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Self-reported smoking, alcohol and drug use among adolescents and young adults with and without mild/moderate intellectual disability

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Abstract

Background. People with intellectual disability may be at elevated risk of adverse consequences of substance use. This study outlines the prevalence of, and factors associated with, substance use in young people with and without intellectual disability.

Method. Secondary analysis was undertaken of the *Next Steps* annual panel study which follows a cohort through adolescence into adulthood and contains self-report data on smoking, alcohol and drug use.

Results. Young people with mild/moderate intellectual disabilities were generally less likely to use substances than their non-disabled peers. The pattern of association with socio-demographic factors was mixed. Overall, matching participants on between-group differences in exposure to extraneous risk factors did not impact on between group differences in substance use.

Conclusions. Young people with mild/moderate intellectual disability are less likely to use substances than their non-disabled peers. Prevention and intervention programs need to be adapted for those in this population who do use substances.

Keywords: intellectual disability, smoking, alcohol, drug use

Introduction

Smoking cigarettes, drinking alcohol and the use of illicit drugs, particularly by young people, have long been seen as key public health concerns (Fuller, 2015). Greater normalisation and deinstitutionalisation for people with intellectual disability brings with it greater access to tobacco, alcohol and drugs (Kiewik, VanDerNagel, Kemna, Engels, & DeJong, 2016) and there is growing concern about the number of people with intellectual disability who have access to such substances (Taggart and Temple, 2014).

Individuals with mild intellectual disability or borderline intellectual functioning have been identified as a group at risk for negative consequences of substance use (Didden, 2017), with substance users with intellectual disability showing an elevated likelihood of problematic substance use (Chapman and Wu, 2012) or substance use related problems (McGillicuddy, 2006). An "all or nothing" principle has been suggested in relation to alcohol use, with larger proportions of adolescents with mild intellectual disability or borderline intellectual functioning being abstinent but those who begin to drink being at an increased risk for intoxication and subsequent at-risk behaviours (Reis, Wetzel, & Häßler, 2017).

Consequences associated with substance misuse by people with intellectual disability include aggression, erratic mood changes, sexual exploitation, difficulties in maintaining relationships and loss of daily routine (Taggart, McLaughlin, Quinn, & Milligan, 2006). There are also potentially life threatening risks associated with substance use in relation to cross-reactions with psychotropic medications (Slayter, 2008). Substance users with intellectual disability may also be at risk for being involved with the criminal justice system (Chapman and Wu, 2012), with the majority of participants in one study reporting that they were intoxicated at the time of their offence (McGillivray and Newton, 2016).

A small amount of research has considered the prevalence of substance use among adolescents and young people with intellectual disability, with reviews noting that their level of substance use appears to be lower than that of their nondisabled peers (Chapman and Wu, 2012; McGillicuddy, 2006). However, findings are mixed with studies finding: higher rates of smoking among adolescents with intellectual disability (Emerson and Turnbull, 2005), elevated levels of alcohol use among 11 year old children with intellectual disability (Emerson, Robertson, Baines, & Hatton, 2016), and levels of tobacco or alcohol use in children with mild intellectual disability as high as for school children generally (although cannabis use was half the rate as for school children generally) (Pacoricona Alfaro et al., 2017).

For adolescents and young adults generally, a substantial body of research has examined risk factors for substance use (Melotti et al., 2013; Patrick, Wightman, Schoeni, & Schulenberg, 2012; Stone, Becker, Huber, & Catalano, 2012). Children with intellectual disability are more likely than their peers to be exposed to a range of environmental adversities due the combination of lower family socio-economic position, disability related discrimination and social exclusion (Emerson, 2013). These socio-economic inequalities may impact on substance use. However, research that examines risk factors for substance use among young people with intellectual disability is limited to a study of predictors of alcohol use among 11-year-old children with intellectual disability (Emerson, et al., 2016) and a study of variables associated with smoking and alcohol use among adolescents with intellectual disability (Emerson and Turnbull, 2005).

Given the heightened risk for substance use related problems among people with intellectual disability, lack of accurate estimates of prevalence and dearth of information on risk factors for substance use, there is a clear need for further research on the prevalence of and factors

associated with substance use in people with intellectual disability. There is little research relating to substance use among adolescents and young people with intellectual disability in the UK, with existing evidence generally being limited to alcohol and tobacco use. We are aware of no studies using a large population-based sample that consider use of a wider range of substances by adolescents and young people with intellectual disability in the UK. In this paper, we present the results of a secondary analysis of a large scale longitudinal study which includes information relating to self-reported substance use (tobacco, alcohol, cannabis and other drugs) by adolescents and young adults with and without mild/moderate intellectual disability in England. Our aims are threefold: to compare substance use by those with and without mild to moderate intellectual disability; to identify socio-demographic predictors of substance use; and to estimate the extent to which any between-group differences in substance use may be attributable to between-group differences in exposure to extraneous risk factors.

