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Using secondary statistical analysis to assess the level of 'high risk' behaviours for sexually transmitted infections in Ireland

Introduction

Throughout the 1990s, reported rates of sexually transmitted infections (STIs), other than HIV/AIDS, increased enormously across Western societies, especially in the under 30s age group. In the Republic of Ireland, there was a threefold augmentation in national reported rates within one decade, with 20 to 30 year olds constituting 65% of the overall reported rates (Department of Health and Children, 1999: 53-54; Department of Health and Children, 1974-1998). The prevalence and incidences of STIs, in particular gonorrhoea, are customarily used as indicators of the proportion of 'high risk' behaviours in a population.¹ A subsequent increase in reported infections is seen to represent more people engaging in unsafe sex. Given the huge changes that occurred in Irish sexual politics at the start of the 1990s and the continual secularisation of the society, the augmenting rates of STIs have recently entered the public forum through the medium of the Irish media. Incorporating voices of concern amongst medical professionals working in genitourinary medicine, articles on STIs focus on the supposed lapsed sexual morals of the Irish people, especially young adults. Such reports have been reflected in recent sexual health policy making. While health authorities should be commended for attempting to reduce levels of STIs in a population, drawing a causal link between rising number of 'high risk' behaviours and the rates is too simplistic. Like other contagious diseases and infections, the spread of STIs depends upon a number of factors, including

¹ In this context, 'high risk' behaviours refer to unsafe sex, which can be defined as sexual intercourse (anal, vaginal or oral) without the use of a condom and where one or both persons have more than one current or recent sexual partner or one partner is known to have an STI.

improvement in the provision of Irish genitourinary medical services and changes to the surveillance system. Furthermore, conclusions about sexual behaviours can only be reached through the analysis of sexual behaviours and not through proxy measures.

Unfortunately, there is a lack of suitable data on STIs and sexual risk-taking in Ireland. Apart from a number of small-scale qualitative studies, there is no national survey on sexual attitudes, behaviours and sexual risk. Data protection laws and the sensitivity of the subject impedes funding, making it difficult to conduct such a survey. As a result, it is difficult to produce a definitive answer on whether the prevalence and incidences of STIs have changed in Ireland nor can information be provided on the levels of 'high risk' behaviour in the population. However, existing sources of data can have some value, even if they have been gathered for another purpose. In this case, a component of the International Social Survey Programme (ISSP) 1994 dataset on family and changing gender roles can be used to examine the proportion of the Irish population who were exposing themselves to the potential risk of STIs at certain point during the 1990s. This information is of use to the policy maker as it provides a description of target audiences for preventative measures.

The aim of this article is to demonstrate that where there is a lack of specific information, a re-analysis of an existing dataset can yield relevant details. While the ISSP dataset is usually utilised in large-scale comparative studies, this study focuses solely on the Irish component of the ISSP dataset. Through this close examination of the data, quantitative methods can be employed as an exploratory tool, generating questions about sexual risk-taking behaviours as well as describing the forms of 'high risk' behaviours in the population. This may be a deviation from the usual testing of hypotheses, but in a situation where information is lacking and where the sample is small, the utilization of secondary statistical analysis as an exploratory tool can provide a good basis for the production of knowledge. In this instance, the social research method can be used to examine levels of sexual risk taking in order to help aid the development of a preventive strategy for STIs.

Determining the proportion and characteristics of the Irish population engaging in 'high risk' behaviours largely involves an assessment of the number of sexual partners

individuals have had within specific units of time. Along with sexual orientation, age, social status and other demographic variables influencing partner choice, number of partners per unit time is a long established measure of risk behaviour in sexual behaviour surveys (Kretzschmar, 2000). Irrespective of sexuality, epidemiological studies and surveys have shown that the probability of acquiring STIs increases with the number of sexual partners with whom one has unprotected sexual intercourse (Liljeros et al., 2001; Jonsson et al., 1997; Wellings et al., 1994; Giesecke et al., 1992). STIs are spread through sexual interactions between individuals and the greater the number of people an individual has sexual relationships with, the greater the likelihood of coming in to contact with STIs (Kost and Darroch Forrest, 1992: 244). If 'lifetime risk of STI acquisition' is defined as having more than two lifetime partners, then in the USA, it has been argued that people with two to four lifetime partners have three to five-percent chance of being infected with a bacterial STI, while those with over 20 partners have between 28% and 35% likelihood (Michael et al., 1994: 193).

