

Alcohol use disorders in EU countries and Norway: An overview of the epidemiology[☆]

Jürgen Rehm^{a,b,c,*}, Robin Room^d, Wim van den Brink^e, Frank Jacobi^f

^aAddiction Research Institute, Zurich, Switzerland

^bCentre for Addiction and Mental Health, Toronto, Canada

^cUniversity of Toronto, Canada

^dCentre for Social Research on Alcohol and Drugs, Stockholm University, Stockholm, Sweden

^eDepartment of Psychiatry, Academic Medical Center University of Amsterdam, Amsterdam Institute of Addiction Research, The Netherlands

^fInstitute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Germany

Abstract

Based on a systematic literature search and an expert survey, publications after 1990 on prevalence of alcohol use disorders (AUD) in EU countries and Norway were reviewed. The search was restricted to studies using the DSM-III-R or DSM-IV, or ICD-10, plus validated instruments to assess AUD. Using only representative general population surveys, the weighted median estimates for 12-month prevalence rates for dependence alone are 6.1% for males (arithmetic mean 5.0%; interquartile range 0.4% to 7.5%) and 1.1% for females (arithmetic mean 1.4%; interquartile range 0.1% to 2.1%). Results thus showed, that AUD constitute a high burden of disease in Europe, but there was high variability of prevalence. Men have higher prevalence rates of AUD than women. No clear pictures emerged with respect to age and AUD prevalence, or with respect to urban vs. rural and AUD prevalence. The discussion highlights potential explanations for the high variability of prevalence between countries, and the fact, that AUD constitute only a small part of all alcohol-related harm.

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1. Introduction

Alcohol use disorders (AUD), i.e. alcohol dependence and abuse (DSM IV) or harmful use (ICD-10), have been linked to a considerable burden of disease in Europe in recent estimations by the World Health Organization (WHO, 2001, 2003). As pointed out in Table 1, more than 3% of the overall burden of disease in Europe in 2002, as

measured in disability adjusted life years (DALYs; Murray and Lopez, 1996), is attributable to AUD. Thus, AUD were among the 10 leading causes of DALYs in Europe, only surpassed by ischemic heart disease, cerebrovascular disease, unipolar depressive disorders and Alzheimer and other dementias (Üstün et al., 2004). However, these global estimates are far removed from the underlying assessments and they do not give a clear picture of the epidemiology with regard to differences between countries and regions, sex and age.

This paper tries to fill the gap by going back to the original studies on prevalence of AUD in different countries and regions. Though this paper focuses only on alcohol use disorders, it should be noted that the burden attributable to AUD is only part, and not the majority, of the total burden of disease attributable to alcohol consumption (Rehm et al., 2004; WHO, 2002).

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* Corresponding author. ISF-Addiction Research Institute, Konradstr. 32, CH 8031 Zurich, Switzerland. Tel.: +41 1 448 11 60; fax: +41 1 448 11 70.
E-mail address: jrehm@aol.com (J. Rehm).

Table 1
Alcohol use disorders, mortality and burden of disease in Europe 2002 (cf. WHO, 2003)

	Mortality stratum*			All of Europe (strata A, B, C)
	(A) Very low child, very low adult	(B) Low child, low adult	(C) Low child, high adult	
Population (000)	415,323	222,846	239,717	877,887
Total DALYs ^a (000)	51,734	37,701	60,340	149,776
DALYS attributable to AUD (000)	2227	636	1715	4578
% of all disease burden due to AUD	4.3%	1.7%	2.8%	3.1%
Deaths total	3,925,922	1,866,362	3,689,285	9,481,569
Deaths attributable to AUD	13,305	3632	6495	23,431
% of all deaths due to AUD	0.3%	0.2%	0.2%	0.2%

*Definition of mortality strata (WHO, 2000)

Europe A	Andorra, Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
Europe B	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Slovakia, The Former Yugoslav Republic of Macedonia, Tajikistan, Turkmenistan, Turkey, Uzbekistan, Yugoslavia
Europe C	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine

^a DALYs: disability adjusted life years, i.e. sum of years of life lost to premature mortality and years of life lost to disability (see Murray and Lopez, 1996).