Method

Secondary analysis was conducted of data collected from 2004 to 2010 in Waves 1 to 7 of *Next Steps* (formerly known as the Longitudinal Study of Young People in England), an annual panel study that followed a cohort from early adolescence into adulthood. It has collected information about education, employment, economic circumstances, family life, physical and emotional health and wellbeing, social participation and attitudes. *Next Steps* data has been linked to the Department for Education's National Pupil Database (NPD). *Next Steps* data files and documentation were obtained from the UK Data Service. Full details of the method and design of *Next Steps* are available in a series of user guides (Department for Education, 2011b). Key aspects are summarised below.

Sampling

Fieldwork commenced in 2004 when the sampled children were aged 13-14 (school year 9). The initial (Wave 1) sample was drawn from a sampling frame based on children attending schools (with the exception of special schools) and pupil referral units (schools set up specifically to deal with pupils that otherwise would not receive a suitable education for any reason, including illness or exclusion) in England who in February 2004 were in Year 9 (or equivalent) and were born between 1 September 1989 and 31 August 1990. Schools in deprived areas and students from minority ethnic groups were oversampled. At Wave 1, 73% of selected schools participated leading to an issued sample of approximately 21,000 young people. The attained sample at W1 was 15,770 children (75% response rate). This cohort was followed-up every year until 2010 (age 19-20).

Information on rate and predictors of sample retention can be found in the online supplementary material (https://dx.doi.org/10.17635/lancaster/researchdata/198). In summary, for participants with intellectual disability, sample retention at Wave 7 from Wave 1 was 39%, with retention from each wave varying from 79% to 94%. For those without intellectual disability, retention at Wave 7 from Wave 1 was 54%, with retention from each wave varying from 86% to 94%.

Identification of Participants with Mild/Moderate Intellectual Disability

Data linkage with the 2004 and 2006 NPD was undertaken to identify participants with Special Educational Needs (SEN). Linkage was successful for 15,240 young people present at Wave 1 (97% of the *Next Steps* sample). Linkage included data on stage of assessment and primary/secondary category of SEN.

Following the example of previous studies (Emerson and Halpin, 2013; Naylor, Dawson, Emerson, & Tantam, 2011), we used the SEN category of Moderate Learning Difficulty (MLD), if the child was at the School Action Plus stage of assessment of SEN (a stage where it is necessary to involve support services external to the school) or had a Statement of SEN (a formal document detailing a child's SEN and help that will be given) as an indicator of mild/moderate intellectual disability. Both School Action Plus and Statements required the involvement of professionals external to the school in the categorisation of SEN. Current guidance defines MLD in relation to pupils having 'attainments significantly below expected levels in most areas of the curriculum despite appropriate interventions [and having] ... much greater difficulty than their peers in acquiring basic literacy and numeracy skills and in understanding concepts'(Department for Education, 2011a).

Of the children sampled, 527 (3.5% of the unweighted linked sample) were identified as having mild/moderate intellectual disabilities in either 2004 or 2006. Consistent with existing epidemiological research, the prevalence of intellectual disability was significantly higher among boys than girls (4.3% vs 2.5%; prevalence ratio (PR)=1.75 (95% CI 1.46-2.09)) and among children eligible for free school meals, an indicator of household poverty (further details on this are given in the 'Measures' section below), (8.0% vs 1.9%; PR=4.10 (95% CI 3.14-5.35)) (Emerson, 2012; Maulik, Mascarenhas, Mathers, Dua, & Saxena, 2011; Roeleveld, Zielhuis, & Gabreels, 1997).

Procedure

Data in the first four waves was collected by face to face interviews using computer assisted personal interviewing with the young person themselves and their parents. Total interview time at Wave 1 was 1 hr 30 mins (35 mins young person, 55 mins parent) (Department for

Education 2011b). Waves 5-7 used a mixed mode approach in which information, which was only collected from the young person, was collected by their choice of method (online, telephone or face to face).

Measures

Further details on the measures including exact wording for questions can be found in the online supplementary material noted above.

Smoking. Two binary variables were created: ever smoked at any Wave; and has smoked more than six cigarettes a week at any Wave.

Alcohol Use. Five binary variables were created: ever had an alcoholic drink under 18; regular drinker under 18 (*once or twice a week* or *most days*) at Wave 1-4; regular drinker age 18+ (*once or twice a week* or *most days*) at Wave 6-7; usually gets drunk (*around half the time* or *more frequently*); and regular drinker age 18+ who usually gets drunk (combining regular drinker age 18+ AND usually gets drunk).

Drug Use. Binary variables created were**:** ever tried cannabis under 18 at Wave 1-4; ever tried cannabis 18+ (at either Wave 6 or 7); and ever tried other drugs (e.g. cocaine, LSD, ecstasy, heroin, crack, speed) 18+ (at either Wave 6 or 7); frequent cannabis user 18+ (*three or more times* in last 4 weeks); had cannabis in last 12 months age 18+.

