

# Frequency of and responses to illegal activity related to commerce in firearms: findings from the Firearms Licensee Survey

Garen J Wintemute

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/injuryprev-2012-040715>).

## Correspondence to

Dr Garen J Wintemute,  
Department of Emergency  
Medicine, School of Medicine,  
University of California,  
Sacramento, CA 95817, USA;  
[gjwintemute@ucdavis.edu](mailto:gjwintemute@ucdavis.edu)

Received 20 November 2012

Revised 25 January 2013

Accepted 13 February 2013

## ABSTRACT

**Background** Firearms may be obtained illegally from federally-licensed dealers and pawnbrokers through surrogate (straw) purchases, undocumented purchases and theft. Some retailers knowingly make illegal sales.

**Objective** To obtain information about the frequency of and risk factors for these events, and retailers' reactions to them, directly from licensed retailers.

**Methods** Survey of a random sample of 1601 licensed dealers and pawnbrokers in 43 states who were believed to sell  $\geq 50$  firearms annually, conducted by mail during June–August 2011.

**Results** The response rate was 36.9%, typical of establishment surveys using such methods. In the preceding year, 67.3% of respondents experienced attempted straw purchases; 42.4% experienced undocumented purchase attempts. For each event, 10% reported  $\geq 1$  occurrence/month. A quarter (25.6%) experienced firearm theft in the preceding 5 years. Pawnbroker status, sales volume, denied sales and sales of firearms that were subsequently traced by law enforcement were associated with all outcomes in multivariate analysis. Estimates of retailer involvement in illegal sales (median 3%, IQR 1–10%) were related in multivariate analysis to respondents' age and sex, and to denied sales. In a hypothetical case involving 50 illegal sales, respondents recommended prolonged incarceration (median 10 years, IQR 5–20 years) and a substantial fine (median \$50 000, IQR \$10 000–\$250 000) for retailers and made similar recommendations for buyers.

**Conclusions** Attempts to acquire firearms illegally from licensed dealers and pawnbrokers are common. Characteristics associated with frequency of occurrence may facilitate prevention efforts. Licensed retailers consider selling and buying firearms illegally to be serious crimes.

## INTRODUCTION

There were an estimated 478 422 firearm-related violent crimes in the USA in 2011, including 11 101 homicides; 55 544 firearm-related assaults required treatment in hospital emergency departments.<sup>1–3</sup> Criminal users may obtain firearms from federally licensed retail establishments such as dealers and pawnbrokers, either directly through purchase<sup>4 5</sup> or theft,<sup>6–8</sup> or indirectly through surrogate or 'straw' purchases.<sup>6–11</sup> While some retailers knowingly participate in illegal firearm sales,<sup>6 7 10 12–14</sup> others refuse or act to prevent them and report suspicious activity to law enforcement.<sup>6 10 13–15</sup>

Efforts to identify licensees who might be important 'point sources'<sup>16 17</sup> of firearms used in

crime have focused in part on those who (1) disproportionately sell firearms that are later recovered by law enforcement and subjected to ownership tracing by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and (2) frequently have sales denied because the purchasers are prohibited persons.<sup>17–21</sup> These attributes may reflect clientele or community characteristics that a licensee cannot control, a licensee's willingness to engage in suspect activity, or both.

Research on illegal activity related to commerce in firearms has left important gaps unfilled. Other than for attempted purchases by prohibited persons, there are no data on the frequency of attempts to purchase firearms illegally from retail licensees or on licensees' reactions to such attempts. There are no estimates of the prevalence of participation in illegal firearm sales among retail licensees or assessments of what might motivate such behaviour, of how seriously it should be sanctioned, or of what might underlie disproportionate sales of traced firearms.

We conducted the Firearms Licensee Survey in 2011 to gather such information. Our target population was the owners, managers or other senior executives of federal firearms licensees that were actively engaged in retail firearm sales. An initial report<sup>22</sup> detailed the characteristics of the respondents and their business establishments, including self-reported frequencies of firearm traces and denied sales; we incorporate data from that report in this analysis.

## METHODS

The design and execution of the survey are described elsewhere,<sup>22</sup> and summarised here. We use 'retailer' only to refer to an individual person.

### Identifying the study population

We used the February 2011 roster of federal firearms licensees<sup>23</sup> to identify 55 020 retail licensees: dealers and gunsmiths (type 01 licenses), and pawnbrokers (type 02 licenses). We restricted study eligibility to the 9720 licensees who sold an estimated 50 or more firearms annually, based on data supplied by the Federal Bureau of Investigation (see online supplementary material). These data were not available for licensees in seven states. A random sample of 1601 licensees in the 43 remaining states, stratified by license type, was drawn using PROC SURVEYSAMPLE in SAS software.<sup>24</sup> The sample size provided 95% CIs of  $\pm 3\%$  when equal proportions of respondents provided alternate responses to questions with two possible answers and the response rate was 60%.<sup>25</sup>

To cite: Wintemute GJ. *Inj Prev* Published Online First: [please include Day Month Year] doi:10.1136/injuryprev-2012-040715

### Questionnaire design

We followed recommendations made by Dillman *et al* (see online supplementary material).<sup>25 26</sup> Subjects were asked how often in the past year their firearms business had a customer 'who, in the salesperson's judgment, was trying to do a straw purchase' or, separately, 'who wanted to buy a gun without filling out an ATF Form 4473 ... or without having a background check when one was required'. *Straw purchase* was defined in the questionnaire. Subjects were then asked, again in separate questions, how often their business had 'refuse[d] to complete a gun sale', had 'contact[ed] local law enforcement or ATF to report concerns' or had 'contact[ed] another retailer to give them a "heads up" because a customer was apparently "trying to make an illegal purchase"'. Response options ranged from 'several times a week' to 'never'. To capture theft, subjects were asked, 'Over the past 5 years, has anyone stolen guns from your business inventory?'