This review is restricted to European Union (EU) countries and Norway, where the overwhelming majority of the epidemiological studies in Europe were undertaken. Moreover, we restricted ourselves to studies where the field work was conducted after 1990. The reason for the restriction to 1990 onwards is that the concept of AUD, the diagnostic criteria and the assessment instruments have changed dramatically over the past 25 years (e.g. Room, 1998; Schmidt and Room, 1999). In contrast, the newest definitions of alcohol dependence in ICD-10 (WHO, 1993; see Appendix A) and DSM-IV (1994; see Appendix B and American Psychiatric Association, 2000) converge and have been shown to be relatively stable across standard assessments and cultures (e.g. Üstün et al., 1997; Compton et al., 1996; Caetano and Tam, 1995). Unfortunately, the definitions for harmful use according to ICD-10 (see Appendix A), and for alcohol abuse according to DSM-IV (see Appendix B) are less stable and comparable across cultures and instruments (e.g. Üstün et al., 1997; Compton et al., 1996; Caetano and Tam, 1995). Thus, in the following review, we try to separate between dependence and harmful use/abuse as much as possible.

DSM-III-R and DSM-IV diagnoses of AUD will generally lead to similar prevalence rates, but the ratio between dependence and abuse might be quite different, with relatively more abuse in DSM-IV (e.g. Hasin and Grant, 1994; Grant, 1993; Rounsaville et al., 1993). Also, the rates of DSM and ICD-10 alcohol dependence are similar (e.g. Caetano and Tam, 1995; see also Table 3 below). Thus, we accepted papers from DSM-III-R onwards.

In terms of diagnostic instruments, the most common was the Composite International Diagnostic Interview (CIDI). The CIDI has been shown to generate data very similar to those obtained by the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) and a special version of the Alcohol Use Disorder and Associated Disabilities Interview Schedule-Alcohol/Drug-Revised

(AUDADIS-ADR) in the WHO/NIH cross-national reliability and validity study (e.g. Üstün et al., 1997; Pull et al., 1997). We thus decided to include only studies using these instruments in our quantitative summary for European countries. We will descriptively report results on other studies using different assessment procedures if they clearly tried to assess AUD as defined in the diagnostic systems described above. Thus, assessments with instruments like the CAGE or the Alcohol Use Disorders Identification Test (AUDIT) were excluded.

2. Methods

The following steps were undertaken in this review:

- Systematic computer-assisted search in Medline for “alcohol dependence”, “alcohol problems”, “alcohol abuse”, “alcohol use disorders”, and the name of the relevant countries or Europe. Criteria for inclusion were: indication of a sex-specific prevalence rate for AUD; publication in English, French, Spanish or German; field work in 1990 and later; a representative general population or primary care visitors sample of an EU country (Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom) or Norway; and an assessment of AUD with a validated instrument.
- Comparison of the computer search with the results of the search of the project group of the European Brain Council (EBC; www.ebc-eurobrain.net) Initiative “Cost of Disorders of the Brain”.
- Check with experts about the completeness of the literature and inclusion of studies published in other

Table 2
Prevalence of AUD in EU countries and Norway 1990–2004 as measured with CIDI or SCAN

