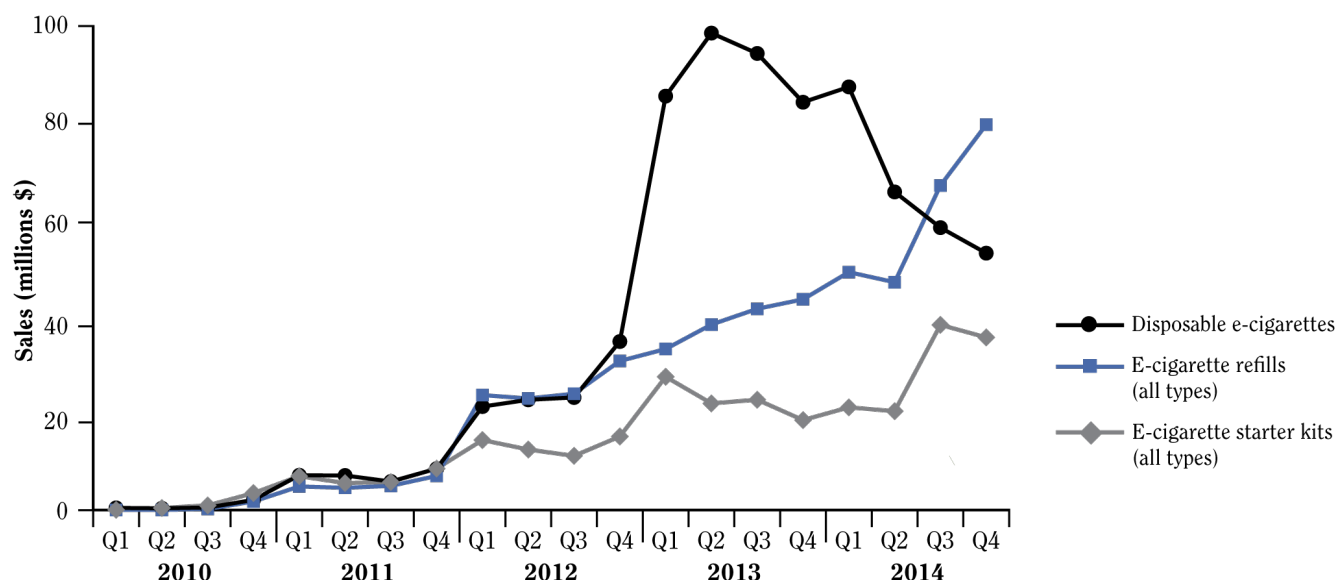
Figure 4.2 presents sales data by product type. Sales of disposable e-cigarettes trended upward from 2010 to 2013, increasing from a minimal amount in 2010 to almost \$100 million in the second quarter of 2013, but 2014 showed a substantial decline, with the value only about \$50 million for the final quarter of that year. The figure shows a clear pattern of seasonality in sales for disposables: sales usually rose in the first quarter of the

¹All appendixes and appendix tables that are cross-referenced in this chapter are available only online at <http://www.surgeongeneral.gov/library/reports/>.

Figure 4.1 E-cigarette sales in tracked channels by brand, 2010–2014

Source: Huang and Chaloupka (in press).

Note: Data points for this figure are shown in Table A4.4-1 in Appendix 4.4.

Figure 4.2 E-cigarette sales in tracked channels by product type, 2010–2014

Source: Huang and Chaloupka (in press).

year—potentially reflecting the effect of New Year’s resolutions among smokers who seek to use rechargeable e-cigarettes as a way to quit conventional cigarettes—but had subsequently declined during the rest of the year. Sales of e-liquid refills increased steadily over the 4-year period between 2010 and 2014 and reached \$80 million in the final quarter of 2014, representing approximately half of the total e-cigarette sales in the tracked retail channels.

In 2014, more than 85% of e-cigarette sales occurred in the tracked retail and online channels, including certain convenience stores and food, drug, and big-box stores (Wells Fargo Securities 2015a; see Table 4.1). It was estimated that 20% of *all* e-cigarette sales (including e-cigarettes and tanks/mods) in 2014 occurred online, while 44% of *all* e-cigarette sales occurred in “vape shops” and other untracked retail channels (Wells Fargo Securities 2015a; see Table 4.1).

Another important trend in e-cigarette sales is the growth of flavored products. Although some brands, such as NJOY, initially did not sell flavored e-cigarette products, most companies now offer some form of flavored varieties. Giovenco and colleagues (2015) found that sales of menthol-flavored e-cigarettes in traditional U.S. retail channels (e.g., convenience stores, grocery stores, pharmacies, and mass merchandisers) more than doubled between 2012 and 2013, increasing from \$96.4 million in 2012 to \$215.7 million in 2013. Sales of fruit-flavored e-cigarettes more than tripled during the same period, from \$4.9 million to \$16.7 million.

Sales of different types and brands of e-cigarettes likely differ by demographic group. For example, anecdotal evidence suggests that youth and young adults prefer pen-style devices, those that come in various shapes and styles, and devices that may be used interchangeably with e-hookahs (Richtel 2014b). Research also suggests that users may eventually graduate to more complex systems; more specifically, experienced users may be more likely to use tanks and mods (Farsalinos et al. 2014). Unfortunately, sales data by demographics are very limited, and studies have not yet examined how sales of e-cigarette products differ by demographic classification.

Production of E-Liquids

E-liquids used in closed-system devices usually are produced in the United States and then shipped to China to be included in the assembly process. For example, MarkTen, blu, and NJOY manufacture their own e-liquids in the United States, which then are sent to China before the final product is assembled there.

In the United States, one of the biggest players in the premixed e-liquid market for refillable e-cigarettes is Johnson Creek Vapor Company (2011), which claims to be the world’s leading manufacturer of e-liquid and the first company to produce and manufacture e-liquid in the United States. Johnson Creek has not disclosed the suppliers of its nicotine solution.

Impact of E-Cigarette Price on Sales and Use of These Products

This section summarizes the limited evidence on the impact of e-cigarette prices on the sales and consumption of these products. The sizable body of research examining the effects of taxes and prices on the sale and use of conventional cigarettes (Chaloupka and Tauras 2011; International Agency for Research on Cancer 2011) leads to the conclusion that price increases resulting from higher excise taxes are effective tools for reducing cigarette consumption, especially among youth.

Trends in E-Cigarette Prices over Time

A study by Huang and Chaloupka (in press) documented and analyzed the relationship between real price and sales volume for both disposable and rechargeable e-cigarettes by using Nielsen data, which reflected the e-cigarette (predominantly cigalikes) sales and prices in retail stores tracked by Nielsen.

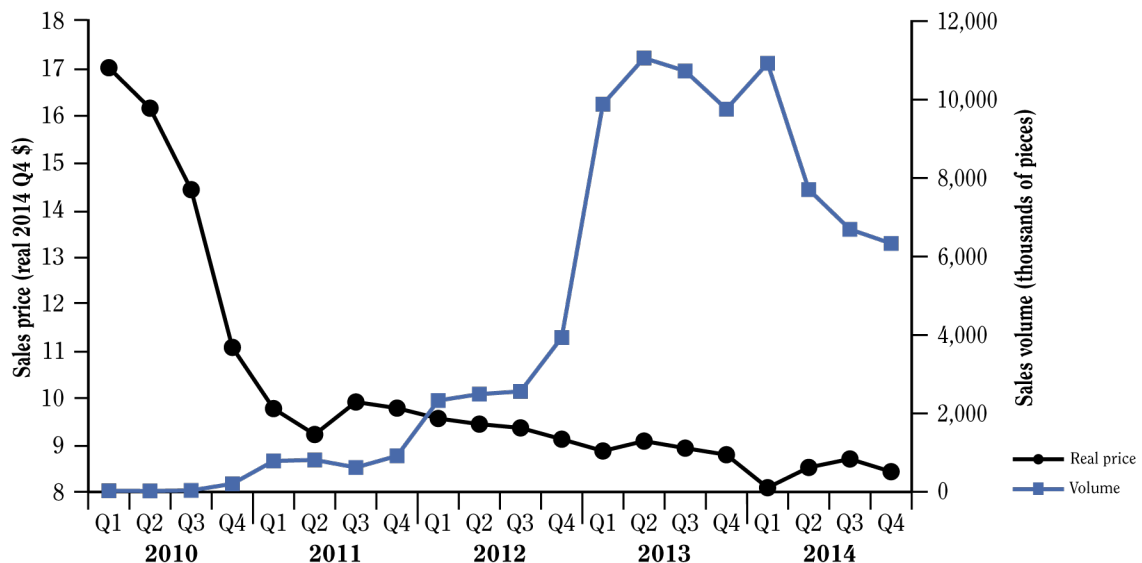
Figure 4.3 presents U.S. data on real price (determined by adjusting the prices to the value of the U.S. dollar in the fourth quarter of 2014) and sales volume for disposable e-cigarettes between 2010 and 2014 based on data from Huang and Chaloupka (in press). The average price for a single disposable e-cigarette declined from approximately \$17 in the first quarter of 2010 to less than \$9 in 2014. In terms of volume, the estimate for disposables increased

from far below 100,000 in the first quarter of 2010 to almost 11 million in the first quarter of 2014, before dropping to about 6.3 million in the final quarter of 2014. This graph reveals an association between real price and the sales volume for disposable e-cigarettes from 2010 to the second quarter of 2013: As real price declined over time, sales volume increased. Looking back, the rapid decline in the price of disposable e-cigarettes between 2007 and 2011 (Huang and Chaloupka in press) may have occurred because of improvements in product technology and industry promotion, which significantly cut the costs of producing such products (Bhatnagar et al. 2014; Wells Fargo Securities 2015c). The rather modest declines in prices since 2011 may reflect the fact that further technological improvements became less feasible (Wells Fargo Securities 2015c).

In terms of volume, the substantial decrease in 2014 may be partly attributable to consumers shifting away from cigalikes to tanks, mods, and other more powerful devices, for which sales were not tracked well.

An inverse relationship is also evident between real price and sales volume for rechargeable e-cigarettes. Figure 4.4 demonstrates that when the real price went down, the sales volume increased, particularly after 2012. Between 2010 and 2014, the average unit price for rechargeables decreased markedly, dropping from \$37 in the first quarter of 2010 to \$12 at the end of 2014. However, there were more price fluctuations than were found for disposable e-cigarettes (Figure 4.3). The price fluctuations for rechargeables were likely because of the

Figure 4.3 Sales volume and price of disposable e-cigarettes, U.S. market, 2010–2014



Source: Huang and Chaloupka (in press).

change in product mix and the influx of various new types and brands of these devices during this period (Bhatnagar et al. 2014; Wells Fargo Securities 2015c). Sales volume increased dramatically between 2010 and 2014, rising from a minimal amount at the beginning of 2010 to about 3 million units in the last quarter of 2014.

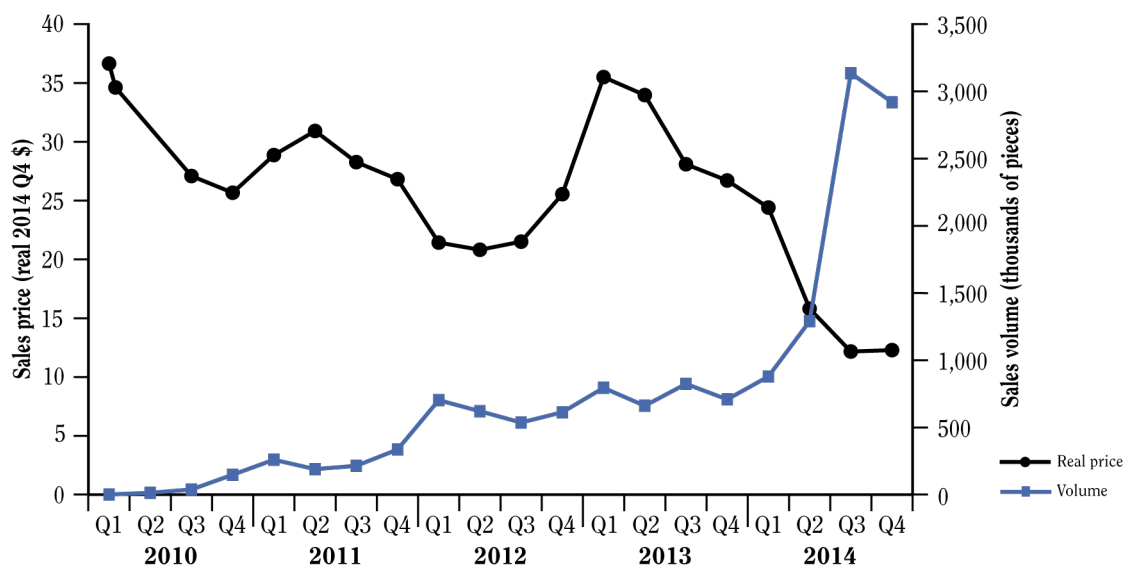
Impact of E-Cigarette Prices on E-Cigarette Sales

In one of the first studies to explore the effects of e-cigarette prices on the sales of these products, Huang and colleagues (2014b) estimated, from Nielsen data, both the own-price elasticity and the cross-price elasticity of demand for e-cigarettes (disposable or rechargeable) and studied the impact of conventional cigarette prices and smokefree policies on e-cigarette sales. Own-price elasticity is a measure showing how much demand for a product will change given a change in its price, while cross-price elasticity is a measure showing how much demand for a product will change given a change in another product's price. Using data from Nielsen's commercial retail store scanning service, this study employed fixed-effects models to estimate elasticity of demand and associations between e-cigarette sales and either the prices of conventional cigarettes or smokefree policies from 2009 to 2012. Results demonstrated (a) that e-cigarette sales were quite responsive to own-price changes (estimated own-price elasticities for disposable e-cigarettes centered around -1.2 [a 10% increase in price would decrease sales by 12%], while those for rechargeable e-cigarettes

were approximately -1.9 [a 10% increase in price would decrease sales by 19%]) and (b) that disposable e-cigarettes appeared to be emerging as substitutes for rechargeables (a 10% increase in rechargeable e-cigarette prices increased sales of disposable e-cigarettes by about 5%). This study concluded that policies increasing the retail prices of e-cigarettes—such as imposing taxes or limiting rebates, coupons, and discounts—could potentially lead to significant reductions in e-cigarette sales and that variations in tax policy by product type could lead to substitution between product categories. It is important to note that “vape shops” were not included in these data, as Nielsen collects data only from convenience, food, drug, and big-box stores.