Illegal activity among retailers was introduced by citing an article in an industry periodical<sup>27</sup> 'about what they called "bad apple" retailers, operating outside the law, who give a black eye to firearms retailers in general'. Subjects were asked, 'In your opinion, what percentage of licensed retailers might be "bad apples" who participate knowingly in illegal gun sales?' and 'When a straw purchase is taking place, about what percentage of the time, in your opinion, does the salesperson either strongly suspect or know for certain about it, but sell the gun anyway?'

A question array followed: 'In your opinion, how important is each of the following reasons in a retailer's decision to participate knowingly in illegal gun sales?' Each of five reasons could be ranked as 'very important', 'somewhat important' or 'not at all important'.

Subjects were asked to recommend sentencing for 'a licensed retailer who has just been convicted of knowingly making 50 illegal gun sales to a gun trafficking operation' and, in a parallel question earlier in the questionnaire, 'an individual who has just been convicted of buying 50 guns from licensed retailers as part of a gun trafficking operation'. The quantity 50 firearms was chosen as a round number approximating the median number of firearms (42) linked to trafficking cases that involve licensed retailers.<sup>6</sup> Both scenarios specified that the convicted person had no prior offences. The sentence could include a fine, incarceration, or both. The answer fields were free-text (response options were not provided).

Finally, a question array proposed five reasons why 'a retailer has more gun traces than would be expected from the number of guns he sells'. Each reason could be ranked as described above.

Respondents also provided data on personal demographics and establishment characteristics, including the number and types of firearms sold, denied sales and trace requests.

### Survey implementation

We conducted the survey by mail, following procedures developed by Dillman *et al*,<sup>25</sup> beginning 16 June 2011 (see online supplementary material). This time of slower business activity<sup>28</sup> was chosen to improve the response rate.

The survey protocol required up to three questionnaire mailings; we included a cash incentive in the first. We sent personalised letters to the chief executive or regulatory officer of the 25 corporations with more than one licensee in our sample, requesting that they authorise store managers to participate.

### Data management and statistical analysis

We determined response and refusal rates and questionnaire completeness using established guidelines.<sup>29</sup> The response rate

was the percentage of subjects in the sample who returned filled-out questionnaires. Complete questionnaires provided answers to >80% of questions, partial questionnaires to 50–80% and break-off questionnaires to <50%.

Respondents known not to be owners, managers or other senior executives (n=21, of whom 18 were salespeople) or of undetermined status (n=27) were excluded from analyses of respondents' opinions, such as on motivations for participation in illegal activity.

Responses regarding the frequency of attempted illegal purchases were summed to estimate overall frequency (see online supplementary material) and collapsed from seven strata to four for further analysis. Continuous variables were summarised by medians with IQRs and stratified into quartiles, to minimise effects due to outliers and clustering.

Descriptive analyses used the Pearson or Mantel–Haenszel  $\chi^2$  test to assess significance. We used binary and ordinal logistic regression, expressing results as ORs with 95% CIs, to model associations between outcome and explanatory variables. For multivariable models, variables with  $p < 0.20$  in bivariate regression were entered into an initial model, with elimination in order of decreasing  $p$  until remaining variables had  $p \leq 0.10$ ;  $p < 0.05$  was taken as the threshold for statistical significance. Analyses were performed using SAS V.9.1.3 for Windows.<sup>24</sup>

### RESULTS

The response rate was 36.9% (591 of 1601). Of returned questionnaires, 96.3% were complete and 3.7% were partial. Individual question completion rates were >90% except for questions regarding sentencing (86.9–88.0%). Response rates for dealers and pawnbrokers were similar: 37.2% and 36.3%, respectively ( $p = 0.75$ ). The response rate for employees of corporate/multi-site licensees (19.7%) was less than half that for employees of corporate/single site licensees (41.1%) or licensees who were named individual persons (40.5%),  $p < 0.0001$ . Further detail is reported elsewhere.<sup>22</sup>

### Illegal events and responses to them

This section presents results for incidents occurring at respondents' business establishments; all 591 respondents are included.

Approximately 10% of respondents reported attempted straw purchases and undocumented purchases occurring at least once a month; 67.3% had experienced at least one attempted straw purchase, and 42.4% at least one attempted undocumented purchase, in the year preceding the survey (table 1). Frequencies of the two events varied in parallel (see online supplementary appendix figure 1). Altogether, respondents reported an estimated 2051 attempted straw purchases (range 1726–2642) and 2244 attempted undocumented purchases (range 1800–3454) during the year. Pawnbrokers experienced both events more frequently than dealers did ( $p < 0.0001$ , table 1). Firearm theft in the preceding 5 years was reported by 25.6% of respondents and was also more common among pawnbrokers (table 1).

As a group, respondents refused to complete sales approximately as often as they experienced illegal purchase attempts, but notified law enforcement or another retailer less often (table 1). Individually, approximately 75% of respondents reported that they notified law enforcement or another retailer less frequently than they experienced attempted straw purchases or undocumented purchases (range 72.4–76.5% for four comparisons of two events to two responses).