Country	Prevalence in % ^a (age group with highest prevalence and rate)	Diagnosis and assessment	Sample and population	Field work	Reference
Belgium, France, Germany, Italy, Netherlands, and Spain ^b	Males: 0.4 AD, 1.3 AA, females: 0.1 AD, 0.2 AA (highest prevalence: 18–24 years: 2.2% ^c)	12-Month-prevalence, DSM-IV, CIDI	9953 males, 11472 females, general population, 18 years and older	2001–2003	ESEMeD/MHEDEA, 2004a
Belgium, Louven region	Males: 5.9 AD, 18.5 AA; females: 1.6 AD, 3.7 AA	Lifetime prevalence, DSM-IV, CIDI	1624 males, 1940 females, students, 18 years old	1995–1996	Aertgeerts et al., 1999
Czech Republic	Males: 0.7 AD; females: 0.1 AD (males: 35–49 years 1.2%; females: 18–34 years 0.9%)	12-Month prevalence, DSM-IV, CIDI	755 males, 779 females, general population, 18–79 years old	1998–1999	
Finland	Males: 3.6 AD, 1.1 AA; females: 1.5 AD, 0.5 AA	Lifetime prevalence, ICD-10, CIDI			Dzurova et al., 2000
Finland	Males: 6.5 AD; females: 1.4 AD (males: 30–44 years 8.5%; females: 30–44 years 2.7%)	12-Month prevalence, DSM-IV, CIDI	2748 males and 3257 females in sample, general population, 30 years and older	2000	http://www.ktl.fi/attachments/suomi/julkaisut/julkaisusarja_b/2002b3.pdf ; Aromaa and Koskinen (2002)
Finland, Helsinki and Jyväskylä regions	Males: 1.4 AD, 3.3 AA; females: 1.4 AD, 1.1 AA	1-Month prevalence, DSM-IV, SCAN	233 males, 414 females, general population, 20–24 years old	1995	Aalto-Setälä et al., 2001
France, Paris region	Males: 1.6 AD, 6.5 AA; females: 2.2 AD, 3.3 AA (dependence 25–44 4.7%; harmful use: 15–24 12.1% ^c)	12-Month prevalence, ICD-10, CIDI	194 males, 211 females, primary care sample, 15–65 years old	1991	Leclercq et al., 1995
Germany	Males: 5.4 AD, 2.2 AA; females: 1.3 AD, 0.1 AA (dependence males 18–34 6.3%; females: 35–49 1.5%)	12-Month prevalence, DSM-IV, CIDI	1913 males, 2268 females, general population, 18–65 years old	1997–1999	Jacobi et al., 2002, 2004, personal communication; Wittchen et al., 2000
Germany	Males: 14.4 AD and AA; females: 2.6 AD and AA	Lifetime prevalence, DSM-IV, CIDI			
Germany	Males: 3.9 AD; 7.3 AA; females: 1.0 AD; 2.6 AA	12-Month prevalence, ICD-10, CIDI			
Germany	Males: 8.1 AD, 4.9 AA; females: 1.9 AD, 1.1 AA (dependence 21–24 5.3% abuse: 18–20 8.3% ^c)	12-Month prevalence, DSM-IV, CIDI adapted	3209 males, 3171 females, 18–59 years old	1997	Kraus and Bauernfeind, 1998
Germany, Berlin region	Males: 7.3 AD, 7.9 AA; females: 3.8 AD, 1.2 AA (dependence 25–44 6.8%; harmful use: 15–24 12.0% ^c)	12-Month prevalence, ICD-10, CIDI	136 males, 264 females, primary care sample, 15–65 years old	1991	Linden and Helmchen, 1995
Germany, Lübeck region	Males: 6.0 AD, 8.0 AA; females: 1.5 AD, 1.0 AA (dependence 50–59 4.8%; abuse: 25–29 5.6% ^c)	Lifetime prevalence, DSM-IV, CIDI	2037 males, 2024 females, general population, 18–64 years old	1996–1997	Meyer et al., 2000
Germany, Lübeck region	Males: 12.1 AD, 5.6 AA; females: 4.2 AD, 2.1 AA (dependence males 50–59 22.6%; abuse 40–49 11.8%; dependence females 30–49 6.5%; abuse 60–69 4.3%)	12-Month prevalence, ICD-10, SCAN	355 males, 574 females, primary care sample, 14–75 years old	1994–1995	Hill et al., 1998
	Males: 22.2 AD; females: 6.5 AD	Lifetime prevalence, ICD-10, SCAN			

(continued on next page)

Table 2 (continued)

