Objective: To reach a better understanding of occupational illness amongst truck drivers, in order to define appropriate health monitoring protocols and promote a healthy lifestyle.

Methods: We assessed 673 male drivers (mean age 43.85 years, SD 9.56; mean working seniority 27.28 years, SD 10.59), employed by 46 different companies. The drivers, who were gradually recruited in the study over the years, had a maximum of 8 re-assessments each, for a total of 2608 examinations. We applied a survey protocol consisting in a medical examination, questionnaires for the most common risks and instrumental and laboratory tests in compliance with SIML guidelines.

Results: We identified a total of 44 work-related diseases: 22 cases of noise-induced hearing loss (NIHL) and 22 cases of lumbar degenerative disc disease. As regards metabolic disorders, we observed 28 cases of diabetes mellitus, in most cases (71.4%) as a first diagnosis or under poor therapeutic control. We observed poorly-controlled hypertension in 103 drivers, the majority of whom (54%) were diagnosed for the first time. Over 30% of the workers in our study were obese and approximately 40% were tobacco smokers. We identified just 9 individuals (1.3%) with a positive toxicological screening for use of recreational drugs. Our data confirm a high prevalence of occupational illness amongst truck drivers. Cardiovascular and metabolic conditions require close monitoring.

Key words: Truck driver; fitness to work; workplace health promotion; occupational disease

Parole chiave: Autista di camion; idoneità lavorativa; promozione della salute negli ambienti di lavoro; patologia lavoro-correlata

Summary

Background: This paper follows up on a project that was launched in 2008 and contributed to the development of the new Italian Society of Occupational Medicine (SIML) guidelines for the road haulage industry. Objective: To reach a better understanding of occupational illness amongst truck drivers, in order to define appropriate health monitoring protocols and promote a healthy lifestyle. Methods: We assessed 673 male drivers (mean age 43.85 years, SD 9.56; mean working seniority 27.28 years, SD 10.59), employed by 46 different companies. The drivers, who were gradually recruited in the study over the years, had a maximum of 8 re-assessments each, for a total of 2608 examinations. We applied a survey protocol consisting in a medical examination, questionnaires for the most common risks and instrumental and laboratory tests in compliance with SIML guidelines. Results: We identified a total of 44 work-related diseases: 22 cases of noise-induced hearing loss (NIHL) and 22 cases of lumbar degenerative disc disease. As regards metabolic disorders, we observed 28 cases of diabetes mellitus, in most cases (71.4%) as a first diagnosis or under poor therapeutic control. We observed poorly-controlled hypertension in 103 drivers, the majority of whom (54%) were diagnosed for the first time. Over 30% of the workers in our study were obese and approximately 40% were tobacco smokers. We identified just 9 individuals (1.3%) with a positive toxicological screening for use of recreational drugs. Our data confirm a high prevalence of occupational illness amongst truck drivers. Cardiovascular and metabolic conditions require close monitoring.

Riassunto

«Tutela della salute e della sicurezza dei lavoratori dipendenti di società di autotrasporti». Introduzione: Questo documento segue un progetto iniziato nel 2008 ed è stato parte integrante per lo sviluppo delle nuove linee guida per il settore dei trasporti stradali della Società Italiana di Medicina del Lavoro (SIML). Obiettivo: Il nostro obiettivo finale è, attraverso la raccolta e l’analisi di dati biostatistici, raggiungere una migliore comprensione delle malattie lavoro-correlate per i conducenti di camion e definire di conseguenza protocolli di sorveglianza sanitaria appropriati, promuovendo al contempo l’applicazione di stili di vita sani. Metodi: Abbiamo valutato 673 autisti (età media 43,85 anni, SD 9,56, anzianità lavorativa media 27,28 anni, SD 10,59), impiegati in 46 diverse aziende, tutti di sesso maschile. Gli autisti, gradualmente reclutati nello studio nel corso degli anni, sono stati sottoposti sino ad un
INTRODUCTION

Professional truck drivers need to maintain their mental and physical health, in order to perform their duties safely and without risks to themselves or others (11). As in other industries with a high risk of occupational injuries, such as construction or agriculture, it is possible that pharmacological treatments or undiagnosed or poorly-controlled medical conditions could contribute to an increased risk of occupational injuries for drivers, in particular from road traffic accidents (RTAs) (5, 9, 21).

