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*Sex Transm Infect* published online September 18, 2010  
doi: 10.1136/sti.2010.044875

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# Risk behaviours among internet-facilitated sex workers: evidence from two new datasets

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Accepted 10 August 2010

## ABSTRACT

Sex workers have historically played a central role in STI outbreaks by forming a core group for transmission and due to their higher rates of concurrency and inconsistent condom usage. Over the past 15 years, North American commercial sex markets have been radically reorganised by internet technologies that channelled a sizeable share of the marketplace online. These changes may have had a meaningful impact on the role that sex workers play in STI epidemics. In this study, two new datasets documenting the characteristics and practices of internet-facilitated sex workers are presented and analysed. The first dataset comes from a ratings website where clients share detailed information on over 94 000 sex workers in over 40 cities between 1999 and 2008. The second dataset reflects a year-long field survey of 685 sex workers who advertise online. Evidence from these datasets suggests that internet-facilitated sex workers are dissimilar from the street-based workers who largely populated the marketplace in earlier eras. Differences in characteristics and practices were found which suggest a lower potential for the spread of STIs among internet-facilitated sex workers. The internet-facilitated population appears to include a high proportion of sex workers who are well-educated, hold health insurance and operate only part time. They also engage in relatively low levels of risky sexual practices.

## INTRODUCTION

Empirical studies of commercial sex workers have frequently focused on the characteristics and behaviours of individuals participating in the outdoor, street-focused sector of the industry. Historically, this was appropriate, since most transactions took place there. In a 1990 study, researchers estimated that the vast majority of sex workers at that time operated in street or massage parlour environments and that frequently the same women worked in both places.<sup>1</sup> While this still may be the case in many developing countries, in North America and other developed areas, the marketplace for sex work has shifted dramatically with the widespread adoption of at-home internet service. Online classified advertising and verification services, client reviewing websites and bulletin boards for sex workers and clients have produced a market infrastructure which has served to channel a large and growing share of the market off-street. Recent estimates indicate that <20% of transactions in the USA take place in the traditional outdoors environment.<sup>2</sup> One important law enforcement official in the USA referred to <http://craigslist.org> (accessed August 2010), an online advertising site, as 'the single largest source of prostitution in the nation.'<sup>3</sup>

Public health concerns have historically been a key motive for the study of the sex worker industry, as well as an important rationale for government regulation and prohibition. Sex workers and their clients can form a core group for the propagation of sexually transmitted infections and bridge distant nodes in the sexual network through higher rates of concurrency and inconsistent condom usage.<sup>4–6</sup> Before the current era in which internet access has become ubiquitous, one study found that nearly a third of the total STI burden could be traced to 3% of the population involved in sex work.<sup>7</sup>

However, it is less clear how well previous research findings concerning street-based sex work translate to the new internet-facilitated marketplace. While recent evidence suggests that the growth of the internet has led to substantial growth in the overall number of transactions and participants, relatively little is known about the risk behaviours of online market participants (S Cunningham, T D Kendall, unpublished manuscript, 2009). To the extent that the internet has changed the incentives faced by sex workers, diluted the core group with more part-time (or 'moonlighting') workers, or introduced a different (and possibly well-informed or better-educated) set of clients to the market, it is possible that the public health impact of sex work may have actually declined (S Cunningham, T D Kendall, unpublished manuscript, 2010).<sup>8</sup> As internet-facilitated sex work becomes more prominent, research focused on street-based worker populations may provide increasingly poor guidance for understanding the role of sex work in STI epidemics.

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## METHODS

In order to provide basic facts and trends for the internet-facilitated commercial sex market, we analysed evidence from two sources. The first source is a dataset containing detailed information on around 90 000 sex workers and is drawn from the most popular North American sex worker-reviewing website, known as <http://TheEroticReview.com> (TER; accessed August 2010), where clients share information with each other about workers they have seen. The second is a survey of 685 sex workers who solicit for customers online, in which we asked respondents to provide detailed information about their business and sexual practices. We describe these two sources in more detail in the following subsections.

