

## Failure to reduce drinking and driving in France: a 6-year prospective study in the GAZEL cohort

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### ABSTRACT

**Aim** An unprecedented decline in alcohol consumption and road mortality has been observed recently in France, but it is still unclear whether or not these changes affected driving while alcohol-intoxicated (DWI). The objective of the study was to estimate prospectively trends of excessive speed on the roads, alcohol consumption and DWI between 2001 and 2007 in a large cohort of experienced drivers. **Methods** Participants were current employees or recent retirees of the French national electricity and gas company, who volunteered to participate in a research cohort established in 1989 under strict conditions of anonymity. An annual cohort questionnaire is sent to participants that includes two questions about overall alcohol consumption. In 2001 and 2007, 10 684 participants reported their driving behaviours using the same self-administered questionnaire. **Results** Between 2001 and 2007, the proportion of participants ( $n = 10\ 684$ ) who reported having driven at speeds at least 20 km/hour above the limit decreased from 23.7% to 4.1% in built-up areas ( $P < 0.001$ ), from 34.3% to 9.3% on rural roads ( $P < 0.001$ ) and from 24.3% to 2.7% on highways ( $P < 0.001$ ). Regular and non-regular excessive alcohol consumption decreased from 22.7% to 19.7% and from 18.0% to 14.9%, respectively, whereas DWI increased from 22.9% to 25.3% over the same period ( $P < 0.001$ ). **Conclusions** A recent crackdown on road violations by the French government has failed to deter DWI. Given that DWI seems to be a sporadic and rarely punished behaviour, its prevention requires more coercive measures, such as using a breath alcohol ignition interlock device.

**Keywords** Alcohol, drinking and driving, GAZEL cohort, longitudinal study, risk behaviours, road traffic safety.

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Submitted 17 March 2009; initial review completed 21 May 2009; final version accepted 30 June 2009

### INTRODUCTION

In France, a country with a long-standing history of tolerance towards alcohol consumption and road traffic offences [1,2], two major public health successes were observed recently. First, rates of alcohol consumption per capita and alcohol-related diseases have decreased continuously over recent decades, concomitantly with an increased awareness of the potential negative effects of alcoholic beverages [3–5]. Secondly, traffic law enforcements were enhanced significantly in 2002, with an increased crackdown on road violations, which helped to reduce mortality significantly on the roads [6]. Recent figures show that road fatalities decreased by 40.1%

between 2001 and 2007 [7], concomitantly with an average 8.5% reduction in observed speed on all road surfaces.

The conjunction of declines in both alcohol consumption and risky road behaviours over a limited period is an unprecedented event, but it is still unclear whether or not these changes have affected driving while alcohol-intoxicated (DWI), because offenders can be detected exclusively through targeted police alcohol checks and in the aftermath of injury/fatal crashes. Awareness of the risk of being drunk when driving has reached excellent levels in Europe because, according to a large-scale study conducted in 2003, 87% of drivers considered DWI as a major cause of road crashes; in France, 92% [4].

Commission des transports et de  
l'environnement

Déposé le: 11/02/2010

N° CTE - 20

Secrétaire: Dany Dineley

However, various individual and environmental factors might jeopardize the impact of prevention messages regarding DWI on actual road behaviour, especially in societies where alcohol is considered an integral part of cultural traditions [4].

Therefore, we conducted a prospective longitudinal study in a large cohort of experienced drivers (the GAZEL cohort) to estimate trends in road risky behaviours, alcohol consumption and DWI between 2001 and 2007.

## METHODS

The participants were current employees or recent retirees of the French national electricity and gas company, Electricité De France-Gaz De France, who volunteered to participate in a research cohort, known as the GAZEL cohort, under strict conditions of confidentiality. The GAZEL cohort was established in 1989 and originally included 20 624 subjects, men aged 40–50 and women aged 35–50 at baseline. Since 1989 this cohort has been followed-up annually [8]. The study protocol was approved by the French authority for data confidentiality (Commission Nationale Informatique et Liberté).

### Data collection

A Driving Behaviour and Road Safety (DBRS) questionnaire was administered twice, in 2001 and 2007. Only drivers who participated in the 2001 survey received the 2007 questionnaires. Participants were asked to estimate their frequency of driving while alcohol-affected over the past 12 months by responding to the following question: 'How many times in the last year did you take the wheel after having drunk too much alcohol?' (never, few times a year, once a month or more). They also reported their past 12-month maximum speed on three types of roads: built-up areas, where the speed limit (SL) is 50 km/hour [31.1 miles per hour (mph)], rural roads (SL = 90 km/hour; 55.9 mph) and highways (SL = 130 km/hour; 80.8 mph). These road types are the most commonly used in French National Statistics to describe road behaviours. Socio-demographic data from the cohort database included gender, year of birth (1939–43, 1944–48, 1949–53) and occupational category (unskilled worker, skilled worker, manager).

