Case ascertainment of alcohol dependence in general population surveys: ‘gated’ versus ‘ungated’ approaches

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Abstract

Social role impairment and other forms of maladaptation are referenced explicitly in the case definitions for the drug use disorders within DSM-IV-TR, but there is continuing debate about whether and how to include these manifestations of ‘clinical significance’ in diagnostic criteria and assessment protocols. When a ‘gated’ approach (based on impairment or other maladaptation) has been taken during recent large scale psychiatric surveys with coverage of drug dependence (e.g. to reduce participant fatigue or burden), the net effect may include (a) a reduced number of identified cases, and (b) biases in the estimates of association linked to the occurrence of drug dependence. In this report focused on alcohol dependence, we probe these issues, making use of data from the cross-sectional US National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a household survey with 44,093 adult participants. NESARC alcohol dependence assessments were ‘ungated’, but allowed simulation of a ‘gated’ approach; the end result was a robust decrement in the estimated prevalence of this condition. Nonetheless, patterns of association linking suspected background characteristics to prevalence of alcohol dependence were not appreciably different when the gated and ungated estimates were contrasted. In summary, there are reasons to take the ungated approach in detailed research on alcohol use and dependence. Nevertheless, in panoramic mental health surveys, the inefficiency of an ungated approach must be balanced against the anticipated yield of cases who have experienced alcohol dependence without alcohol related social role impairments or other maladaptation, particularly when the dependence syndromes without these consequences are sometimes thought to lack clinical significance. Copyright © 2007 John Wiley & Sons, Ltd.

Key words: epidemiological research, psychiatric diagnostic interview, alcohol, abuse, dependence

Introduction

This paper examines the issue of alcohol dependence case ascertainment in community-based epidemiological field research on mental disorders generally, with specific reference to the use of social role impairments and other manifestations of alcohol-related maladaptation in order to improve field survey estimates of the frequency and occurrence of ‘clinically significant’ alcohol dependence syndromes. It may go without saying that large epidemiologic studies can augment the information value of prevalence estimates based solely

upon counts of clinically recognized cases admitted to treatment facilities (Robins, 2004); in addition, these surveys may detect and assess a large number of cases of a ‘borderline’ severity character, less often seen in clinical samples, and may give a picture of the distribution of individual features and disorders across the general population. Moreover, through field surveys, case identification biases in clinical sample research can be constrained; the resulting estimates may be less sensitive to iatrogenic shaping of clinical features, as occurs when effective treatment interventions may lead

the affected case to greater insights about previously unrecognized alcohol-related harms (Berkson, 1946; Robins and Guze, 1970; Narrow et al., 2002; Robins, 2004).

In the early panoramic psychiatric field surveys that covered many categories of psychiatric disturbances, the alcohol and the other drug dependence syndromes often were assessed by no more than a few screening items or were ignored altogether. At the other extreme, field surveys with a primary focus upon alcohol or other drug use have included a multiplicity of standardized items on drug dependence; for example, in the US, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) and the annual National Household Surveys on Drug Use and Health (NSDUH) have assessed alcohol and other drug dependence with well over 50 standardized assessment items. In the context of the more typical panoramic and general psychiatric field survey, a 'happy medium' approach is required. It was in this context that a 'gated' approach has been devised by survey methodologists trying to juggle competing time demands within the field survey assessment session. The 'gated' approach involves setting up algorithmic decision rules, such that responses to measurements taken at earlier points during the assessment session are used to determine whether later, more detailed alcohol dependence assessments will be skipped or administered. (The 'gated' approach often has been described in terms such as 'skip patterns', 'branching', and other 'conditional skips' within the assessment session.)

The exact nature and content of the algorithmic decision rules and skip patterns has varied from survey to survey. For example, in NESARC and NSDUH, the 'gating' approach is based strictly upon number of occasions of use and recency of use, respectively. As discussed later, some surveys have resorted to a 'clinical significance' criterion that reflects current American diagnostic criteria for alcohol dependence, with an emphasis upon alcohol-related social role impairments or other maladaptation. There is a tradition of debate about these matters (Edwards and Gross, 1976; Vaillant, 1995). For example, Edwards and colleagues suggested that alcohol dependence should be distinguished from alcohol-related problems occurring in heavy drinkers, and thought of as a cluster of clinical features comprising seven facets: (1) narrowing of the behavioural repertoire; (2) salience of drinking (alcohol use given priority over other activities); (3)

subjective awareness of a compulsion (experiencing loss of control over alcohol use, or an inability to stop using); (4) increased tolerance (using more alcohol to get the same effects, or finding that the same amount of alcohol has less effect); (5) repeated alcohol withdrawal symptoms; (6) relief or avoidance of withdrawal symptoms by further drinking; (7) reinstatement of dependent drinking after abstinence (Edwards and Gross, 1976). Notably, this original specification for alcohol dependence did not explicitly reference alcohol-related social role impairment or other maladaptation. The World Health Organization's International Classification of Diseases (ICD-10) reflects this view, and defines alcohol and other drug dependence as a drug-induced state, with no requirement for evidence of associated maladaptation (World Health Organization, 1993).