Although these results provide evidence that changing the price of e-cigarettes affects the number sold, the potential effects of the price of conventional cigarettes on the purchase of e-cigarettes are less clear. Huang and colleagues (2014b) found no consistent or statistically significant relationship between the price of conventional cigarettes and the sale of e-cigarettes. In contrast, Grace and colleagues (2015), who measured the cross-price elasticity of e-cigarettes and conventional cigarettes using simulated demand for the latter in a sample of New Zealand smokers, found that the cross-price elasticity of e-cigarettes was significantly positive, suggesting that e-cigarettes may be partially substitutable for conventional cigarettes. Thus, the use of e-cigarettes may increase as the price of conventional cigarettes increases.

Figure 4.4 Sales volume and price of rechargeable e-cigarettes, U.S. market, 2010–2014



Source: Huang and Chaloupka (in press).

Other evidence suggests that the potential impact of price changes on the use of e-cigarettes may differ by demographic characteristics. Relationships between the smoking of conventional cigarettes and socioeconomic status (SES) are well documented in the literature, and additional evidence has demonstrated that youth and young adults, and those with low SES, tend to exhibit higher sensitivity to changes in the price of conventional cigarettes (International Agency for Research on Cancer

2011; U.S. Department of Health and Human Services [USDHHS] 2012). Therefore, youth and young adults, as well as low-SES persons, may be more price-sensitive in the purchase of e-cigarette products, and thus they may be more likely to stop using e-cigarettes as their price increases. These potential connections between the price of e-cigarettes and their use should be examined carefully as more data become available.

Marketing and Promotion of E-Cigarettes

Marketing is an important tool for industries to use in influencing consumer preferences, and the potential for marketing to influence smoking behaviors has been a source of public health concern for many years (DiFranza et al. 1991; USDHHS 2000, 2012; National Cancer Institute [NCI] 2008). Research has demonstrated a causal relationship between tobacco marketing and smoking, with the majority of research focusing on the impact of tobacco marketing on the initiation of smoking by youth (Biener and Siegel 2000; USDHHS 2012). For adolescents, studies have found cross-sectional and longitudinal associations between the intensity of cigarette marketing and initiation of smoking, brand awareness, brand preferences, attitudes toward smoking, susceptibility to smoking, and smoking behaviors (O'Connell et al. 1981; Chapman and Fitzgerald 1982; McNeill et al. 1985; Charlton 1986; Potts et al. 1986; Aitken et al. 1987; Goldstein et al. 1987; Aitken and Eadie 1990; Botvin et al. 1991; DiFranza et al. 1991; Klitzner et al. 1991; Pierce et al. 1991; Botvin et al. 1993; Hastings et al. 1994; Pierce et al. 1994; Coeytaux et al. 1995; Evans et al. 1995; Pierce and Gilpin 1995; Richards et al. 1995; Slade et al. 1995; Unger et al. 1995; Pollay et al. 1996; Schooler et al. 1996; Gilpin and Pierce 1997; Lam et al. 1998; Feighery et al. 2006). A review of these and other studies led the 2012 Surgeon General's report to conclude that exposure to advertising causes the initiation of smoking (USDHHS 2012).

In general, product marketing is designed to inform people about the products being offered (and thus develop brand "awareness") and to persuade people to buy particular brands (i.e., develop brand "preference"). Branding is particularly important for products considered to be "commodities," such as conventional cigarettes and e-cigarettes, where the offerings are similar and branding differentiates the products (Rossiter and Bellman 2005; NCI 2008). Marketing is particularly critical for e-cigarettes, as new products must be introduced to potential users (Sethuraman et al. 2011).

Like marketers of conventional cigarettes, marketers of e-cigarettes use a number of channels and tactics

to advertise and promote their products. These channels have included extensive marketing on the Internet and advertising in mainstream media, including popular magazines, retailer point-of-sale ads, product placement on popular media, and even television commercials—an advertising option unavailable to cigarette manufacturers because of regulatory policies (Legacy for Health 2014; Ganz et al. 2015). E-cigarette brands also use websites to interact directly with their customers through direct-to-consumer marketing (e.g., direct mail and direct e-mail) and social media channels, such as Facebook, Twitter, and Instagram (Huang et al. 2014a; Richardson et al. 2014; Ganz et al. 2015).

Marketing Expenditures

E-cigarette manufacturers currently are not required to report marketing expenditures to any regulatory agency (Boxer et al. 2013; *Federal Register* 2015). Using proprietary data from Kantar Media, however, Kornfield and colleagues (2015) tracked marketing expenditures (television, print, radio, and Internet) back to 2008 for approximately 130 e-cigarette brands (note that many e-cigarette products are not branded, and thus these data are not complete). Kornfield and colleagues (2015) found minimal spending through 2010, followed by an acceleration in spending from \$12 million in 2011 to \$125 million in 2014 (Figure 4.5). Not shown in the figure is that in 2012, more than 60% of advertising expenditures were for blu (then owned by Lorillard, now Imperial Tobacco), which was the market leader (Kornfield et al. 2015). The trajectory for spending was consistent with the pattern for product sales, particularly for the most dominant brands (Figures 4.1 and 4.5).

Annual marketing expenditures for conventional cigarettes (\$9.2 billion in 2012) dwarf the \$125 million in 2014 for e-cigarettes (Federal Trade Commission 2015a,b;

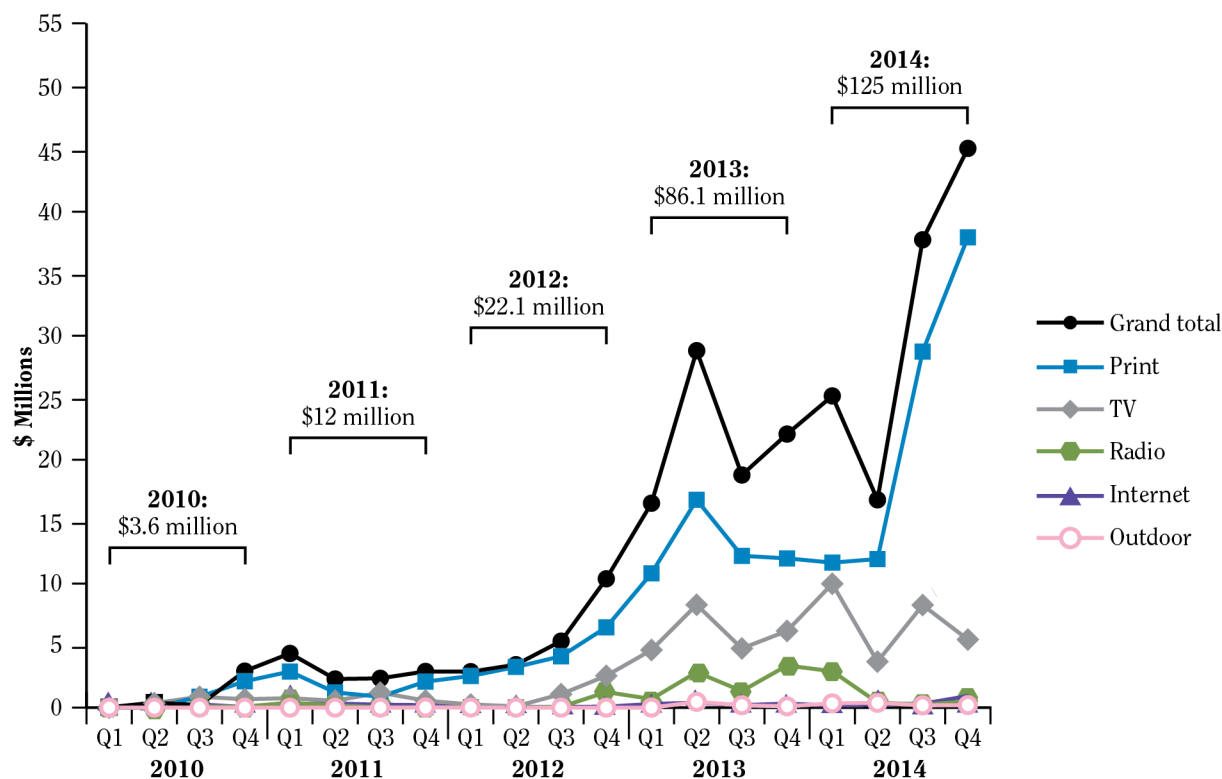
Kornfield et al. 2015). However, the available data about e-cigarette marketing also underestimate total marketing expenditures. Not included are expenditures for retail marketing, social media, and sponsored events, all of which are essential components of the industry's integrated marketing strategy. In the absence of regulation, television advertising for e-cigarettes will continue, as the two largest tobacco companies moved promotions of MarkTen (Altria) and VUSE (Reynolds American) from test markets to national distribution in 2014 (Kornfield et al. 2015; Truth Initiative 2015; Cantrell et al. 2016).

Tobacco marketing and surveillance systems—including the Trinkets & Trash archive maintained by the Rutgers University School of Public Health and the Stanford Research into the Impact of Tobacco Advertising (SRITA) research group—collect examples of e-cigarette advertising and promotions and make these available to users through image-rich websites (see Trinkets & Trash [<http://www.trinketsandtrash.org>] and Stanford Research into the Impact of Tobacco Advertising [http://tobacco.stanford.edu/tobacco_main/index.php]).

Magazine and Print Advertising

Print has been the dominant channel for tracked expenditures of traditional e-cigarette advertising, representing 84% of annual expenditures in 2014 (Kornfield et al. 2015; Figure 4.5). A study by Richardson and colleagues (2014) collected U.S. advertisements for all noncombustible tobacco products (i.e., e-cigarettes, snus, dissolvables, and chew/dip/snuff) for a 3-month period in 2012 through Mintel, which tracks direct mail and opt-in e-mail ads, and Competitrack, which monitors 21 other media sources. Metadata for identified ads showed advertising for e-cigarettes in print, television, radio, online, direct mail, and e-mail. The three most common media were print, television, and e-mail, and spending was highest for print ads (Richardson et al. 2014). An analysis of industry marketing data by the American Legacy Foundation (now called Truth Initiative) reported that 47% of U.S. teens (12–17 years of age) and 82% of young adults (18–21 years of age) were exposed to magazine advertising for e-cigarettes in 2014; popular venues

Figure 4.5 Quarterly promotional spending for e-cigarettes, 2010–2014



Source: Data for 2010–2013 (Q2) from Kornfield and colleagues (2015, p. 110) and adapted with permission from BMJ Publishing Group Limited. Data for 2013 (Q3)–2014 from Kantar Media (unpublished data).

included tabloids, entertainment weeklies, and men's lifestyle magazines (Truth Initiative 2015).

Research indicates that e-cigarette advertising in magazines with high teen readership is on the rise (U.S. Congress 2014). From 2012 to 2013, the number of e-cigarette advertisements in magazines with high youth readership was four times the number in magazines with high adult readership (U.S. Congress 2014). Recent studies using data from Kantar Media and GfK MRI (the latter measures media audiences and consumer insights; see <http://www.mri.gfk.com>) on e-cigarette advertisements show that blu led all e-cigarette brands in magazine advertising and that respondents had the highest recall of blu advertisements (Legacy for Health 2014).

A content analysis by Banerjee and colleagues (2015) of print magazine tobacco ads for 2012–2013, using data collected from Kantar Media, identified 171 e-cigarette ads over this period, 27 of which were unique. Ads were found in 24 magazines, 11 of which had been identified in prior studies as having youth and young adult readerships greater than 2 million per year or for which the teen portion of the audience was more than 10%. By number, ads for e-cigarettes were second only to those for conventional cigarettes and higher than the numbers for moist snuff, cigars, and snus. Eighty-five percent of the content in e-cigarette ads focused more on a theme of logos (i.e., logic or facts to support a position) than on a theme of emotional appeal.

In examining persuasive themes, the study found that ads used several approaches, including highlighting the conventional advantages of the product—such as a focus on customer satisfaction—and emphasizing the quality of the product or price (85.2%) (Banerjee et al. 2015). The ads also used the comparative approach, such as portraying the product as being different from other products, being smokefree, or being exempt from use in areas where conventional cigarettes are prohibited. Figure 4.6 shows examples of the claims in e-cigarette marketing. In terms of images, 100% of the ads included the brand name and an image of the product. In addition, ads were most frequently full-page advertisements (89.9%), usually placed the product in a way that drew attention to it (92.6%), and most often used six or more colors (85.2%), which the authors noted increases the attention-grabbing ability of the ads (Banerjee et al. 2015).

A different content analysis of magazine ads for e-cigarettes, this one for a 3-month period in 2012 (Richardson et al. 2014), found health-related themes and non-health-related attributes—such as romantic, sexual, or sociability content, with the highlighting of taste as the most frequent selling proposition (see Figure 4.6, parts B–D for examples). All ads in this analysis were found to contain links to a product's website. When examined by readership, e-cigarette ads were found to have run in

magazines with mostly White-male readers and, to a lesser extent, magazines targeting White women. The analysis noted that ads were targeted to a magazine's readership, with different ads shown in the White, male-oriented *Rolling Stone* publication as compared with the female-dominated *Us Weekly*.

Television Advertising to Youth and Young Adults

The increasing frequency and reach of advertising on television raises concerns about the potential impact of promoting nicotine products and renormalizing smoking through that medium, particularly for youth (Hodge Jr 2013; Duke et al. 2014; Grana and Ling 2014). At least 40 unique advertisements for e-cigarettes appeared on U.S. television in 2013 and early 2014 (Farrelly et al. 2015). For example, e-cigarette ads were featured in the Super Bowl broadcast, which reached an estimated audience of more than 100 million persons in 2012 (Deans 2012). The Truth Initiative (formerly the American Legacy Foundation) found that in 2014, television advertising reached similar proportions of youth (62% of 12- to 17-year-olds) and young adults (64% of 18- to 24-year-olds) (Truth Initiative 2015). Using proprietary data from Nielsen, Duke and colleagues (2014) estimated that 50% of U.S. youth were exposed to e-cigarette ads on television in 2013 and that 80% of this advertising was for blu (Lorillard, now Reynolds American). On average, those exposed saw 21 ads between October 2012 and September 2013. Between 2011 and 2013, exposure to e-cigarette advertising on television increased dramatically, by 321% for young adults (18–24 years of age) and 256% for adolescents (12–17 years of age) (Duke et al. 2014).