Country	Prevalence in % ^a (age group with highest prevalence and rate)	Diagnosis and assessment	Sample and population	Field work	Reference
Germany, Munich region	Males: 10.0 AD, 15.1 AA; females: 2.5 AD, 4.5 AA Males: 7.3 AD, 8.4 AA; females: 2.2 AD, 2.7 AA	Lifetime prevalence, DSM-IV, CIDI 12-Month prevalence, DSM-IV, CIDI	1493 males, 1528 females, general population, 14–24 years old	1995	Wittchen et al., 1998; Nelson and Wittchen, 1998
Germany, Mainz region	Males: 14.5 AD, 5.1 AA; females: 1.7 AD, 1.5 AA (dependence 15–24 10.8%; harmful use: 15–24 7.1% ^c)	12-Month prevalence, ICD-10, CIDI	146 males, 254 females, primary care sample, 15–65 years old	1991	Herr et al., 1995
Greece, Athens region	Males: 1.8 AD, 9.2 AA; females: 0.7 AD, 0.5 AA (dependence 15–24 2.4%; harmful use: 45–65 4.7% ^c)	12-Month prevalence, ICD-10, CIDI	60 males, 136 females, primary care sample, 15–65 years old	1991	Mavreas et al., 1995
Italy, Verona region	Males: 1.1 AD, 7.1 AA; females: 0.2 AD, 0.0 AA (dependence 25–44 1.3%; harmful use: 25–44 5.6% ^c)	12-month prevalence, ICD-10, CIDI	83 males, 163 females, primary care sample, 15–65 years old	1991	Piccinelli et al., 1995
Netherlands	Males: 9.0 AD, 19.3 AA; females: 1.9 AD, 3.9 AA Males: 6.1 AD, 7.3 AA; females: 1.1 AD, 1.8 AA (dependence males 18–34 8.7%; females: 18–34 1.3%) Males: 4.5 AD, 4.0 AA; females: 0.9 AD, 0.9 AA	Lifetime prevalence, DSM-III-R, CIDI 12-Month prevalence, DSM-III-R, CIDI 1-Month prevalence, DSM-III-R, CIDI	3304 males, 3773 females, general population, 18–64 years old	1996	Bijl et al., 1998a,b
Netherlands, Groningen region	Males: 7.5 AD, 7.0 AA; females: 0.6 AD, 4.5 AA (dependence 25–44 5.8%; harmful use: 15–24 10.5% ^c)	12 Month prevalence, ICD-10, CIDI	132 males, 208 females, primary care sample, 15–65 years old	1991	Tiemens et al., 1995
Norway	Males: 10.5 AD, 5.9 AA; females: 3.5 AD, 2.5 AA (highest prevalence for substance use disorders in age group 30–39 years old; no rates given) Males: 13.2 AD, 20.2 AA; females: 5.2 AD, 9.1 AA (highest prevalence for substance use disorders in age group 30–39 years old; no rates given)	12-month prevalence, DSM-III-R, CIDI lifetime prevalence, DSM-III-R, CIDI	928 males, 1138 females, general population, 18–65 years old	1994–1997	Kringlen et al., 2001
Sweden, Gothenburg region	Females: 1.0 AD, 0.5 AA Females: 1.8 AD, 1.4 AA	12-Month prevalence, DSM-III-R, CIDI Lifetime prevalence, DSM-III-R, CIDI	3130 females, general population, 24–65 years old	1985	Spak and Hällström, 1995
Sweden, Stockholm county	Males: 6.0 AD; females: 3.0 AD (dependence: males 18–24 13.3%; females: 7.4%)	12-Month prevalence, DSM-IV, CIDI	3064 respondents; general population, 18–54 years old	1996	Hvitfeldt et al., 1999
Sweden, Stockholm region	Males: 9.7 AA and AD; females: 3.5 AA and AD unweighted analyses, weighted would be between 9.7 and 10.6 for males; and between 3.5 and 3.7 for females	12-Month prevalence, DSM-IV, SCAN	4643 males and 5798 females, general population, 20–64 years old; Swedish nationality only. Two step sampling procedure after screening with AUDIT phase	1998–2003 (phase 1 1998–2001; phase 2 2001–2003)	Unpublished data from the PART Study (Hällström et al., 2003)
Sweden, Stockholm region	Males: 1.9 AD, 1.8 AA; females: 1.0 AD, 1.0 AA (dependence males 18–24 4.9%; females: 18–24 5.0%; harmful use males 18–24 7.4%; females: 18–24 4.4%)	12-month prevalence, ICD-10, CIDI	1710 males and 1846 females, general population, 18 years and older	2002	Directly calculated by the authors from the raw data of the Stockholm county alcohol and drug treatment study http://www.stakes.fi/nat/nat03/2/roomeng.htm

Table 2 (continued)

Country	Prevalence in % ^a (age group with highest prevalence and rate)	Diagnosis and assessment	Sample and population	Field work	Reference
United Kingdom	Males: 7.5 AD; females: 2.1 AD	12-Month prevalence, ICD-10, CIS-R	4859 males, 4933 females, general population, 16–64 years old	1993	Jenkins et al., 1997
United Kingdom, Derry region	Males: 3.4 AD; females: 0.5 AD Males: 3.0 AD; females: 0.5 AD	12-Month prevalence, ICD-10, SCAN 1-Month prevalence, ICD-10, SCAN	123 males, 184 females, general population, 18–64 years old	1993–1994	McConnell et al., 2002
United Kingdom, Manchester region	Males: 5.3 AD, 4.1 AA; females: 0.8 AD, 0.1 AA (dependence 15–24 3.1%; harmful use: 15–24 10.5% ^c)	12-Month prevalence, ICD-10, CIDI	119 males, 309 females, primary care sample, 15–65 years old	1991	Kisely et al., 1995

^a AD: alcohol dependence; AA: alcohol abuse (if DSM was used as diagnostic instrument), or harmful use of alcohol (if ICD-10 was used).

^b In another publication of the study group, the following country specific 12-month prevalence rates for AUD in total were given: Belgium 1.2%; France 0.7%; Germany 1.1%; Italy 0.1%; Netherlands 3.0%; Spain 0.3%.

^c No gender specific prevalence rates were given.

languages. The following experts were included: H. Katschnig, Austria; J. Mendlewicz, Belgium; E. Dragomirecka, Czech Republic; L. Kubička, Czech Republic; P. Munk-Jørgensen, Denmark; J. Lönnqvist, Finland; K. Poikolainen, Finland; J. Lèpine, France; L. Kraus, Germany; M. Kopp, Hungary; Z. Rihmer, Hungary; C. Faravelli, Italy; C. Pull, Luxembourg; R. de Graaf, Netherlands; I. Sandanger, Norway; T. Sorensen, Norway; M. Xavier, Portugal; J. Alonso, Spain; C. Allgulander, Sweden; J. Storbjörk, Sweden; T. Brugha, United Kingdom.