A different tradition existed within the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-III), which specified impairments in social or occupational functioning as one criterion for alcohol dependence, as manifest in 'marked loss of interest in activities, loss of friends, absence from work, loss of job, or legal difficulties (other than due to a single arrest for possession, purchase, or sale of an illegal substance)' (American Psychiatric Association, 1980). Within the more recent DSM-IV and DSM-IV-TR, alcohol- and other drug-caused impairments and other forms of maladaptation (e.g. failure to fulfil social role obligations) are referenced explicitly in the definition of drug dependence (American Psychiatric Association, 2000). Clinically significant impairment is allowed to be exchangeable with a separate clinically significant 'distress' phenomenon (American Psychiatric Association, 2000).

Survey researchers who wish to study alcohol dependence in panoramic epidemiologic studies face the challenge of translating existing psychiatric nomenclature into standardized survey assessments that may be administered by lay interviewers, in such a way as to accurately measure the constructs as presently defined (Blazer and Kaplan, 2000; Robins, 2004; Narrow et al., 2002; Frances, 1998; Pincus et al., 1998). Somewhat unsurprisingly given its 'necessarily vague' nature, much debate has occurred about how to gauge 'clinical significance' appropriately, such that true cases are included, and both false positives and false negatives are minimized (Frances, 1998; Narrow et al., 2002; Blazer and Kaplan, 2000; Beals et al., 2004). It should

be noted that the concept of 'clinical significance' is not always clearly defined or made operational and may be 'necessarily vague' (Frances, 1998).

In the case of alcohol and other drug dependence syndromes, the early and highly influential Epidemiologic Catchment Area (ECA) studies conducted in the US employed a 'gated' assessment of alcohol dependence (Robins et al., 1981a, 1981c). They followed the prevailing case definitions in presuming that alcohol and other drug dependence would not be present without accompanying social role impairments or maladaptive behaviours, defined to include very hazardous drinking. For example, in the Diagnostic Interview Schedule (DIS), detailed questions on the alcohol withdrawal syndrome and 'benders' were asked only when the drinker had reported difficulties with family, at work, or other related maladaptation (Robins et al., 1981b). The logic behind this 'gating' of assessment was (a) that a drinker would not have experienced these signs of serious dependence unless the alcohol-related maladaptation also had occurred, and (b) that many non-dependent drinkers would be annoyed by the line of detailed questioning if all persons were required to answer so many detailed questions about drinking topics so distant from their own lives (L. N. Robins, personal communication, 2006). From the standpoint of evidence based medicine concepts, it might have been worthwhile to evaluate the predictive value of this gating by drawing a random sample of the apparently non-problematic drinkers, and asking them about 'benders' and withdrawal, but the DIS development team felt that such gating would produce very few and possibly no falsely negative cases of alcohol dependence in a community sample.

The tradition of 'gating' the assessment of alcohol dependence on the basis of clinical features such as maladaptation re-surfaced many years after DIS development, within the context of a still unresolved discussion about whether the ECA surveys and the National Comorbidity Survey (NCS) might have produced overestimates of the prevalence of mental disorders, including alcohol dependence, because there was no requirement for any indicator of 'clinical significance', and therefore sub-threshold disorders may have been incorrectly classified as cases (Frances, 1998; Regier et al., 1998; Spitzer, 1998; Narrow et al., 2002). In pursuit of this line of thinking, Narrow and colleagues imposed a post-survey gating algorithm approach and re-

estimated the prevalence of mental disorders, with a 'clinical significance' criterion based upon respondent answers to questions about disorder-specific maladaptations and/or help-seeking (Narrow et al., 2002). They found robust reductions in estimated prevalence of past year DSM-III-R alcohol use disorders (abuse and/or dependence) when they employed this 'clinical significance' criterion – from 9.9% (original ungated approach with NCS data) to 6.5% (post-survey gated definition). In this instance, the 'gating' approach based on a clinical significance algorithm (and the associated reduction in prevalence) was regarded by the authors as an improvement over the previous 'ungated' approach (Narrow et al., 2002).