The same study (Duke et al. 2014) found that more than 75% of the exposure of youth to e-cigarette ads occurred on cable networks. The study found television ads for several different brands—including blu, FIN, Starfire, and NJOY—during a 9-month period in 2013. The most widely aired ad was for blu, featuring a celebrity and closing with the tagline “we’re all adults here. It’s time to take back your freedom” (Duke et al. 2014, p. 6).

Sponsorships

After the Master Settlement Agreement in 1998, sponsorship of events with a significant youth audience, such as concerts and athletic events, was banned for conventional cigarettes. However, e-cigarettes do not fall under these parameters, and recalling the early marketing of conventional cigarettes, e-cigarette brands have used sponsorships to increase the awareness and appeal of their label and product. For example, in 2011 blu sponsored a NASCAR driver and had its own car in some races (PRNewswire 2011). Additionally, blu has handed out free

Figure 4.6 E-cigarette marketing claims

A. Freedom



Source: Esquire (2014).

B. Health



Source: Stanford Research into the Impact of Tobacco Advertising (n.d.b.).

C. Romance, sexuality, or sociability



Source: (Left) Maxim (2012), (middle) Men's Journal (2014), and (right) Sports Illustrated (2014).

Figure 4.6 Continued

D. Taste

[illegible]

Source: Soap Opera Digest (2013).

E. Smoking cessation

RESOLUTION SOLUTION.

INTRODUCING THE NJOY KING ELECTRONIC CIGARETTE.
IN 2013, SMOKERS FINALLY HAVE A REAL ALTERNATIVE.

It's the first electronic cigarette with the look and feel of the real thing, and authentic flavor developed in the USA by our Master Flavorist. So this New Year, you can get rid of the smoke and keep the flavor. You've got NJOY on your side.

CIGARETTES. YOU'VE MET YOUR MATCH.

AVAILABLE AT CONVENIENCE STORES NATIONWIDE.

njoy.com

©2012 NJOY Inc. NJOY is a registered trademark owned by NJOY Inc. All other trademarks are the property of their respective owners.

Source: Rolling Stone (2013).

F. Use in smokefree environments

~~Filthy. Stinking. Rich.~~



blu ELECTRONIC CIGARETTE

With no ash, no odor, and an unmistakably rich taste, blu is everything you enjoy about smoking without the things you hate. You control when and where you want to smoke. Take back your freedom with blu.

blucigs.com

© 2007 blu inc. All rights reserved. New blu Smart Pack

18+ only CALIFORNIA PROPOSITION 65 Warnings: This product contains nicotine, a chemical known to the state of California to cause birth defects or other reproductive harm.

Source: Rolling Stone (2012).

G. Product engineering

MEET THE CLOUD PEN FAMILY...

1.0

- RECHARGEABLE LI-ION BATTERY
- COLOR LCD DISPLAY
- COLOR APP TECHNOLOGY
- LOW BATTERY INDICATOR
- CERTIFICATE OF AUTHENTICITY
- 10 TONES
- COLOR PINE STRIKER
- SMOOTH BRASSER DOUBLE COILS
- ON THE BATTERY SIDE
- COMPACT CARRYING CASE
- LOW BATTERY INDICATOR
- LOW BATTERY

2.0

- RECHARGEABLE LI-ION BATTERY
- COLOR APP TECHNOLOGY
- LOW BATTERY INDICATOR
- CERTIFICATE OF AUTHENTICITY
- 10 TONES
- COLOR PINE STRIKER
- SMOOTH BRASSER DOUBLE COILS
- ON THE BATTERY SIDE
- COMPACT CARRYING CASE
- LOW BATTERY INDICATOR
- LOW BATTERY

3.0

- RECHARGEABLE LI-ION BATTERY
- COLOR APP TECHNOLOGY
- LOW BATTERY INDICATOR
- CERTIFICATE OF AUTHENTICITY
- 10 TONES
- COLOR PINE STRIKER
- SMOOTH BRASSER DOUBLE COILS
- ON THE BATTERY SIDE
- COMPACT CARRYING CASE
- LOW BATTERY INDICATOR
- LOW BATTERY

CHLORIS™

- RECHARGEABLE LI-ION BATTERY
- COLOR APP TECHNOLOGY
- LOW BATTERY INDICATOR
- CERTIFICATE OF AUTHENTICITY
- 10 TONES
- COLOR PINE STRIKER
- SMOOTH BRASSER DOUBLE COILS
- ON THE BATTERY SIDE
- COMPACT CARRYING CASE
- LOW BATTERY INDICATOR
- LOW BATTERY

THE VAPOR VENTURES GROUP

#CLOUDLIFE

AVAILABLE AT

WWW.VAPORNATION.COM

YOUR ONLINE VAPORIZER SUPERSTORE

©2010 VAPOR NATION

Source: Rolling Stone (2015).

Figure 4.6 Continued

H. Cleaner than cigarettes



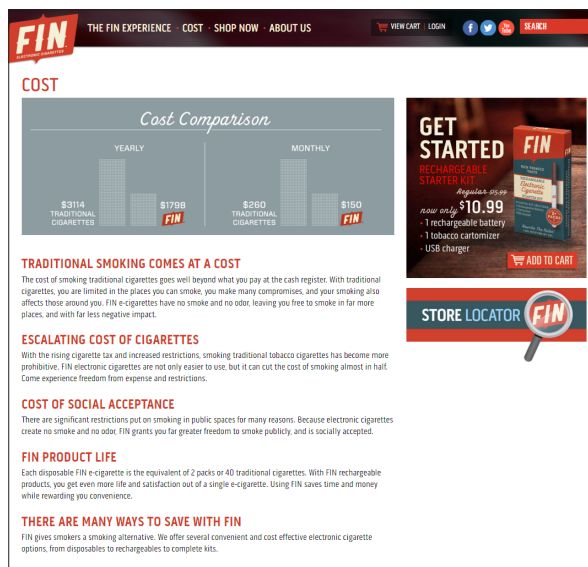
**ADULT SMOKERS:
IF YOUR CAR COULD TALK...**

It would insist you try blu™ electronic cigarettes. Smoke-free, ash-free, and odor-free means blu eCigs® electronic cigarettes give you complete freedom. Imagine smoking satisfaction without rolling down the car windows! No more offensive, lingering odors in your car's upholstery. No more fuss over messy ashes that missed the ashtray. Since your car can't talk, it won't ask you to try blu eCigs e-cigarettes. So we will... take back your freedom: have a blu e-cigarette.

Visit www.blucigs.com for more information.

Source: *Car and Driver* (2014).

I. Save money



FIN THE FIN EXPERIENCE COST SHOP NOW ABOUT US

COST

Cost Comparison

YEARLY	MONTHLY
\$3114 TRADITIONAL CIGARETTES	\$260 TRADITIONAL CIGARETTES
\$1798 FIN	\$150 FIN

GET STARTED
RECHARGEABLE STARTER KIT
As low as \$10.99
Includes:
• 1 rechargeable battery
• 1 tobacco cartomizer
• USB charger
[ADD TO CART](#)

STORE LOCATOR **FIN**

TRADITIONAL SMOKING COMES AT A COST
The cost of smoking traditional cigarettes goes well beyond what you pay at the cash register. With traditional cigarettes, you are limited in the places you can smoke, you make many compromises, and your smoking also affects those around you. FIN e-cigarettes have no smoke and no odor, leaving you free to smoke in far more places, and with far less negative impact.

ESCALATING COST OF CIGARETTES
With the rising cigarette tax and increased restrictions, smoking traditional tobacco cigarettes has become more prohibitive. FIN electronic cigarettes are not only easier to use, but it can cut the cost of smoking almost in half. Come experience freedom from expense and restrictions.

COST OF SOCIAL ACCEPTANCE
There are significant restrictions put on smoking in public spaces for many reasons. Because electronic cigarettes create no smoke and no odor, FIN grants you far greater freedom to smoke publicly, and is socially accepted.

FIN PRODUCT LIFE
Each disposable FIN e-cigarette is the equivalent of 2 packs or 40 traditional cigarettes. With FIN rechargeable products, you get even more life and satisfaction out of a single e-cigarette. Using FIN saves time and money while rewarding you convenience.

THERE ARE MANY WAYS TO SAVE WITH FIN
FIN gives smokers a smoking alternative. We offer several convenient and cost effective electronic cigarette options, from disposables to rechargeables to complete kits.

Source: FIN Electronic Cigarettes (n.d.).

J. Circumvent smokefree policies



DEAR SMOKING BAN,

blu ELECTRONIC CIGARETTE

Take back your freedom to smoke anywhere with blu electronic cigarettes. blu produces no smoke and no ash, only vapor, making it the smarter alternative to regular cigarettes. It's the most satisfying way to tell the smoking bans to kiss off. Okay, maybe the second-most satisfying way.

New blu Smart Pack

blucigs.com

18+ only. CALIFORNIA PROPOSITION 65 Warning: This product contains nicotine, a chemical known to the state of California to cause birth defects or other reproductive harm.

Source: *Spin* (2012).

samples during large events and has even sponsored events at music festivals (PRNewswire 2013; blu eCigs 2014). Further, conservative estimates indicate that in 2012 and 2013, free samples were provided by six companies at 348 events, most of these events having high participation by youth (Durbin et al. 2014). Under the deeming rule published in May 2016 (currently under litigation), free samples were banned (*Federal Register* 2016).

Digital Landscape for E-Cigarettes

The Internet has been widely used to promote cigarettes, cigars, and smokeless products (Ribisl 2003; Freeman and Chapman 2007; USDHHS 2012). This medium—through websites, message forums, and social media—has been heavily used to sell and glamorize e-cigarettes and their use. Nearly all teens 13–17 years of age (92%) use the Internet daily, and 73% of teens access the Internet via smartphones (Lenhart 2015). In 2015, a study conducted by the Truth Initiative indicated that 40% of youth (13–17 years of age) and 57% of young adults (18–21 years of age) had seen e-cigarette advertising online (Truth Initiative 2015).

Price promotions are not just involved in sales at brick-and-mortar stores; they are also offered by online stores and through social media. Grana and Ling (2014) found that 80% of websites indicated a sale price or discount, while Huang and colleagues (2014a) found that 34% of commercial tweets mentioned the words “price” or “discount.” Both Facebook and Twitter provide opportunities for brands and companies to offer online coupons and discounts (Discount Coupons for blu n.d.; Vapor4Life n.d.). In a study of online e-cigarette retailers, 28% of the websites offered a promotion, such as a discount, other free items, or a loyalty program (Williams et al. in press). Without age restrictions or age verification, youth can access these websites easily and thus obtain the discount or coupon (Williams et al. in press). However, under the deeming rule, websites cannot sell e-cigarettes to youth under the age of 18, so access will likely be curtailed as a result (*Federal Register* 2016). The following sections review three basic categories of online e-cigarette content: websites that sell e-cigarettes, manufacturer-sponsored brand name websites, and e-cigarette promotions on social media websites (including Facebook, Twitter, and YouTube).

Websites Selling E-Cigarettes

Tobacco industry analysts estimate that online sales accounted for approximately 30% of e-cigarette sales volume in the first quarter of 2015 (Wells Fargo Securities 2015a). Some Internet vendors sell their own brands exclusively (e.g., Mistic, Green Smoke), while a large

number are online stores that sell many brands and varieties of products (Zhu et al. 2014; Williams et al. in press).

Although the marketers of e-cigarettes have made claims that differ from those made for conventional cigarettes (such as use for smoking cessation, which is illegal without being an approved cessation drug or device), a content analysis of e-cigarette marketing (Grana and Ling 2014) and the observations of tobacco marketing surveillance systems point to several similarities, including the use of young, attractive models; lifestyle claims; and celebrities. Other claims made in e-cigarette advertising have been used in the past by conventional cigarette brands (such as having fewer carcinogens, lower risk of tobacco-related disease) or by smokeless tobacco products (such as the ability to use them where smoking is prohibited) (Grana and Ling 2014). However, under the deeming rule that was published in May 2016, after August 8, 2016, e-cigarette manufacturers cannot make modified risk claims (*Federal Register* 2016) (although this provision has been challenged in pending lawsuits).

Formal analyses of marketing claims of branded e-cigarette sites that both promote and sell e-cigarettes provide details on the types of claims made in these channels. The study by Grana and Ling (2014) analyzed claims from 59 English-language websites over a 2-month period in 2011 and found four major thematic content areas: health- and cessation-related benefits, avoiding smokefree policies, lifestyle benefits, and product-engineering claims. Ninety-five percent of websites made explicit or implicit health-related claims, and 64% made claims related to cessation, often through the use of testimonials. Almost all (98%) included a comparison of the risks and benefits of e-cigarettes and conventional cigarettes; 95% included claims that e-cigarettes are cleaner; and 93% said they were cheaper. Claims regarding where e-cigarettes could be used were also common—with 88% claiming e-cigarettes can be used anywhere, and 71% pointing to e-cigarette use as a means of circumventing clean air policies. Figure 4.6 shows advertising that exemplifies these marketing claims for e-cigarettes.

Grana and Ling's (2014) analysis also points to the common use of lifestyle-related claims, a hallmark of traditional tobacco marketing: 73% of websites contained images or claims of being modern or glamorous. Websites also pointed to social advantages for users of their particular brand: 44% of claims pointed to increased social status and 32% to enhanced social activity, 31% suggested romantic advantages, and 22% used celebrities. Claims of increased social status, opportunity, and romance as well as the use of celebrities may resonate especially with youth and young adults (Grana et al. 2011).