### The Erotic Review.com data file

We first examined what we believe is the largest dataset currently available on sex workers who use the internet to solicit and communicate with customers, drawn from a website known as <http://TheEroticReview.com> (TER), where clients share reports about sex workers they have met. Data of this nature are new to the literature on sex work and have only recently been acquired and studied (S Cunningham, T D Kendall, unpublished manuscript, 2009; L Edlund, J Engelberg, C Parsons, unpublished manuscript, 2009).<sup>9 10</sup>

TER was established in 1998 and the number of individuals reviewed, as well as the number of reviews, has grown substantially over the past decade as the use of the internet for advertisement by sex workers has grown. While there exist other websites offering customer reviews on sex workers, TER is by far the largest. As of August, 2008, when we retrieved the data, there were over 500 000 reviews of more than 94 000 sex workers on the site. All sex workers reviewed on TER are either women or transgendered men.

A recent estimate indicated that TER receives between 500 000 and 1 000 000 unique visitors each month.<sup>11</sup> Both published sources and our own ethnographic interviews with sex workers indicate that TER reviews are widely recognised as a key to business success among independently operating workers, although they may be somewhat less important among brothel and agency-based workers and among the small set of extremely high-priced workers who operate exclusively through word-of-mouth among clients.<sup>12</sup>

After an assignment, a customer may access the TER website and fill out a standardised online review form which demands very detailed information on physical characteristics, prices and services offered, as well as ratings (on a 10-point scale) of the worker's overall appearance and 'performance'. It is a requirement that any worker reviewed on TER must solicit for customers online—for instance, through an advertisement on a public classified advertisement site like <http://craigslist.org>, or a personal website. We have heard of isolated cases in which incorrect reviews were deleted by TER staff but, in general, reviews remain on the site permanently. This facet of the data allows us to trace changes in key characteristics and practices among reviewed sex workers over time.

To collect the data, we purchased a membership to the site, which gave us full access to all available reviews since the origin of TER in 1998. We then wrote a custom PERL script to repeatedly query the site, copying fields from each of the nearly 500 000 reviews and organising them in a spreadsheet for statistical analysis. The program took roughly 30 h to run in total. While most entries in the review form are standardised (eg, reviewers are allowed to describe a worker's hair colour in one of only seven ways), a few are free-form entry, such as the length of the assignment. For the purposes of statistical analysis, additional work was needed to convert these responses in a consistent manner (eg, changing varied entries such as 'one hour', '1 hour' and '1 h' to a consistent "60 min").

### Survey of adult service providers

In order to learn more about the business and sexual practices of sex workers who solicit online, we implemented an in-depth survey of sex workers between August 2008 and June 2009, which we styled 'Survey of Adult Service Providers', or SASP. We believe SASP represents the most comprehensive sampling of online workers to date and by correcting for the inverse probability of appearing in the survey, it is unique in the literature in its efforts to deal with selection bias.

Our earlier research describes the survey procedure in more detail and gives the full text of the questionnaire.<sup>13</sup> However, to summarise briefly, after approval from the institutional review board at Baylor, SASP was implemented by sending requests to all valid email addresses among TER-reviewed workers, supplemented with all sex workers who advertise on a popular national site for escort ads, <http://Eros.com> (accessed August 2010). In the email, respondents were asked to click on a link that led them to the survey, hosted on Baylor University servers. Each email sent was associated with a randomly generated string of characters, which prevented multiple responses from the same email, while at the same time maintaining the anonymity of the survey, which we found to be a key factor driving participation. Respondents were also allowed to answer survey questions by telephone with the authors or their research assistants.

In total, we attempted to contact 26 189 individuals to participate in SASP. Thirteen thousand three hundred and thirty-three of these emails were successfully delivered to an address and did not 'bounce back'. Some share of the accounts receiving these emails, although nominally open for incoming mail, are probably unused or rarely checked, especially since our population of TER-reviewed workers stretches back to 1998. Thus, 13 333 is an upper bound on the pool of potential respondents and the true response rate is higher as a result. Nevertheless, 685 respondents answered our request to take the survey, giving a lower bound response rate of 5.14%.

While this figure is low by traditional survey standards, we believe the survey results are of value, given the general difficulty previous research has faced in reaching this population and the typical hesitancy among sex workers to answer questions related to work in illicit activity. In an attempt to make the survey as representative as possible, we adjusted the responses for the most serious potential selection biases on the part of respondents, as described below. Nevertheless, the results must be interpreted with some care.