In the first section of the paper, the dataset is utilised to demonstrate the importance of multiple partnerships to the spread of STIs by showing how the accumulation of sexual partners increases the risk of exposure to someone with multiple partnerships and thereby potential infection. The second section is concerned with the existence of concurrency and other 'high risk' behaviours, such as homosexual and bisexual behaviours and sex with a sex worker. This is a simple description of the 'high risk' groups as the numbers are too small to carry out any significant differential analysis. Therefore, this section has to be descriptive and devoid of attempts to determine sexual linkages as possible routes of STIs. Following on from that discussion, a logistic regression analysis is employed to yield the combination of predictor variables that affect the likelihood of multiple partners within the time-frames of one year and five years.

Data and methods

The International Social Survey Programme is a voluntary grouping of study teams in 26 countries, each of which undertakes to run a short annual self-completion survey in a probability-based sample of adults over the age of 18 years. Each national survey contains an agreed set of questions, so comparisons can be made between countries and the topics vary from year to year with a view to replicate the cross-national survey every 4 or 5 years. The topic of family was examined in 1988 and again in 1994, this time with an appendix on sexual behaviours in some of the participating countries. The data on Irish sexual behaviours is taken from the 1994 ISSP module on Family and Changing Sex Roles, although the focus here is on the appendix of questions on sexual behaviours. This appendix was collected through postal questionnaires. Response by written questionnaire, anonymously returned by post, is a reliable method for collecting valid sexual behavioural data (Aral and Peterman, 1996: 32).

When using secondary data analysis, it is important to note that the datasets have usually been gathered with other research questions in mind. While the appendix of the ISSP 1994 dataset on sexual behaviours was gathered in light of the HIV/AIDS pandemic, the information collected is very general and not specific to risky sexual behaviours. Nevertheless, an individual's exposure to multiple partners can still be assessed. This measure does not however include the intervening effects of contraceptive usage or partnership characteristics and as a result, it is an over-representation of potential risk. It determines the proportion of a population exposing themselves to multiple partnerships, which increases their chances of risk exposure to a potentially infected individual. If a substantial proportion of the population have multiple partnerships, it can be surmised that the increasing reported rates could be linked to a growing number of people engaging in 'high risk' behaviour. However, if only a small minority of the population are engaging in multiple partnerships, then explanations for the increase in reported Irish STI rates lie elsewhere.

According to Liljeros et al. (2001), there is no well-defined boundary separating the 'high risk' group of multiple partnerships from other individuals. This means that all

individuals are likely to meet a sexual partner who has had multiple partnerships. Thus, all sexually active respondents in the data set were used for calculating the risk of encountering a potentially infected partner. Since we cannot control for the impact of condom usage or presence of infection, the calculations show the risk of being exposed to a partner who has had multiple partnerships. Furthermore, since the majority of respondents are heterosexual (and this is also true of the general population), the risk of encountering a sexual partner with multiple partners will be calculated on the assumption that all sexual encounters will be heterosexual. Separate estimates are made for males and females. The period used for the calculation was the last year, as number of sexual partners in this time-frame play a greater role in exposure to STIs, as relationships are of a shorter duration than those over the past five years (Morris, 1994; Knox et al., 1993).

For the logistic regression, the sexual partner measures were recoded from ordinal variables into binary response variables, with a reference category of those who had one sexual partner within the specified time-period and those who had two or more sexual partners. Those who had no sexual partner were excluded from the analysis, as they were not deemed to be at risk from multiple partnerships. This accounted for 13.5% (127) of the respondents. It is intended that the time span of five years (roughly 1989 to 1994) would give some indication of the numbers of individuals exposing themselves to the risk of multiple partners and inadvertently to the risk of STIs within the very period of escalating rates. Age has an effect on the prevalence of STIs, with those aged between 20 and 30 reporting the largest proportion of STI rates in Ireland.² By dividing the sample into those between 18 and 30 and those over the age of 30, we can focus on this group of people and compare their behaviours with the rest of the population. Using the ISSP dataset, we can attempt to predict if membership of the younger age group does increase likelihood of having multiple partners and identify what other conditions influence the accumulation of two or more partners within a stated time-frame.

Unstandardised logistic regression coefficients (B) and their standard errors are reported rather than odds ratios. This is because standardised logistic regression

² Material on numbers of new cases and demographic characteristics of the patients visiting the GUM clinics in Ireland was obtained personally from the individual GUM clinics or through written requests for the information.

coefficients are better for evaluating the strength of the influences of the independent variables on the dependant, relative to one another (Menard, 1994). Significance levels of 0.005, 0.05 and 0.1 are used, with reference given to those that were just over the 0.1 level. Since the regression models are being used here for exploratory analysis, the emphasis is not on determining causality, rather the interest is to find a set of predictors that can accurately predict the likelihood of two or more sexual partners. Therefore, 0.05 can be deemed too low and rigid for exploratory research as it can often exclude important variables from the model (Menard, 1994, 55). Because of this, a significance level of 0.1 is employed. No interactions are included as none of them brought any explanatory or specification power to the models.