A different content analysis, this one of the marketing messages of English-language branded e-cigarette

retail sites, examined and compared websites for two different time periods (May–August 2012 and December 2013–January 2014) and found differences in claims between the two timeframes (Zhu et al. 2014). In comparing claims for brands available during both time periods with those that were newly available in 2013–2014, the authors found that products and advertising messages varied between the two samples. Brands analyzed from 2012 were significantly more likely than those in the later period to (a) claim that their products were healthier and less expensive than conventional cigarettes and could be used where smoking is prohibited and (b) indirectly claim their products were effective for smoking cessation through testimonials and other methods (Zhu et al. 2014). The study also found an increase from one period to the next in the number of branded retail websites and the number of flavors per brand advertised on a website, as well as the likelihood of a website offering e-cigarette hardware and such other products as e-liquids and e-hookahs or other products that did not resemble cigalikes (Zhu et al. 2014). The study's findings suggested that the emphasis for newer brands had shifted from comparing them with conventional cigarettes to a focus on their role as new nicotine delivery systems.

Williams and colleagues (in press) used a standardized search strategy employed in their earlier study of websites selling cigarettes (Ribisl 2003) to identify 995 English-language websites selling e-cigarettes in 2014. The authors performed a content analysis on the 281 most popular websites, as judged by data on traffic. Most of the websites were based in the United States (71.9%), the United Kingdom (16.7%), and China (5.3%), and they offered a variety of products, but more sold e-cigarette starter kits (92.5%) than disposables (55.2%). Most offered flavors, with the most popular being fruit (79.4%), candy (75.2%), coffee (68.0%), and alcohol (45.6%). Although 71.5% featured some type of health warning, 69.4% claimed health advantages over other tobacco products, and 32.7% claimed that the product helped people to quit smoking conventional cigarettes. The sites also featured endorsements or mentions of celebrities using the products (Stanford Research into the Impact of Tobacco Advertising n.d.a.). Physicians and other health professionals provided endorsements as well.

Elsewhere, Cobb and colleagues (2015) conducted a forensic analysis of websites that sold e-cigarettes and participated in affiliate advertising on the Internet. In addition to identifying multiple layers of redirection between online advertising by affiliates and websites selling e-cigarettes, the authors found that online advertisements and affiliate websites included cessation claims.

Research suggests Internet e-cigarette vendors have not routinely verified the age and identity of website visitors or blocked sales to minors. However, after August 8,

2016, due to the deeming rule, it has become illegal for online retailers to sell e-cigarettes to those under 18 (*Federal Register* 2016). In a survey of purchasing by youth, Williams and colleagues (2015) identified 98 websites selling e-cigarettes on which youth, 14–17 years of age, made purchase attempts using prepaid credit cards. In all, 18 (of 98) order attempts failed because of technical problems with the website or the payment system, all of which were unrelated to age verification. Of the remaining 80 orders, 75 (93.8%) were filled. Five vendors claimed to use a service offered by shipping companies to verify age at delivery, but none actually did. Although data are not available on the proportion of youth who purchase their e-cigarettes online versus buying them at retail outlets, this study suggests that youth would have ready access if they tried to purchase e-cigarettes online. The *Prevent All Cigarette Trafficking Act of 2009* requires Internet sellers of cigarettes and smokeless tobacco to, among other provisions, verify age of customers at the time of purchase and ensure that the deliverer checks identification at the time of delivery; stop Internet sales to minors; and pay applicable local, state, federal, and territorial taxes to reduce the price advantage of online sales. FDA regulation now prohibits the Internet sales of e-cigarettes to minors. However, there are currently no federal requirements for Internet vendors of e-cigarettes to check identification upon delivery or pay applicable taxes (Campaign for Tobacco Free Kids 2016).

The marketing of candy and fruit flavors may be one of the reasons that e-cigarettes appeal to youth (Grana and Ling 2014; Richtel 2014a; Zhu et al. 2014). Young adults (18–24 years of age) are more likely to use flavored tobacco products than are adults in the next age group (25–34 years of age) (Villanti et al. 2013). Zhu and colleagues (2014), who used three search engines (Google, Yahoo!, and Bing) and various keywords from May 2012 to January 2014 to identify a wide variety of e-cigarette brands and flavors, found 466 brands and 7,764 unique flavors, with 242 new flavors appearing each month. Other than tobacco flavor, the most popular flavors were menthol (92.1%), fruit (84.2%), dessert/candy (79.9%), and alcohol/drinks (77.5%). Additionally, in their content analysis of e-cigarette retail websites, Grana and Ling (2014) found that such flavors as coffee, fruit, and candy were offered on most sites. Further, flavors were being sold under brand names similar to cereal and candy products that appeal to youth, such as Wrigley's Big Red Gum (Daniels 2015).

Tobacco Industry Corporate and Brand Websites

Three categories of e-cigarette brands have emerged within the U.S. market: brands developed by cigarette manufacturers (i.e., MarkTen, VUSE), brands acquired

by cigarette manufacturers (i.e., blu, Green Smoke) (Table 4.3), and brands that have no affiliation with a cigarette manufacturer (e.g., NJOY, FIN). A content analysis of websites for these three types of brands suggested that those *developed* by cigarette manufacturers may be marketed more cautiously than brands *acquired* by cigarette manufacturers or brands that have no affiliation with a cigarette manufacturer (Seidenberg et al. 2016). Table 4.4

compares and contrasts some key features of the websites by manufacturer affiliation. It shows, for example, that access to websites of brands developed by cigarette manufacturers (or a subsidiary) was restricted to users 21 years of age and older (MarkTen), and user registration was required (i.e., the user needed to input personal information such as name, address, and birthdate) for VUSE. In contrast, websites for brands with no affiliation

Table 4.3 Mergers, acquisitions, partnerships, and other agreements in the e-cigarette industry

Date	Purchaser	Acquisition target	Partnerships and other agreements	Deal size ^a	Geography ^b
December 2011	Japan Tobacco	—	Ploom (partnership)	Not disclosed	United States
December 2012	BAT	CN Creative	—	£40 million	United Kingdom
April 2012	Lorillard	blu	—	\$135 million	United States
April 2013	National Tobacco	—	V2 Cigs (partnership)	Not disclosed	United States
August 2013	Imperial	Dragonite	—	\$75 million	China
October 2013	Lorillard	SKYCIG	—	£60 million	United Kingdom
January 2014	ECIG	VAPESTICK	—	\$70 million	United Kingdom
January 2014	Gilla	Drinan	—	Not disclosed	Ireland
February 2014	Altria	Green Smoke	—	\$110 million	United States
March 2014	ECIG	FIN	—	\$170 million	United States
April 2014	ECIG	VIP	—	\$58 million	United Kingdom
June 2014	ECIG	Ten Motives	—	\$104 million	United Kingdom
June 2014	PMI	Nicocigs	—	Not disclosed	United Kingdom
July 2014	ECIG	Hardwire	—	\$30 million	Internet
November 2014	Japan Tobacco	E-Lites	—	Not disclosed	United Kingdom
January 2015	BreatheEcigs/DNA	Breathe LLC	—	Not disclosed	United States
February 2015	Japan Tobacco	—	Ploom (purchased the intellectual rights to some Ploom technology)	Not disclosed	United States
March 2015	Gilla	An undisclosed Florida e-liquid company	—	\$1.5 million	United States
April 2015	Japan Tobacco	Logic	—	Not disclosed	United States
June 2015	Imperial	blu	—	\$7.1 billion	United States and United Kingdom
December 2015	Gilla	The Mad Alchemist	—	\$500,000	United States, Canada, Europe, and United Arab Emirates

Source: Various news sources and companies' websites, SEC (Securities and Exchange Commission) reports, and press releases as of January 25, 2016.

^aDeal size refers to prices at the time of the announcement, not necessarily the final transaction price.

^bGeography refers to the country in which the acquisition target was registered.

with a cigarette manufacturer and those acquired by cigarette manufacturers were accessible to users 18 years of age and older via self-reporting of age, with the exception of 21st Century Smoke. In addition, VUSE e-cigarettes were not sold online (they were sold only in retail outlets), and they were available in a single nicotine level with limited flavor options (except for forthcoming tank versions), while MarkTen could be purchased online. The websites for both MarkTen and VUSE mentioned selling flavored e-cigarettes. As far as e-cigarette brands not having an affiliation with a cigarette manufacturer or that were acquired by a cigarette manufacturer, all brands except Logic offered fruit, candy, or other flavors. Further, all of the unaffiliated brand websites sold e-cigarettes online and offered multiple nicotine levels. Most websites offered nicotine-free options and flavored e-cigarettes as

well (Seidenberg et al. 2016). The Green Smoke website even provided a link to guide customers in finding the proper nicotine level for their cartridges (Green Smoke E-Vapor n.d.).

Social Media Promoting E-cigarettes

E-cigarettes have been widely promoted on social media platforms such as YouTube, Twitter, Instagram, and Facebook; most of these social media sites do not require age verification. YouTube is the most popular video-sharing website globally and features many e-cigarette videos. Luo and colleagues (2014) used various search terms to identify 196 unique videos in February 2013 that were portraying e-cigarettes and found that 94% of the videos were “pro” e-cigarettes, 4% were neutral, and

Table 4.4 Comparison of website access restrictions, online sales, nicotine levels, and flavors among e-cigarette brands with no cigarette manufacturer affiliation, brands acquired by cigarette manufacturers, and brands developed by cigarette manufacturers

	E-cigarette brands (10)		
	Not affiliated with a cigarette manufacturer: NJOY, Logic, 21st Century Smoke, FIN, Nicotek, and Mistic (6)	Acquired by a cigarette manufacturer: blu and Green Smoke (2)	Developed by a cigarette manufacturer (or subsidiary): MarkTen and VUSE (2)
Website access	All websites (except 21st Century Smoke) have one-click access ^a or age verification to restrict initial access to people 18 years of age and older; 21st Century Smoke does not have any website restrictions for initial access.	Both sites have one-click access or age verification to restrict initial access to people 18 years of age and older (blu) and 21 years of age and older (Green Smoke).	MarkTen has age verification to restrict initial access to people 21 years of age and older. Before initial access, VUSE requires people 21 years of age and older to register first with the website.
Online sales	All brands can be purchased online.	Both brands can be purchased online.	MarkTen can be purchased online; VUSE cannot.
Multiple levels of nicotine	Among all brands, the level of nicotine varies by product. Some (e.g., blu, Logic Zero, 21st Century Smoke, Nicotek) offer products with 0% nicotine (by volume).	Among both brands, the level of nicotine varies by product.	For MarkTen, the level of nicotine varies by product. VUSE e-cigarettes contain 4.8% nicotine (by weight). VUSE tanks, set to come out in February 2016, will have different levels of nicotine (Kress 2015).
Flavors (other than tobacco and/or menthol)	All brands offer a variety of flavors, such as fruit and candy.	Both brands offer a variety of flavors.	MarkTen offers two flavors: fusion and wintermint. VUSE offers four flavors: crema, chai, berry, and mint (Kress 2015).

Source: Unless cited otherwise, information was obtained from the companies' websites (January 2016): <https://www.njoy.com/>; <http://store.logiccig.com/>; <https://www.21stcenturysmoke.com/>; <https://www.fincigs.com/>; <http://www.nicotekecigs.com/>; <http://www.misticecigs.com/>; <http://www.blucigs.com/>; <https://www.greensmoke.com/>; <https://www.markten.com/>; and <https://vusevapor.com/>.

^aWith “one-click access,” visitors to a website self-report on their age by identifying their age from a clickable pop-up box. For example, persons 18 years of age and older can browse the website, but those younger than 18 cannot.

2% were “anti” e-cigarettes. Those authors found that the three most common genres were advertising of products, user sharing, and product reviews. Of the “pro” e-cigarette videos, 84.3% featured links to websites selling e-cigarettes, and 71.4% claimed that e-cigarettes were a healthier alternative to conventional cigarettes. Finally, the “pro” videos received more visits and were rated more favorably than were the small number of “anti” videos.

The authors of another study, this one a content analysis of 365 e-cigarette videos on YouTube that ran at some time from June 2007 to June 2011, estimated that more than 1.2 million youth and a total of 15.5 million people worldwide were exposed to these videos (Paek et al. 2014). In addition to looking at viewership, the content analysis examined the type, sponsorship, and health claims of the videos. Just 16% of the videos were formal advertisements or news clips, and 79.2% of the content was coded as appearing to have been generated by users. Videos emphasized economic, psychological, and social benefits, and health claims included e-cigarettes being less harmful than conventional cigarettes, healthy, and providing help in quitting smoking. Most (85.2%) videos in the sample were sponsored by e-cigarette companies or their associates, with an additional 10% coming from individuals who did not mention a specific website or company. Interestingly, videos sponsored by marketers contained a significantly lower level of health claims than did those from laypeople (users) and, not surprisingly, contained a higher level of information cues (e.g., product contents, price, distribution channel).

A cross-sectional study of Twitter, a microblogging platform, that examined more than 74,000 tweets accessed through a licensed Twitter data provider over a 2-month period in 2012, found extensive marketing of e-cigarettes (Huang et al. 2014a). The majority of e-cigarette content during this period was advertising and promotion. In fact, 89.6% of the tweets contained commercial content (e.g., presence of branded promotional messages or hyperlinks to commercial websites), and only 11% identified as being non-sponsored or independent, reflecting individual opinions or experiences, or being linked to non-promotional content. Commercial tweets most commonly contained price promotions and discounts (34.3%), with cessation-related claims included in 10.8% and lower percentages for health or safety (Huang et al. 2014a).

Jo and colleagues (2016), in a study of 2,847 tobacco-related tweets about price promotions and coupons, found that e-cigarettes, not conventional cigarettes, were the most frequently mentioned product (90.1%), and about one-third of all e-cigarette-related tweets included a discount code. The tweets also touted the relatively low price of e-cigarettes and made comparative claims about the health risks of the product.

Sponsored Online and Video Advertising

The study by Richardson and colleagues (2015) used information from the monitoring service Competitrack to analyze the volume and characteristics of industry-sponsored tobacco and e-cigarette online banner/video advertisements in the United States and Canada in 2012–2013. This study found that online banner/video advertising—which embeds an ad or video on a website—was more commonly used for e-cigarettes than for conventional cigarettes. E-cigarette ads were often placed on music or entertainment (39.1%) sites, which the authors noted attract a sizeable number of youth and young adults. The most frequent theme for the 24 online banner or video e-cigarette ads (promoting five e-cigarette brands) analyzed was that the product was more “green” or environmentally friendly than conventional cigarettes (54.2%), followed by less harmful than cigarettes (37.5%), and being an alternative to conventional cigarettes when someone could not smoke (33.3%).