Many licensee characteristics were associated with the frequency of attempted illegal purchases and the occurrence of theft (table 2, figure 1). The largest effect sizes were seen for

**Table 1** Frequency of illegal and other adverse events and of reactions to them, by retail establishment type

Event/reaction	Retail establishment type			p Value
	All N (%)	Dealer N (%)	Pawnbroker N (%)	
<b>Events</b>				
Attempted straw purchase, past year				
≥Monthly	58 (9.9)	31 (8.2)	27 (12.9)	<0.0001
>1 or 2	82 (13.9)	37 (9.8)	45 (21.4)	
1 or 2	256 (43.5)	164 (43.3)	92 (43.8)	
0	193 (32.8)	147 (38.8)	46 (21.9)	
Attempted undocumented purchase, past year				
≥Monthly	62 (10.5)	28 (7.4)	34 (16.2)	<0.0001
>1 or 2	42 (7.1)	27 (7.1)	15 (7.1)	
1 or 2	146 (24.8)	81 (21.4)	65 (31.0)	
0	339 (57.6)	243 (64.1)	96 (45.7)	
Theft of firearms, past 5 years				
Yes	148 (25.6)	74 (19.8)	74 (36.1)	<0.0001
No	431 (74.4)	300 (80.2)	131 (63.9)	
<b>Reactions, past year</b>				
Refused to complete a sale				
≥Monthly	46 (7.8)	27 (7.1)	19 (9.1)	<0.0001
>1 or 2	92 (15.7)	43 (11.4)	49 (23.4)	
1 or 2	249 (42.4)	153 (40.5)	96 (45.9)	
0	200 (34.1)	155 (41.0)	45 (21.5)	
Notified law enforcement or ATF				
≥Monthly	7 (1.2)	5 (1.3)	2 (1.0)	0.06
>1 or 2	21 (3.6)	8 (2.1)	13 (6.2)	
1 or 2	145 (24.8)	90 (23.9)	55 (26.3)	
0	413 (70.5)	274 (72.7)	139 (66.5)	
Gave another retailer a 'heads up'				
≥Monthly	12 (2.0)	7 (1.8)	5 (2.4)	0.14
>1 or 2	22 (3.7)	14 (3.7)	8 (3.8)	
1 or 2	135 (22.9)	76 (20.0)	59 (28.1)	
0	421 (71.4)	283 (74.5)	138 (65.7)	

ATF, Bureau of Alcohol, Tobacco, Firearms and Explosives.

overall sales volume, denied sales and firearm trace requests. Dose-response (trend) relationships existed between sales volume and both straw purchases and undocumented purchases, between denied sales and straw purchases, and between gun show sales and undocumented purchases.

In multivariate models (table 3), pawnbroker status, sales volume, denied sales and trace requests were positively associated with all outcomes; some associations were not statistically significant. Multiple sales and sales at gun shows were associated with attempted undocumented purchases. Purchases by women were not associated with straw purchase frequency in a multivariate model; supplemental analysis (see online supplementary appendix table 1) found that the bivariate association (table 2) disappeared when sales volume and denied sales were included in the model.

### Involvement in illegal sales

This and the following sections present results based on personal opinions; only the 543 respondents known to be owners, managers or other senior executives are included.

Estimates of the prevalence of other retailers' knowing participation in illegal firearm sales varied widely (median 3%, IQR 1–10%, range 0–50%), were higher among younger respondents and women, and were directly associated with the

frequency of attempted straw purchases, denied sales, sales of inexpensive handguns and sales of multiple firearms to the same purchaser (figure 2, see online supplementary appendix table 2). There was no difference in estimates by dealers and pawnbrokers and little association with other establishment characteristics. Age, sex and denied sales remained associated with these estimates in multivariate analysis (see online supplementary appendix table 2).

Estimates of the proportion of straw purchases that involve the retailer's knowing participation were similar (median 4.5%, IQR 0–10%, range 0–100%). The two estimates were highly correlated (Pearson correlation coefficient=0.47).

Among possible motivations for a retailer's participation in illegal sales, respondents ranked 'He wants the extra income' as most important and 'He will face trouble from criminal gun buyers if he doesn't' as least important (figure 3A). There was little variation with respondent or establishment characteristics (data not shown).

### Sentencing for illegal sales

Among owners, managers or other senior executives, 472 (86.9%) recommended a specific sentence for a retailer convicted of selling 50 firearms to a trafficking operation. The median term of incarceration was 10 years (IQR 5–20 years);

**Table 2** Bivariate associations between establishment characteristics and frequency of attempted straw purchases\* and undocumented purchases\* in the past year and firearm theft in the past 5 years