Before discussing the findings, it is necessary to briefly note that a problem with the Irish component of the ISSP dataset is the large proportion of people who did not respond to the questions on sexual behaviour. Out of 938 respondents, almost half (46%) did not return the appendix to the survey. Since the non-response rate is so large, it is possible that the analysis of risk behaviour (i.e. the number of sexual partners during a specific time period) could be biased. Individuals who discuss their sexual behaviours may be different from those who do not. If there was a bias in the type of person who responded to the questionnaire, it was important to establish how likely members of the 'non-response' group were to have multiple partners, using the characteristics associated with the probability of that behaviour. A logistic regression analysis was carried out with the log-likelihood of non-response to the sexual behavioural questions being calculated using a number of demographics. If the 'non-response' group had consisted of mostly young, single urban dwellers, then the chances are that the risk assessment would be inaccurate, as the proportion of 'high risk' takers is too small. As it transpired, it was largely the older age groups who were married and lived in rural areas that declined inclusion (see table 1). This means that those who do have multiple partners may actually be a much smaller percentage of the sample, resulting in a possible over-estimation of multiple partners. However, given that the numbers of people with multiple partners are so small, it is not necessarily a bad thing to have a small over-representation of those with

multiple partners. Not only does it help the statistical analysis in terms of sample size, but it can also help predict maximum risk levels for the population.

Table 1. Results from logistic regression analysis for predicting the variables associated with the log-likelihood of non-response to sexual behavioural questions

	Model I		Model II		Model III		Model IV		Model V		Model VI	
	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.
Reached or completed third level education	-0.557***	0.211	-0.383*	0.217	-0.461**	0.222	-0.372	0.23	-0.366	0.232	-0.39*	0.233
Reached or completed secondary school level	-0.075	0.164	-0.008	0.167	-0.065	0.171	-0.009	0.175	0.024	0.178	0.001	0.179
Reached or completed primary school level (Base)	0		0		0		0		0		0	
Reside in an urban area			-0.678***	0.145	-0.712***	0.147	-0.71***	0.147	-0.71***	0.148	-0.771***	0.151
Reside in a rural area (Base)			0		0		0		0		0	
Premarital sex is not wrong					0.254*	0.152	0.324*	0.159	0.324*	0.159	0.191	0.17
Premarital sex is wrong (Base)					0		0		0		0	
Aged between 18 and 30 years							-0.295	0.19	-0.39*	0.216	-0.441**	0.218
Aged 31 and older (Base)							0		0		0	
Single and never married									0.194	0.19	0.114	0.193
Separated, divorced or widowed									0.19	0.254	0.174	0.256
Married or cohabiting (Base)									0		0	
Never attend religious services											0.327	0.371
Attend religious services once a month to once a year											0.467**	0.194
Attend religious services once a week or more (Base)											0	
- 2ll	1118.907		1096.839		1094.042		1091.62		1090.246		1084.284	
Model Chi ²	8.194**		30.263***		33.06***		35.482***		36.856***		42.818***	

N = 435

*** = significant at 0.005 level; ** = significant at 0.05 level; * = significant at 0.1 level

Risk-taking and multiple partners

Irrespective of whether condoms are used or not, having multiple partners increases the risk of exposure to a STI for an individual. The more partners a person has in a specific time unit, the more likely it is a non-monogamous relationship (Michael et al, 1994: 195). Relationships also tend to be casual, short-term or 'one night' stands. There is a strong correlation between those with several partners and the likelihood of paid sex and casual encounters fuelled by alcohol (Michael et al., 1994: 196). This leads to a decreased usage of condoms. There is also evidence that people with many sexual relationships engage with others who are also in non-monogamous relationships (Michael et al., 1994: 195). This greatly increases the chances of acquiring a sexually transmitted infection.

The importance of multiple partnerships to the risk of encountering a potentially infected partner can be illustrated using information obtained from the Irish sample.

Table 2. Reports of sexual partners and sexual encounters for both genders

Number of sexual partners reported by women	Number of women	Number of sexual encounters
1	174	174
2	9	18
3	5	15
4	1	4
5 and 10 [7.5]	1	7.5
21 and 100 [60]	1	60

Number of sexual partners reported by men	Number of men	Number of sexual encounters
1	144	144
2	11	22
3	6	18
4	3	12
5 and 10 [7.5]	2	15
21 and 100 [60]	0	0