We recently extended the earlier line of inquiry, focusing our attention on cannabis dependence. Specifically, we examined whether the use of a 'gated' assessment approach would cause noteworthy reductions of the population prevalence estimates of cannabis dependence, and whether these might vary across key background variables such as age, sex, and race-ethnicity (Degenhardt et al., 2007). We found a very modest attenuation of the prevalence of recently active cannabis dependence, but no statistically robust variation in the prevalence estimate for cannabis use disorders (i.e. combined DSM-IV categories of dependence and/or non-dependent abuse). Overall, the relationships between cannabis dependence and the background variables of interest remained remarkably consistent across the assessment approaches ('gated' versus 'ungated') because a large majority of cannabis dependence cases actually *have* experienced cannabis-related impairments or other maladaptive behaviour (Degenhardt et al., 2007). From these results, we estimated that in a general population sample of 10,000 respondents we might fail to identify at most 12 cannabis dependence cases if cannabis-related maladaptation were to be used as a gating criterion during assessment; the number of the 'clinically insignificant' cases of this type is so small that their characteristics would be difficult to examine in the scale of most population surveys of psychiatric disturbances.

Of course, cannabis dependence and alcohol dependence are not the same, and there are good reasons to separately examine the potential impact of a 'gated' approach with respect to prevalence of alcohol dependence and prevalence correlates. First, alcohol is much more widely used than cannabis, and the prevalence of alcohol dependence is considerably larger than

prevalence of cannabis dependence (Anthony et al., 1994; Hall et al., 1999; Teesson et al., 2000). Any survey of the general population will therefore have greater power to detect and examine subgroups of alcohol dependent persons – in this case, those dependent drinkers who do, and do not, experience drink-related maladaptation. Second, alcohol is not an illegal drug for adults to consume, so it is possible that the maladaptations experienced by the majority of cannabis dependent persons are seen in comparatively fewer alcohol dependent persons. Third, the natural history of alcohol use and cannabis use differ quite markedly: cannabis use is more time limited and concentrated mainly during the years of adolescence and young adulthood, whereas alcohol use more often persists through the adult years. Similarly, cannabis dependence emerges quite early after the onset of use, whereas the period of risk for alcohol dependence extends many more years after onset of alcohol use (Wagner and Anthony, 2002). As such, we considered it quite possible that for many drinkers, the alcohol dependence process might start in the absence of alcohol-related maladaptation, (e.g. see Jellinek, 1946).

Aims

The availability of the US NESARC public use dataset made it possible to examine the characteristics of persons who met criteria for alcohol dependence, according to whether or not they had also experienced alcohol-related maladaptation, which included social role impairments. The aims were:

- To make estimates of the prevalence of alcohol dependence, according to 'gated' and 'ungated' assessments of the syndrome, and to estimate the size of epidemiological sample that might be required in order to identify cases of alcohol dependence who lack alcohol-related maladaptation.
- To examine whether the observed patterns of association of background characteristics with 'gated' alcohol dependence are markedly different from those with 'ungated' alcohol dependence.
- To consider whether the profile of clinical features differ for those dependent drinkers who manifest clinical features in the maladaptation domain, compared with those who do not manifest such features.

Methods

Sample

This study is based upon US data from NESARC, a population based face-to-face survey of 43,093 participants aged 18 years and older, conducted under the direction of Dr Bridget F. Grant of the US National Institute on Alcohol Abuse and Alcoholism (e.g. see Grant et al., 2001). The sample was recruited from a prior US Census Supplementary Survey sample (C2SS) that had been interviewed in 2000–2001. Participant and interviewing were conducted by the US Census Bureau (Stetser et al., 2002), after pre-screening of households as described later.

Sampling method: NCSS

The Census Bureau's C2SS sample had been recruited from all counties and county equivalents across the US, with over-sampling of communities of size 250,000 or greater. More details of the sampling strategy for that survey are given in detail by Stetser et al. (2002), but the multistage sampling process they describe is outlined later.

The universe of primary sampling units (PSUs) consisted of 3142 counties and county-equivalents in the US. The C2SS sample PSUs included 42 counties selected with certainty to serve as comparison counties with the 2000 Decennial Census. The remaining PSUs were included in the 'National Sample': PSUs with a 1996 population of 250,000 or more were selected as self-representing (SR), and all other PSUs were designated as non self-representing (NSR) and stratified within state by several demographic characteristics including: population and housing growth, education, poverty, housing and rural characteristics, and Hispanic and Black populations (in some states). From each stratum, two NSR PSUs were selected with a probability that was proportional to the size of the estimated 1996 population (Stetser et al., 2002).

Once the sample PSUs were determined, a 'housing unit' (HU) frame was constructed (Stetser et al., 2002). The unit frame within-PSU sampling occurred in two stages. In stage one, 17.5% of HU were selected; and in stage two, a systematic sample of HU was used to reach the required sample size for that county. The C2SS sample was interviewed between November 2000 and March 2001.