Socio-Demographic Variables.

Family socio-economic position. We created a binary variable of free school meal eligibility scored 1 if the child was eligible at Wave 1, Wave 3 or both Waves and scored 0 if the child was not eligible at both Waves. Free school meal eligibility is a commonly used proxy indicator of low household socio-economic position (Kounali, Robinson, Goldstein, &

Lauder, 2008). Eligibility for free school meals is an indicator of a pupil living in a family with an income considered to be below the poverty line (Gorard, 2012), with eligibility being based on receipt of a range of income-based benefits, such as income support for those with low or no income.

We created a binary variable of living in a workless household scored 1 if no resident parental figure was in employment or full time education at any of Waves 1-4 and scored 0 if at least one resident parental figure was in employment or full time education in each of the four Waves.

Young adult socio-economic position. We created a binary variable of not in employment, education or training (NEET) scored 1 if the young person was NEET at any of Waves 5-7 and scored 0 if they were in employment, education or training in each of the three Waves.

Household composition. We created a binary variable of single parent household scored 1 if only one parental figure was resident at any of Waves 1-4 and scored 0 if two parental figures were resident in each of the four Waves.

Area deprivation. We created a binary variable of High Neighbourhood Deprivation scored 1 if the child was living in the lowest Income Deprivation Affecting Children Index (IDACI) (Noble et al., 2008) quintile at Wave 1, Wave 3 or both Waves and scored 0 if the child was not living in the lowest IDACI quintile at both Waves.

Peer victimisation. At each of Waves 1-3, children were asked about exposure to five types of peer victimisation (bullying) in the last 12 months: name calling, social exclusion, theft, threat of violence, and actual violence. Preliminary analysis of responses indicated a

strong association between threat of and actual violence, but weak associations between other forms of peer victimisation. As a result we combined self-report of threat of or actual violence at each of the three Waves. For each of the four types of peer victimisation (name calling, social exclusion, theft, violence) we created one binary variable; whether this had happened at all in any 12 month period in Waves 1-3 (contrasted with it never happening in any of the three Waves).

Friendships. We created two binary variables: Wave 2 spends free time with friends, and Wave 6/7 has few friends (no or only 1 close friend versus two or more close friends.

Approach to Analysis

In the first stage of analysis we made simple bivariate comparisons between participants with and without intellectual disability with regard to available indicators of smoking, alcohol and drug use. In the second stage of analysis we investigated, for key indicators of smoking, alcohol and drug use, the strength of association between socio-demographic factors and outcomes separately for participants with and without intellectual disability. Missing data among socio-demographic variables was imputed using multiple imputation routines in SPSS 22 to create five parallel imputed data sets. The subsequent analysis used the following approach: (1) five blocks of variables were created (SEP, neighbourhood, family type, peer victimisation, friendships) and entered sequentially; (2) variables within blocks were entered in order of bivariate strength of association with the outcome of interest; (3) variables were only retained in the model if *at the point of entry* they were significantly related to the outcome of interest or had a prevalence ratio of 1.50 or greater. Poisson regression with robust standard errors was used to estimate prevalence ratios uniquely associated with each

variable in the model (Knol, Le Cessie, Algra, Vandenbroucke, & Groenwold, 2012; Zocchetti, Consonni, & Bertazzi, 1997).

In the final stage of analysis we estimated the strength of association between intellectual disability and smoking, alcohol and drug use while controlling for between group differences in exposure to socio-demographic variables that have been established as important social determinants of poorer health. Two separate approaches were used to address this issue. First, we used Poisson regression with robust standard errors to estimate prevalence ratios associated with intellectual disability for each outcome with exposures included in the model as covariates.

Second, we used Propensity Score Matching routines in SPSS 22 to match each participant with intellectual disability with a participant without intellectual disability. Propensity score matching is increasingly used in epidemiological research to estimate between-group differences including those related to treatment effects while controlling for the effects of potential confounding variables (Austin, 2011; Blackford, 2007; Oakes and Johnson, 2006; Sturmer et al., 2006). The procedure is used to first determine the risk (propensity) that each participant in the sample will have intellectual disability based on exposure to the socio-demographic variables listed above. Technically, an individual's propensity score is the logit of the predictor variables regressed against intellectual disability status. Then, propensity scores are used to match each participant with intellectual disability with a participant with the same propensity (risk) for intellectual disability, but who did not have intellectual disability. We used the lowest tolerance for matching (0.05) that allowed complete matching for all participants with intellectual disability. A number of reviews have suggested that propensity score matching often gives similar results to more traditional methods of adjusting for the effects of potentially confounding covariates, for example, logistic regression (Shah,

Laupacis, Hux, & Austin, 2005; Sturmer, et al., 2006). Recently, researchers have shown that propensity score matching gives more accurate estimates of marginal treatment effects than does traditional methods and that, in certain circumstances, the differences between the two approaches can be substantial (Martens, Pestman, de Boer, Belitser, & Klungel, 2008). Propensity score matching has previously been used in disability research to investigate such issues as the wellbeing of mothers of children with and without early cognitive delay (Emerson et al., 2010) and the fairness of pay of working age adults with disabilities (Milner et al., 2015).