For the male population, the calculations are based on the number of male sexual partners reported by women for the last year and for the female population, the calculations involve the number of reported sexual partners by the male respondents (see table 2). For

the categories of five to 10 partners and 21 to 100, the midpoints are taken for the calculations. Since we are estimating the probability of meeting a sexual partner who has had multiple partnerships, we need to think in terms of sexual encounters. Therefore, we multiply the number of reported sexual partners by the number of respondents. This calculates the number of new sexual encounters in the last year. This gives us a total of 278.5 new sexual encounters involving women who had one or more sexual partners and 211 new sexual encounters involving males with one or more sexual partners for the past year. The next step in our calculations involves finding the fraction of all sexual encounters that involved a female and a male with just one sexual partner and those who had two or more sexual partners. By dividing the 174 sexual encounters that involved females with only one sexual partner by the total number of new sexual encounters (278.5), the result is 0.625. When subtracting this figure from one to get the fraction of total sexual encounters that involved females with two or more sexual partners in the last year, the resulting figure is 0.375. This means that 62.5% of male new sexual encounters were with females who had one sexual partner, while 37% of female new sexual encounters were with females who had two or more sexual partners. This was repeated for the female population, resulting in 68.2% of new sexual encounters in the last year involving males who had just one sexual partner, while 31.8% of new sexual encounters involved males who had two or more sexual partners.

To calculate the probability that a male had contact with a woman who has had two or more sexual partners in the past year, we use the following equation:

$$P = 1 - (0.625)^n$$

where n equals the number of sexual partners a male has had in the last year.

For women, the probability is calculated by:

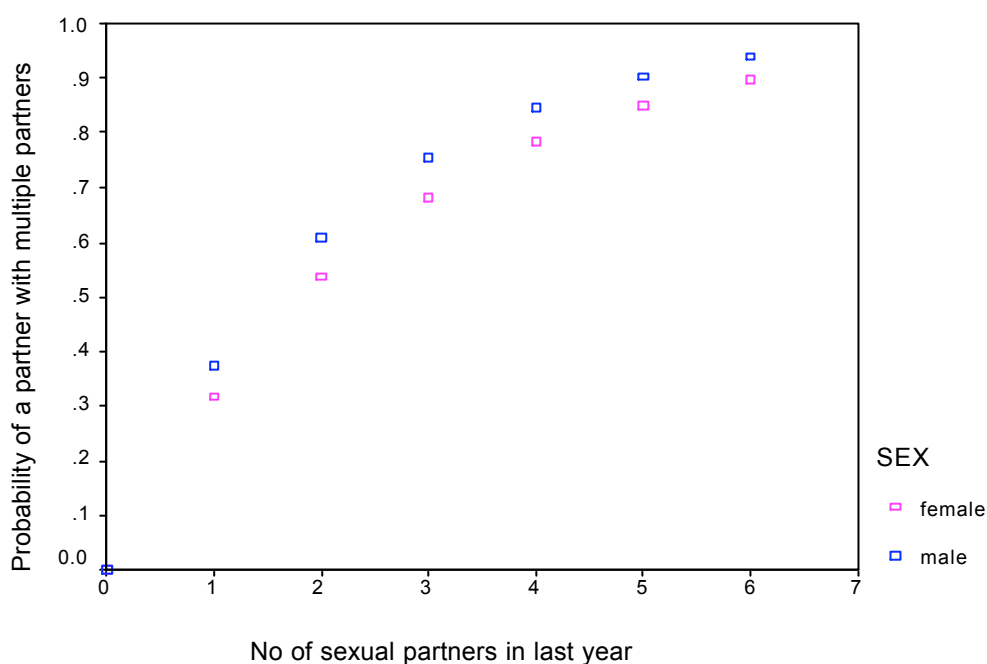
$$P = 1 - (0.682)^n$$

where n equals the number of sexual partners a female has had in the last year.

For a male who has had just 1 sexual partner, he has 37.5% chance of coming into contact with a woman who has multiple partnerships, i.e. $1 - (0.625)^1$. While women who have had only one sexual partner have a 31.8% chance of having a partner who has had multiple partners. As illustrated in figure 1, for both sexes, the probability of

encountering a sexual partner who had multiple partnerships in the last year increase as the individual increases his or her number of sexual partners. For example, a woman, who has had five sexual partners has an 85.2% chance of having a sexual encounter with a male who has had two or more sexual partners.

Figure 1. Graph displaying the probability of encountering a sexual partner who has had multiple sexual partnerships by increasing number of sexual partners for the last year by gender



Taking into account the other influential factors, such as condom usage and whether or not the sexual partner is infected, the risk of acquiring a STI would be much lower. However, by increasing the numbers of sexual partners, an individual increases the likelihood of having a partner who has had multiple partners, thus increasing his or her risk of being exposed to an infected individual.