E-Cigarettes in the Retail Environment

Conventional Tobacco Retailers (Convenience Stores, Pharmacies, Tobacco Shops)

As of December 2015, 48 of the 50 states prohibited sales of e-cigarettes to minors (National Conference of State Legislatures 2015), but compliance of retailers with youth-access laws has not yet been studied. FDA is actively enforcing the federal minimum age requirements. As of August 8, 2016, the federal deeming rule bans the sale of e-cigarettes to minors under the age of 18 and requires photo identification for those under age 27 (*Federal Register* 2016). In the past few years, brick-and-mortar retailers have surpassed the Internet as the dominant distribution channel for e-cigarettes. For example, after Lorillard acquired blu in 2012, the number of retailers selling this brand increased from 13,000 to 127,000 in just 1 year (Esterl 2012; Bannon 2013). In California, the proportion of licensed tobacco retailers that sold e-cigarettes increased from 12% in 2011 to 67% in 2014 (Chapman 2015).

E-cigarettes are widely available in convenience stores, a type of establishment that 4.1 million U.S. teenagers visit at least once per week (Rose et al. 2014; Sanders-Jackson et al. 2015a). According to a 2013 state-sponsored survey that included a sample of approximately 7,300 licensed tobacco retailers in California, e-cigarettes were sold in more than half of convenience stores, pharmacies, and liquor stores and in nearly all tobacco shops

(California Department of Public Health and California Tobacco Control Program 2014).

Only three studies have examined the retail availability of e-cigarettes near schools. In a 2012 nationally representative sample of tobacco retailers, the presence of a public school within 1,000 feet was not related to the availability of e-cigarettes (Rose et al. 2014). In a study that examined a much larger buffer zone in Kentucky, 88% of schools in two counties were located within 1 mile of a retailer that sold e-cigarettes (Hahn et al. 2015). As for colleges, disposable and/or rechargeable e-cigarettes were available at 60% of tobacco retailers near campuses in North Carolina and Virginia in 2013, a more than two-fold increase from the previous year (Wagoner et al. 2014).

A pilot study examining tobacco point-of-sale advertising and promotion in the central Harlem neighborhood of New York City found that 26% of stores had e-cigarette advertising on the building's exterior (Ganz et al. 2015). External ads included those located less than 3 feet above the ground at the eye level of children—a placement that was outlawed for conventional cigarettes by the Master Settlement Agreement—and featured flavored products (Ganz et al. 2015).

Unlike conventional cigarettes, e-cigarettes appear to be relatively less prevalent at stores in economically disadvantaged communities. In an analysis that examined data from two studies that had used representative samples of U.S. tobacco retailers, e-cigarettes were less likely to be sold than conventional cigarettes at stores located in economically disadvantaged neighborhoods and in neighborhoods with a higher proportion of African American residents (Rose et al. 2014). These patterns are consistent with evidence that e-cigarette marketing in other channels targets higher income non-Hispanic White males (Emery et al. 2014). However, the retail availability of e-cigarettes has changed at different rates in different neighborhoods. In a study of U.S. food stores, only 3% of stores located in non-Hispanic White and Hispanic neighborhoods sold e-cigarettes in 2010; none of the stores in predominantly African American neighborhoods sold them (Khan et al. 2014). Three years later, the figures were 36% in predominantly non-Hispanic White neighborhoods, 18% in Hispanic-majority neighborhoods, and 19% in African American-majority neighborhoods. Notably, these data were collected before the two largest U.S. tobacco companies launched MarkTen (Altria) and VUSE (Reynolds American) in late 2013. Thus, the industry's current influence on disparities in the retail availability and marketing of e-cigarettes cannot be readily estimated from the studies reviewed.

Two studies examined retail data about e-cigarettes as a function of state and/or county smokefree air laws (Huang et al. 2014b; Rose et al. 2014). In one of the

studies, which used data collected in two studies that used independent samples of U.S. tobacco retailers, the odds of selling e-cigarettes were greater for retailers in states with weaker smokefree air policies, even after controlling for store type, price of conventional cigarettes, and neighborhood demographics (Rose et al. 2014). A similar inverse relationship was found between sales of disposable e-cigarettes (as measured by retail scanner data in 52 U.S. markets from 2009 to 2012) and the proportion of the population protected by 100% smokefree policies covering all indoor areas of bars, restaurants, and workplaces (Huang et al. 2014b). Taken together, these results suggest that e-cigarettes are, at least initially, more likely to be sold in communities with weaker smokefree policies.

Few retail surveillance studies have characterized promotion, placement, or price for e-cigarettes (Hsu et al. 2013; Wagoner et al. 2014; Ganz et al. 2015). In a study of licensed tobacco retailers in Florida, advertising for e-cigarettes was more prevalent on the exterior than the interior (50% vs. 11%) (Kim et al. 2015). In the study by Wagoner and colleagues (2014), the presence of e-cigarette advertising near college campuses in North Carolina and Virginia tripled on store exteriors and quadrupled in store interiors in just 1 year. Although the price of rechargeable units decreased significantly, there was little evidence of price discounting for any e-cigarettes (Wagoner et al. 2014). The low visibility of price discounts at the point of sale suggests that marketing for e-cigarettes favors a “pull” strategy, relying on direct mail and e-mail coupons and special offers to entice customers to retail locations.

“Vape Shops”

“Vape shops” specialize in the sale of refillable devices and tank systems, typically offer a tasting menu of flavors, and sometimes feature a lounge area where customers can “vape” while socializing (Lee and Kim 2015; Sussman et al. 2016). “Vape shops” have been excluded from most studies about the retail marketing of e-cigarettes, in part because the environment is so different from that of conventional tobacco retailers (Lee and Kim 2015) and because so few states require these establishments to obtain a tobacco retailer license, effectively keeping them out of the sampling frame for many studies and making the monitoring and enforcement of laws difficult (Lee et al. 2014).

Anecdotal evidence suggests that “vape shops” currently do not have readily visible branded signs and displays that characterize the retail marketing of other tobacco products. Even though the relationship between the “vape shop” industry and the tobacco industry can be adversarial (Sussman et al. 2016), one study found that the marketing practices of these establishments closely resemble the current and former strategies that tobacco companies have

used to market other tobacco products (Cheney et al. 2015). According to this study, “vape shop” owners and managers in Oklahoma used free samples, loyalty programs, sponsored events, direct mail, advertising through social media, and price promotions targeted at particular consumers, such as college students (Cheney et al. 2015). No other study about marketing by “vape shops” has been published.

Numerous gaps exist in research about “vape shops,” including information on consumer behavior, the use of tracking systems for sales data, marketing surveillance, purchases by youth, and the opinions of retailers and the general public about regulations. Spatial analyses are needed to determine whether “vape shops” are clustered near schools or college campuses, whether other neighborhood demographics are correlated with the location of these establishments, and how such associations, if present, have changed over time and in response to state and local policy interventions. The proportion of “vape shops” where workers mix solutions of liquid nicotine on site is not known, and the absence of uniform safety precautions regarding handling and spills poses additional concern for regulation (ChangeLab Solutions 2014). Under the deeming rule that was published in May 2016, “vape shops” that mix and sell e-liquids are both retailers and manufacturers and, therefore, are subject to the provisions in the deeming rule and the Tobacco Control Act that apply to both (*Federal Register* 2016).

Exposure and Receptivity to Advertising for E-Cigarettes

Exposure

Given industry data about increasing expenditures for e-cigarette advertising and extending its reach, the high levels of advertising awareness reported in studies of youth and/or young adults are not surprising. An online panel of U.S. youth (13–17 years of age) and young adults (18–21 years of age) conducted in February 2014 found that awareness of e-cigarette advertising was greatest for retail advertising, followed by awareness of advertising on television and online (Truth Initiative 2015). In this study, and compared with the entire population, awareness among current smokers of e-cigarette advertising was higher across all channels and higher for online ads than for television ads (Legacy for Health 2014).

In school-based surveys of middle and high school students in Connecticut, gas stations and television were the dominant channels in which students reported recently seeing e-cigarettes advertised or sold (Krishnan-Sarin et al. 2015). A different pattern was observed in a convenience sample of college students in Hawaii, where the figures for

seeing ads were 59%, online; 58%, television; 71%, malls; 41%, gas stations; and 47%, convenience stores (Pokhrel et al. 2015). Elsewhere, in an online experiment, 56% of adolescents (13–17 years of age) who had never used e-cigarettes reported seeing at least one televised advertisement previously, and there were modest, but statistically insignificant differences in exposure by smoking status and race/ethnicity ($p < .10$) (Farrelly et al. 2015).

The National Youth Tobacco Survey reported that in 2014, 18.3 million middle and high school students were exposed to e-cigarette advertising from at least one source (CDC 2016b). In this nationally representative sample of U.S. middle and high school students, nearly 7 out of 10 reported seeing an e-cigarette advertisement in that year. The most common places for exposure among middle school students were retail stores (52.8%), the Internet (35.8%), television and movies (34.1%), and newspapers and magazines (25.0%). Similarly, high school students reported the highest exposure at retail stores (56.3%) and then the Internet (42.9%), television and movies (38.4%), and newspapers and magazines (34.6%). Among both middle school and high school students, exposure through retail stores was higher among non-Hispanic Whites than non-Hispanic Blacks. However, non-Hispanic Blacks had higher exposure to e-cigarette advertisements on television and in movies than non-Hispanic Whites. Females had higher exposure than males to advertisements on the Internet and in newspapers and magazines.

Receptivity to Advertising

Receptivity to tobacco marketing is a well-established risk factor for tobacco use by adolescents and young adults (NCI 2008; USDHHS 2012), and two studies adapted measures of receptivity to the marketing of tobacco in research on e-cigarettes. In one study, college students from a southwestern state who watched three advertisements for different brands of e-cigarettes in an online survey used a 7-point scale to rate how enjoyable, likable, and appealing the ads were; results suggested moderate receptivity (mean of 51 on a scale ranging from 7 to 126) and significant differences between brands (Trumbo and Kim 2015). In the other study, Pokhrel and colleagues (2015), using a sample of college students from Hawaii, adapted a multi-item scale of liking advertisements from studies about alcohol (Unger et al. 2003) and two items from the most commonly used measure of receptivity to tobacco marketing (Pierce et al. 1998). This study observed low levels of liking advertisements (all below the scale midpoint) (Pokhrel et al. 2015). The extent to which youth and young adults who are receptive to e-cigarette marketing are also receptive to tobacco marketing has not been studied. However, the extent to which advertising

strategies for e-cigarettes mimic strategies used by tobacco companies suggests that the two measures of receptivity could be highly correlated.

Effect of E-Cigarette Advertising on Behavior

Associations with E-Cigarette Use and Intentions to Use

Evidence that advertising for conventional cigarettes increases product initiation among never users, discourages quit attempts in current users, and encourages relapse in those trying to quit is well established (NCI 2008; USDHHS 2012). However, while fewer studies have focused on e-cigarette advertising in particular, the available evidence suggests that e-cigarette advertising has similar effects, although additional research is recommended. A search for studies of youth or adults that either (a) manipulated exposure to e-cigarette advertising or measured self-reported recall of advertisements, (b) assessed the frequency of exposure to advertising in one or more channels, or (c) measured receptivity to e-cigarette advertising yielded 10 studies that addressed the impact of advertising on the use of or intentions to use e-cigarettes.

One experiment tested whether seeing television advertising for e-cigarettes predisposed adolescents to try these products (Farrelly et al. 2015). Among adolescents (13–17 years of age) who had never used e-cigarettes, a single exposure to a set of four televised advertisements for popular brands resulted in significantly greater intention to try e-cigarettes—more than 50% higher in the treatment group than the control group (Farrelly et al. 2015). Another study examined responses to e-cigarette advertisements among young adults (Trumbo and Kim 2015); among a convenience sample of college students who watched three television ads for e-cigarettes, greater receptivity to e-cigarette advertising was associated with significantly higher odds of intending to use e-cigarettes in the future, but the analysis did not adjust for prior use or individual demographics (Trumbo and Kim 2015).

Very few cross-sectional or longitudinal surveys have examined associations between adolescents' exposure to e-cigarette advertising and either trial or regular use of such products. An analysis of the 2011 National Youth Tobacco Survey found that adolescents who reported frequent exposure to protobacco advertising at the point of sale and on the Internet (e.g., seeing ads most of the time or always) had significantly higher odds of ever using e-cigarettes, and there was a dose-response association between the number of marketing channels to which they were exposed and ever use (Agaku and Ayo-Yusuf 2014).

Surveillance research that differentiates exposure to advertising for e-cigarettes from exposure to ads for conventional tobacco products would be useful to establish whether exposure to e-cigarette advertising is correlated with product use and contributes to product initiation and product use among young people who were not tobacco users to start. It bears mentioning here that a generation of U.S. youth has grown up without any television or billboard ads for conventional cigarettes. In this context, research is needed to understand at what age young people understand that e-cigarette advertising depicts the use of e-cigarettes rather than the smoking of conventional cigarettes and to examine whether there are spillover effects of marketing for e-cigarettes on the use of conventional tobacco products.

In the study from Hawaii (Pokhrel et al. 2015), researchers examined the association between exposure to e-cigarette advertising and product use using a convenience sample of approximately 300 college students in that state. The study found that more frequent exposure to e-cigarette advertising—as measured by exposure in any of multiple channels (e.g., newspapers, magazines, Internet, television billboards, sporting/cultural events, convenience stores, gas stations, grocery stores, and malls)—was associated with significantly higher odds of ever using e-cigarettes, and receptivity to e-cigarette advertising was associated with higher odds of past-month use, even after adjustments for smoking status and individual demographics.

Two studies strongly support the association between exposure to e-cigarette advertising and youth susceptibility to and use of e-cigarettes (CDC 2016a; Mantey et al. 2016). Both studies examined data from the 2014 National Youth Tobacco Survey, a survey of more than 20,000 U.S. middle and high school students. The studies assessed self-reported levels of exposure to e-cigarette ads on the Internet, in newspapers and magazines, at retail stores, and on television or in movies, and used multivariate logistic regression models to examine the relationships between marketing exposure and e-cigarette susceptibility and use. Exposure to each type of e-cigarette marketing was significantly associated with increased likelihood of ever having used and current use of e-cigarettes among middle and high school students (CDC 2016a; Mantey et al. 2016). Exposure was also associated with susceptibility to use e-cigarettes among current nonusers. In multivariate models, as the number of channels of e-cigarette marketing exposure increased, the likelihood of use and susceptibility also increased (Mantey et al. 2016).