Results

Differences in smoking, alcohol and drug use between participants with and without intellectual disability

The proportion of participants with and without intellectual disability who used cigarettes, alcohol and other drugs is given in Table 1 along with the unadjusted PR.

[Table 1 here]

Males with intellectual disability (aged under 18, smoking data is not available for age 18+) were at significantly greater risk of having ever smoked (28% versus 22%) and of smoking 6+ cigarettes a week (17% versus 11%) than males without intellectual disability. Females with intellectual disability were at significantly less risk of having ever smoked (22% versus 30%).

Males aged under 18 with intellectual disability were at significantly lower risk of ever having had an alcoholic drink (62% versus 80%), but not for being a regular drinker (43%

versus 43%). Females were also at significantly lower risk of ever having had an alcoholic drink (46% versus 80%), but not for being a regular drinker (28% versus 35%).

At age 18+, males with intellectual disability were at significantly lower risk of all categories of drinking (regular drinker 10% versus 24%, usually gets drunk 39% versus 54%, regular drinker and usually gets drunk 6% versus 15%). Females were at significantly lower risk of being a regular drinker (6% versus 14%) and usually getting drunk (27% versus 53%) but this did not reach significance for regular drinker and usually gets drunk (4% versus 10%).

For males aged under 18, there was no difference in the risk of having tried cannabis (12% versus 11%) but significantly lower risk at age 18+ (36% versus 49%). However, at age 18+ there was a 41% greater chance of participants with intellectual disability being a frequent user if they had tried cannabis. Whilst females with intellectual disability were consistently at lower risk of cannabis use, this did not reach statistical significance for any category of cannabis use.

At age 18+, both males (10% versus 23%) and females (8% versus 16%) were at significantly lower risk of having tried other drugs.

Socio-demographic variables associated with key smoking, alcohol and drug use outcomes

Socio-demographic predictors of key smoking, drinking and drug use outcomes for participants with and without intellectual disability are given in Table 2.

[Table 2 here]

As can be seen in Table 2, the pattern of socio-demographic predictors of substance use outcomes is generally mixed both within and between the two groups of participants. For

example, ‘neighbourhood deprivation’ was associated with an increased likelihood of six out of the total of 14 outcomes (including all smoking outcomes), and decreased likelihood of two outcomes for people with intellectual disabilities, but decreased likelihood of six outcomes for people without intellectual disabilities. Similarly, whilst ‘single parent family’ was associated with increased likelihood of eight outcomes for those without intellectual disability, it was associated with only three outcomes for those with intellectual disability (two with an increased likelihood, one with a decreased likelihood).

The only predictor consistently associated with an increased likelihood of outcomes was ‘being bullied (socially excluded)’ which was associated with an increased likelihood of seven outcomes for people with intellectual disability, and increased likelihood of eight outcomes for people without intellectual disability. It is also notable that for people without intellectual disability, ‘spending spare time with friends’ was the strongest predictor of all but two (male and female ‘regular drinker’) of the 14 categories of substance use. It was also the strongest predictor for half of the categories of substance use for those with intellectual disability.

The association between intellectual disability and exposure to socio-demographic variables predictive of smoking, alcohol and drug use outcomes

Table 3 reports the prevalence of a range of indicators of socio-economic position and peer victimisation for those with and without intellectual disabilities. Participants with intellectual disability were significantly more likely than their peers to be brought up by lower socio-economic position families, live in more socially deprived neighbourhoods, experience peer victimisation, and to have fewer friends.

[Table 3 here]

Between-group differences in smoking, alcohol and drug use when controlling for between-group differences in exposure to socio-demographic variables predictive of poorer outcomes

[Table 4 here]

Both methods eliminated the statistical significance of risk between intellectual disability and smoking for males. Propensity score matching does, however, still leave a residual increased risk of frequent smoking for males (45% increased risk). Propensity score matching eliminated the statistical significance of reduced risk of females with intellectual disability having ever smoked. The first method resulted in a significantly lower risk of females smoking regularly. Neither method altered the overall pattern of results and statistical significance for drinking or having tried cannabis prior to age 18.

For age 18+, both methods eliminated the statistical significance of reduced risk of regular drinking for females with intellectual disability. Propensity score matching eliminated the statistical significance of reduced risk for males with intellectual disability being a regular drinker and usually getting drunk. Propensity score matching resulted in a non-significant 37% increased risk of females who had used cannabis being a frequent user. Finally, the first method resulted in eliminating the statistical significance of the reduced risk of females with intellectual disability having tried other drugs.