Concurrency

Another effect of multiple partnerships on the risk of STIs, is that people with multiple partners over a twelve month period are more likely to have concurrent or overlapping relationships, which is conducive to the spread of STIs (Overseas Development Administration, 1996; Aral and Peterman, 1996; Laumann et al., 1994). Unfortunately, there is no information to support the presence of concurrent relationships in the data. Even where respondents were married and were stated as having two or more partners in the last year, it is difficult to determine if these relationships were concurrent as the time frame of marriage is not stated. However, respondents were asked about participation in extramarital affairs. Despite not possessing any knowledge of the nature and duration of the extra-marital affair, we can assume concurrency at a particular point in time, although it is possible that a person may not be in a sexual relationship with the marital partner. It can be argued that a married individual who is having sex with someone other than their spouse, will recruit his or her partner from outside their social circle of acquaintances in order to minimize the chances of being discovered (Mai et al., 2000; Laumann et al., 1994) Laumann et al. (1994) in their study on the sexual behaviours of the USA population argued that this action increases the individual's risk of STIs more than if the individual was single and had indulged in a series of short-term monogamous relationships (172).

Eighteen men (7.7% of all males) and eight women (3.7%) admitted to having an extramarital affair. All males were aged 31 and over, while two women were less than 30 years of age (the youngest of whom was 28). With the exception of one person who had never been married, all respondents who had been involved in an extramarital affair had been married, with two men and one woman now widowed. None of the respondents classified themselves as separated or divorced, thus indicating that the marriage had continued in spite of the affair.

Sixteen of those respondents who admitted having extramarital affairs cited only one sexual partner in the last year with eight of these (50%) reporting sex with someone they had termed as a close friend, perhaps referring to a mistress. It is possible that the

other eight had their affair some time ago. Another ten respondents reported between two and 100 partners yet all cited having a 'regular sexual partner'. None of respondents had paid for sex or had casual sex. While eight respondents indicated that the sexual relationship had ceased with the marital partner due to their only sexual partner in the last year being 'a close friend', at least ten respondents were still at risk of concurrency. Furthermore, participation in extramarital affairs helps to link high-risk partners with low risk sexual partners by providing a channel for the transmission of STIs from core groups to low risk groups.

'High risk' groups

Apart from multiple partnerships, other 'high risk' behaviours associated with spread of STIs include sex with a sex worker and homosexual and bisexual behaviours. Only a tiny number of respondents reported having used paid sex. None of the females reported being involved in prostitution since their 18th birthdays, though it is possible that there is a social desirability bias with female responses (Wellings et al., 1994). Only one unmarried male under the age of 30, reported having used a prostitute. Another seven were aged between 31 and 40 and four were between 41 and 50 years of age. The majority of these older men were married (nine respondents). No one reported use of paid sex in the last year, indicating that the use of prostitution may not have placed them in contact with a high risk group within that year, but their reported past experience reveals that they have taken risks in being potentially exposed to STIs. Furthermore, given that the majority are married and of older age groups, it is conceivable that the respondents have placed both themselves and their partners at risk.

A limitation with this dataset is that the size of the subpopulation of homosexuals and bisexuals is too small to carry out any significant differential analysis. One problem with using a randomised sample for sex research is that the homosexual population tends to be underrepresented. As O'Connell Davidson and Layder (1994) have argued, the homosexual population is not geographically dispersed across a nation, as homosexuals

tend to live in cities where there are cohesive gay communities (93). Only 21 respondents reported homosexual behaviours – 4.1% of those who had exclusively male partners since 18th birthday were men and 6.1% of those who had only female partners since 18th birthday were women. The percentage of bisexual behaviour was even smaller. This low percentage reflects what has been found in other European sexual behavioural surveys. Out of five surveys done on USA, Denmark, France, UK and Sweden on aspects of sexual orientation and behaviour which are related to risk of HIV/STIs, lifetime homosexual behaviour was reported to be less than seven-percent with rates of past year same gender sexual contact of between one-percent to three-percent (Dunne et al., 1994: 41). Similar to Wellings et al. (1994) in their national study on sexual behaviours in Britain, the majority of respondents in this sample reported to have had exclusive heterosexual behaviours. Moreover, this heterosexual sub-population were more likely to have multiple partners, thus indicating that perhaps transmission of STIs in the Irish population may be more affected by heterosexuals. Indeed, the largest proportion of reported STI rates consists of ano-genital warts, an STI which is associated with heterosexual coupling (Department of Health and Children, 1999: 53-54).

It is worth noting however that irrespective of sexual identity, people can be engaging in both homosexual and heterosexual transmission of STIs (Wilton, 2000: 85). Evans et al. (1988) found in their studies on risk factors and STIs that over 50% of homosexual men had reported previous heterosexual intercourse and that the risk of heterosexual spread of HIV is increased by the combination of heterosexual and homosexual intercourse by bisexual and homosexual men (129).

What factors influence the likelihood of having multiple partners?