Characteristic	Straw purchase			Undocumented purchase			Theft		
	OR*	95% CI	p Value	OR*	95% CI	p Value	OR	95% CI	p Value
Licensee type									
Pawnbroker	2.25	1.64 to 3.09	<0.0001	2.09	1.51 to 2.90	<0.0001	2.31	1.57 to 3.38	<0.0001
Dealer	Referent			Referent			Referent		
Sales (n)									
≥500	7.50	4.60 to 12.23	<0.0001	3.01	1.82 to 4.99	0.0003	3.74	1.97 to 7.11	0.0005
200–499	2.82	1.77 to 4.48		2.30	1.35 to 3.68		1.96	1.02 to 3.79	
100–199	1.76	1.08 to 2.84		2.12	1.26 to 3.58		2.60	1.33 to 5.07	
<100	Referent			Referent			Referent		
Handgun sales (%)†									
≥75	0.71	0.42 to 1.21	0.29	0.86	0.49 to 1.50	0.85	1.80	0.90 to 3.60	0.053
50–74	1.03	0.69 to 1.55		0.95	0.62 to 1.45		2.14	1.25 to 3.68	
25–49	0.76	0.48 to 1.20		1.10	0.68 to 1.75		1.63	0.89 to 3.00	
0–24	Referent			Referent			Referent		
Inexpensive handgun sales (%)‡									
≥50	1.40	0.93 to 2.11	0.06	1.46	0.94 to 2.27	0.03	1.36	0.81 to 2.28	0.49
25–49	1.74	1.09 to 2.79		2.02	1.23 to 3.32		1.32	0.73 to 2.39	
10–24	1.69	1.09 to 2.64		1.79	1.12 to 2.87		1.53	0.88 to 2.64	
0–9	Referent			Referent			Referent		
Sales to women (%)†									
≥25	2.52	1.66 to 3.83	0.0001	1.93	1.24 to 3.00	0.01	1.93	1.12 to 3.34	0.004
11–24	1.79	1.17 to 2.72		1.77	1.14 to 2.77		1.68	0.96 to 2.94	
6–10	2.06	1.33 to 3.19		1.81	1.14 to 2.87		2.76	1.59 to 4.78	
0–5	Referent			Referent			Referent		
Sales to law enforcement (%)‡									
10+	1.63	1.04 to 2.55	0.03	1.40	0.87 to 2.24	0.47	1.61	0.89 to 2.91	0.30
5–9	2.09	1.29 to 3.38		1.35	0.82 to 2.24		1.54	0.82 to 2.89	
≥1, <5	1.54	0.98 to 2.43		1.13	0.70 to 1.83		1.75	0.97 to 3.16	
<1	Referent			Referent			Referent		
Multiple sales (%)†									
≥5	1.69	1.11 to 2.57	0.01	2.50	1.59 to 3.94	0.0002	1.21	0.71 to 2.06	0.70
2–4	2.01	1.31 to 3.10		2.34	1.47 to 3.74		1.36	0.79 to 2.32	
1–1.9	1.42	0.94 to 2.16		1.58	0.99 to 2.50		1.08	0.63 to 1.84	
<1	Referent			Referent			Referent		
Tactical rifle sales (%)§									
≥20	1.90	1.23 to 2.94	0.002	1.82	1.13 to 2.92	0.002	2.33	1.33 to 4.10	0.03
6–19	1.77	1.13 to 2.78		2.48	1.53 to 4.02		1.92	1.06 to 3.46	
2–5	0.98	0.65 to 1.50		1.94	1.23 to 3.05		1.71	0.98 to 3.00	
0–1	Referent			Referent			Referent		

Continued

Table 2 Continued

Characteristic	Straw purchase			Undocumented purchase			Theft		
	OR*	95% CI	p Value	OR*	95% CI	p Value	OR	95% CI	p Value
Gun show sales (%)†									
≥25	1.98	1.08 to 3.63	0.046	4.63	2.52 to 8.48	<0.0001	1.44	0.70 to 2.95	0.61
>0, <25	0.76	0.43 to 1.34		1.81	1.02 to 3.22		1.09	0.55 to 2.17	
0	Referent			Referent			Referent		
Internet sales (%)‡									
≥10	1.24	0.77 to 1.98	0.08	1.60	0.99 to 2.59	0.053	1.05	0.58 to 1.91	0.47
>0, <10	1.59	1.05 to 2.40		1.48	0.97 to 2.27		1.36	0.83 to 2.23	
0	Referent			Referent			Referent		
Denied sales (%)¶									
≥5	4.61	2.92 to 7.30	<0.0001	2.70	1.63 to 4.42	0.0003	2.28	1.26 to 4.13	0.002
2-4	4.23	2.60 to 6.89		2.65	1.58 to 4.47		3.09	1.68 to 5.69	
1	1.99	1.29 to 3.09		2.36	1.46 to 3.83		1.60	0.88 to 2.90	
<1	Referent			Referent			Referent		
Trace requests (%)**									
≥2	3.83	2.41 to 6.09	<0.0001	2.14	1.33 to 3.47	0.004	4.56	2.41 to 8.63	<0.0001
>0.5, <2	4.46	2.80 to 7.11		2.27	1.40 to 3.67		2.75	1.42 to 5.31	
>0, ≤0.5	4.01	2.48 to 6.50		2.00	1.21 to 3.30		2.93	1.50 to 5.74	
0	Referent			Referent			Referent		

\*Results obtained by ordinal regression. ORs represent the effect of a given characteristic on the odds of reporting attempted straw purchases or undocumented purchases with a greater frequency than was reported by the referent group.

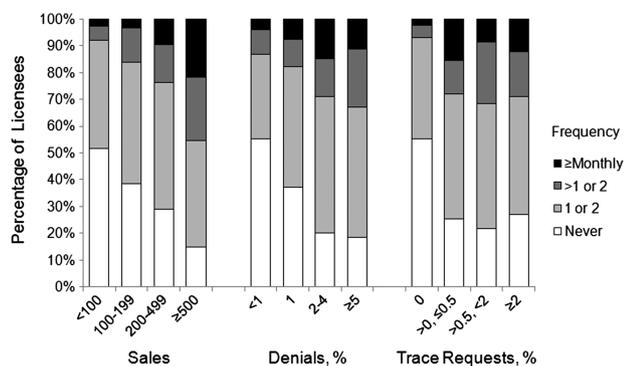
†Percentage of overall firearm sales in 2010.