Discussion

With the exception of males with intellectual disability being more likely to smoke, young people with intellectual disability were generally at lower risk of using substances than their peers without intellectual disability. Overall, matching participants on between-group

differences in exposure to extraneous risk factors did not impact on between group differences in substance use, with the majority of outcomes retaining similar associations as prior to adjustment.

The pattern of socio-demographic predictors of substance use was mixed. However, for people without intellectual disability, 'spending spare time with friends' was the strongest predictor of all but two (male and female 'regular drinker') of the 14 categories of substance use. It was also the strongest predictor for half of the categories of substance use for those with intellectual disability, being a particularly strong predictor of females with intellectual disability having tried cannabis. This supports the suggestion that peer influence can be more important than family socioeconomic conditions for some adolescent substance use (Hanson and Chen, 2007).

People with intellectual disability were less likely to spend spare time mainly with friends, and more likely to have no or only one close friend. To some extent their lack of social inclusion may act as a protective factor for substance use contributing to the finding of lower overall substance use. Indeed, the literature on alcohol use by people with intellectual disability has been criticised for taking an inherently pathological view of drinking in people with intellectual disabilities, framing it entirely within a discourse of risk and as a personal behaviour, when alcohol use can be seen as an indicator of cultural participation and social inclusion for people with intellectual disabilities (Simpson, 2012).

However, whilst lack of social inclusion may mean that less young people with intellectual disability overall begin to use substances, those that do use substances may be more likely to progress to problematic substance use. Indeed, for those who had used cannabis, males with intellectual disability were more likely to be a frequent cannabis user than those without

intellectual disability, suggesting that the "all or nothing" principle found in relation to alcohol consumption by people with intellectual disability (Reis, et al., 2017) may extend to other substances. As has been reported previously, those with intellectual disability who use substances have a relatively high likelihood of abuse (McGillicuddy, 2006), with both intra- (e.g. low self-esteem, impulsivity) and inter-personal (e.g. lack of routine, poverty) characteristics putting them at risk from misusing alcohol and drugs (Taggart, Huxley, & Baker, 2008).

Whilst in some instances substance use was significantly less than that seen in those without intellectual disability, it remains the case that a substantial proportion of adolescents and young adults with mild/moderate intellectual disability had used both licit and illicit substances. Around one third had tried cannabis and around one in ten had tried other drugs such as cocaine, LSD, ecstasy, heroin, crack, and speed. Adolescence and young adulthood represent key periods during which substance use behaviours can become established and are therefore important periods in relation to the prevention of substance use and escalation to problematic substance use (Stockings et al., 2016).

There is a dearth of evidence on tobacco and alcohol-related health promotion interventions for people with intellectual disability (Kerr, Lawrence, Darbyshire, Middleton, & Fitzsimmons, 2013) and a pressing need to develop effective substance use prevention programs for this target group (Kiewik, et al., 2016). Recent research has begun to consider whether an existing substance use e-learning prevention program for young people without intellectual disability can be used successfully with young people with borderline to mild intellectual disability (Kiewik, et al., 2016) and mild to moderate intellectual disability (Kiewik, VanDerNagel, Engels, & DeJong, 2017). Further research could consider whether existing evidence based substance use prevention programs for people without intellectual

disability could be adapted to meet the varying cognitive, perceptive, memory and language needs of this population (Kerr, Lawrence, Middleton, Fitzsimmons, & Darbyshire, 2017). Further research could also adopt this approach in relation to interventions for those with intellectual disability who have progressed to substance misuse, particularly illicit drugs for which a recent review identified no intervention studies (Didden, VanDerNagel, & van Duijvenbode, 2016). In the meantime, a recent report provides information, ideas and good practice in relation to the provision of reasonable adjustments for people with intellectual disabilities who misuse substances (Marriott, 2017).

This study has a number of strengths including: the use of a large population-based sample that (with appropriate weights) is reasonably representative of children attending mainstream schools and pupil referral units in England; the use of multiple and robust measures of household and neighbourhood disadvantage; and the use of multiple imputation methods to take account of item non-response on socio-demographic variables. However, there are a number of limitations to this analysis. First, mild/moderate intellectual disability was ascertained from educational administrative status (SEN of MLD). While this categorization shows expected associations with gender and socio-economic disadvantage and provides similar prevalence rates to mild/moderate intellectual disability (Emerson, 2012), the degree of correspondence between the two constructs has not been formally validated. Second, the *Next Steps* sample does not include special schools, thus limiting the generalisability of the results. Third, free school meal eligibility is a relatively crude indicator of family socio-economic position (Kounali, et al., 2008). Fourth, sample retention at Wave 7 from Wave 1 was lower for participants with intellectual disability and it may be that participants with problematic substance use are more likely to be lost to follow-up. Fifth, the analysis is based

on data collected between 2004 and 2010 and since that time there may have been changes in the picture of substance use in England, such as the emergence of new psychoactive substances (formerly know as 'legal highs' in the UK) (Chatwin, Measham, O'Brien, & Sumnall, 2017). Finally, whilst a large range of risk factors for substance use have been identified in the literature (Stone, et al., 2012), this analysis included only a limited number of potential predictor variables.

