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Primary prevention of drink driving by the large-scale use of alcolocks in commercial vehicles

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Abstract

Alcolocks are commercial breath test devices that prevent a motor vehicle from starting when a driver's blood alcohol concentration (BAC) is elevated. This report is an evaluation of the experiences and BAC data from the first use of alcolocks in commercial vehicles as a *primary prevention strategy*. In most applications, the alcolock is imposed only after an impaired driving conviction. This study, implemented in Sweden, estimates drink driving on a large scale in a variety of commercial vehicles.

Officials from 118 companies were interviewed representing 3689 alcolock-equipped vehicles used by 9614 professional drivers, an 80% compliance rate. In a contrast group of 230 transport businesses without alcolocks the interview compliance rate was 57%. Survey results probed motivation for and experience with alcolocks. Analysis of BAC test patterns showed alcohol consumption among employees through prevalence estimates of drink-driving attempts at the rate of BAC ≥ the legal limit 0.020%.

Before alcolock installation, 64% of the employers suspected alcohol problems among their employees and their motive for installing alcolocks (cost averaged 1700 €/vehicle) was to improve the transport quality. Several companies had technical problems with the alcolocks; but 98% recommended that other companies install alcolocks.

Among 600, heavy vehicles, 0.19% of all starts were prevented by elevated BAC; most during weekends and mornings. Daytime Saturday and Sunday mornings 0.72% of the drivers had elevated BAC.

Conclusions: The prevalence of drink driving among professional drivers is probably similar to that among drivers in general. Alcolocks would improve the safety margin and reduce public risk. Provided that the entire fleet of trucks, buses, and taxis in Sweden had installed alcolocks that would correspond to about half a million drink driving trips being prevented every year.

Keywords: Drink driving; Traffic safety; Primary prevention; Alcolocks/ignition interlocks; Commercial vehicles

1. Introduction

In Sweden, as in many other countries, drinking drivers are among the biggest problem in road traffic safety with 15,000–17,000 drink-drivers identified every year. As the risk of detection is very low, it is widely assumed that most people convicted of drinking and driving have driven while under the influence of alcohol on many previous occasions. According to population surveys, 10–15% of all men and approximately 5% of all women are estimated to have chronic alcohol dependence, and around a quarter of these are in what can be called an "active" phase (Statens beredning för medicinsk utvärdering SBU report, 2001). However, we do not know how many of these people and how often they are on our roads while intoxicated. Nor do we know how many people only occasionally drive while intoxicated.

Based on convincing data from other studies (for a review see ICADTS, 2001) a volunteer alcolock programme for convicted DWI offenders was introduced in Sweden in 1999. This involves a 2-year programme involving strict medical requirements (Bjerre, 2003; Bjerre and Thorsson, 2008). However, this strategy of using voluntary *secondary prevention* was not expected to have a major impact on the overall problem of drinking and driving since too few people volunteer for the interlock (Bjerre, 2005). Therefore, in 1999 a *primary prevention* approach to prevent any kind of drinking and driving also was introduced in Sweden by one of the authors. This was the first attempt world-wide to prevent drink driving in a large scale

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among a population of drivers who had not previously been identified as having alcohol problems.

The *primary prevention* approach was adopted to overcome the difficult task of detecting vehicle operators with alcohol problems who are employed by various transport businesses. Starting with a pilot project, alcolocks were voluntarily installed in commercial vehicles (buses, trucks, and taxis) (Bjerre, 2005). Currently approximately 20,000 various kinds of vehicles have alcolocks installed in Sweden and some transport companies have had the device installed for as long as 6 years.

The object of the present study was to evaluate the experiences from and attitudes to this primary prevention strategy. This evaluation was based on questionnaires distributed to key informants at companies which installed alcolock devices. To permit a comparison, and to determine reasons for not installing, companies without alcolocks were also interviewed.

As the alcolock also records the drivers' BAC test data we also had the opportunity to study the prevalence of drink-driving attempts in an unselected population of drivers employed in commercial transport companies.

2. Materials and methods

2.1. Inquiry to companies having installed alcolocks

A questionnaire-based interview was sent to transport companies having installed alcolocks. With the smaller companies the questionnaire was addressed to the head of the company, and to the larger companies to the person responsible for road-safety issues or to the one responsible for the alcolocks. Thus, all 118 companies in Sweden that were known by the Swedish Road Administration and by the two main alcolock suppliers to have alcolocks installed in their fleets were included (the majority of the alcolocks were ACS Alcolock WR3/V3 and Dräger Interlock XT, but also some other devices were used by the included companies).

The following questions were posed in this study:

Number of and kind of vehicles having installed alcolocks and number of drivers using alcolocks?
Previous experiences of alcohol problems among the employees?
Main reasons for installing alcolocks?
The costs for installing and for service of the alcolocks?
Type of alcolock?
How are alcohol positive breath tests recorded and handled?
Observed problems with the alcolocks?
Attitudes to the alcolocks among the employees and employers?

2.2. Inquiry to companies not having installed alcolocks

A similar questionnaire was sent to 230 different transport companies that were not known to have installed alcolocks. These companies were selected by first matching the overall distribution and size of companies from the various transport sectors of the companies with alcolocks. After that, a random selection was made from among the great number of transport companies that were available. The questionnaire was addressed to the head of the company. To make comparisons possible about two thirds of the questions were the same as those addressed to companies having alcolocks. The main research questions addressed were

Number and kind of vehicles and number of drivers?
Main reasons for not installing alcolocks?
Previous experiences of alcohol problems among the employees?

2.3. Outcome evaluation

2.3.1. Breath tests records

The information about positive breath tests (BAC $\geq$ 0.02%) is sensitive for commercial as well as individual reasons because a positive test reveals a DWI offence that could have occurred had the alcolock not prevented it. Therefore, we tried to evaluate the prevalence of alcohol positive BAC start up attempts that resulted in an ignition lockout in two different ways.

In the interview study we inquired about the number and rate of alcohol positive start failures. We also got results from two cohorts of vehicles, where the monitoring program was served by one of the alcolock suppliers; one cohort of 687 vehicles with alcolocks during 2004 and another with 581 vehicles during 2005, where all breath tests were recorded. In these cohorts a larger number of the vehicles were heavy (trucks, buses and some single purpose vehicles) than in the whole population; about 70 and 40%, respectively. Due to request for privacy we cannot present any more information about the companies and the vehicles in the two cohorts.

The total number of breath test recorded when there was an attempt to start the vehicle and the rate of those that were alcohol positive (BAC > 0.02%) were recorded for 2 years in the two cohorts. We also recorded the number of tests just below the legal limit (BAC 0.010–0.019) and those showing high BAC (>.10%). The breath tests were distributed on the 7 days of the week and on four different time intervals of the day. Typically after a failed test the driver will perform re-tests until he succeeds in starting the vehicle therefore repeated new positive breath tests usually occur after the first failure. Accordingly for the evaluation we have filtered out the re-tests and only record the first alcohol positive test.

3. Results

The response rate was 80% on the questionnaires sent to the companies that installed alcolocks. Eight of the 118 eligible companies were excluded as they had gone out of business or were reorganized. Thirty-three of the total 88 responses were received after one or two reminders. When comparing the first, second and third sets of answers we found no differences. The response rate on the questionnaires sent to the companies that did not install alcolocks was, as we expected, lower, 57%. Considering the low response rate we analyzed whether the first set of answers differed from those after one or two reminders. We then found some non-significant trends; i.e. those answering