‡Percentage of handgun sales in 2010.

§Percentage of rifle sales in 2010.

¶Percentage of sales that were denied after a background check, average over 5 years.

\*\*Annual number of trace requests, average over 5 years, as percentage of overall firearm sales in 2010.



**Figure 1** Frequency with which respondents reported experiencing attempted straw purchases.

The median fine was \$50 000 (IQR \$10 000–\$250 000). For 376 respondents (79.7%) recommending incarceration and a fine, the term remained unchanged; the median fine was \$100 000 (IQR \$25 000–\$250 000).

Of these same respondents, 478 (88.0%) recommended a specific sentence for an individual convicted of buying 50 firearms for a trafficking operation. The median period of incarceration was again 10 years (IQR 5–20 years); the median fine was again \$50 000 (IQR \$10 000–\$100 000). Median recommendations were unchanged for 382 (79.9%) respondents recommending both incarceration and a fine.

Younger respondents recommended longer terms and larger fines for both retailers and buyers, and respondents with higher frequencies of attempted straw purchases and denied sales recommended larger fines. Recommendations did not otherwise vary with respondent or establishment characteristics (data not shown).

There were 458 respondents (83.6%) who recommended sentences for both the retailer and the buyer; 304 (66.4%) recommended approximately equal terms of incarceration, 87 (19.0%) recommended a longer term for the retailer and 67 (14.6%) did so for the buyer. Recommended fines were approximately equal in 278 cases (60.7%), greater for the retailer in 132 (28.8%) and for the buyer in 48 (10.5%). These findings did not vary with respondent or establishment characteristics (data not shown).

### Disproportionate traces

Most respondents considered each explanation for a licensee receiving disproportionate trace requests to be important (figure 3B). By a slight margin, ‘the retailer is known to “go along” and not ask questions’ was most often ranked as very important (59.5% of respondents); ‘there is no reason’ was seen as least important. There was again little variation with respondent or establishment characteristics (data not shown).

## DISCUSSION

Attempted illegal firearm purchases were frequent occurrences for these federally licensed firearm dealers and pawnbrokers. Many thousands of such attempts likely occur each year. A rough estimate, which assumes that the respondents’ experience is representative, is that the 9720 licensees in the 43 study states selling 50 or more firearms a year experienced 33 800 attempted straw purchases (range 28 500–43 600) and 37 000 attempted undocumented purchases (range 29 700–57 000) in the year prior to the survey. Firearm theft was also common.

These findings are consistent with criminal case evidence that diverting firearms into criminal markets, known as trafficking, is

frequently accomplished through straw purchasing (46–51% of cases) and theft from retail licensees (14–21% of cases).<sup>6–7</sup> Undocumented purchases have repeatedly been recognised as important beyond their role in trafficking.<sup>6–7</sup> They are the principal means by which prohibited persons and purchasers with criminal intent acquire firearms.<sup>4–5,30</sup> This is true in large part because such purchases are made anonymously; no background checks are involved and no records are kept.<sup>9–10,14,31,32</sup>

The relationship seen here between the frequency of attempted illegal purchases and theft on the one hand and sales volume on the other is predictable. Less obvious, perhaps, is the basis for relationship between such events and trace requests and denied sales, particularly since these are expressed as a percentage of sales (removing sales from the equation) and the data are reported by the retailers themselves. It appears that, as in previous studies,<sup>17–19–21</sup> frequent trace requests and denied sales are markers for exposure to illegal commerce in firearms that would be useful in focusing law enforcement’s efforts to disrupt such commerce. The link between denials and straw purchases might also be direct: denied purchasers might return with surrogates to make purchases for them.

Three other associations between attempted illegal purchases or theft and characteristics of the respondents’ business establishments deserve further comment. First, as compared to dealers, pawnbrokers experienced illegal purchase attempts and theft more frequently, even when controlling for other factors that have been identified in prior research.<sup>19–22,33</sup> This was a surprising finding and remains a subject for further exploration.

Second, attempted illegal purchases and theft were related to sales to women, which have been linked to disproportionate sales of traced firearms.<sup>19–21</sup> The association with straw purchases is of particular interest. Studies of firearm trafficking<sup>6–7</sup> and gun shows<sup>10</sup> have found that women often serve as straw purchasers. Media reports have discussed increasing firearm sales to women, yet the prevalence of firearm ownership among women has remained stable.<sup>33</sup> Some of the reported sales increase may reflect straw purchasing. The association disappeared when sales volume and denied sales were included, as was true in a study of disproportionate sales of traced firearms.<sup>20</sup> Women acting as straw purchasers may select large-volume dealers or pawnbrokers who serve a high-risk clientele.

Third, there was a strong association between gun show sales and attempted undocumented purchases. Unlicensed private parties, from whom undocumented purchases may be legal, account for 25–50% of firearm vendors at gun shows, and licensed sellers are often not easily identifiable as such at these events.<sup>9,32</sup> Buyers intent on making an undocumented purchase may learn that the seller is a licensee only when the required forms appear.<sup>10</sup>

Respondents refused to participate in illegal purchases but did not always alert law enforcement and other licensees when such attempts occurred. It might prove beneficial for licensees to make such notifications routinely and advertise their intent to do so. The existing ‘Don’t Lie for the Other Guy’ campaign<sup>15</sup> could be modified to include a message such as ‘If You Try, We Will Turn You In’.