Conclusion

Despite the limitations outlined above, this study nonetheless contributes further to our knowledge of the prevalence of and risk factors for the use of tobacco, alcohol and drugs by young people with and without mild/moderate intellectual disability. A significant proportion of young people with mild/moderate intellectual disability have used tobacco, alcohol, cannabis and other drugs (such as cocaine, LSD, ecstasy, heroin, crack, and speed). The pattern of association with socio demographic factors is mixed. Future research could consider a wider range of predictor variables such as severity of intellectual disability, ethnicity, substance use by parents, and urban versus rural environments. Future research could also include a wider range of substances such as readily available inhalants, and new psychoactive substances (formerly known as 'legal highs' in the UK).

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Table 1

Smoking, Alcohol and Drug Use Among Participants With and Without Intellectual Disability

	Sex	Participants with intellectual disabilities		Other participants		Unadjusted Prevalence Ratio
		Total n	%	Total n	%	
Age < 18						
Ever smoked	Male	342	28%	6950	22%	1.32** (1.11-1.57)
	Female	171	22%	6865	30%	0.74* (0.56-0.98)
Smoked 6+ cigarettes a week	Male	342	17%	6949	11%	1.47** (1.15-1.88)
	Female	172	11%	6865	16%	0.71 (0.46-1.09)
Had alcoholic drink	Male	340	62%	6954	80%	0.77*** (0.71-0.84)
	Female	171	46%	6848	80%	0.57*** (0.48-0.68)
Regular drinker	Male	207	43%	5526	43%	0.99 (0.84-1.16)
	Female	79	28%	5439	35%	0.81 (0.56-1.15)
Tried cannabis	Male	317	12%	6756	11%	1.16 (0.86-1.57)
	Female	152	6%	6683	9%	0.64 (0.34-1.21)
Age 18+						
Regular drinker	Male	170	10%	4079	24%	0.41*** (0.26-0.65)
	Female	99	6%	4127	14%	0.43* (0.20-0.94)
Usually gets drunk	Male	163	39%	4071	54%	0.73*** (0.60-0.88)
	Female	97	27%	4047	53%	0.51*** (0.36-0.70)
Regular drinker & usually gets drunk	Male	160	6%	3997	15%	0.38** (0.20-0.71)
	Female	93	4%	4031	10%	0.44 (0.17-1.14)
Tried cannabis	Male	201	36%	4346	49%	0.74*** (0.61-0.89)
	Female	125	31%	4444	39%	0.80 (0.62-1.04)
Had cannabis in last 12 months	Men	61	56%	1650	64%	0.87 (0.69-1.09)
	Women	29	38%	1304	47%	0.80 (0.50-1.28)
Frequent cannabis user	Male	51	31%	1668	22%	1.41 (0.93-2.14)
	Female	20	10%	1350	12%	0.81 (0.22-3.03)
Tried other drugs	Male	201	10%	4345	23%	0.45*** (0.29-0.68)
	Female	126	8%	4437	16%	0.50* (0.27-0.91)

Table 2

Predictors of Key Outcomes for Participants With and Without Intellectual Disability

Outcome & Group	Variable	People with ID	People without ID
Male (< 18): Ever smoked	FSM eligibility		1.27** (1.07-1.51)
	High neighbourhood deprivation	1.49 (0.86-2.57)	
	Single parent HH		1.19* (1.03-1.37)
	Bullied (threat of or actual violence)	1.94 (0.96-3.95)	1.34*** (1.18-1.53)
	Bullied (socially excluded)	2.55** (1.30-5.03)	1.58*** (1.39-1.80)
	W2 spare time spent with friends		2.92*** (2.35-3.63)
Female (< 18): Ever smoked	FSM eligibility		1.14* (1.01-1.28)
	Workless HH		1.15* (1.02-1.29)
	High neighbourhood deprivation	1.52 (0.84-2.75)	
	Single parent HH	1.47 (0.77-2.79)	1.32*** (1.21-1.44)
	Bullied (robbed)	1.85* (1.05-3.25)	
	Bullied (threat of or actual violence)		1.53*** (1.41-1.66)
	Bullied (socially excluded)		1.24*** (1.14-1.35)
	W2 spare time spent with friends	3.44** (1.49-7.93)	1.94*** (1.71-2.21)
Male (< 18): Smoked 6+ cigarettes a week	FSM eligibility		1.65*** (1.29-2.09)
	High neighbourhood deprivation	1.63 (0.83-3.20)	
	Single parent HH		1.50*** (1.22-1.85)
	Bullied (threat of or actual violence)	2.01 (0.89-4.57)	1.52*** (1.25-1.85)
	Bullied (socially excluded)	1.98 (0.95-4.13)	1.53*** (1.26-1.86)
	W2 spare time spent with friends		3.66*** (2.61-5.13)
Female (< 18): Smoked 6+ cigarettes a week	FSM eligibility	1.37 (0.56-3.37)	1.39*** (1.16-1.66)
	Workless HH		1.27** (1.06-1.52)
	High neighbourhood deprivation	2.64* (1.03-6.76)	
	Single parent HH		1.52*** (1.33-1.74)
	Bullied (socially excluded)	1.62 (0.64-4.15)	1.21** (1.07-1.37)
	Bullied (threat of or actual violence)		1.91*** (1.68-2.17)
	W2 spare time spent with friends	3.97* (1.26-12.56)	2.43*** (1.98-2.98)
Male (18+): Regular drinker	FSM eligibility	0.40 (0.12-1.41)	0.62*** (0.50-0.78)
	Workless HH	0.45 (0.15-1.36)	
	High neighbourhood deprivation		0.61*** (0.48-0.77)
	Single parent HH	0.41 (0.11-1.53	