The range of such medical conditions representing a relative or absolute contraindication to work for truck drivers is diverse, including (5): cardiovascular disease (7, 24), diabetes mellitus (30), central nervous system diseases, sleep disorders (4, 14, 15, 25, 34, 37, 39, 41), sight and hearing impairment, etc. Alcohol use disorders, drug abuse, drug addiction (3, 6, 9, 18, 20, 23, 28, 29) and long-haul driver fatigue (1, 2, 22) are, therefore, not the only conditions to be considered when addressing the occupational safety and health of truck drivers, despite being undoubtedly the most extensively studied and monitored.

In this paper, we do not take into account certain environmental risk factors that could be important for these workers. Truck drivers are consistently found to have a higher incidence of and mortality from lung cancer than controls (10, 22, 26). Some studies consider the occupational exposure to diesel exhaust fumes to be the main cause (26), and this kind of exposure is also thought to be the cause of an increased risk of bladder cancer (8, 17, 31).

In their retrospective cohort study, Garshick et al measured exposure to vehicle exhaust fumes (21), and found an increased risk of mortality from lung cancer amongst haulage workers with regular exposure to vehicle exhaust fumes. Furthermore, local drivers were seen to have greater exposure to dust than long-distance drivers, who showed no difference compared to a control group (40). This finding was explained by the fact that local drivers spend more time in polluted environments. Unfortunately, literature does not allow for firm conclusions regarding chemical hazards, since exposure assessment in most epidemiological studies on, for instance, occupational cancer, is based on job title rather than actual exposure measurements (13).

In 2008, in view also of the new Italian occupational health and safety law (according to which mandatory toxicological screenings were required) the Department of Occupational Medicine at Ospedale Papa Giovanni XXIII in Bergamo designed a study to identify the health and safety issues of haulage company employees, with the support of EBITRAL, advisory body for this sector. We collected a large sample of biostatistical data and analysed the prevalence and incidence of occupational diseases and their influence on the employees’ fitness for work, in order to formulate a new occupational health protocol for this industry.

Indeed, our survey made a significant contribution to the development of the new Italian Society...
of Occupational Medicine (SIML) guidelines for this industry (13).

In this paper, we present the results of the biostatistical data we have collected thus far.

METHODS

For every driver enrolled in our descriptive cohort study, we followed an occupational health protocol based on the guidelines of the Italian Society of Occupational Medicine, which we helped revise with our previous experimental work (13).

During the initial assessment, every driver had to provide a full medical history, placing particular emphasis on musculoskeletal disorders (MSDs), sleep disorders, hearing and lifestyle resulting in higher level of risk factors.

We performed a full physical exam, an electrocardiogram (ECG), a pure tone audiometry test and a visual test with a digital vision screen.

With a blood test, we measured the complete blood count (CBC), aspartate aminotransferase (AST), alanine aminotransferase (ALT), Gamma-glutamyltransferase (GGT), cholesterol levels, (total, low-density lipoprotein [LDL] and high-density lipoprotein [HDL]), triglycerides, serum creatinine and blood glucose.

Chemical and physical and microscopic urine analysis (urinalysis) and urine flow cytometry were performed. Toxicological screening for recreational drugs was performed, on the urine sample by on-site immunochemical assay.

When screening was positive, we requested a confirmatory analysis by liquid chromatography–mass spectrometry (LC–MS) in an accredited laboratory.

We screened for the following substances (directly or through secondary metabolites): cocaine (COC), opiates (OPI), amphetamines and methamphetamines (MAMP), 3,4-methylenedioxyamphetamine (MDMA), buprenorphine (BUP) and delta-9-tetrahydrocannabinol (THC).