Sampling method: NESARC

Our companion paper on cannabis dependence has provided a detailed description of the NESARC sampling method (Degenhardt et al., 2007), as do several background papers on the survey methodology (e.g. Grant et al., 2001, 2003, 2004); the description by Stetser et al. (2002) provides essential details. In brief, the NESARC was intended to contain an overrepresentation of Black and Hispanic participants, and it was intended to use the same design as the earlier National Longitudinal Alcohol Epidemiological Survey (NLAES; Stetser et al., 2002). After completing the N2SS interviews used to secure basic census data, the US Census Bureau selected HU for NESARC sample selection where there had been a prior response to the Bureau's prior C2SS survey (Stetser et al., 2002). The NESARC sampling frame excluded dwelling units that generated a refusal for participation in the C2SS, as well as seasonally occupied houses. Neither the C2SS nor NESARC sample included institutionalized, homeless or incarcerated individuals. Recruitment for NESARC took place between August 2001 and April 2002, between five and 18 months after the prior C2SS contact (Stetser et al., 2002). The response rate for eligible housing units in the NESARC has been reported as 81%. Further details on the interview, method and characteristics of the NESARC sample can be found elsewhere in publications by Grant and colleagues (Grant et al., 2001, 2003, 2004).

Measurements

The main response variable under study was case status with respect to recently active alcohol dependence defined by DSM-IV-TR criteria, with both alcohol use and a clustering of at least three manifestations of dependence within the 12 months prior to assessment. For a subsidiary analysis, we also combined cases of alcohol dependence with cases of non-dependent alcohol abuse, also defined by DSM-IV-TR criteria. As described earlier, NESARC assessments were via computer-assisted personal interviews (CAPI), with the 'ungated' approach. For comparative purposes, we simulated the 'gated' approach by recoding alcohol dependence cases as non-cases unless there was evidence of at least one manifestation of alcohol-related maladaptation, including social role impairments and other clinical features described under the DSM-IV non-dependent alcohol abuse rubric. Background characteristics, including recently active (past year) DSM-IV-TR

alcohol use disorders also were assessed via CAPI standardized survey questions.

In the NESARC, alcohol dependence and non-dependent abuse were assessed for all persons reporting alcohol use in the past 12 months. For this project, the following 'dependence' and 'use disorder' categories were generated:

1. *Ungated assessment approach:*
 - a. *Dependence:* this group included all persons meeting criteria for DSM-IV dependence without regard for alcohol-related maladaptation (e.g. as referenced under the rubric of DSM-IV non-dependent alcohol abuse).
 - b. *Use disorders:* this included persons meeting criteria for DSM-IV dependence or non-dependent abuse.
2. *Gated assessment approach:*
 - a. *Dependence:* after gating, this group only included alcohol dependence cases who had experienced at least one manifestation of alcohol-related maladaptation (e.g. as referenced under the rubric of DSM-IV non-dependent alcohol abuse).
 - b. *Use disorders:* this group included the 'gated' alcohol dependence cases, as well as cases qualifying for DSM-IV non-dependent alcohol abuse.

Analysis

Weighted prevalence estimates and their 95% confidence intervals were derived using Taylor series linearization with SUDAAN Version 9.0, which accommodates field survey samples with self-representing PSUs and accounts for other features of the complex survey sampling design (SAS Institute Inc., 2006). Prevalence estimates (and their 95% confidence intervals) were made according to sex, age group (18–24 years, 25–34 years, 35–44 years and 45 years and older), and race-ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and other). Note that some group categories had to be collapsed due to the very small raw sample sizes for older age groups and some race-ethnicity subgroups. Multiple logistic regressions, which included all background variables in the models, also were run using SUDAAN 9.0, to derive estimates of strength of association (i.e. odds ratios).

Additional estimates were derived to show the prevalence of individual clinical features of alcohol dependence and related problems among those classified as

dependent, using gated and ungated assessment methods. These weighted estimates and their 95% confidence intervals were also derived using Taylor series linearization SUDAAN 9.0.

In addition to completing multiple logistic regressions described earlier, we conducted alternating logistic regressions (ALR), which take the survey design effect into account, while estimating a pairwise odds ratio (PWOR) as a statistical measure of geographic clustering at both the state and county levels, which is explicitly modelled (Bobashev and Anthony, 1998, 2000; Petronis and Anthony, 2003). The geographic variables used in these analyses were the PSU and state variables. As in the prevalence estimation and multiple logistic regression analyses described earlier, these analyses were repeated to allow comparison of results from the 'gated' and 'ungated' approaches.

Results

Alcohol dependence

Table 1 shows the prevalence and 95% confidence intervals of alcohol dependence according to 'ungated' and 'gated' assessment approaches. As can be seen, the 'gated' approach led to a statistically robust lower estimate of prevalence compared to the 'ungated' approach (2.5% versus 3.8%; Table 1), without overlap of the 95% confidence interval (CI). Nonetheless, the 'gated' approach did not seem to induce bias in the estimated odds ratios from multiple regressions (OR). The direction and strength of association with background variables did not differ markedly between the 'gated' and 'ungated' assessment approaches. In other words, whereas prevalence estimates were attenuated, the gated approach did not distort estimated relationships with background variables according to whether alcohol-related maladaptation was required.