- Extraction of information about each article according to the following categories: country and region of the study; type of prevalence (i.e., lifetime prevalence, 12-month prevalence, 1-month prevalence); diagnostic category (alcohol dependence, alcohol abuse/harmful use, both); diagnostic system (ICD-10; DSM-IV, DSM-III-R); assessment instrument (CIDI, SCAN, other); sample information (*N* males, *N* females, age range); year of fieldwork; full citation and influencing factors on prevalence rate.

- Analysis of the extracted information for similarity between countries and diagnostic systems, influence of socio-demographic variables and sampling.

3. Results

Tables 2 and 3 give overviews of the studies used in this overview. There is considerable variation, even in surveys conducted with comparable instruments, with 12-month prevalence rates for alcohol dependence in males ranging from 0.4% to 14.5%; and females from 0.1% to 4.2%; i.e. the differences are more than 20-fold for both genders.

These differences remain even when we further restrict ourselves to general population studies only. Using this criterion, the weighted median estimates for 12-month prevalence rates for dependence alone are 6.1% for males (arithmetic mean 5.0%; interquartile range 0.4% to 7.5%) and 1.1% for females (arithmetic mean 1.4%; interquartile range 0.1% to 2.1%). Thus, in total, alcohol use

Table 3

Prevalence of AUD in EU countries and Norway 1990–2004 as measured by instruments other than CIDI and SCAN

Country	Prevalence in % ^a	Diagnosis and assessment	Sample and population	Field work	Reference
Finland	Males: 17.9 AD; females: 3.8 AD	12-Month prevalence, ICD-10 questionnaire cf. Caetano and Tam (1995)	302 males, 312 females, general population, 18–81 years old	1996	Poikolainen, 1997
Italy, Sesto Fiorentino region	Males: 0.8 AD; females: 0.5 AD	Lifetime prevalence, DSM-IV, FPI (based on knowledge of physician only and not on answers to an assessment)	1071 males, 1229 females, primary care sample, 14–90 years old	2001	Faravelli et al., 2004a
	Males: 0.3 AD; females: 0.2 AD	12-Month prevalence, DSM-IV, FPI (based on knowledge of physician only)			Faravelli et al., 2004b
	Males: 0.2 AD; females: 0.2 AD	1-Month prevalence, DSM-IV, FPI (based on knowledge of physician only)			

^a AD: alcohol dependence; AA: alcohol abuse (if DSM was used as diagnostic instrument), or harmful use of alcohol (if ICD-10 was used).

Table 4
Dimensions of alcohol consumption in EU countries and Norway 2000 (cf. Rehm, 2004 and Global Alcohol Database)

Country	Per capita consumption ^a	Unrecorded consumption ^b	Hazardous drinking score ^c	Male abstainers in %	Female abstainers in %
Austria	13.90	1.0	1	13	33
Belgium	11.45	0.5	1	10	21
Cyprus	9.29	1.0	1	1	15
Czech Republic	15.02	1.0	2	4	18
Denmark	14.32	2.0	1	2	4
Estonia ^d	11.70	5.0	3	10	32
Finland	11.69	2.0	3	8	10
France	15.62	1.0	1	7	11
Germany	14.40	1.0	1	4	5
Greece	11.39	2.0	2	1	15
Hungary	17.35	4.0	3	4	8
Iceland	6.41	1.0	3	9	13
Ireland	15.21	1.0	3	9	16
Italy	10.34	1.5	1	15	30
Latvia ^d	16.48	7.0	3	16	41
Lithuania	11.41	4.9	3	15	46
Luxembourg	17.32	– 2.0 ^e	1	1	4
Netherlands	10.39	0.5	1	14	27
Norway	7.50	2.0	3	8	17
Poland	12.64	5.0	3	12	26
Portugal	15.06	1.0	1	15	49
Slovakia	19.30	7.0	3	5	9
Slovenia	13.42	5.2	3	31	55
Spain	13.28	1.0	1	24	48
Sweden	9.07	2.0	3	7	12
United Kingdom	11.88	2.0	2	8	14

^a Alcohol consumption in litres of pure alcohol per capita for all adults older than 15 years of age.

^b Unrecorded consumption, i.e. not taxed consumption in litres of pure alcohol per capita for all adults older than 15 years of age.