A series of logistic models was constructed in order to examine the effects of age group membership, area of residence, level of education religious attendance and marital status. Only these demographics were included as they were found in other studies to be strongly correlated with sexual behaviours (Sandfort et al., 1998; Wellings et al., 1994; Hendry et

al., 1993). When run in single models, all variables were shown to have an effect on the log-odds of two or more partners for both time periods and were significant at 0.005 and 0.05 levels. Gender was not used in the analysis, as it was not found to be a confounding variable. This is an interesting finding as previous sex surveys have suggested that while roughly the same proportion of men and women claimed one partner, in relation to two or more partners, men were more likely to overestimate their number of sexual partners while women underestimate the number of theirs (Wellings et al., 1994; Hendry et al., 1993; Fitzpatrick et al., 1992). It is possible that the effects of gender differences are being hampered by missing data or there may really be little difference in sexual behaviours between the sexes in Irish sexual culture.

By examining the effects of the demographic factors simultaneously, it is possible to characterise those who reported 2 or more sexual partners in the last year and the last 5 years. Tables 3 and 4 show the results of the combined models for predicting the likelihood of having two or more partners in the last five years and the last year.

Table 3. Combined models for predicting likelihood of having two or more partners in the last 5 years

	Model I		Model II		Model III		Model IV		Model V	
	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.
Under 30 years old	2.112****	0.299	1.894****	0.312	1.849****	0.313	1.697****	0.322	0.319	0.449
31 years and older (Base)	0		0		0		0		0	
Reached or completed third level education			1.153*	0.603	1.11*	0.605	1.003♦	0.616	0.659	0.695
Reached or completed secondary school level			0.815♦	0.567	0.811♦	0.569	0.804♦	0.574	1.001♦	0.633
Reached or completed primary school level (Base)			0				0		0	
Reside in an urban area					0.473♦	0.345	0.315	0.357	0.215	0.418
Reside in a rural area (Base)					0		0		0	
Never attend religious services							0.595	0.6	0.125	0.727
Attend religious services once a month to once a year							0.731**	0.338	0.106	0.417
Attend religious services once a week or more (Base)							0		0	
Single and never married									3.358****	0.476
Separated, divorced or widowed									1.639**	0.655
Married or cohabiting (Base)									0	
- 2ll	288.83		284.620		282.674		277.942		213.292	
Model Chi ²	52.555****		56.765****		58.712****		63.443****		128.093****	
N = 356										

**** = significant at 0.0005 level

*** = significant at 0.005 level

** = significant at 0.05 level

* = significant at 0.1 level

♦ = just over 0.1 level – Model II (0.136); Model III (0.17 and 0.154); Model IV (0.103 and 0.161); Model V (0.114)

Table 4. Combined models for predicting likelihood of having two or more partners in the last year

	Model I		Model II		Model III		Model IV		Model V	
	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.	B.	S.E.
Under 30 years old	1.554****	0.363	1.4****	0.378	1.333****	0.38	1.088**	0.394	-0.444	0.533
31 years and older (Base)	0		0		0		0		0	
Reached or completed third level education			0.99	0.817	0.912	0.818	0.626	0.834	-0.05	0.899
Reached or completed secondary school level			0.908	0.77	0.891	0.771	0.798	0.778	0.714	0.826
Reached or completed primary school level (Base)			0		0		0		0	
Reside in an urban area					0.745*	0.45	0.477	0.468	0.292	0.513
Reside in a rural area (Base)					0		0		0	
Never attend religious services							1.409**	0.652	1.412*	0.737
Attend religious services once a month to once a year							0.992**	0.419	0.695♦	0.475
Attend religious services once a week or more (Base)							0		0	
Single and never married									3.064****	0.589
Separated, divorced or widowed									2.444****	0.805
Married or cohabiting (Base)									0	
- 2ll	213.218		211.327		208.291		200.796		166.305	
Chi ²	18.049****		19.94****		22.976****		30.471****		64.962****	

N = 347

- **** = significant at 0.0005 level
- *** = significant at 0.005 level
- ** = significant at 0.05 level
- * = significant at 0.1 level
- ♦ = just over 0.1 level – Model V (0.144)