As part of the routine follow-up of the cohort, each year participants are sent a cohort questionnaire that includes questions about two aspects of their alcohol consumption: the number of drinking days per week ('during the last week, on how many days did you drink alcohol?') and the maximum number of drinks per drinking day ('during the last week, what is the maximum number of drinks (beer, wine, and liquor) you had in a single day?').

### Statistical analyses

Men (women, respectively) were considered 'excessive' drinkers if they had consumed at least four (three) drinks/days. Among excessive drinkers, those who reported drinking alcohol 6–7 days/week were classified as 'regulars', while others were classified as 'non-regulars'. Risky driving behaviours were categorized as follows: reporting a maximum speed of at least 20 km/hour (12.4 mph) above the speed limit in built-up areas, on rural roads and on highways (yes/no) over the last 12-month period, and driving after having drunk too much alcohol at least a few times in a year (yes/no) over the same period. Changes in risky road behaviours and excessive alcohol consumption between 2001 and 2007 were assessed using the non-parametric McNemar test.

## RESULTS

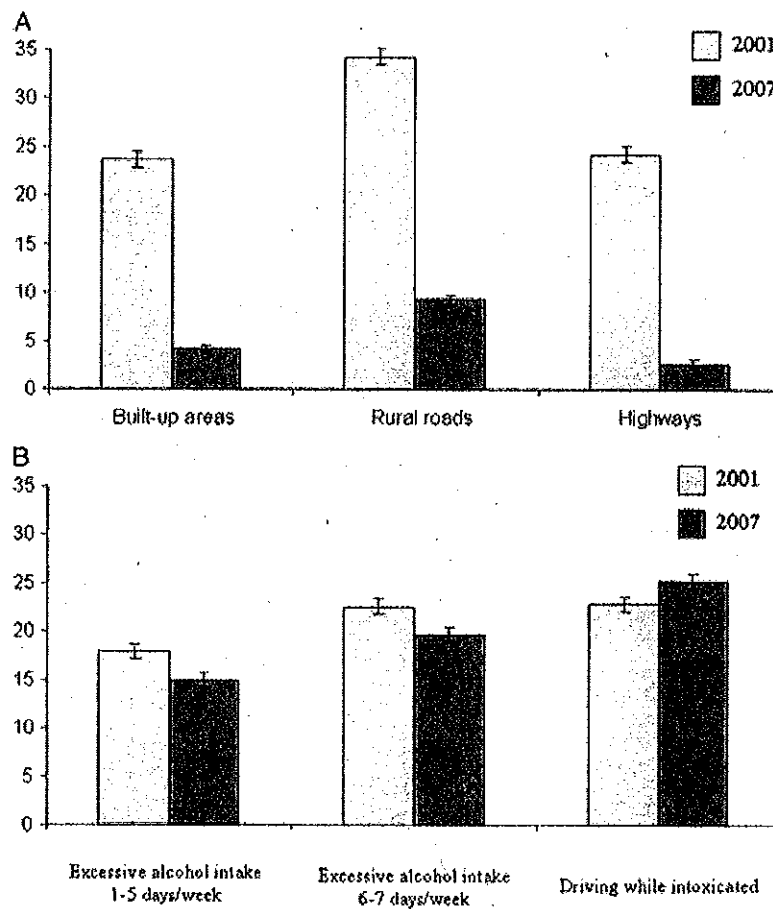
Of the 14 200 participants who returned the 2001 DBRS questionnaire, 11 494 (80.9%) returned the 2007 questionnaire. Those who reported having stopped driving either in 2001 or in 2007 ( $n = 546$ ) and those who did not answer questions about DWI ( $n = 264$ ) were excluded. The final study sample comprised 10 684 respondents. Comparisons at baseline (2001) between participants in the study sample ( $n = 10 684$ ) and excluded or non-responding respondents ( $n = 3516$ ) showed that reporting of DWI was similar, and that overall alcohol consumption was higher among participants (11.2 versus 10.5 drinks per week, respectively).

Most respondents were males (77.7%), skilled workers (57.7%), born between 1944 and 1948 (52.7%) and consuming 11.2 drinks/weeks on average in 2001. Between 2001 and 2007, the proportion of participants who reported having driven at speeds at least 20 km/hour above the limit decreased from 23.7% to 4.1% in built-up areas ( $P < 0.001$ ), from 34.3% to 9.3% on rural roads ( $P < 0.001$ ) and from 24.3% to 2.7% on highways ( $P < 0.001$ ) (Fig. 1a). The proportion of participants reporting regular and non-regular excessive alcohol consumption decreased from 18.0% to 14.9% and from 22.7 to 19.7%, respectively ( $P < 0.001$ ), whereas DWI increased from 22.9% to 25.3% over the same period ( $P < 0.001$ ) (Fig. 1b). Among participants who reported episodes of DWI in 2001 and 2007, 1.8% reported such episodes to occur 'once per month or more', while others reported fewer occurrences ('sometimes in the year').