By the respondents’ estimates, participation in illegal firearm sales by other retailers is not rare: the median estimate was that 3% (IQR 1–10%) of retailers did so. Extrapolating to the 57 312 retail licensees in the USA as of June 2012,<sup>23</sup> an estimated 1719 (range 573–5731) dealers and pawnbrokers nationwide sell firearms illegally. Perhaps 5–10% of firearms trafficking operations involve illegal sales knowingly made by a retail licensee.<sup>6–7</sup> Respondents saw this as a serious crime

**Table 3** Multivariate analysis of associations between establishment characteristics and frequency of attempted straw purchases\* and undocumented purchases\* in the past year and firearm theft in the past 5 years

Characteristic	Straw purchase			Undocumented purchase			Theft		
	OR*	95% CI	p Value	OR*	95% CI	p Value	OR	95% CI	p Value
Licensee type			0.0007			<0.0001			0.001
Pawnbroker	1.91	1.31 to 2.78		2.45	1.68 to 3.56		2.07	1.24 to 3.21	
Dealer	Referent			Referent			Referent		
Sales (n)			<0.0001			0.009			0.0006
≥500	10.07	5.35 to 18.97		2.92	1.57 to 5.42		4.69	2.12 to 10.39	
200–499	3.11	1.78 to 5.45		2.13	1.20 to 3.77		2.04	0.95 to 4.34	
100–199	1.77	1.02 to 3.08		2.02	1.13 to 3.59		2.89	1.36 to 6.12	
<100	Referent			Referent			Referent		
Sales to women (%)†									0.046
≥25							1.19	0.62 to 2.27	
11–24							1.25	0.66 to 2.37	
6–10							2.25	1.20 to 4.23	
0–5							Referent		
Sales to law enforcement (%)‡			0.099						
10+	0.65	0.38 to 1.13							
5–9	1.17	0.66 to 2.06							
≥1, <5	0.79	0.46 to 1.35							
<1	Referent								
Multiple sales (%)‡						0.03			
≥5				1.82	1.08 to 3.08				
2–4				1.71	1.01 to 2.90				
1–1.9				1.04	0.60 to 1.78				
<1				Referent					
Tactical rifle sales (%)‡			0.06						
≥20	1.35	0.80 to 2.28							
6–19	1.26	0.75 to 2.12							
2–5	0.72	0.45 to 1.17							
0–1	Referent								
Gun show sales (%)‡			0.094			<0.0001			
≥25	1.57	0.78 to 3.18		5.94	3.02 to 11.68				
>0, <25	0.56	0.29 to 1.11		2.15	1.13 to 4.05				
0	Referent			Referent					
Denied sales (%)§			<0.0001			0.07			0.10
≥5	4.20	2.49 to 7.09		1.86	1.07 to 3.21		1.53	0.78 to 2.98	
2–4	3.89	2.26 to 6.73		1.97	1.11 to 3.48		2.13	1.07 to 4.25	
1	1.69	1.03 to 2.76		1.83	1.08 to 3.08		1.13	0.58 to 2.20	
<1	Referent			Referent			Referent		
Trace requests (%)¶			0.0001			0.096			0.001
≥2	2.30	1.38 to 3.81		1.72	1.02 to 2.90		3.34	1.69 to 6.60	
>0.5, <2	2.64	1.56 to 4.45		1.53	0.89 to 2.62		1.55	0.76 to 3.17	
>0, ≤0.5	1.22	0.68 to 2.20		1.06	0.57 to 1.94		1.38	0.63 to 3.03	
0	Referent			Referent			Referent		

\*Results obtained by ordinal regression. ORs represent the effect of a given characteristic on the odds of reporting attempted straw purchases or undocumented purchases with a greater frequency than was reported by the referent group.

†Percentage of overall firearm sales in 2010.

‡Percentage of rifle sales in 2010.

§Percentage of sales that were denied after a background check, average over 5 years.

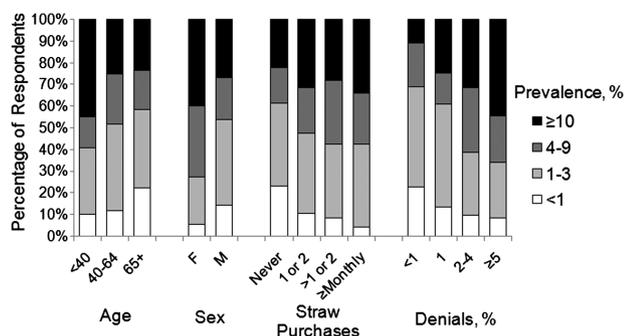
¶Annual number of trace requests, average over 5 years, as percentage of overall firearm sales in 2010.

The following variables were deleted from the table because they were not retained in any model: handgun sales, inexpensive handgun sales, internet sales.

motivated by desire for personal gain that merited, when 50 guns were involved, a 10-year term of incarceration and a \$100 000 fine. Current federal sentencing guidelines are more lenient, recommending incarceration for at most 5.25–6.5 years in such cases and a fine of \$12 500–\$125 000.<sup>34</sup>

Respondents' estimates of the prevalence of illegal activity among other retailers were directly related to the respondents' own exposure to attempted straw purchases and denied sales. It

remains an intriguing subject for future research that a firearm retailer's exposure to criminal activity on the part of his buyers could raise his estimate of participation in such activity by other sellers. There is evidence that retailers know who among them is involved in illegal activity. Tips from retailers identify trafficking operations,<sup>6, 7</sup> and some speak publicly about the illegal activities of others.<sup>10, 27</sup> Such contributions should be encouraged and rewarded.