The alternating logistic regressions suggested that for both 'gated' and 'ungated' assessment approaches, there was tangible geographic clustering of alcohol dependence at both the state and county levels (Table 1). However, the 'gated' assessment of alcohol dependence (which required at least one clinical feature of abuse) appeared to result in estimates that were relatively more clustered geographically.

Alcohol use disorders

Similar results were found when examining the prevalence and correlates of 'alcohol use disorders'.

There appeared to be a reduction in the population prevalence when a 'gated' assessment approach was used, and this appeared consistently distributed across the background variables considered here (Table 2). Both assessment methods ('gated' and 'ungated') resulted in estimates with tangible geographical clustering. There did not appear to be a differential effect of clustering according to the assessment method used.

Profile of clinical features

Table 3 depicts the prevalence of clinical features among persons meeting criteria for alcohol dependence, and considering the inclusion (or lack thereof) of the gating approach. With the exception of the dependence feature 'much time spent obtaining, using or recovering from alcohol', all 95% CIs overlapped or touched for the prevalence of individual dependence features according to 'gated' and 'ungated' approaches to case ascertainment of alcohol dependence.

Table 3 also illustrates the differences in prevalence of clinical features among those who met criteria for the aggregated category of 'alcohol use disorders', versus dependent drinkers with no manifestations of drink-related maladaptation. In general, dependence features tended to be more prevalent among alcohol dependent persons who also had experienced drink-related maladaptation. With the odds ratio (OR) used to gauge strength of association, virtually all clinical features were shown to be more common among dependent drinkers who had experienced drink-related maladaptation. The only exception was 'A persistent desire, or unsuccessful attempts, to cut down alcohol use', which did not differ between the two groups (i.e. $OR \approx 1.0$).

Discussion

In our prior work on cannabis dependence, we observed no more than modest attenuation of prevalence estimates when a gated approach was substituted for an ungated approach (Degenhardt et al., 2007). The situation with alcohol dependence apparently is different. Here, the evidence indicates that tangibly smaller alcohol dependence prevalence estimates may be obtained when a 'clinical significance' criterion is applied – i.e. by stipulating the additional requirement of at least one manifestation of alcohol-related maladaptation, defined to include social role impairment. A reduction in prevalence of the size observed here might well be detectable only in very large surveys of psychiatric disorders on the scale of the NESARC sample

Table 1. Estimated prevalence of 12 month alcohol dependence by background characteristics, according to 'gated' and 'ungated' approaches. Data from the US NESARC surveys, 2001–2002 (unweighted sample size, $n = 43,093$)¹

	Dependence – ungated approach					Dependence – gated approach ¹				
	Percentage	95% CI ³	Adjusted OR	95% CI	<i>p</i>	Percentage	95% CI ³	Adjusted OR	95% CI	<i>p</i>
<i>Alcohol dependence</i>										
Males ($n = 18,518$)	3.81	3.54, 4.09	–	–	–	2.52	2.30, 2.77	–	–	–
Females ($n = 24,575$)	5.42	5.01, 5.86	2.36	2.08, 2.69	<0.0001	3.88	3.49, 4.30	3.04	2.53, 3.65	<0.0001
18–24 years	2.32	2.07, 2.60	1	–	–	1.28	1.09, 1.50	1	–	–
($n = 21,045$)	11.65	10.50, 12.91	10.17	8.37, 12.36	<0.0001	7.98	7.01, 9.06	10.15	7.90, 13.04	<0.0001
25–34 years	4.94	4.33, 5.63	3.97	3.23, 4.89	<0.0001	3.15	2.67, 3.70	3.75	2.86, 4.91	<0.0001
($n = 9,090$)										
35–44 years ($n = 7,759$)	3.55	3.06, 4.11	2.76	2.25, 3.38	<0.0001	2.28	1.87, 2.79	2.62	1.99, 3.47	<0.0001
45+ years ($n = 5,199$)	1.32	1.14, 1.54	1	–	–	0.89	0.73, 1.09	1	–	–
Non-Hispanic White	3.83	3.52, 4.16	1	–	–	2.62	2.37, 2.89	1	–	–
($n = 24,507$)										
Non-Hispanic Black	3.57	3.03, 4.21	0.80	0.65, 0.97	0.0252	1.96	1.55, 2.47	0.64	0.49, 0.83	0.009
($n = 8,245$)										
Hispanic ($n = 8,308$)	3.95	3.17, 4.92	0.71	0.55, 0.92	0.0090	2.24	1.74, 2.89	0.58	0.45, 0.76	<0.0001
Other ² ($n = 2,033$)	3.70	2.80, 4.86	0.82	0.61, 1.11	0.1983	2.95	2.15, 4.05	0.97	0.68, 1.39	0.8812
Clustering at state level	–	–	1.13 ⁴	1.05, 1.22	0.0021	–	–	2.61 ⁴	2.18, 3.12	<0.0001
Clustering at county level	–	–	1.09 ⁴	1.04, 1.14	0.0003	–	–	1.88 ⁴	1.67, 2.11	<0.0001