^c Score measuring the degree of harm associated with a given volume of pure alcohol. This score was originally based on optimal scaling of different indicators of heavy drinking (i.e. drinking 5 and more drinks on one occasion, fiesta drinking), and one indicator each for drinking with meals and drinking in public places (cf. Rehm et al., 2004). Higher scores indicate higher harm associated with the same volume of alcohol consumed.

^d Estimates of abstainers from Reitan (2004).

^e Negative unrecorded consumption due to sales to foreigners coming into the country because of lower prices.

disorders, and alcohol dependence in particular, constitute a large burden of disease within the EU countries and Norway.

These prevalence differences can be contrasted to the relatively homogeneous high volume of alcohol consumption in all examined countries (Table 4; see Rehm et al., 2003a, for comparisons with other parts of the world).

What could help explain the differences in prevalence rates of dependence and alcohol use disorders?

- Clearly, in all European countries, males have higher rates of AUD than females. The ratio depends on the culture, on the gender-specific abstinence rates and on the gender-specific consumption patterns (Table 4; for a

comparison of patterns of drinking by gender, see Simpura and Karlsson, 2001).

- In studies done on the same populations, there seems to be a higher rate for DSM-IV dependence compared to ICD-10 (see e.g., Jacobi et al., 2004 and personal communication, who used diagnostic systems in the same sample). This does not generalize to AUD or harmful use vs. abuse. In fact, in Germany, a country with high volume of overall consumption, the prevalence rates of harmful use according to ICD-10 are higher than the rates for DSM-IV abuse (Wittchen et al., 2000).
- There seems to be a tendency for the prevalence rates to be slightly higher in primary care patient samples than in general population samples.
- With respect to age patterns, a mixed picture emerges (Table 2). One can find the highest prevalence of alcohol use disorders not only in the youngest age groups in several studies, but also in middle age groups or in the oldest age groups, dependent on the country and the exact diagnosis (i.e., alcohol dependence or abuse). While no clear picture emerges with respect to dependence, alcohol abuse tends to be more prevalent in younger age groups. However, it is somewhat doubtful whether alcohol abuse in the younger age groups actually represents psychopathology rather than some indication of transitory life phase, risk taking behaviour or misinterpretation of normal drinking behaviour (Caetano, 1999). It is remarkable, for example, that DSM-abuse seems to be related not at all or less than dependence to any other type of psychopathology; i.e. no significant or smaller co-morbidity of abuse and other psychiatric disorders (Bijl et al., 1998b; de Graaf et al., 2003). In addition, the variability of the prevalence of alcohol abuse between different age groups is much higher than the variability of alcohol dependence (see Table 2). It seems that the diagnosis of alcohol abuse with its emphasis on psychosocial consequences of drinking is much more sensitive to existing cultural differences in drinking patterns and mores surrounding social drinking. This is also one of the reasons why WHO did not accept this diagnostic category in the ICD-10, instead constructing the category of “harmful use” with emphasis on more somatic consequences of drinking (see Appendix A). Overall, Europe does not present such clear age trends as those in the US, where all alcohol use disorders are more prevalent in the age groups before 30, and then rates decline (e.g. Grant, 1997). But again, this may be part of a misinterpretation of transitional life phase and life style indicators as psychopathology (Caetano, 1999; Bailey, 1999). There seems to be a need to adopt the operationalization of the diagnostic criteria of DSM-IV and ICD-10 to the drinking behaviour of adolescents and young adults in order to avoid misclassifications that obviously lead to overestimations of dependence and abuse/harmful use.

- Rates of AUD do not seem to be particularly related in Europe to levels of alcohol consumption in a country's population. In fact, per capita consumption rates (see Global alcohol database, www.who.int) correlate negatively with 12-month prevalence of alcohol dependence in general population studies for males ($r=-0.65$) and females ($r=-0.61$). On the other hand, there are positive correlations with the Hazardous Drinking Score (Rehm et al., 2004; see Table 4), a measure of the extent to which heavy drinking occasions dominates a country's drinking patterns (males: $r=0.46$; females: $r=0.58$).
- Alcohol use disorders show considerable co-morbidity with other mental disorders, especially with generalized anxiety and depressive disorders (e.g. ESEMeD, 2004b; Kessler et al., 2003). However, the proportion of people with co-morbid disorders among people with AUD is smaller than among other mental disorders (de Graaf et al., 2002; see also ESEMeD, 2004b).
- With regards to urban vs. rural, only few studies have data, but for studies with data again no clear picture emerges. Whereas alcohol in some regions in Europe is still consumed to much larger degrees in rural settings (e.g. see Mateos et al., 2002, who found that in rural Galicia 2.7% of the population consumed more than 150 g pure alcohol on average per day), the ESEMeD group (2004b) or Kringlen et al. (2001) did not find any significant differences of prevalence rates between cities and rural areas.
- As with most other mental disorders, being married or living with a partner is protective (e.g. ESEMeD, 2004b).