One concern is that e-cigarette advertising may perpetuate dual use of conventional cigarettes and e-cigarettes, a concern that comes from the visual depictions of e-cigarette use that may serve as smoking cues

to current and former smokers of conventional cigarettes, increasing the urge to smoke and decreasing intentions and efficacy to quit or abstain from smoking (Glynn 2014; Grana and Ling 2014; Maloney and Cappella 2016). Consistent with cue-reactivity studies about conventional cigarettes, exposure to e-cigarette use in a laboratory was associated with increased urge to smoke conventional cigarettes among smokers and an urge to use e-cigarettes among users of that product (King et al. 2015). Whether exposure to depictions in advertising of the use of e-cigarettes triggers urges to begin or continue to smoke conventional cigarettes or weakens users' resolve to quit has received little attention. This is particularly important because rates of cigarette smoking among youth in the United States are at an historic low (CDC 2014).

Associations with Knowledge, Risk Perceptions, and Other Attitudes

Advertising is an important source of information about e-cigarettes for youth and adults (de Andrade et al. 2013; Pepper et al. 2014a), and there is emerging evidence about how unregulated advertising for e-cigarettes may influence consumer perceptions about product safety. One study of adolescents (Farrelly et al. 2015) and three studies of adults (Pokhrel et al. 2015; Sanders-Jackson et al. 2015b; Tan et al. 2015a) examined the associations between exposure to e-cigarette advertising and knowledge or perceptions of these products.

Among U.S. adolescents (13–17 years of age) who had never used e-cigarettes, a single exposure to a set of four televised advertisements was associated with significantly higher odds of agreeing that the products can be used without affecting those around you and with lower odds of agreeing that the products are harmful (Farrelly et al. 2015). Compared with the control group, the treatment group reported significantly more positive attitudes about the benefits of using e-cigarettes. Elsewhere, in an online survey representative of U.S. households, 57% of young adults (18–34 years of age) were aware that some e-cigarettes contain nicotine, but more frequent exposure to e-cigarette advertising at point of sale, in mass media, and in social media (the three variables combined) was associated with a significantly higher likelihood of answering this question incorrectly (Sanders-Jackson et al. 2015b).

In the previously cited study of college students in Hawaii (Pokhrel et al. 2015), greater receptivity to e-cigarette marketing—but not more frequent exposure to the advertising of these products—was associated with significantly greater endorsement of beliefs about harm reduction for e-cigarettes (e.g., safer, improves health, helps to quit). A different study referred to an online

survey of U.S. adults (the Annenberg National Health Communication Survey [ANHCS]) in which surveyors measured the frequency of exposure to e-cigarette advertising (point of sale, mass media, and social media) and the degree to which participants perceived those messages as negative or positive (Tan et al. 2015a). Compared with those who reported no exposure to advertising, those who held negative perceptions of these messages reported significantly greater perceptions of harm from breathing e-cigarette vapor. Taken together, the available evidence suggests that continued exposure to unregulated advertising likely promotes reduced perceptions of harm and toxicity and increased perceptions of the efficacy of e-cigarettes for quitting conventional cigarettes.

Whether the increasing amount of advertising and promotional activities for e-cigarettes serves to renormalize the smoking of conventional cigarettes—that is, to shift public norms back to acceptance of cigarette smoking—is also not known. In focus groups of adult smokers 45 years of age and older, participants expressed almost unanimous agreement, after seeing selected ads, that e-cigarette advertisements promote smoking as a socially desirable behavior (Cataldo et al. 2015). The analysis by Farrelly and colleagues (2015) also looked at outcomes for conventional cigarettes. After exposure to e-cigarette advertising, there were no significant differences between the treatment and control groups on intentions to smoke conventional cigarettes, attitudes toward those products, or perceived harm from cigarettes (even though there were differences between groups on their perceptions of e-cigarettes, as noted previously).

The study that used data from the ANHCS also tested the hypothesis that greater exposure to e-cigarette advertising was associated with weaker support for restricting cigarette smoking in public spaces (Tan et al. 2015b). Both more frequent exposure to e-cigarette advertising and the degree to which participants perceived those messages as positive correlated negatively with support for smoking restrictions. However, in models adjusted for demographic variables, neither measure predicted support for restricting smoking. Further research is needed to address whether the large amount of advertising for e-cigarettes weakens support for smokefree air laws and other tobacco control policies or supports other potential indicators of renormalizing smoking, particularly those indicators that are known risk factors for tobacco use by adolescents and young adults, such as descriptive norms (e.g., perceived prevalence), injunctive norms (e.g., peer acceptance or social acceptability), outcome expectations (e.g., perceived benefits), and attitudes toward the tobacco industry. Additional research is also needed to assess whether e-cigarette advertising that draws comparisons to conventional cigarettes could serve to undermine antismoking messages.

Evidence Summary

Although the e-cigarette marketplace is complicated by the differences in brands that are owned by tobacco companies versus independent brands, e-cigarette companies continue to change and to influence the manufacturing, price, marketing and promotion, and distribution of e-cigarette products and accessories. The e-cigarette market continues to grow, with projected sales of \$3.5 billion in 2015. Consolidation of e-cigarette companies has been rapid, with the first major merger taking place in 2012. These mergers and acquisitions are likely to continue, but the rate of consolidation may slow down as sales of cigalettes decelerate, and “vape shops” could have the potential to influence the e-cigarette marketplace based

on the current structure of the marketplace and a regulatory landscape where federal regulation is just beginning to be implemented. All of these factors create additional uncertainties and risks for both the existing independent e-cigarette companies and the large cigarette companies. This chapter has shown that many of the marketing techniques used by e-cigarette companies are similar to those used by the tobacco industry for conventional cigarettes, and that awareness by youth and young adults of this marketing, and their levels of exposure to it, is high. Further, tracking marketing expenditures and product sales is difficult because of the rapidly changing venues, including “vape shops,” use of social media, and online advertising.

Conclusions

1. The e-cigarette market has grown and changed rapidly, with notable increases in total sales of e-cigarette products, types of products, consolidation of companies, marketing expenses, and sales channels.
2. Prices of e-cigarette products are inversely related to sales volume: as prices have declined, sales have sharply increased.
3. E-cigarette products are marketed in a wide variety of channels that have broad reach among youth and young adults, including television, point-of-sale, magazines, promotional activities, radio, and the Internet.
4. Themes in e-cigarette marketing, including sexual content and customer satisfaction, are parallel to themes and techniques that have been found to be appealing to youth and young adults in conventional cigarette advertising and promotion.

References

- Agaku IT, Ayo-Yusuf OA. The Effect of Exposure to Pro-Tobacco Advertising on Experimentation With Emerging Tobacco Products Among U.S. Adolescents. *Health Education and Behavior* 2014;41(3):275–80.
- Aitken PP, Eadie DR. Reinforcing effects of cigarette advertising on under-age smoking. *British Journal of Addiction* 1990;85(3):399–412.
- Aitken PP, Leather DS, O'Hagan FJ, Squair SI. Children's awareness of cigarette advertisements and brand imagery. *British Journal of Addiction* 1987;82(6):615–22.
- Ayers JW, Ribisl KM, Brownstein JS. Tracking the rise in popularity of electronic nicotine delivery systems (electronic cigarettes) using search query surveillance. *American Journal of Preventive Medicine* 2011;40(4):448–53.
- Banerjee S, Shuk E, Greene K, Ostroff J. Content analysis of trends in print magazine tobacco advertisements. *Tobacco Regulatory Science* 2015;1(2):103–20.
- Bannon R. *Lorillard, Inc. Reports Third Quarter Results*. Greensboro (NC): Lorillard Inc., 2013.
- Barboza D. China's e-cigarette boom lacks oversight for safety. *New York Times*, December 13, 2014; <<http://nyti.ms/1zNA4da>>; accessed: October 28, 2015.
- Bauld L, Angus K, de Andrade M. *E-Cigarette Uptake and Marketing: A Report Commissioned by Public Health England*. London (UK): Public Health England, 2014.
- Bettis K. E-cig maker Mistic shifts production from China to Greenville, 2014; <<http://www.newsobserver.com/news/local/article10078856.html>>; accessed: July 8, 2015.
- Bhatnagar A, Whitsel LP, Ribisl KM, Bullen C, Chaloupka F, Piano MR, Robertson RM, McAuley T, Goff D, Benowitz N. Electronic cigarettes: a policy statement from the American Heart Association. *Circulation* 2014;130(16):1418–36.
- Biener L, Siegel M. Tobacco marketing and adolescent smoking: more support for a causal inference. *American Journal of Public Health* 2000;90(3):407–11.
- blu eCigs. blu's coming to a city near you: plenty of engines revved at the Bank of America 500, 2014; <<http://www.blucigs.com/blus-coming-city-near/>>; accessed: January 20, 2016.
- Botvin EM, Botvin GJ, Michela JL, Baker E, Filazzola AD. Adolescent smoking behavior and the recognition of cigarette advertisements. *Journal of Applied Social Psychology* 1991;21(11):919–32.
- Botvin GJ, Goldberg CJ, Botvin EM, Dusenbury L. Smoking behavior of adolescents exposed to cigarette advertising. *Public Health Reports* 1993;108(2):217–24.
- Bour N. How many vape shops are there in the USA?, 2015; <<http://vapeenewsmagazine.com/november-2014/how-many-vape-shops-are-there-in-the-u-s-a/>>; accessed: April 19, 2015.
- Boxer B, Blumenthal R, Durbin D, Harkin T, Brown S, Markey EJ. Boxer, Blumenthal, Durbin, Harkin, Brown and Markey urge the Federal Trade Commission to investigate e-cigarette marketing practices: senators ask agency to protect public from deceptive health claims in advertising and marketing tactics targeting kids, 2013; <<https://www.boxer.senate.gov/press/release/boxer-blumenthal-durbin-harkin-brown-and-markey-urge-the-federal-trade-commission-to-investigate-e-cigarette-marketing-practices/>>; accessed: January 20, 2016.
- Brown CJ, Cheng JM. Electronic cigarettes: product characterisation and design considerations. *Tobacco Control* 2014;23(Suppl 2):ii4–ii10.
- Bryan M. Pot smoke and mirrors: vaporizer pens hide marijuana use, 2014; <<http://www.npr.org/sections/health-shots/2014/04/18/302992602/pot-smoke-and-mirrors-vaporizer-pens-hide-marijuana-use/>>; accessed: October 28, 2015.
- California Department of Public Health, California Tobacco Control Program. Healthy Stores for a Healthy Community, 2014; <<http://www.healthystoreshealthycommunity.com/>>; accessed: June 1, 2015.
- Campaign for Tobacco Free Kids. *The PACT Act. Preventing Illegal Internet Sales of Cigarettes & Smokeless Tobacco*, 2016; <<http://www.tobaccofreekids.org/research/factsheets/pdf/0361.pdf>>; accessed: July 1, 2016.
- Cantrell J, Emelle B, Ganz O, Hair EC, Vallone D. Rapid increase in e-cigarette advertising spending as Altria's MarkTen enters the marketplace. *Tobacco Control* 2016;25(e1):e16–e18.
- Car and Driver*. Adult smokers: if your car could talk [advertisement]. *Car and Driver*, 2014 February.
- Cataldo JK, Petersen AB, Hunter M, Wang J, Sheon N. E-cigarette marketing and older smokers: road to renormalization. *American Journal of Health Behavior* 2015;39(3):361–71.
- Centers for Disease Control and Prevention. State laws prohibiting sales to minors and indoor use of electronic nicotine delivery systems—United States,