¹Gating refers to the situation where dependence is only assessed if the participant experienced alcohol-related social role impairment or other maladaptation.²Note that due to very small numbers, the categories of 'Asian', 'Native American' and other racial groups were combined into 'Other'.³Confidence intervals (CIs) calculated using Taylor series linearization, adjusting for clustering using sampling strata and primary sampling units.⁴Pairwise odds ratios (PWORs) estimated from alternating logistic regressions including state and county in the model; models did not converge with background covariates included in models.

Table 2. Estimated prevalence of 12 month alcohol use disorders by background characteristics, according to 'gated' and 'ungated' approaches. Data from the US NESARC surveys, 2001–2002 (unweighted sample size, $n = 43,093$)¹

	Use disorders – ungated approach					Use disorders – gated approach ¹				
	Percentage	95% CI ⁴	Adjusted OR	95% CI	<i>p</i>	Percentage	95% CI ⁴	Adjusted OR	95% CI	<i>p</i>
<i>Alcohol use disorder</i> ²										
Males	8.46	7.99, 8.95	–	–	–	7.17	6.71, 7.67	–	–	–
Females	12.35	11.66, 13.08	2.74	2.49, 3.00	<0.0001	10.81	10.09, 11.58	3.01	2.72, 3.34	<0.0001
18–24 years	4.87	4.45, 5.33	1	–	–	3.83	3.46, 4.24	1	–	–
25–34 years	18.38	16.89, 19.96	5.69	4.96, 6.53	<0.0001	14.70	13.30, 16.23	4.92	4.23, 5.72	<0.0001
35–44 years	11.86	10.85, 12.94	3.35	2.97, 3.78	<0.0001	10.06	9.11, 11.10	3.15	2.75, 3.61	<0.0001
45+ years	9.21	8.35, 10.16	2.45	2.14, 2.79	<0.0001	7.94	7.09, 8.89	2.35	2.03, 2.71	<0.0001
Non-Hispanic white	4.06	3.69, 4.47	1	–	–	3.63	3.27, 4.03	1	–	–
Non-Hispanic Black	8.93	8.41, 9.47	1	–	–	7.72	7.23, 8.23	1	–	–
Hispanic	6.86	6.10, 7.70	0.67	0.58, 0.76	<0.0001	5.25	4.58, 6.01	0.59	0.51, 0.69	<0.0001
Other ³	7.92	6.83, 9.17	0.63	0.53, 0.75	<0.0001	6.21	5.35, 7.20	0.58	0.50, 0.68	<0.0001
Clustering at state level	7.01	5.65, 8.66	0.66	0.52, 0.84	0.0011	6.27	4.97, 7.88	0.70	0.54, 0.90	0.0068
Clustering at country level	–	–	1.23 ⁵	1.12, 1.35	<0.0001	–	–	1.46 ⁵	1.26, 1.70	<0.0001
	–	–	1.20 ⁵	1.13, 1.28	<0.0001	–	–	1.39 ⁵	1.25, 1.54	<0.0001

¹Gating refers to the situation where dependence is only assessed if the participant experienced alcohol-related social role impairment or other maladaptation.²Note that for gated dependence assessment, 'alcohol use disorders' includes DSM-IV alcohol dependence and DSM-IV non-dependent alcohol abuse.³Note that due to small numbers, the categories of 'Asian', 'Native American' and other racial groups were combined into 'Other'.⁴Confidence intervals (CIs) calculated using Taylor series linearization, adjusting for clustering using sampling strata and primary sampling units.⁵Pairwise odds ratios (PWORs) estimated from alternating logistic regressions including state and country in the model.

Table 3. Prevalence of clinical features of alcohol dependence and maladaptation among alcohol dependence cases with and without alcohol-related maladaptation. Data from the US NESARC surveys, 2001–2002 (unweighted sample size, $n = 43,093$)