In order to facilitate extrapolation to the population of sex workers who solicit online, we adjusted SASP responses using probability weights constructed from the distribution of age and race characteristics of all TER-reviewed workers and SASP respondents. Specifically, we calculated the share of individuals reviewed on TER in each age–race category and divided that share by the similarly calculated share of SASP respondents in that same category. Thus for instance, there were 1155 White workers between ages 31 and 35 reviewed on TER, which is 11% of all TER-reviewed workers. Likewise, there were 99 White SASP respondents aged 31–35, which is 15% of all SASP respondents. The inverse probability of appearing in our sample is therefore 0.73 ( $=0.11/0.15$ ) for Whites aged 31–35.

To the extent that TER represents the best available portrait of the population of sex workers who solicit online in North America, this procedure allows us to use SASP to make general statements about the population. In order to gauge the reasonableness of our results using this methodology, we compared population-weighted means in SASP against those in another survey, which analysed interviews of 240 female sex workers in the United Kingdom, including 125 indoor workers.<sup>14</sup> Our population-weighted averages for age and experience were quite similar to those of that survey's indoor sample.

The SASP data are organised into two files—a worker-level file based on responses to questions about personal characteristics and general practices and a transaction-level file with observations that vary across clients for a given worker. The latter file is based on a sequence of questions asked in the survey

about each respondent's (up to) five most recent client-session transactions.

## RESULTS

### TER-reviewed sex workers

Table 1 illustrates sample statistics for some key characteristics, business and sexual practices from the TER data file. Means are calculated separately for 1999–2002, 2003–2005 and 2006–2008 (through August 2008) in order to demonstrate how sex workers who solicit online have changed over the past decade.

Table 1 shows that hourly wages (deflated to constant 2003 US dollars in order to eliminate the effects of general inflation) are quite high, nearing or surpassing \$300 per hour in all years. Wages have risen nearly 20% over the 10 years of our sample. Turning to advertised services, the data indicate that sessions involving vaginal sex and fellatio are the most common, followed by manual stimulation. Over time, it appears that the provision of less-risky sexual services, such as manual

stimulation, has declined, relative to vaginal sex and fellatio and group sex.

Under business practices, the typical session lasts around an hour and roughly half of workers are 'independent' of third-party management, such as an agency or pimp. The share of independent workers fell between 1999–2002 and 2003–2005, before rising substantially in 2006–2008. The other variables associated with business practices generally indicate high-quality services (from the perspective of clients) and improving quality over time. For instance, the share of workers who offered clients an option of either incall (assignment at the worker's location) or outcall (assignment at the client's location) rose over the sample period, as did the share of workers appearing on time for their assignments.

Focusing on sexual practices, the data indicate that, contrary to popular stereotypes about sex workers, women who solicit online appear to kiss their clients quite frequently. The share of sex workers who are willing to kiss with tongue contact—a measure of (perceived) emotional attachment—has increased

**Table 1** Client-reported characteristics and practices of internet-facilitated sex workers: summary of reviews on 'The Erotic Review.com' website ((TER; 1999–2002, 2003–2005 and 2006–2008)

Category	Variable	Period when worker first appeared on TER		
		1999–2002	2003–2005	2006–2008
Wage	Calculated real hourly wage (US\$2003)	263.13	281.80	313.35
Advertised service	Vaginal sex and fellatio	0.714	0.771	0.813
	Anal sex	0.020	0.020	0.025
	Massage with manual stimulation	0.195	0.131	0.093
	Massage with fellatio	0.033	0.024	0.016
	Bondage/S&M	0.018	0.020	0.014
	Group sex	0.015	0.030	0.037
Business practices	Length of session in minutes	64.231	64.479	61.005
	Independent of third-party manager	0.531	0.453	0.584
	Incalls only (escort provides location)	0.380	0.350	0.310
	Outcalls only (client provides location)	0.209	0.165	0.129
	Offers both incalls and outcalls	0.406	0.483	0.560
	Showed up on time	0.931	0.938	0.943
Sexual practices	Rushed service	0.266	0.263	0.237
	Does not kiss	0.420	0.357	0.382
	Kisses, no tongue	0.238	0.228	0.217
	Kisses with tongue	0.342	0.415	0.402
	Offers no fellatio	0.163	0.137	0.110
	Offers fellatio with condom	0.488	0.428	0.455
Age	Offers fellatio without condom	0.348	0.435	0.436
	Accepts cunnilingus	0.558	0.582	0.571
	18–20	0.082	0.104	0.132
	21–25	0.388	0.444	0.448
	26–30	0.287	0.256	0.238
	31–35	0.148	0.113	0.101
Race/ethnicity	36–40	0.058	0.052	0.047
	41–45	0.025	0.022	0.022
	46+	0.013	0.009	0.011
	White	0.540	0.520	0.517
	Black	0.073	0.087	0.123
	Asian	0.164	0.174	0.148
Reviews	Hispanic	0.128	0.135	0.142
	'Foreign'	0.079	0.069	0.052
	Other	0.016	0.016	0.018
	Mean appearance review (1–10)	7.034	7.316	7.396
	Mean performance review (1–10)	6.706	7.057	7.149
N	Number of observations	15008	30257	34042