- November 2014. *Morbidity and Mortality Weekly Report* 2014;63(49):1145–50.
- Centers for Disease Control and Prevention. Tobacco use among middle and high school students—United States, 2011–2014. *Morbidity and Mortality Weekly Report* 2015;64(14):381–5.
- Centers for Disease Control and Prevention. Tobacco use among middle and high school students—United States, 2011–2015. *Morbidity and Mortality Weekly Report* 2016a;65(14):361–7.
- Centers for Disease Control and Prevention. Vital signs: exposure to electronic cigarette advertising among middle school and high school students—United States, 2014. *Morbidity and Mortality Weekly Report* 2016b;64(52):1403–8.
- Chaloupka FJ, Tauras JA. The power of tax and price. *Tobacco Control* 2011;20(6):391–2.
- ChangeLab Solutions. *Local Strategies to Regulate Vape Shops & Lounges Law & Policy Innovation for the Common Good*. Oakland (CA): ChangeLab Solutions, 2014; <http://www.changelabsolutions.org/sites/default/files/Vapor_Lounges_FINAL_20140926_1.pdf>; accessed: September 16, 2015.
- Chapman R. *State Health Officer's Report on E-Cigarettes—A Community Health Threat*. Sacramento (CA): California Department of Public Health, California Tobacco Control Program, 2015.
- Chapman S, Fitzgerald B. Brand preference and advertising recall in adolescent smokers: some implications for health promotion. *American Journal of Public Health* 1982;72(5):491–4.
- Charlton A. Children's advertisement-awareness related to their views on smoking. *Health Education Journal* 1986;45:75–8.
- Cheney M, Gowin M, Wann TF. Marketing practices of vapor store owners. *American Journal of Public Health* 2015;105(6):e16–e21.
- Cheney MK, Gowin M, Wann TF. Vapor store owner beliefs and messages to customers. *Nicotine & Tobacco Research* 2016;18(5):694–9.
- Cobb NK, Brookover J, Cobb CO. Forensic analysis of online marketing for electronic nicotine delivery systems. *Tobacco Control* 2015;24(2):128–31.
- Coeytaux RR, Altman DG, Slade J. Tobacco promotions in the hands of youth. *Tobacco Control* 1995;4(3):253–57.
- CSP Daily News. New NJOY products will “bring vape national”: Herzog adds “new level of professionalism and marketing innovation” to category, 2014; <<http://www.cspnet.com/category-news/tobacco/articles/new-njoy-products-will-bring-vape-national-herzog>>; accessed: October 28, 2015.
- CSP Daily News. Reynolds consolidates Vuse manufacturing: all production of electronic cigarette brand shifts to Tobaccoville, N.C., facility, 2015; <<http://www.cspdailynews.com/category-news/tobacco/articles/reynolds-consolidates-vuse-manufacturing>>; accessed: June 30, 2016.
- Daniels M. The new Joe Camel in your pantry: marketing liquid nicotine to children with candy and cereal brands, 2015; <<https://firstfocus.org/wp-content/uploads/2015/10/The-New-Joe-Camel-in-Your-Pantry.pdf>>; accessed: January 20, 2016.
- de Andrade M, Hastings G, Angus K. Promotion of electronic cigarettes: tobacco marketing reinvented? *BMJ* 2013;347:f7473.
- Deans J. Super Bowl 2012 sets U.S. TV ratings record for third year running, 2012; <<http://www.theguardian.com/media/2012/feb/07/super-bowl-2012-tv-ratings-record>>; accessed: September 16, 2015.
- DiFranza JR, Richards JW, Paulman PM, Wolf-Gillespie N, Fletcher C, Jaffe RD, Murray D. RJR Nabisco's cartoon camel promotes camel cigarettes to children. *JAMA: the Journal of the American Medical Association* 1991;266(22):3149–53.
- Discount Coupons for blu. Facebook page, n.d.; <<https://www.facebook.com/BluCigs.CouponsCode.Promos.Discount.FreeShipping/>>; accessed: January 20, 2016.
- Duke JC, Lee YO, Kim AE, Watson KA, Arnold KY, Nonnemaker JM, Porter L. Exposure to electronic cigarette television advertisements among youth and young adults. *Pediatrics* 2014;134(1):e29–e36.
- Durbin R, Waxman H, Harkin T, Rockefeller JD, Blumenthal R, Markey EJ, Brown S, Reed J, Boxer B, J. M, et al. Gateway to addiction? A survey of popular electronic cigarette manufacturers and targeted marketing to youth, 2014; <<http://www.durbin.senate.gov/imo/media/doc/Report%20-%20E-Cigarettes%20with%20Cover.pdf>>; accessed: January 20, 2016.
- Emery SL, Vera L, Huang J, Szczypka G. Wanna know about vaping? Patterns of message exposure, seeking and sharing information about e-cigarettes across media platforms. *Tobacco Control* 2014;23(Suppl 3):iii17–iii25.
- Esquire*. Take back your freedom [advertisement]. *Esquire*, 2014 March.
- Esterl M. Got a light—er charger? Big tobacco's latest buzz, 2012; <<http://www.wsj.com/articles/SB10001424052702304723304577365723851497152>>; accessed: September 16, 2015.
- Evans N, Farkas A, Gilpin E, Berry C, Pierce JP. Influence of tobacco marketing and exposure to smokers on adolescent susceptibility to smoking. *Journal of the National Cancer Institute* 1995;87(20):1538–45.
- Farrelly MC, Duke J, Crankshaw E, Eggers ME, Lee YC, Nonnemaker J, Kim A, Porter L. A randomized trial of the effect of e-cigarette television ads on intentions

- to use e-cigarettes. *American Journal of Preventive Medicine* 2015;49(5):686–93.
- Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: a systematic review. *Therapeutic Advances in Drug Safety* 2014;5(2):67–86.
- Farsalinos KE, Romagna G, Tsiapras D, Kyrzopoulos S, Voudris V. Characteristics, perceived side effects and benefits of electronic cigarette use: a worldwide survey of more than 19,000 consumers. *International Journal of Environmental Research and Public Health* 2014;11(4):4356–73.
- Federal Register. Federal Trade Commission. Agency information collection activities; proposed collection; comment request, 80 *Fed. Reg.* 207, 2015.
- Federal Register. U.S. Department of Health and Human Services, Food and Drug Administration. Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act, as Amended by the Family Smoking Prevention and Tobacco Control Act; Restrictions on the Sale and Distribution of Tobacco Products and Required Warning Statements for Tobacco Products. 81 *Fed. Reg.* 28974 (2016); <<https://federal-register.gov/a/2016-10685>>; accessed: May 16, 2016.
- Federal Trade Commission. *Cigarette Report for 2012*. Washington (DC): Federal Trade Commission, 2015a.
- Federal Trade Commission. *Smokeless Tobacco Report for 2012*. Washington (DC): Federal Trade Commission, 2015b.
- Feighery EC, Henriksen L, Wang Y, Schleicher NC, Fortmann SP. An evaluation of four measures of adolescents' exposure to cigarette marketing in stores. *Nicotine & Tobacco Research* 2006;8(6):751–9.
- FIN Electronic Cigarettes. Cost, n.d.; <<http://www.fincigs.com/blog/e-cigarette-cost/>>; accessed: February 19, 2016.
- Freeman B, Chapman S. Is “YouTube” telling or selling you something? Tobacco content on the YouTube video-sharing website. *Tobacco Control* 2007;16(3):207–10.
- Ganz O, Cantrell J, Moon-Howard J, Aidala A, Kirchner TR, Vallone D. Electronic cigarette advertising at the point-of-sale: a gap in tobacco control research. *Tobacco Control* 2015;24(e1):e110–e112.
- Gilpin EA, Pierce JP. Trends in adolescent smoking initiation in the United States: is tobacco marketing an influence? *Tobacco Control* 1997;6(2):122–7.
- Giovenco DP, Hammond D, Corey CG, Ambrose BK, Delnevo CD. E-cigarette market trends in traditional U.S. retail channels, 2012–2013. *Nicotine & Tobacco Research* 2015;17(10):1279–83.
- Glynn TJ. E-cigarettes and the future of tobacco control. *CA: A Cancer Journal for Clinicians* 2014;64(3):164–8.
- Goldstein AO, Fischer PM, Richards JW, Jr., Creten D. Relationship between high school student smoking and recognition of cigarette advertisements. *Journal of Pediatrics* 1987;110(3):488–91.
- Goniewicz ML, Kuma T, Gawron M, Knysak J, Kosmider L. Nicotine levels in electronic cigarettes. *Nicotine & Tobacco Research* 2013a;15(1):158–66.
- Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: an Internet survey. *Drug and Alcohol Review* 2013b;32(2):133–40.
- Grace RC, Kivell BM, Laugesen M. Estimating cross-price elasticity of e-cigarettes using a simulated demand procedure. *Nicotine & Tobacco Research* 2015;17(5):592–8.
- Grana R, Benowitz N, Glantz S. *Background paper on e-cigarettes (electronic nicotine delivery systems)*. San Francisco (CA): University of California, San Francisco, Center for Tobacco Control Research and Education, 2013.
- Grana RA, Benowitz N, Glantz SA. E-cigarettes: a scientific review. *Circulation* 2014;129(19):1972–86.
- Grana RA, Glantz SA, Ling PM. Electronic nicotine delivery systems in the hands of Hollywood. *Tobacco Control* 2011;20(6):425–6.
- Grana RA, Ling PM. “Smoking revolution:” a content analysis of electronic cigarette retail websites. *American Journal of Preventive Medicine* 2014;46(4):395–403.
- Green Smoke E-Vapor. Which nicotine level?, n.d.; <<https://www.greensmoke.com/ecig-info/which-nicotine-level.html>>; accessed: January 27, 2016.
- Hahn EJ, Begley K, Gokun Y, Johnson AO, Mundy ME, Rayens MK. Electronic cigarette retail outlets and proximity to schools. *American Journal of Health Promotion* 2015;29(6):380–3.
- Hastings GB, Ryan H, Teer P, MacKintosh AM. Cigarette advertising and children's smoking: why Reg was withdrawn. *BMJ* 1994;309(6959):933–7.
- Hodge JG Jr, Collmer V, Orenstein DG, Millea C, Van Buren L. Reconsidering the legality of cigarette smoking advertisements on television public health and the law. *Journal of Law, Medicine and Ethics* 2013;41(1):369–73.
- Honig Z. The Supersmoker Bluetooth pairs an electronic cigarette with a speakerphone, 2014; <<http://www.engadget.com/2014/02/19/supersmoker-bluetooth/>>; accessed: October 28, 2015.
- Hsu R, Myers AE, Ribisl KM, Marteau TM. An observational study of retail availability and in-store marketing of e-cigarettes in London: potential to undermine recent tobacco control gains? *BMJ Open* 2013;3(12):e004085.
- Huang J, Chaloupka FJ. Rapidly Changing Electronic Nicotine Delivery Systems (ENDS) Market (working

- paper). Chicago (IL): University of Illinois at Chicago, in press.
- Huang J, Kornfield R, Szczypka G, Emery SL. A cross-sectional examination of marketing of electronic cigarettes on Twitter. *Tobacco Control* 2014a;23(Suppl 3):iii26–iii30.
- Huang J, Tauras J, Chaloupka FJ. The impact of price and tobacco control policies on the demand for electronic nicotine delivery systems. *Tobacco Control* 2014b;23(Suppl 3):iii41–iii47.
- International Agency for Research on Cancer. *Effectiveness of Tax and Price Policies for Tobacco Control*. IARC Handbooks of Cancer Prevention in Tobacco Control, Vol. 14. Lyon (France): International Agency for Research on Cancer, 2011.
- Jo CL, Kornfield R, Kim Y, Emery S, Ribisl KM. Price-related promotions for tobacco products on Twitter. *Tobacco Control* 2016;25(4):476–9.
- Johnson Creek Vapor Company. New global headquarters [blog post], 2011; <<http://smokejuice.tumblr.com/post/69172777938/new-global-headquarters>>; accessed: November 18, 2015.
- Jourdan A. “Vaping” a slow burner in China, world’s maker of e-cigarettes, 2014; <<http://www.reuters.com/article/2014/01/15/us-china-smoking-idUSBREA0E1JX20140115>>; accessed: October 28, 2015.
- Kamerow D. The battle between big tobacco and vape shops. *British Medical Journal* 2014;349:g5810.
- Khan T, Barker DC, Quinn CM, Huang J, Chaloupka FJ. *Changes in E-Cigarette Availability Over Time in the United States: 2010–2012—A BTG Research Brief*. Chicago (IL): Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago, 2014.
- Kim AE, Arnold KY, Makarenko O. E-cigarette advertising expenditures in the U.S., 2011–2012. *American Journal of Preventive Medicine* 2014;46(4):409–12.
- Kim AE, Lieberman AJ, Dench D. Crowdsourcing data collection of the retail tobacco environment: case study comparing data from crowdsourced workers to trained data collectors. *Tobacco Control* 2015;24(e1):e6–e9.
- King AC, Smith LJ, McNamara PJ, Matthews AK, Fridberg DJ. Passive exposure to electronic cigarette (e-cigarette) use increases desire for combustible and e-cigarettes in young adult smokers. *Tobacco Control* 2015;24(5):501–4.
- Klein K. Healthy markups on e-cigarettes turn vacant storefronts into ‘vape shops’, 2013; <<http://www.bloomberg.com/bw/articles/2013-10-03/healthy-markups-on-e-cigarettes-turn-vacant-storefronts-into-vape-shops>>; accessed: September 16, 2015.
- Klitzner M, Gruenewald PJ, Bamberger E. Cigarette advertising and adolescent experimentation with smoking. *British Journal of Addiction* 1991;86(3):287–98.
- Kornfield R, Huang J, Vera L, Emery SL. Rapidly increasing promotional expenditures for e-cigarettes. *Tobacco Control* 2015;24(2):110–1.
- Kress M. RAI gives sneak peek of VUSE’s next generation tobacco company unveils four “truly game-changing innovations”, 2015; <<http://www.csnews.com/product-categories/tobacco/rai-reveals-next-gen-vuse-products>>; accessed: January 14, 2016.
- Krishnan-Sarin S, Morean ME, Camenga DR, Cavallo DA, Kong G. E-cigarette use among high school and middle school adolescents in Connecticut. *Nicotine & Tobacco Research* 2015;17(7):810–8.
- Lam TH, Chung SF, Betson CL, Wong CM, Hedley AJ. Tobacco advertisements: one of the strongest risk factors for smoking in Hong Kong students. *American Journal of Preventive Medicine* 1998;14(3):217–23.
- Lee JG, Henriksen L, Myers AE, Dauphinee AL, Ribisl KM. A systematic review of store audit methods for assessing tobacco marketing and products at the point of sale. *Tobacco Control* 2014;23(2):98–106.
- Lee YO, Kim AE. ‘Vape shops’ and ‘e-cigarette lounges’ open across the USA to promote ENDS. *Tobacco Control* 2015;24(4):410–2.
- Legacy for Health. *Vaporized: E-Cigarettes, Advertising, and Youth*. Washington (DC): Legacy for Health, 2014.
- Lenhart A. Teen, social media and technology overview 2015, 2015; <http://www.pewinternet.org/files/2015/04/PI_TeensandTech_Update2015_0409151.pdf>; accessed: January 27, 2016.
- Linarch Information Solutions. *U.S. Electronic Cigarettes Market 2011–2015*. Bangalore (India): Linarch Information Solutions Pvt. Ltd., 2012.
- Luo C, Zheng X, Zeng DD, Leischow S. Portrayal of electronic cigarettes on YouTube. *BMC Public Health* 2014;14:1028.
- Maloney EK, Cappella JN. Does vaping in e-cigarette advertisements affect tobacco smoking urge, intentions, and perceptions in daily, intermittent, and former smokers? *Health Communication* 2016;31(1):129–38.
- Mantey DS, Cooper MR, Clendennen SL, Pasch KE, Perry CL. E-Cigarette marketing exposure is associated with e-cigarette use among U.S. youth. *Journal of Adolescent Health* 2016;58:686–90.
- Maxim. 2012 only comes once: make the switch to Blu electronic cigarettes [advertisement]. *Maxim*, 2012 January.
- McConnell M. White Cloud cigarettes moves cartridge production to the USA, 2014; <<http://www.electroniccigaretteconsumerreviews.com/white-cloud-cigarettes-moves-cartridge-production-to-the-usa/>>; accessed: July 8, 2015.
- McNeill AD, Jarvis MJ, West RJ. Brand preferences among schoolchildren who smoke. *Lancet* 1985;2(8449):271–2.