4. Discussion

The overall result from compiling studies of the epidemiology of alcohol dependence in the EU countries and Norway is that alcohol use disorders constitute a huge public health burden, although there is considerable diversity between countries. This diversity does not necessarily follow the level of volume of consumption in countries, as measured by per capita consumption, no matter whether unrecorded consumption is included or not (Rehm et al., 2003a; see Table 4 and correlations above).

However, it is not clear to what degree the differences are real or result from measurement error. There is considerable variability even between prevalence rates assessed with the same assessment instrument, the CIDI, which has become quasi-standard in the field. However, there are different CIDI versions, and general population rates derived for Germany within 5 years differ for instance between 1.1% for all AUD and drug use disorders (i.e. including alcohol dependence and abuse as well as drug dependence and abuse; cf. WHO (World Mental Health Survey Consortium, 2004), Table 2) and 3.3% for alcohol dependence alone (Wittchen and Jacobi, 2005). Both of these estimates are based on large general

population surveys, claimed to be representative, using different versions of the same instrument (CIDI) and same diagnostic system (DSM-IV). In the discussion sections of papers reporting prevalence rates, there is usually very little mention of measurement error, and if it is mentioned, the high reliability and validity of instruments such as the CIDI is stressed. However, differences like that noted above for Germany do occur quite frequently, are not easily explained and should be addressed in further research. We suspect that there are differences in the actual algorithms used to combine the data to come up with a diagnosis which seem to vary from study to study and which are not disclosed in publications.

Confidence intervals offer little guidance on the true underlying rate in a population where estimates differ, since they mainly reflect sample size. Also, non-response is not taken into consideration in these intervals, and often a random sample of the population is assumed when that was not in fact the sampling design. Moreover, the CIDI is a subjective measure (see below) and thus it is not surprising that the differences between estimates in the same country are often so large that the confidence intervals sometimes do not overlap at all, not even at the 90% confidence level (e.g. for the German case). Currently, we just do not know enough about the samples who actually answered and the measurement error of the instruments used to give meaningful confidence intervals for true rates of AUD in a population.

With regard to the results, it seems that the influence of cultural factors in responses to questions used to derive AUD diagnoses needs to be given greater attention. Qualitative studies across a wide range of cultures have found that the criteria used for diagnosing AUD often carry different meanings and implications in different cultural settings (Room et al., 1996; Schmidt and Room, 1999). The same seems to hold true even within the narrower range of European cultures. One factor to which the correlations above point is the potential effect of different patterns of drinking on AUD (Rehm et al., 1996). As Table 4 shows, the countries included in Table 2 vary between 1 and 3 on the Hazardous Drinking Score, a 4-point score primarily indicating the extent to which heavy drinking occasions predominate in a country's drinking pattern. One explanation of the pattern of correlations may be that it is not only the level of drinking in a country, but also how that drinking is patterned, which may matter for alcohol use disorders, including the alcohol dependence syndrome. The gradient from higher Hazardous Drinking Scores in such northern countries as Norway, Sweden and Finland to lower scores in southern countries such as Greece, Italy, Spain and Portugal has also been found to influence the effect of levels of drinking on such alcohol-related causes of mortality as cirrhosis, homicides and accidental deaths (Norström, 2002).

Another potential explanation of the patterns found for AUD, related to the differences in drinking patterns, is

differences in the threshold of attention and concern about the criteria for AUD in different cultures. Temperance movements were especially strong in Norway, Sweden and Finland, for instance, and concerns about alcohol problems and issues remain strong, as reflected in political discourse and media coverage. Where concerns about alcohol problems are high, the threshold for a positive response to an item used in AUD criteria may well be lower. [Midanik and Clark \(1995\)](#), for instance, showed that, while levels of consumption dropped in the 1980s in a period of rising concern about alcohol problems in the USA, there was a marginal rise in positive responses on dependence symptoms. Along the same lines, in the period 1990–2000, while consumption levels in the USA dropped by 11% (and the rate of alcohol dependence also dropped), the rate of alcohol abuse rose by 53% ([Grant et al., 2004](#)). These authors note that the rise may reflect that “social attitudes [in the USA] may have become more negative towards drinking at levels that were previously accepted”. More research is necessary to better describe the role of patterns of drinking and of social responses to heavy drinking in what is measured as alcohol use disorders.