	Bullied (threat of or actual violence)	2.51 (0.83-7.60)	
	Few close friends		0.72* (0.54-0.96)
Female (18+):	FSM eligibility		0.75* (0.57-0.98)
Regular drinker	High neighbourhood deprivation		0.66** (0.49-0.89)
	Bullied (names)	0.11* (0.01-0.85)	
	W2 spare time spent with friends	0.49 (0.08-2.78)	
Male (18+):	Workless HH	0.56* (0.33-0.95)	
Usually get	High neighbourhood deprivation	0.43 (0.18-1.04)	
drunk	W2 spare time spent with friends	1.87* (1.13-3.09)	1.26*** (1.16-1.36)
	Few close friends		0.87* (0.75-1.00)
Female (18+):	FSM eligibility		0.80*** (0.73-0.89)
Usually get	Workless HH	0.36* (0.15-0.88)	
drunk	High neighbourhood deprivation	5.45*** (3.18-9.33)	
	Single parent HH	1.65 (0.66-4.08)	
	Bullied (robbed)	0.34 (0.11-1.08)	
	Bullied (threat of or actual violence)		0.91** (0.85-0.97)
	W2 spare time spent with friends	1.79 (0.82-3.89)	1.37*** (1.25-1.49)
	Few close friends		0.70*** (0.61-0.80)
Male (18+):	High neighbourhood deprivation		0.60** (0.45-0.81)
Regular drinker	Bullied (socially excluded)	3.41 (0.73-15.93)	
& usually gets drunk	W2 spare time spent with friends		1.26* (1.03-1.53)
Female (18+):	FSM eligibility		0.74 (0.53-1.04)
Regular drinker	High neighbourhood deprivation		0.63* (0.43-0.93)
& usually gets	Bullied (names)	0.21 (0.02-2.18)	
drunk	W2 spare time spent with friends		1.38* (1.06-1.80)
	Few close friends		0.61* (0.39-0.94)
Male (18+):	Single parent HH		1.14*** (1.08-1.22)
Tried Cannabis	Bullied (socially excluded)	1.69** (1.15-2.48)	1.24*** (1.16-1.32)
	Bullied (threat of or actual violence)		1.16*** (1.09-1.24)
	W2 spare time spent with friends	2.08** (1.28-3.38)	1.56*** (1.42-1.71)
	Few close friends		0.82** (0.71-0.95)
Female (18+):	High neighbourhood deprivation	3.15*** (1.74-5.68)	0.83** (0.74-0.94)
Tried Cannabis	Single parent HH		1.24*** (1.14-1.34)

	Bullied (socially excluded)	1.93* (1.15-3.25)	1.29*** (1.19-1.39)
	Bullied (threat of or actual violence)		1.12** (1.04-1.21)
	W2 spare time spent with friends	9.38***(4.76-18.51)	1.75*** (1.56-1.97)
	Few close friends	2.15** (1.37-3.40)	
Male (18+):	High neighbourhood deprivation	0.18 (0.03-1.29)	
Tried Other	Single parent HH		1.27*** (1.13-1.42)
Drugs	Bullied (socially excluded)		1.34*** (1.19-1.51)
	Bullied (threat of or actual violence)		1.20** (1.07-1.35)
	W2 spare time spent with friends		2.31*** (1.92-2.77)
Female (18+):	FSM eligibility	1.41 (0.38-5.19)	
Tried Other	Workless HH		1.07 (0.90-1.28)
Drugs	High neighbourhood deprivation		0.74* (0.59-0.93)
	Single parent HH		1.64*** (1.41-1.90)
	Bullied (socially excluded)	4.82 (0.74-31.55)	1.61*** (1.40-1.84)
	Bullied (names)	2.22 (0.33-15.06)	
	W2 spare time spent with friends	8.92* (1.03-77.09)	1.95*** (1.58-2.40)