Dependence features	Alcohol dependence ungated approach ($n = 1484$)		Alcohol dependence with alcohol-related maladaptation (gated approach) ($n = 931$)		Alcohol dependence without alcohol- related maladaptation ($n = 553$)		OR ¹	95%CI
	Percentage	95% CI	Percentage	95% CI	Percentage	95% CI		
1. Tolerance	69	66, 72	72	68, 75	64	58, 68	1.5	1.1, 1.9
2. Withdrawal or use to avoid withdrawal	69	66, 72	72	68, 75	64	59, 69	1.4	1.1, 1.8
3. Alcohol taken in larger amounts or longer than intended	88	86, 90	90	88, 92	85	81, 88	1.6	1.2, 2.3
4. Persistent desire, or unsuccessful attempts, to cut down alcohol use	72	69, 75	72	68, 76	72	67, 77	1.0	0.7, 1.4
5. Much time spent obtaining, using or recovering from alcohol	41	38, 45	49	46, 53	25	21, 30	2.9	2.2, 3.9
6. Social, occupational or recreational activities reduced	15	13, 18	21	18, 24	5	3, 7	5.4	3.5, 8.4
7. Continued use despite harm caused by use	54	51, 58	62	58, 66	39	35, 44	2.6	2.0, 3.4
<i>Median number of dependence symptoms</i>								
<i>Features of drink-related maladaptation</i>								
1. Recurrent use resulting in a failure to fulfill role obligations	18	15, 20	26	23, 30	–	–	–	–
2. Recurrent use in situations where physically hazardous	55	51, 58	83	79, 85	–	–	–	–
3. Recurrent alcohol related legal problems	9	7, 11	14	11, 16	–	–	–	–
4. Continued use despite persistent social or interpersonal problems	30	27, 33	45	41, 49	–	–	–	–

Note: confidence intervals (CIs) calculated using Taylor series linearization, adjusting for clustering using sampling strata and primary sampling units.

¹Odds ratios (ORs) refer to estimated strength of association between the two forms of alcohol dependence ('alcohol dependence without alcohol-related maladaptation' versus 'alcohol dependence with alcohol-related maladaptation') and the occurrence of each clinical feature.

(over 40,000 participants). We note, however, that the magnitude of the observed reduction in NESARC prevalence was more modest than the large reduction in the NCS-estimated prevalence of alcohol use disorders found by Narrow et al. (2002), who recommended the implementation of gated approaches in order to sharpen the focus of field surveys on 'clinically significant' cases. That is, Narrow and colleagues were not troubled by prevalence reductions induced by 'clinical significance' gating: they regarded the (lower) gated estimates as *improvements* on the original survey estimates.

We believe it is of interest that the gated and ungated approaches yield similar OR estimates of association with background characteristics. That is, the impact of the gated approach does not appear to be strongly associated with particular subgroups within the population. Moreover, the prevalence of individual features of alcohol dependence among dependent drinkers did not differ appreciably when a gated assessment of alcohol dependence was simulated, compared to the ungated assessment method. In addition, the ALR analyses disclosed geographic clustering of alcohol dependence cases, whether the approach was gated or ungated.

There has been considerable discussion of the meaning, utility and importance of the concept of 'clinical significance' during the evolution of the DSM-III-R and DSM-IV-TR classification systems (Frances, 1998; Blazer and Kaplan, 2000; Narrow et al., 2002; Beals et al., 2004). This study cannot resolve what appears to be substantial disagreement about how and why to use different case ascertainment approaches in large scale psychiatric field surveys.

What is clear is that for dependence upon some drugs (e.g. cannabis), there is a concurrent evolution of manifestations of drug-related social role impairments and other maladaptive behaviours such as driving under the influence or very hazardous drug-taking (e.g. see Degenhardt et al., 2007) such that the gated versus ungated approaches to case ascertainment yield little or no difference in prevalence estimates from large sample epidemiological field surveys. In contrast, for alcohol dependence, it appears that an appreciable number of dependence cases are developing without experiences or manifestations in the domain of alcohol-related maladaptation. It is the very large size of the NCS and NESARC samples that makes it possible to discern an impact of the gated approach with respect to alcohol dependence. It is unknown whether this

impact would be tangible in smaller samples on the scale of most field surveys (i.e. with typical $n = 1500$ to 3000 participants). In addition, we are aware of no evidence on gated versus ungated approaches in countries other than the US. It is possible that the impact of a gated approach varies cross-nationally, or depends upon styles of responding to survey questions that are state-like in character (e.g. 'denial') or trait-like (e.g. a general predisposition toward 'socially desirable responding').

Invited to speculate about the implications of this study for refinement of the clinical constructs of alcohol dependence and abuse, revision of DSM and ICD diagnostic criteria, and the conduct of epidemiological surveys, we now offer several observations. With respect to the clinical constructs of alcohol dependence and abuse and their diagnostic criteria, this study's evidence leads us to a greater appreciation of a research and diagnostic approach that segregates the phenomena of the dependence syndrome from the separable phenomena of secondary impairments and maladaptation, and other manifestations of 'clinical significance' emphasized by others (Narrow et al., 2002). As illustrated in the original Edwards–Gross formulation of the alcohol dependence syndrome (Edwards and Gross, 1976), it is possible to conceptualize diagnostic criteria for a dependence process without appealing to constructs of social role impairment or other secondary maladaptation.