Age group membership

Both tables reveal that age group membership does have an affect on the log-likelihood of having 2 or more partners within a certain time frame until adjusting for marital status, when the effect disappears.³ Throughout Models I to IV on both tables, those who are between 18 and 30 years have higher log-odds of multiple partners in the last year or 5 years than those who are 31 and older. This is expected as those of the younger age group are at the start of their sexual career and are more likely to sexually experiment with a number of sexual partners.⁴ Without controlling for the other 5 independent variables, membership of the younger age group increases the log odds of having two or more partners by 1.6 times for the last year and doubles the log odds when compared to the other age group for the period of five years. These log-odds decrease when adjusting for the effects of the other variables indicating intervening variables. When the log-odds fall to near zero in the final models, this is not unexpected given that one would expect marriage to diminish the likelihood of having multiple partners. Similar to the findings of Wellings et al (1994) and Kost & Darroch Forrest (1992), irrespective of age, those who are single are more likely to have multiple partners than those who are married. People of all ages respect the monogamous union of marriage (Wellings et al., 1994: 104). When taking age, area of residence, educational level and religious attendance into account, those who have never married have higher log-odds of 3.358 times to have had two or more partners within last five years compared to those married or living as married. They also have a higher log-odds of 3.064 times for multiple partnerships within the last year. People who are separated, divorced or widowed also had significantly higher log-odds of having multiple partners than those who were married (despite presence of extramarital affairs). Gott et al. (2000) have pointed out that

³ Model V is also the 'best fit' model for both time period, with a difference in $-2\ln$ from the first model of 46.913 for last year and 75.538 for the 5 year period. Thus indicating that the addition of variables provide an improvement in the predictive power of multiple partnerships for both time frames. Changes in the Model Chi-square for each new block added in the models were significant at the 0.0005 level, showing improvement in chi-square for each additional degree of freedom.

⁴ The life course of sexual activity and lifestyle of an individual can be termed a sexual career. Generational effects and secular trends aside, most individuals' sexual careers undergo a similar process (Welling et al., 1994). There is an initial experimental phase with a number of partner changes. Then there is the establishment of a long term and committed relationship (e.g.: marriage). Later in life, there can be separation, divorce and widowhood, which result in either sexual abstinence or new relationships.

relationship patterns are becoming more flexible in later life in western societies with many people actively seeking sexual partners post-marriage (717). This is reflected in the positive log-odds of 1.69 for having multiple partners over the last 5 years and 2.444 for the last year.

Education

In spite of the level of education being significant when used in a single model for predicting log-likelihood of two or more partners within the last year or five years, it does not add to the explanatory power of Model II in table 4. Its addition only reduces -2 log-likelihood by 4.21. When predicting log-likelihood of having two or more partners in the last five years, education did display an increase of 1.153 in log-odds when controlling for age (Model II in table 3). It is possible that the effect of educational level reached may have higher significance with a larger sample. In Model V, those who reached or completed secondary school level had higher odds of 1.001. This is in keeping with previous research which found that despite age, the higher the level of education, the more liberal the attitudes to sexual behaviour and the greater the possibility of multiple partnerships. Lear (1997) found that unlike those who did not attend university, college populations frequently partook in risk-taking sexual behaviours, such as alcohol fuelled sexual encounters and multiple partners. Thus over the longer period, those educated at secondary school and higher have higher log-odds to have accumulated more partners than those who attended just primary school. The effect of educational level reached does lose significance for the time period of five years when attendance at religious services and marital status are controlled. Thus showing that in Ireland, the liberalising effects of increasing educational level is compromised by religious devotedness and adherence to marital vows or long term monogamous commitment.

Area of residence

Area of residence was added to the third model in both tables to see if living in an urban area provides greater opportunity to engage in multiple partners. In other words, the greater availability of sexual partners and more secularised outlooks of urban areas would increase the log-odds of multiple partners when controlling for the other variables. For the last year, the log-

odds of multiple partners was increased by 0.76 times while for the last 5 years, the log odds were increased by 0.5 times. Both log-odds are small and hover around the 0.1 level of significance. When controlling for age group membership, residence in an urban area increases log-likelihood of multiple partnerships. This effect may be found to be more significant in a larger sample. Since the effect disappears once the impact of religion was controlled for, it is possible that those living in urban areas had higher log-odds of multiple partners because they had larger numbers of those who did not attend or infrequently attended religious services than the rural areas.

Religious attendance

Religious attitudes (which can be derived from attendance at religious services) have an effect on the possibility of sexual risk-taking within the shorter period of 1 year. Although, 'attendance at religious services' is only one measure of religiosity in relation to sexual behaviours, it can be assumed that attendance at religious ceremonies would bring individuals into contact with the religious institution's teachings on sexual matters. Religious attendance has a significant effect at the 0.05 level on the number of sexual partners in the last year when controlling for age group membership, area of residence and education level reached (Model IV). Those who do not attend church services have higher log-odds of 1.409 of having two or more sexual partners in the last year than those who attended regularly. Furthermore, those who attended infrequently (i.e. between a few times a month and once a year) also increased the log-likelihood of multiple partners by 0.992 times. Since the majority of the Irish population are practising Catholics, one would expect to see either one sexual partner or no sexual partners if the Church teachings were being followed. Indeed, those who regularly attended religious services were more likely to have more conservative sexual behaviour irrespective of age, area of residence and educational level reached - i.e. they did not have two or more sexual partners in the last year.