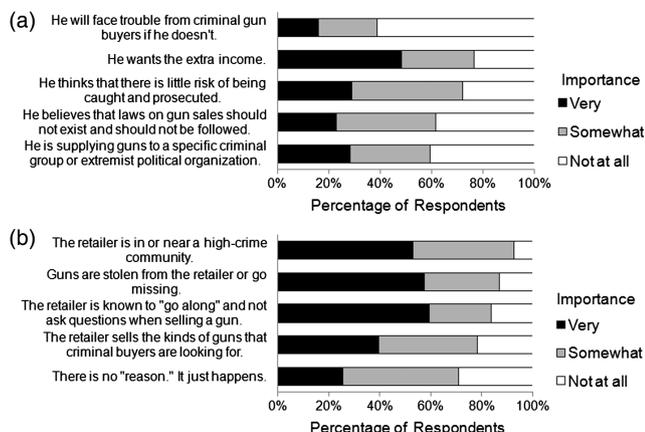


**Figure 2** Respondents' estimates of the prevalence of knowing participation in illegal firearm sales by other retailers.

Finally, there has been little discussion of why some firearms licensees make disproportionate sales of firearms that are later recovered and traced. Respondents were most likely to identify suspect retailer behaviour as very important in this regard (the retailer is 'known to "go along" and not ask questions'), but they also ranked as important factors that reflect clientele or community characteristics. It is plausible that all three domains play a role.<sup>19 20 35</sup>

**Limitations**

Overall study limitations were reviewed in detail elsewhere<sup>22</sup>; no additional limitations apply just to this portion of the study. We restricted the study population to licensees with estimated sales above a specific threshold, and licensees from seven states were excluded because the necessary data were not available. There are no obvious systematic differences between excluded and included states; excluded states are in all parts of the country and have widely-ranging prevalences of firearm ownership and policies regulating firearms. Nevertheless, our results cannot be generalised to the entire licensee population. The response rate was comparable to that achieved by others using similar methods for establishment surveys, including the developer of those methods.<sup>36 37</sup> Varying response rates, such as by business type (multi-site corporation vs sole proprietorship), may have had multiple and offsetting effects on the data.<sup>22</sup> There was an effort to interfere with the execution of the survey, but this appeared to have little if any effect.<sup>22</sup>



**Figure 3** Respondents' assessment of the importance of reasons for retailers' involvement in illegal firearm sales (A) and receipt of disproportionate firearm trace requests (B).

**What is already known on the subject**

- ▶ Illegal purchases and theft from retail firearm licensees are sources of crime-involved firearms; the frequency of such events is unknown.
- ▶ An unknown percentage of individual retailers participate in illegal firearm sales.

**What this study adds**

- ▶ Attempted illegal purchases are common, reported by most licensees selling ≥50 guns per year.
- ▶ Licensees with frequent denied sales or firearm trace requests and pawnbrokers experience attempts most frequently.
- ▶ An estimated 3% of individual retailers participate in illegal sales. Retailers view such participation as a serious crime.

**Acknowledgements** We are especially grateful to the retailers who participated in the survey, many of whom provided additional helpful comments. Barbara Claire, Vanessa McHenry and Mona Wright provided expert technical assistance throughout the project. Dr Tom Smith served as a consultant for the development of the survey questionnaire and gave extensive input. Jeri Bonavia, Kristen Rand and Josh Sugarmann provided helpful reviews of a draft questionnaire.

**Funding** This project was supported in part by a grant from The California Wellness Foundation (grant number 2010-067). Initial planning was also supported in part by a grant from the Joyce Foundation (09-31277). The study sponsors played no role in study design, collection, analysis, and interpretation of data, the writing of the report or the decision to submit the paper for publication.

**Competing interests** None.

**Ethics approval** The Institutional Review Board of the University of California, Davis approved this project.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**REFERENCES**

- 1 Bureau of Justice Statistics. NCVS Victimization Analysis Tool (NVAT). <http://www.bjs.gov/index.cfm?ty=nvat> (accessed 5 Dec 2012).
- 2 Hoyert DL, Xu J. Deaths: preliminary data for 2011. *Natl Vital Stat Rep* 2012;61:1-65.
- 3 Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS). <http://www.cdc.gov/injury/wisqars/index.html> (accessed 25 Oct 2012).
- 4 Scalia J. *Federal firearm offenders, 1992-98*. Washington, DC: Bureau of Justice Statistics, 2000. Report No.: NCJ 180795.
- 5 Harlow CW. *Firearm use by offenders*. Washington, DC: Bureau of Justice Statistics, 2001. Report No.: NCJ 189369.
- 6 Bureau of Alcohol, Tobacco and Firearms. *Following the gun: enforcing federal laws against firearms traffickers*. Washington, DC: Bureau of Alcohol, Tobacco and Firearms, 2000.
- 7 Braga AA, Kennedy DM. The illicit acquisition of firearms by youth and juveniles. *J Crim Justice* 2001;29:379-88.
- 8 Braga AA, Wintemute GJ, Pierce GL, et al. Interpreting the empirical evidence on illegal gun market dynamics. *J Urban Health* 2012;89:779-93.
- 9 Wintemute GJ. Gun shows across a multistate American gun market: observational evidence of the effects of regulatory policies. *Inj Prev* 2007;13:150-56.
- 10 Wintemute GJ. *Inside gun shows: what goes on when everybody thinks nobody's watching*. Sacramento, CA: Violence Prevention Research Program, 2009.
- 11 Mayors Against Illegal Guns. *Inside straw purchasing: how criminals get guns illegally*. New York, NY: Mayors Against Illegal Guns, 2008.
- 12 Sorenson SB, Vittes K. Buying a handgun for someone else: firearm dealer willingness to sell. *Inj Prev* 2003;9:147-50.
- 13 Wintemute GJ. Firearm retailers' willingness to participate in an illegal gun purchase. *J Urban Health* 2010;87:865-78.
- 14 City of New York. *Gun show undercover: report on illegal sales at gun shows*. New York, NY: City of New York, 2009.