All values in table are sample means. Date ranges refer to the year a worker was first reviewed. Age and race/ethnicity refer to the sex worker, as estimated by the reviewing client. Wage is calculated as the ratio of (client reported) payment and length of session and are deflated to constant 2003 US dollars using the consumer price index. Payments in non-US dollar currencies are converted to US dollars using the monthly average exchange rate at the time of the review.



## Supplement

over the past decade from 34% to 40%. Similarly, the propensity of paid sexual encounters among this group that involve higher-risk practices such as anal sex appears to have seen a mild increase as well.

The age distribution of sex workers reviewed on TER indicates that more than two-thirds are in their 20s, with 8% of reviewed workers under age 20 (the site does not allow reviewers to indicate an age below 18). Ten years appears to be towards youth, with more sex workers under age 25 appearing over time. The racial distribution indicates growth among Black and Hispanic (treated as a separate racial group by the site) workers, relative to White workers, over time. Nevertheless, Whites continue to be the majority, with a substantial share of Asian workers as well.

Finally, as suggested by the business practices variables above, it appears that most clients are generally satisfied with the services received from this class of workers. The mean summary review, on a scale of 1 to 10, was around 7, both on 'appearance' and 'performance' dimensions. Moreover, this average score has risen over time in both categories.

### SASP respondents

Table 2 presents sample statistics for key questions to which we received responses in our survey. The top panel summarises variables that describe the characteristics and general practices of sex workers, while the bottom panel focuses on variables derived from questions relating to the most recent (up to) five session-transactions a worker provided. Not all respondents answered every question in the survey, as indicated by the variation in the number of observations across questions. As noted in the previous section, however, all means are population-weighted to represent the general class of workers who solicit online.

Table 2 confirms that sex work is highly compensated, with the average worker receiving \$1711 in weekly compensation. Focusing only on respondents who indicated they worked during the previous week, the average salary was \$2272. The typical worker saw 4.1 different clients during the week, of whom 2.2 were 'regulars'—that is, repeat customers. Careers appear to be relatively long among workers who solicit online, with the average respondent indicating around 5.5 years since her first entry into sex work.

Interestingly, our sample indicates that this class of sex workers is relatively likely to hold health insurance (53%), be college graduates (41%), be married (13%) and have children (38%). A relatively large share appears to be part-time 'moonlighters' in sex work, with 44% indicating that they hold a second job outside of sex work (S Cunningham, T D Kendall, unpublished manuscript, 2010).

Turning to the bottom panel of table 2, SASP confirms both the general level and trend of unprotected fellatio in TER. In SASP, which reflects sex work in late 2008 and early 2009, 50% of transactions involved fellatio with a condom, in comparison with 46% for 2006–2008 in TER (see table 1). Unprotected fellatio levels were also similar across the two datasets with SASP respondents reporting unprotected fellatio 31% of the time and TER reviewers reporting a 35% prevalence for 2006–2008. Unprotected vaginal and anal sex are only available in SASP and our records suggest both are relatively uncommon, taking place in just 5.2% and 1.1% of all transactions, respectively. A total of 5.7% of transactions involved some form of group sex, either with multiple sex workers or multiple clients. Table 2 also shows that the average client of workers who solicit online was around 43 years old and around 80% of these clients were White.