- Men's Journal*. TRYST electronic smoking products: savor the secret [advertisement]. *Men's Journal*, 2014 March.
- Morean ME, Kong G, Camenga DR, Cavallo DA, Krishnan-Sarin S. High school students' use of electronic cigarettes to vaporize cannabis. *Pediatrics* 2015;136(4):611–6.
- National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use*. Smoking and Tobacco Control Monograph No. 19. Bethesda (MD): U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, 2008. NIH Publication No. 07-6242.
- National Conference of State Legislatures. Alternative nicotine products/electronic cigarettes, 2015; <<http://www.ncsl.org/research/health/alternative-nicotine-products-e-cigarettes.aspx>>; accessed: September 16, 2015.
- O'Connell DL, Alexander HM, Dobson AJ, Lloyd DM, Hards GR, Springthorpe HJ, Leeder SR. Cigarette smoking and drug use in schoolchildren. II. Factors associated with smoking. *International Journal of Epidemiology* 1981;10(3):223–31.
- Paek HJ, Kim S, Hove T, Huh JY. Reduced harm or another gateway to smoking? Source, message, and information characteristics of e-cigarette videos on YouTube. *Journal of Health Communication* 2014;19(5):545–60.
- Pepper JK, Emery SL, Ribisl KM, Southwell BG, Brewer NT. Effects of advertisements on smokers' interest in trying e-cigarettes: the roles of product comparison and visual cues. *Tobacco Control* 2014a;23(Suppl 3):iii31–iii36.
- Pepper JK, Ribisl KM, Emery SL, Brewer NT. Reasons for starting and stopping electronic cigarette use. *International Journal of Environmental Research and Public Health* 2014b;11(10):10345–61.
- Pierce JP, Choi WS, Gilpin EA, Farkas AJ, Berry CC. Tobacco industry promotion of cigarettes and adolescent smoking. *JAMA: the Journal of the American Medical Association* 1998;279(7):511–5.
- Pierce JP, Gilpin E, Burns DM, Whalen E, Rosbrook B, Shopland D, Johnson M. Does tobacco advertising target young people to start smoking? Evidence from California. *JAMA: the Journal of the American Medical Association* 1991;266(22):3154–8.
- Pierce JP, Gilpin EA. A historical analysis of tobacco marketing and the uptake of smoking by youth in the United States: 1890–1977. *Health Psychology* 1995;14(6):500–8.
- Pierce JP, Lee L, Gilpin EA. Smoking initiation by adolescent girls, 1944 through 1988. An association with targeted advertising. *JAMA: the Journal of the American Medical Association* 1994;271(8):608–11.
- Pokhrel P, Fagan P, Kehl L, Herzog TA. Receptivity to e-cigarette marketing, harm perceptions, and e-cigarette use. *American Journal of Health Behavior* 2015;39(1):121–31.
- Pollay RW, Siddarth S, Siegel M, Haddix A, Merritt RK, Giovino GA, Eriksen MP. The last straw? Cigarette advertising and realized market shares among youths and adults, 1979–1993. *Journal of Marketing* 1996;60(2):1–16.
- Popken B. Inside the vaper's den: e-cig salvation, and new dangers, 2014; <<http://www.nbcnews.com/business/consumer/inside-vapers-den-e-cig-salvation-new-dangers-n150056>>; accessed: January 20, 2016.
- Potts H, Gillies P, Herbert M. Adolescent smoking and opinion of cigarette advertisements. *Health Education Research* 1986;1:195–201.
- PRNewswire. blu Cigs “smokes” the competition: sponsors NASCAR Sprint Cup driver Mike Bliss in Coca-Cola 600 Memorial Day weekend race, 2011; <<http://www.prnewswire.com/news-releases/blu-cigs-smokes-the-competition-sponsors-nascar-sprint-cup-driver-mike-bliss-in-coca-cola-600-memorial-day-weekend-race-122677683.html>>; accessed: January 20, 2016.
- PRNewswire. blu eCigs announces sponsorship of Sasquatch! Music Festival, 2013; <<http://www.prnewswire.com/news-releases/blu-ecigs-announces-sponsorship-of-sasquatch-music-festival-208127521.html>>; accessed: January 20, 2016.
- Ribisl KM. The potential of the Internet as a medium to encourage and discourage youth tobacco use. *Tobacco Control* 2003;12(Suppl 1):i48–i59.
- Richards JW, DiFranza JR, Fletcher C, Fischer PM. RJ Reynolds' “Camel cash”: another way to reach kids. *Tobacco Control* 1995;4(3):258–60.
- Richardson A, Ganz O, Stalgaitis C, Abrams D, Vallone D. Noncombustible tobacco product advertising: how companies are selling the new face of tobacco. *Nicotine & Tobacco Research* 2014;16(5):606–14.
- Richardson A, Ganz O, Vallone D. Tobacco on the web: surveillance and characterisation of online tobacco and e-cigarette advertising. *Tobacco Control* 2015;24(4):341–7.
- Richtel M. E-cigarette makers are in an arms race for exotic vapor flavors. *New York Times*, July 15, 2014a; <http://www.nytimes.com/2014/07/16/business/e-cigarette-makers-are-in-an-arms-race-for-exotic-vapor-flavors.html?smid=pl-share&_r=0>; accessed: October 28, 2015.
- Richtel M. E-cigarettes, by other names, lure young and worry experts. *New York Times*, March 4, 2014b; <http://www.nytimes.com/2014/03/05/business/e-cigarettes-under-aliases-elude-the-authorities.html?_r=0>; accessed: July 27, 2015.
- Richtel M. Selling a poison by the barrel: liquid nicotine for e-cigarettes. *New York Times*, March 24,

- 2014c; <http://www.nytimes.com/2014/03/24/business/selling-a-poison-by-the-barrel-liquid-nicotine-for-e-cigarettes.html?_r=1>; accessed: January 20, 2016.
- Rolling Stone*. Filthy. Stinking. Rich [advertisement]. *Rolling Stone*, 2012 May.
- Rolling Stone*. Resolution solution: cigarettes, you've met your match [advertisement]. *Rolling Stone*, 2013 January.
- Rolling Stone*. Meet the Cloud Pen family [advertisement]. *Rolling Stone*, 2015 May.
- Rose SW, Barker DC, D'Angelo H, Khan T, Huang J, Chaloupka FJ, Ribisl KM. The availability of electronic cigarettes in U.S. retail outlets, 2012: results of two national studies. *Tobacco Control* 2014;23(Suppl 3):iii10–iii16.
- Rossiter JR, Bellman S. *Marketing Communications: Theory and Applications*. Frenchs Forest, New South Wales (Australia): Prentice-Hall, 2005.
- Saitta D, Ferro GA, Polosa R. Achieving appropriate regulations for electronic cigarettes. *Therapeutic Advances in Chronic Disease* 2014;5(2):50–61.
- Sanders-Jackson A, Parikh NM, Schleicher NC, Fortmann SP, Henriksen L. Convenience store visits by U.S. adolescents: rationale for healthier retail environments. *Health Place* 2015a;34:63–6.
- Sanders-Jackson AN, Tan AS, Bigman CA, Henriksen L. Knowledge about e-cigarette constituents and regulation: results from a national survey of U.S. young adults. *Nicotine & Tobacco Research* 2015b;17(10):1247–54.
- Schooler C, Feighery E, Flora JA. Seventh graders' self-reported exposure to cigarette marketing and its relationship to their smoking behavior. *American Journal of Public Health* 1996;86(9):1216–21.
- Seidenberg AB, Jo CL, Ribisl KM. Differences in the design and sale of e-cigarettes by cigarette manufacturers and non-cigarette manufacturers. *Tobacco Control* 2016;25(e1):e3–e5.
- Sethuraman R, Tellis GJ, Briesch RA. How well does advertising work? Generalizations from meta-analysis of brand advertising elasticities. *Journal of Marketing Research* 2011;48(3):457–71.
- Slade J, Altman D, Coeytaux R. Teenagers participate in tobacco promotions. In: Slama K, editor. *Tobacco and Health*. New York: Plenum Press, 1995:937–8.
- Soap Opera Digest*. Some choices are hard . . . This is easy [advertisement]. *Soap Opera Digest*, 2013 July.
- State of California v. Sottera, Inc.*, Stipulated consent judgment, 2010; <http://oag.ca.gov/sites/all/files/agweb/pdfs/tobacco/sottera_stip_consent_judgment.pdf?>; accessed: October 29, 2015.
- Spielman A, Azer V. E-cigarettes. In: *Disruptive Innovation: Ten Things to Stop and Think About*. Report Series, Issue 15. Citigroup: Global Perspectives & Solutions, 2013; <<https://www.citivelocity.com/citigps/ReportSeries.action?recordId=17>>; accessed: September 16, 2015.
- Spin*. Dear smoking ban [advertisement]. *Spin*, 2012 January.
- Sports Illustrated*. Slim. Charged. Ready to go. [advertisement]. *Sports Illustrated*, 2014 February.
- Stanford Research into the Impact of Tobacco Advertising. Electronic cigarettes, n.d.a.; <http://tobacco.stanford.edu/tobacco_main/ecigs.php>; accessed: November 15, 2015.
- Stanford Research into the Impact of Tobacco Advertising. Fifty-One premier electronic smoking device: healthy alternative, smoke anywhere, n.d.b.; <http://tobacco.stanford.edu/tobacco_main/images_ecigs.php?token2=fm_ecigs_st361.php&token1=fm_ecigs_img16969.php&theme_file=fm_ecigs_mt036.php&theme_name=Healthier&subtheme_name=Healthy>; accessed: February 18, 2016.
- Sussman S, Baezconde-Garbanati L, Garcia R, Barker DC, Samet JM, Leventhal A, Unger JB. Commentary: forces that drive the vape shop industry and implications for the health professions. *Evaluation and the Health Professions* 2016;39(3):379–8.
- Sussman S, Garcia R, Cruz TB, Baezconde-Garbanati L, Pentz MA, Unger JB. Consumers' perceptions of vape shops in Southern California: an analysis of online Yelp reviews. *Tobacco Induced Diseases* 2014;12(1):22.
- Tan AS, Bigman CA, Mello S, Sanders-Jackson A. Is exposure to e-cigarette communication associated with perceived harms of e-cigarette secondhand vapour? Results from a national survey of U.S. adults. *BMJ Open* 2015a;5(3):e007134.
- Tan AS, Bigman CA, Sanders-Jackson A. Sociodemographic correlates of self-reported exposure to e-cigarette communications and its association with public support for smoke-free and vape-free policies: results from a national survey of U.S. adults. *Tobacco Control* 2015b;24(6):574–81.
- Trumbo CW, Kim SJ. The effect of electronic cigarette advertising on intended use among college students. *Addictive Behaviors* 2015;46:77–81.
- Truth Initiative. Vaporized: youth and young adult exposure to e-cigarette marketing, 2015; <<http://truthinitiative.org/sites/default/files/Vaporized%20-%201%204%2016.pdf>>; accessed: January 21, 2016.
- U.S. Congress. *Cigarette, E-Cigarette, and Other Tobacco Product Advertisements and Imagery in Magazines with Large Numbers of Teen Readers*, 2014; <<http://democrats.energycommerce.house.gov/sites/default/files/documents/Report-Tobacco-Magazine-Advertising-2014-9-24.pdf>>; accessed: July 26, 2015.

- U.S. Department of Health and Human Services. *Reducing Tobacco Use. A Report of the Surgeon General*. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2000.
- U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012.
- Unger JB, Johnson CA, Rohrbach LA. Recognition and liking of tobacco and alcohol advertisements among adolescents: relationships with susceptibility to substance use. *Preventive Medicine* 1995;24(5):461–6.
- Unger JB, Schuster D, Zogg J, Dent CW, Stacy AW. Alcohol advertising exposure and adolescent alcohol use: a comparison of exposure measures. *Addiction Research and Theory* 2003;11(3):177–93.
- Vapor4Life. Facebook page, n.d.; <<https://www.facebook.com/OfficialV4L>>; accessed: January 20, 2016.
- Villanti AC, Richardson A, Vallone DM, Rath JM. Flavored tobacco product use among U.S. young adults. *American Journal of Preventive Medicine* 2013;44(4):388–91.
- Wagoner KG, Song EY, Egan KL, Sutfin EL, Reboussin BA, Spangler J, Wolfson M. E-cigarette availability and promotion among retail outlets near college campuses in two southeastern states. *Nicotine & Tobacco Research* 2014;16(8):1150–5.
- Wells Fargo Securities. *Tobacco Talk: Q3 U.S. Vapor Retailer Survey—Vapor Category Growth Remains Robust but Moderating Slightly in C-Stores*. Equity Research. San Francisco (CA): Wells Fargo Securities, October 1, 2014a.
- Wells Fargo Securities. *A Vaping State Of Mind—E-Cig/Vapor Fireside Chats: Detailed Takeaways from Our 2nd Annual E-Cig Conference in NYC*. Equity Research. San Francisco (CA): Wells Fargo Securities, November 25, 2014b.
- Wells Fargo Securities. *Nielsen: Tobacco “All Channel” Data Cig Pricing Remains Strong; E-Cig \$ Sales Growth Re-Accelerates*. Equity Research. San Francisco (CA): Wells Fargo Securities, March 31, 2015a.
- Wells Fargo Securities. *Tobacco Talk: Independent Vapor Mfr. Survey: More Bullish Than Retailers—Suggesting Vapor Growth Remains Robust*. Equity Research. San Francisco (CA): Wells Fargo Securities, January 23, 2015b.
- Wells Fargo Securities. *Tobacco Talk: Q4 U.S. Vapor Retailer Survey—Wake Up Call! Action Needed To Keep Vapor Category Momentum Alive*. San Francisco (CA): Wells Fargo Securities, January 22, 2015c.
- Williams RS, Derrick J, Ribisl KM. Electronic cigarette sales to minors via the Internet. *JAMA Pediatrics* 2015;169(3):e1563.
- Williams RS, Derrick J, Richardson A, Ribisl KM. Surveillance of the sales and marketing practices of Internet e-cigarette vendors: a content analysis of 281 websites. In press.
- Zhu SH, Sun JY, Bonnevie E, Cummins SE, Gamst A, Yin L, Lee M. Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation. *Tobacco Control* 2014;23(Suppl 3):iii3–iii9.