- 15 Bureau of Alcohol, Tobacco, Firearms and Explosives, Sponsored by The National Shooting Sports Foundation. *Don't lie for the other guy*. <http://www.dontlie.org> (accessed 25 Jan 2013).
- 16 Braga AA, Cook PJ, Kennedy DM, et al. The illegal supply of firearms. In: Tonry M *Crime and justice: a review of research*. Chicago, IL: The University of Chicago Press, Chicago and London, 2002:319–52.
- 17 Pierce GL, Braga AA, Hyatt RR, et al. Characteristics and dynamics of illegal firearms markets: implications for a supply-side enforcement strategy. *Justice Q* 2004;21:391–422.
- 18 Koper CS. *Crime gun risk factors: buyer, seller, firearm, and transaction characteristics associated with gun trafficking and criminal gun use*. Philadelphia, PA: Jerry Lee Center of Criminology, 2007.
- 19 Wintemute GJ, Cook PJ, Wright MA. Risk factors among handgun retailers for frequent and disproportionate sales of guns used in violent and firearm related crimes. *Inj Prev* 2005;11:357–63.
- 20 Wintemute GJ. Disproportionate sales of crime guns among licensed handgun retailers in the United States: a case-control study. *Inj Prev* 2009;15:291–99.
- 21 Wright MA, Wintemute GJ, Webster DW. Factors affecting a recently-purchased handgun's risk for use in crime under circumstances that suggest gun trafficking. *J Urban Health* 2010;87:352–64.
- 22 Wintemute GJ. Characteristics of federally licensed firearms retailers and retail establishments in the United States: initial findings from the Firearms Licensee Survey. *J Urban Health* 2013;90:1–26.
- 23 Bureau of Alcohol, Tobacco, Firearms and Explosives. *Downloadable lists of Federal Firearms Licensees (FFLs)*. <http://www.atf.gov/about/foia/ffl-list.html> (accessed 26 Oct 2012).
- 24 SAS for Windows. *SAS for windows*. Cary, NC: SAS Institute, 2003.
- 25 Dillman D, Smith J. *Internet, mail, and mixed-mode surveys: the tailored design method*. 3rd edn. Hoboken, NJ: John Wiley & Sons, Inc, 2009.
- 26 Dillman DA, Gertseva A, Mahon-Haft T. Achieving usability in establishment surveys through the application of visual design principles. *J Off Stat* 2005;21:183–214.
- 27 Shapiro O. Rogue retailers: innocent until proven guilty? Or guilty by profession? *Shooting Sports Retailer* 2008;26:50–2, 54, 56, 113.
- 28 Federal Bureau of Investigation. *Total NICS background checks*. [http://www.fbi.gov/about-us/cjis/nics/reports/04032012\\_1998\\_2012\\_monthly\\_yearly\\_totals.pdf](http://www.fbi.gov/about-us/cjis/nics/reports/04032012_1998_2012_monthly_yearly_totals.pdf) (accessed Nov 2010).
- 29 The American Association for Public Opinion Research. *Standard definitions: final dispositions of case codes and outcome rates for surveys*. 7th edition., AAPOR, 2011 [http://www.aapor.org/Standard\\_Definitions2.htm](http://www.aapor.org/Standard_Definitions2.htm) (accessed 1 Mar 2013).
- 30 Vittes KA, Vernick JS, Webster DW. Legal status and source of offenders' firearms in states with the least stringent criteria for gun ownership. *Inj Prev* 2013;19:26–31.
- 31 Braga AA, Kennedy DM. Gun shows and the illegal diversion of firearms. *Georgetown Public Pol Rev* 2000;6:7–24.
- 32 Bureau of Alcohol, Tobacco and Firearms. *Gun shows: Brady checks and crime gun traces*. Washington, DC: Bureau of Alcohol, Tobacco and Firearms, 1999.
- 33 General Social Survey. Data analysis using SDA (1972–2010). Interactive website. <http://www3.norc.org/GSS+website/> (accessed 13 Apr 2011).
- 34 United States Sentencing Commission. *Guidelines manual*. Washington, DC: United States Sentencing Commission, 2011.
- 35 Wright MA, Wintemute GJ. Felonious or violent criminal activity that prohibits gun ownership among prior purchasers of handguns: incidence and risk factors. *J Trauma* 2010;69:948–55.
- 36 Paxson MC, Dillman DA, Tarnai J. Improving response to business mail surveys. In: Cox BG, Binder DA, Chinnappa BN, Christianson A, Colledge MJ, Kott PS *Business survey methods*. New York, NY: John Wiley & Sons, Inc, 1995:303–15.
- 37 Kriaucinas A, Parmigiani A, Rivera-Santos M. Leaving our comfort zone: integrating established practices with unique adaptations to conduct survey-based strategy research in nontraditional contexts. *Strat Mgmt J* 2011;32:994–1010.