**Table 2** Self-reported characteristics and practices of internet-facilitated sex workers: population-weighted mean responses of 2008–2009 survey of adult service providers

Variable	Mean	Linearised SE	Observations
<b>Statistics based on sex worker characteristics</b>			
Weekly earnings (all), US\$	1710.84	263.702	593
Weekly earnings (only those with clients), US\$	2272.48	348.419	440
Any clients past week (0/1)	0.755	0.028	601
Total no of clients in the past week	4.127	0.278	598
No of 'regular' clients in the past week	2.164	0.154	595
No of first-time clients in the past week	1.947	0.196	595
Years since entry into sex work	5.484	0.260	599
Independent/own boss	0.943	0.015	601
Have health insurance	0.527	0.036	597
Have second job	0.437	0.035	597
College graduate	0.414	0.030	602
Married/cohabitating with partner	0.130	0.018	603
Age	28.353	0.328	606
Any children (0/1)	0.384	0.037	602
White race	0.621	0.041	604
Black race	0.113	0.025	604
Hispanic race	0.123	0.044	604
Asian race	0.070	0.020	604
<b>Statistics based on most recent five transactions</b>			
Fellatio with condom	0.502	0.017	2426
Fellatio without condom	0.312	0.018	2426
Vaginal sex with condom	0.690	0.015	2457
Vaginal sex without condom	0.052	0.009	2457
Anal sex with condom	0.049	0.006	2480
Anal sex without condom	0.011	0.003	2480
Group sex	0.055	0.007	2519
Age of client	42.998	0.406	2399
Client White race	0.802	0.015	2443
Client Black race	0.050	0.006	2443
Client Hispanic race	0.035	0.007	2443
Client Asian race	0.074	0.012	2443

Survey means and SEs are weighted by population means within each age–race cell, taking all 'The Erotic Review.com' website-reviewed workers as the population.

In order to better understand the prevalence of high-risk sexual practices which facilitate STI transmission among this class of sex workers, table 3 displays the mean number of weekly clients and the frequency of unprotected fellatio, vaginal or anal sex and group sex among various subpopulations of workers, as estimated using SASP (the data are still, however, weighted to be representative of the population generally).

For comparison, the first row in table 3 replicates the mean for the entire population. The other rows focus on key subgroups. For example, sex workers who reported their business as 'independent' appear to see fewer clients per week than the average, but their conditional frequencies of engaging in unprotected or group sex are similar to the population as a whole. Workers under age 30 appear to engage in higher-risk behaviours, both seeing more clients and engaging in more frequent unprotected sex and group sex, relative to workers over age 30. Geographically, high-risk behaviour appears to be concentrated in the southern census region of the USA, relative to other parts of the USA or Canada.

### DISCUSSION

While we have only presented simple summary statistics here, we believe these datasets provide one of the first comprehensive empirical evaluations of the practice of off-street, internet-facilitated

**Table 3** Self-reported frequency of high-risk sexual practices among subgroups of internet-facilitated sex workers: population-weighted mean responses of 2008–2009 survey of adult service providers

Subgroup	Mean number of weekly clients	Share of transactions involving:		Group sex
		Unprotected fellatio	Unprotected vaginal or anal sex	
All workers	4.13 (0.278)	0.502 (0.018)	0.053 (0.009)	0.055 (0.007)
Independents	4.04 (0.279)	0.503 (0.019)	0.054 (0.009)	0.056 (0.008)
Under age 30	4.287 (0.412)	0.533 (0.023)	0.070 (0.013)	0.061 (0.011)
White	4.428 (0.305)	0.483 (0.015)	0.037 (0.006)	0.051 (0.007)
More than 5 years' experience	3.913 (0.425)	0.465 (0.028)	0.040 (0.010)	0.060 (0.013)
Have health insurance/Medicaid	3.850 (0.365)	0.490 (0.027)	0.043 (0.011)	0.058 (0.011)
Primary business in northeast	3.702 (0.815)	0.547 (0.046)	0.072 (0.025)	0.076 (0.024)
Primary business in mid-west	4.020 (0.564)	0.394 (0.038)	0.030 (0.016)	0.076 (0.024)
Primary business in south	4.732 (0.667)	0.671 (0.028)	0.069 (0.022)	0.036 (0.009)
Primary business in west	3.939 (0.498)	0.439 (0.037)	0.070 (0.019)	0.067 (0.016)
Primary business in Canada	4.451 (0.837)	0.544 (0.054)	0.007 (0.005)	0.045 (0.021)

Means are weighted by population means within each age–race cell, taking all the 'The Erotic Review.com' website-reviewed workers as the population. Linearised SD in parentheses.

sex work in North America. Compared with previous research, these data allow for more general conclusions about the characteristics and behaviours of sex workers who solicit for customers online. The relatively long time series associated with TER data also allows for examination of the way in which these characteristics and behaviours have changed over the past decade.