Religious attendance is not as strong a predictor in the models for log-odds of having two or more partners in the last five years. Those who never attend did not have significantly higher log-odds than those who attended regularly. When controlling for age, area of residence and education level, those who attended services infrequently did have slightly higher log-odds of

multiple partners than those who did attend regularly (0.731). Erratic attendances could be symptomatic of family obligations rather than personal beliefs and so would display higher odds of multiple partners than those who attended church regularly. Sporadic attendance at church could mean an inconsistency in beliefs and values that spill over into sexual behaviours and lifestyles. In relation to the absence of significant differences between those who attend religious services regularly and those who never attend, the effect of religious attendance could be compromised by favourable premarital attitudes. Irish people would be influenced by the overall trend of premarital sex in Western societies (Coleman, 2000). Here the emphasis is still on long-term emotional partnerships with a sexual component but that it no longer needs to be restricted to the marital union. Irrespective of religious beliefs, Irish individuals could be culturally influenced to have monogamous sexual unions prior to or instead of marriage. This would mean that individuals who have had two or more sexual partners in the last five years are more likely to have serial monogamous relationships rather than short term 'flings'.

Discussion

While the regression models explored what best predicts multiple partnerships, they can also help determine whether or the under 30s age group (which accounts for the biggest proportion of STIs) are more likely to engage in risk-taking sexual behaviours than the older age group. When taking into account area of residence, education level and religious practice, the younger age group do display a higher likelihood of multiple partnerships than the older age group. It is not surprising that in the final and best-fit model for both time-frames that marital status would have such a big effect. One would expect that those who have never married and those who are separated, divorced or widowed would have higher log-odds of multiple partners than those who are married. Given that age ceases to be significant in the final models of tables 3 and 4, it can be surmised that within both age groups, an individual ceases other sexual relationships when they meet a long-term partner. Sexual intercourse is not age specific and the larger numbers of reported rates of STIs from under 30s could simply reflect the larger proportion of them being unmarried than the older age group.

Within the two age groups, the majority had just one sexual partner for both time-periods. Similar to other sexual behavioural surveys (Wellings et al., 1994; Michael et al., 1994), an extreme skewness of distribution occurs in relation to the reported number of partners. The vast majority of respondents only report one sexual partner with a few extreme points or outliers reporting several. These form the 'high risk' group. The degree to which those with a high rate of partner change mix with those with a low rate within a specific period is of importance to the spread of STIs in a population (Kretzschmar, 2000). Giesecke et al. (1992) have suggested that high-risk individuals choose similar high-risk partners, more often than is predicted by chance (259). If this is the case for the Irish population, then the increase in reported rates is reflective of this minority rather than changes in high-risk behaviour for the whole population. Indeed, given that the majority of the young age group have had only one sexual partner in the last year, it is very possible that at that period when the rates were increasing, it was not changes in sexual practices amongst the young that were contributing to the augmentation.

Conclusion

This purpose of this article was to illustrate how the social science tool of secondary data analysis is a useful means of extracting information from a general social survey dataset to answer a specific health related question. In this case, it was to describe levels of 'high risk' sexual behaviours, which are conducive to the transmission of STIs. Although the sample of the Irish population was small, we are able to establish individual risk factors for the potential risk of exposure to STIs. When controlling for the demographic factors of age group membership, level of education reached, area of residence and religious attendance, those who are unmarried are the most likely to have multiple sexual partners in the last year or 5 years. Because the majority of those under the age of 30 are unmarried (unlike the older age group), it is possible that this constitutes them as the age group more likely to be exposed to the potential risk of STIs. Sexual risk patterning does occur throughout the generations in the population. Certainly, the younger age groups are more likely to be exposed to STIs, simply because they are at the experimental

stage of their sexual careers. However, those over the age of 30 demonstrated use of prostitutes and extramarital affairs.

Despite the limitations of the information on sexual behaviours in the dataset, the findings do comply with the observations of more specific sex surveys (Wellings et al., 1994; Michael et al., 1994; Knox et al., 1993). A minority of respondents displayed tendencies to risk take in sexual behaviours. This is also in keeping with studies on STI transmission, where only a small proportion of the population contribute disproportionately to the spread of STIs via high rates of STIs and partner change (Jolly et al., 2001). Since only a minority of the Irish population are indulging in multiple partnerships, the explanations for increasing reported rates of STIs may rely on other social mechanisms, such as the Irish surveillance system and the provision of genitourinary medical services. Hence, as an exploratory tool, second secondary analysis of a small sample can provide a direction for future research through the description of a population's characteristics and the revelation of gaps in the explanations of a health phenomenon.

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