Consistent with a more general multi-axial approach that distinguishes disturbances of the mental life from social maladaptation (e.g. see Kellam et al., 1977), one advantage gained by segregating the dependence construct from manifestations of alcohol-related maladaptation is a capacity to separately study the natural history, clinical course, determinants and consequences of alcohol dependence and alcohol-related social maladaptation. If the concept of maladaptation is made part of the diagnostic criteria for dependence, this capacity for research is constrained. At least some of the cases of alcohol dependence will be diagnosed as alcohol dependent because they manifest alcohol-related maladaptation; in the absence of such maladaptation, they would count as non-cases. As such, a change of the DSM-IV-TR approach might be in order, with a revision of the diagnostic categories and criteria for an explicit removal of alcohol-related maladaptation from the alcohol dependence construct, but with an allowance for sub-typing alcohol dependence cases in relation to the presence or degree of alcohol-related

maladaptation. Under DSM-IV-TR, when dependence is present, the case of alcohol dependence no longer can qualify as a case of 'non-dependent' alcohol abuse; this nosological distinction thwarts any cross-classification of alcohol-related maladaptation with alcohol dependence. A construct of 'alcohol-related maladaptation' might be substituted for 'non-dependent abuse', which would allow for a cross-classification: there *would* be cases of alcohol dependence with and without alcohol-related maladaptation, and there *would* be cases of alcohol-related maladaptation with and without alcohol dependence.

Whereas alcohol dependence without maladaptation might be a rare occurrence in clinical settings, the evidence of this study highlights such cases clearly exist in the community, which invites research questions about the severity or phase of the alcohol dependence process when alcohol-related maladaptation has not appeared. The present study revealed that the prevalence of individual clinical features of alcohol dependence was higher among cases who had also experienced alcohol-related maladaptation (Table 3). Nonetheless, the diagnostic validity of the proposed sub-typing of alcohol dependence merits more detailed inquiry beyond the scope of the present study.

With respect to implications for future epidemiological field surveys, the implications seem to favour the ungated approach – at least with respect to alcohol dependence, though not necessarily with respect to other drugs such as cannabis (e.g. see Degenhardt et al., 2007). Nevertheless, it is possible to envision at least three situations in which a gated approach to case ascertainment of alcohol dependence might be favoured: (1) when the main task of the survey is to estimate caseloads for planning of service delivery under generally prevailing conditions of scarce health resources, (2) when the gated approach is motivated by the 'clinical significance' philosophy expressed by Narrow et al. (2002), and (3) when there are concerns about response burden of the field survey assessment, and a need to constrain the thoroughness of diagnostic assessments so as to permit more extensive coverage of other scientific topics (e.g. suspected causal determinants; secondary social maladaptation or other suspected consequences of the primary disturbances). In situations (1) and (2), as argued by Narrow and colleagues, there is reason to constrain the scope of inquiry to cases of 'clinical significance'; the appeal for allocation of scarce health resources is more compelling when the cases can be

shown to have important impairments or other tangible maladaptation. However, in these situations, an even-handed approach is required. It would be mischievous to apply a gated approach to estimation of caseloads for alcohol dependence services unless the same type of gated approach is applied to the estimation of caseloads for other disorders (e.g. major depression). Further, if the services to be provided are in the domain of early outreach and early intervention, then a gated approach might well miss a very important subgroup – namely, cases with early or mild alcohol dependence lacking manifestations of drink-related maladaptation.

In situation (3), a gated approach to case ascertainment of alcohol dependence would generally be preferable to no alcohol dependence assessment whatsoever. If the survey goals extend beyond quantification of caseloads for service delivery, a more constrained set of diagnostic assessments can open up possibilities for measurement of a broader range of topics such as suspected causal determinants and consequences, including manifestations of disorder-driven social maladaptation. One set of criticisms of past surveys such as ECA, NCS, and NESARC has targeted the preoccupation with diagnostic assessment and the very narrow range of survey coverage of scientific topics outside this domain (e.g. see Jorm, 2006). Of course, this narrow range was, in part, a consequence of these surveys' panoramic and thorough coverage of the phenomena required for field survey case ascertainment. In future field surveys, an even-handed gated approach can focus attention on 'clinically significant' psychiatric disorders, leaving time for assessment of other scientific topics.

Conclusions

The use of a 'gated' assessment, whereby persons were only assessed for features of alcohol dependence if they had experienced alcohol-related maladaptation, resulted in a tangible reduction in the population prevalence estimates for alcohol dependence. Nevertheless, in the study of associations with background variables and geographic clustering of alcohol dependence, the gated and ungated approaches produced very similar OR estimates. As might be expected, the large subgroup of 'clinically significant' alcohol dependence cases in this community sample appeared to be more severely dependent as indicated by higher prevalence of almost all alcohol dependence features in this subgroup as compared to dependence cases who had experienced no drink-related maladaptation.

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