The data show that sex workers who solicit for customers online generally provide services perceived by customers as 'high quality'. The data also indicate a lower level of high-risk sexual behaviours, relative to those found among street workers, who constituted the bulk of sex workers before the widespread adoption of the internet. The findings also suggest that many of the workers involved in the online trade have characteristics unlike those associated with traditional sex worker stereotypes, including, for instance, a high proportion having a college education and holding health insurance. These factors suggest substantial changes in the market for commercial sex in North America (and probably foretell the future of the market in developing countries, where internet and broadband technologies are in earlier stages of development).

Technology-driven marketplace changes appear to be augmenting the number of participants involved in the sexual marketplace, potentially providing a basis for more substantive attention by public health professionals. However, our findings imply that proposals for interventions should include a careful consideration of the more subtle effects of new technologies, which may be reducing some of the harms associated with sex work, potentially including infection risks.

The increase in internet-facilitated sex work could have important effects on the dynamics of STIs. Because of the increased ability of sex workers to advertise online and for clients to employ ratings sites like TER, sex workers may have greater incentives to avoid high-risk activity and to seek regular STI testing. This is because advertisement and ratings sites allow sex workers to build and profit from their public 'reputations'. Those reputations would be in jeopardy if a client contracted an infection and subsequently communicated that fact widely to other potential clients.

For this and other reasons, it is possible that STI rates among sex workers could fall, even as new technologies have expanded the market.<sup>8</sup> Mathematical modelling and additional empirical studies are needed to assess the potential impacts of the growth in internet-facilitated sex work.

While we believe the data presented in this paper are incomparable for the measurement of online sex worker activity, there

are key limitations to their use. Specifically, TER review data could potentially be corrupted in two ways. First, while most information from previous reviews is available free to all who access the site, prices and some parts of the narratives submitted by reviewers are available only by either submitting two validated reviews, or by paying a fee (as we did to collect the data). Thus, it is plausible that some users could submit non-authentic reviews in order to gain access to the site's restricted details. Despite this possibility, we believe these activities are rare since all other information, including contact and website information is available for free to all users and price information can usually be determined independently through these means. Moreover, users do not gain access to the non-public information until their reviews have been checked by TER staff, which takes several days, so impatient users attempting to gain access to restricted information would probably be dissuaded.

Second, sex workers may attempt to 'review' themselves in order to appear to have more or better reviews. In order to combat this type of fraud, the site allows users to 'click through' a reviewer's screen name to see all other reviews supplied by that client. Thus, reviews from people who have not reviewed many other workers (as would probably be the case with this type of fraud) can be discounted by users.

Surveys of internet-facilitated sex workers like SASP may partially reflect the relative willingness of certain subpopulations, including better-educated workers, to participate in surveys. In addition, the marketplace for commercialised sex

### Key messages

- ▶ Over the past 15 years, North American sex markets have been reorganised by the growth of internet technologies that have created a substantial online, off-street marketplace.
- ▶ We analyse data on more than 94 000 internet-facilitated sex workers listed at a client review website, plus an in-depth survey of 685 of these workers.
- ▶ We document the characteristics and practices of these sex workers and contrast them with those of sex workers before widespread adoption of the internet.
- ▶ Internet-facilitated sex workers appear to differ from earlier sex workers in their sexual risk behaviours and other characteristics related to the transmission of STIs.

## Supplement

continues to change with technology; therefore, we believe additional surveys and empirical work will be key in maintaining accurate perceptions of this changing industry.

**Acknowledgements** The authors thanks Kris Hiew for research assistance in administering the SASP survey, Amanda Brooks for helpful comments on the survey questions and the Nevada chapter of the Sex Workers Outreach Project for endorsing the survey to their members. The authors also thank Baylor University librarian Lance Grigsby for assistance in administering the SASP survey.

**Competing interests** None.

**Ethics approval** Baylor University Institutional Review Board granted an exemption. See [http://business.baylor.edu/scott\\_cunningham/SASP\\_files/IRB%20Exemption.pdf](http://business.baylor.edu/scott_cunningham/SASP_files/IRB%20Exemption.pdf).

**Contributors** Both authors cooperated in collection of data, statistical analysis and writing of this article.

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

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