These observations are supported by research comparing drinking behaviour and alcohol-related problems in the USA and Germany ([Bloomfield et al., 2002](#)). While prevalence of heavy drinking in Germany was three times and prevalence of binge drinking two times higher than in the USA, more Americans responded to the CAGE items “Have you ever felt you should cut down on your drinking?” and “Have you ever felt bad or guilty about your drinking?” Thus, depending on the role and integration of alcohol in society cultural norms or cues in the environment may influence the respondents’ threshold for responding positive to the diagnostic criteria.

Finally, it should be emphasized that alcohol use disorders are not the only problems stemming from alcohol. In fact, alcohol use disorders are only 2 out of 60 disease categories related to alcohol intake ([Rehm et al., 2003b](#)), they make up only a small portion of the alcohol-related mortality ([Rehm et al., 2003c](#)) and not the majority of alcohol-related disease burden ([Rehm et al., 2003c, 2004](#)). Thus, from a public health point of view, alcohol intake should be considered based on all harms associated, and these are not limited to disease but include social harms ([Room et al., 2003](#)).

Appendix A. Diagnostic criteria for research (DCR) ICD-10 for alcohol dependence and harmful use

a

F1x.1 Harmful use

A pattern of psychoactive substance use that is causing damage to health. The damage may be physical (as in cases of hepatitis from the self-administration of injected psychoactive substances) or mental (e.g. episodes of depressive disorder secondary to heavy consumption of alcohol).

Psychoactive substance abuse

DCR-10

- A. There must be clear evidence that the substance use was responsible for (or substantially contributed to) physical or psychological harm, including impaired judgement or dysfunctional behaviour.
- B. The nature of the harm should be clearly identifiable (and specified).
- C. The pattern of use has persisted for at least 1 month or has occurred repeatedly within a 12-month period.
- D. The disorder does not meet the criteria for any other mental or behavioural disorder related to the same drug in the same time period (except for acute intoxication F1x.0).

F1x.2 Dependence syndrome

A cluster of behavioural, cognitive and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.

The dependence syndrome may be present for a specific psychoactive substance (e.g. tobacco, alcohol or diazepam), for a class of substances (e.g. opioid drugs), or for a wider range of pharmacologically different psychoactive substances.

DCR-10

- A. Three or more of the following manifestations should have occurred together for at least 1 month or, if persisting for periods of less than 1 month, should have occurred together repeatedly within a 12-month period:
 - 1) a strong desire or sense of compulsion to take the substance;
 - 2) impaired capacity to control substance-taking behaviour in terms of its onset, termination, or levels of use, as evidenced by the substance being often taken in larger amounts or over a longer period than intended, or by a persistent desire or unsuccessful efforts to reduce or control substance use;
 - 3) a physiological withdrawal state (see F1x.3 and F1x.4) when substance use is reduced or ceased, as evidenced by the characteristic withdrawal syndrome for the substance, or by use of the same (or closely related) substance with the intention of relieving or avoiding withdrawal symptoms;
 - 4) evidence of tolerance to the effects of the substance, such that there is a need for significantly increased amounts of the substance to achieve intoxication or the desired effect, or a markedly diminished effect with continued use of the same amount of the substance;
 - 5) preoccupation with substance use, as manifested by important alternative pleasures or interests being given up or reduced because of substance use; or a great deal of time being spent in activities necessary to obtain, take or recover from the effects of the substance;
 - 6) persistent substance use despite clear evidence of harmful consequences (see F1x.1), as evidenced by continued use when the individual is actually aware, or may be expected to be aware, of the nature and extent of harm.

Appendix B. Diagnostic criteria for DSM-IV for alcohol dependence and abuse

b

Alcohol Abuse

- A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:
- 1) recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)
 - 2) recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)
 - 3) recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct)
 - 4) continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)
- B. The symptoms have never met the criteria for Substance Dependence for this class of substance.

Alcohol Dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

- 1) tolerance, as defined by either of the following:
 - a) a need for markedly increased amounts of the substance to achieve intoxication or desired effect
 - b) markedly diminished effect with continued use of the same amount of the substance
- 2) withdrawal, as manifested by either of the following:
 - a) the characteristic withdrawal syndrome for the substance (refer to Criteria A and B of the criteria set for Withdrawal from the specific substances)
 - b) the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms
- 3) the substance is often taken in larger amounts or over a longer period than was intended
- 4) there is a persistent desire or unsuccessful efforts to cut down or control substance use
- 5) a great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distance), use the substance (e.g., chain-smoking), or recover from its effects
- 6) important social, occupational, or recreational activities are given up or reduced because of substance use
- 7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption)

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