Gender differences were investigated, revealing that changes were similar with regard to gender, although women reported less risky behaviours than men in 2001.

## DISCUSSION

These results show that the increased crackdown on road violations by the French government in 2002 failed to



**Figure 1** (a) Percentages of participants who reported maximum speeds at least 20 km/hour above the limit over the last 12-month period in 2001 and 2007. (b) Percentages of participants who reported excessive alcohol intake in the last week and driving while intoxicated over the last 12-month period in 2001 and 2007

deter DWI between 2001 and 2007 in a cohort of experienced drivers, although both excessive alcohol consumption and speed decreased over the same period [6,9]. DWI increased by almost 10%, and was reported by more than one of five participants, on average. This is consistent with national statistics indicating that the proportion of drivers who tested positive for blood alcohol content (BAC) increased between 2001 and 2007, despite the expected deterrent effect of more frequent BAC checks on the road and harsher penalties [10].

Several factors might explain why preventive measures were ineffective against DWI but effective against excessive speed. First, automated controls have been used to increase the likelihood of detecting speeding offences and preventing speeding in specific locations. One thousand five hundred automated radar units were deployed between 2001 and 2004, and captured more than 1 million images a month, which probably enhanced the perceived probability of being punished and, in turn, acted as a deterrent to speeding [9,11,12]. The picture is quite different when it comes to DWI, as offenders are detected exclusively through police alcohol checks, making the probability of being caught very low [13,14].

Secondly, the higher prevalence of DWI in southern European countries, where alcohol consumption is part of the cultural background and life-style [14], compared with their northern counterparts, suggests that drinking habits might jeopardize efforts to prevent DWI in these societies. Excessive alcohol intake has declined since 2001 in France [15], as well as in our study sample, with no apparent effect on DWI. According to participants' self-reports DWI occurs a few times a year, while consuming significant amounts of alcohol is more frequent, occurring up to 6–7 days/week in nearly 20% of the sample. It is thus likely that respondents manage to dissociate their usual alcohol intake from their driving, except on rare occasions. Drinking wine during dinner with friends and/or family and at social events is a relatively common practice in France, which might explain why abstinence is more difficult to adopt before driving than in other circumstances [16–18]. Accordingly, 69.3% of alcohol-related road fatalities in France occur at night-time (44.3% at nights during the weekend and holidays) [10].

Socially stigmatized behaviours such as speeding, DWI and alcohol intake are prone to be under-reported in studies using self-questionnaires, because of social

desirability bias [19]. There are strong elements, however, supporting the reliability of self-reported behaviours in our survey, because road traffic collision trends paralleled trends in self-reported behaviours in the GAZEL cohort, such as speeding [6,20], DWI [6,20], driving while tired [6,21] and telephoning while driving [6,20]. Our study population included employed and retired middle-aged drivers from a large company who were relatively exempt from alcohol-related diseases [22], which may limit the generalizability of our results. However, it is likely that our results are conservative, as participants were experienced drivers with a moderate alcohol intake and are under-represented in road fatal crashes [7,10,23]. As DWI remains a worrying issue in most industrialized countries, the large size of our cohort and the inclusion of diverse trades and socio-economic groups offer a unique opportunity to assess longitudinal trends in road behaviours. This may help, subsequently, to evaluate traffic regulation initiatives against alcohol-related traffic mortality.

In conclusion, the crackdown on road violations by the French government in 2002 failed to deter occasional DWI between 2001 and 2007, while excessive speed declined over the same period. Given that DWI seems to be a sporadic and rarely punished behaviour, its prevention requires more coercive measures, such as using a breath alcohol ignition interlock device.

#### Declarations of interest

None.

#### Acknowledgements

The authors express their thanks to EDF-GDF, especially to the Service des Études Médicales and the Service Général de Médecine de Contrôle, and to the 'Caisse centrale d'action sociale du personnel des industries électrique et gazière'. We also wish to acknowledge the Risques Postprofessionnels—Cohortes de l'Unité mixte 687 Inserm—CNAMTS—Cetaf team responsible for the GAZEL data base management. The GAZEL Cohort Study was funded by EDF-GDF and INSERM, and received grants from the Association de la Recherche sur le Cancer, from the Fondation de France and from the Agence nationale de la recherche. The project was funded by Fondation MAIF and Fondation Sécurité Routière. The writing of the manuscript was funded solely by Fondation Sécurité Routière. The funding bodies had no input into the study design, the collection, analysis and interpretation of data, the writing of the report, or the decision to submit the paper for publication. The project was funded by Electricité de France, Gaz de France, Fondation MAIF and Fondation Sécurité Routière.

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