Table 3

Exposure of Participants With/Without Intellectual Disability to Established Social Determinants of Poorer Health

	% PWID	% Others	PR adjusted for sex
Socio-Economic Position			
FSM eligible W1 or w3	45%	17%	2.82*** (2.52-3.17)
Workless HH W1-4 (any wave)	48%	19%	2.77*** (2.50-3.08)
NEET W5-7 (any wave)[a]	38%	15%	2.40*** (2.09-2.75)
Household Composition			
Single parent household W1-4 (any wave)	46%	30%	1.58*** (1.42-1.75)
Neighbourhood			
Lowest Q of IDACI W1 or W3	30%	16%	2.02*** (1.73-2.36)
Friendships			
Spare time mainly spent with friends (W2)	56%	75%	0.70*** (0.64-0.77)
No or only 1 close friend (W6 or W7)[a]	20%	8%	2.61*** (2.09-3.27)
Peer Victimisation (W1-3 any wave)			
Threatened with violence/attacked	51%	40%	1.26*** (1.15-1.38)
Robbed	16%	6%	3.00*** (2.41-3.74)
Called names etc ….	56%	41%	1.51*** (1.39-1.64)
Socially excluded	43%	30%	1.58*** (1.42-1.76)

Notes:
Data weighted using W1 cross-sectional rates unless specified
[a] Data weighted using W5-7 cross sectional weights
*** p<0.001

Table 4

Smoking, Alcohol and Drug Use for Participants With and Without Intellectual Disability Adjusted for Differential Exposure to Socio-Demographic Variables

	Sex	Unadjusted Prevalence Ratio	Adjusted Prevalence Ratio	Prevalence Ratio for propensity score matched groups (tolerance 0.05)
Age under 18				
Ever smoked	Men	1.32** (1.11-1.57)	0.87 (0.64-1.17)	1.18 (0.89-1.57)
	Women	0.74* (0.56-0.98)	0.60* (0.40-0.90)	0.75 (0.53-1.07)
Smoked 6+ cigarettes a week	Men	1.47** (1.15-1.88)	1.09 (0.74-1.60)	1.45 (0.95-2.20)
	Women	0.71 (0.46-1.09)	0.46* (0.23-0.90)	0.77 (0.45-1.32)
Had alcoholic drink	Men	0.77*** (0.71-0.84)	0.80*** (0.72-0.89)	0.81*** (0.72-0.90)
	Women	0.57*** (0.48-0.68)	0.73*** (0.61-0.87)	0.62*** (0.52-0.74)
Regular drinker	Men	0.99 (0.84-1.16)	0.95 (0.76-1.18)	1.02 (0.81-1.29)
	Women	0.81 (0.56-1.15)	0.75 (0.46-1.20)	0.94 (0.61-1.43)
Tried cannabis	Men	1.16 (0.86-1.57)	0.98 (0.63-1.53)	1.26 (0.77-2.05)
	Women	0.64 (0.34-1.21)	0.30 (0.08-1.19)	0.71 (0.33-1.53)
Age 18+				
Regular drinker	Men	0.41*** (0.26-0.65)	0.50** (0.31-0.78)	0.55* (0.31-0.97)
	Women	0.43* (0.20-0.94)	0.52 (0.24-1.14)	0.49 (0.20-1.19)
Usually gets drunk	Men	0.73*** (0.60-0.88)	0.78** (0.65-0.94)	0.67** (0.53-0.85)
	Women	0.51*** (0.36-0.70)	0.62** (0.44-0.86)	0.54** (0.38-0.79)
Regular drinker & usually gets drunk	Men	0.38** (0.20-0.71)	0.44* (0.23-0.84)	0.51 (0.23-1.14)
	Women	0.44 (0.17-1.14)	0.68 (0.29-1.63)	0.62 (0.20-1.94)
Tried cannabis	Men	0.74*** (0.61-0.89)	0.72*** (0.61-0.86)	0.64*** (0.51-0.80)
	Women	0.80 (0.62-1.04)	0.91 (0.72-1.15)	0.82 (0.59-1.15)
Had cannabis in last 12 months	Men	0.87 (0.69-1.09)	0.90 (0.72-1.13)	0.92 (0.68-1.23)
	Women	0.80 (0.50-1.28)	0.85 (0.52-1.40)	0.85 (0.48-1.51)
Frequent cannabis user	Men	1.41 (0.93-2.14)	1.05 (0.66-1.69)	1.37 (0.76-2.48)
	Women	0.81 (0.22-3.03)	0.70 (0.23-2.06)	1.37 (0.25-7.54)
Tried other drugs	Men	0.45*** (0.29-0.68)	0.48*** (0.32-0.73)	0.48** (0.29-0.80)
	Women	0.50* (0.27-0.91)	0.50 (0.28-0.90)	0.45* (0.23-0.89)