By analysing the risk evaluation and assessment documentation for these companies and through our surveillance work, in some cases we identified a possible chemical risk: animal feed from recycled livestock, powder or liquid chemicals and livestock can have an irritating or sensitizing effect on the driver’s respiratory system. Therefore, in these cases, we implemented our protocol with respiratory function tests.

We considered the importance of sleep disorders due to their role in road accidents (4, 14, 15, 25, 34, 37), exposure to whole-body vibration, prolonged sitting in the same position, the fact that many drivers are involved in loading and unloading, and potential addiction to substances. We therefore complemented the clinical history with questionnaires to obtain a better understanding of musculoskeletal problems, substance and alcohol use, sleep disorders and daytime drowsiness. Some questionnaires were already widely used (CAGE and Epworth) (19, 27) and in some cases we designed our own questionnaires for the purpose.

We assessed 673 drivers, working for 46 different companies, who took part in our research voluntarily. All subjects were male. Table 1 summarizes their demographic characteristics (at the final visit).

The companies involved in this project were very diverse with regard to the type of goods transported (food and beverages, vehicles, powdered material, livestock and mixed cargo), and therefore also with regard to the distances travelled (from a few kilometres to international drives). As a consequence, the exposure to particular risk factors (noise, vibrations, etc.), based on the measurements made by each company was not homogeneous.

The drivers, who were recruited in the study gradually over 8 years, attended up to 8 annual re-as-

| Job            | Number of workers | Mean age (SD) | Mean work seniority (SD) | Mean truck driver seniority (SD) |
|----------------|-------------------|---------------|--------------------------|----------------------------------|
| Truck drivers  | 673               | 43.85 (9.56)  | 27.28 (10.59)            | 18.53 (10.78)                    |
assessments each, for a total of 2608 examinations. As regards frequency, the examinations were performed in compliance with the abovementioned Italian Society of Occupational Medicine (SIML) guidelines.

RESULTS

Of a total of 2608 medical examinations conducted using our standard protocol, 218 (8.4%) led to the need for further investigation for the assessment of fitness to work or in order to diagnose a possible occupational condition. We carried out a total of 306 further medical tests on 168 workers.

A diverse range of medical tests was performed: 52.9% involved the cardiovascular system (24-hour Holter ECG monitoring, blood pressure monitoring, cardiology consultation with echocardiogram, ergometric stress test or spiro-ergometric test, myocardial perfusion scintigraphy); investigation of type 2 diabetes mellitus (fasting blood glucose, glycated hemoglobin, diabetologist consultation) accounted for 31.4% of the tests performed; the remaining investigations concerned eye problems (7.9%), musculoskeletal disorders (4.3%) or sleep disorders, liver disease, hematologic conditions, neurological and psychiatric disorders, which combined represented 3.9% of our investigations.

Amongst the workers enrolled in our study, including those subject to health monitoring in the past, none had a documented diagnosis of an occupational condition. In all, we identified 44 diseases we believe to be related to specific occupational risk factors, for all of which we provided the relevant authorities with a medical report, an occupational disease report and a first medical certificate.

The prevalence of occupational illness was 6.5%. Figure 1 shows the overall prevalence broken down according to age bracket; the Confidence Interval (95% CI) was defined in this and the following cases by applying the formula ±1.96*√P*(1-P)/N.

More specifically, we referred to the relevant authorities 22 cases of noise-induced hearing loss (NIHL) and 22 cases of degenerative disc disease in the lumbosacral spine, often associated with spinal disc herniation.

When referring a worker with NIHL, we used the medicolegal criteria defined by Marello et al (32) In the referred cases, in the presence of a specific audio-

Figure 1 - Prevalence in the different age groups of the work-related disease (total, lumbosacral and hearing loss)
gram, we were able to trace back through the driver’s medical history to previous professional exposure to noise with significant duration and intensity. In the driving of heavy goods vehicles, which once lacked the soundproofing and frequent maintenance they have now, noise exposure almost always originated from the use of noisy devices (e.g. air compressors) and/or loading and unloading activities in environments with high noise levels. On a worldwide level, the provision and use of personal protection equipment is a relatively recent practice and, moreover, it is not homogeneously implemented. We also considered potential exposure to wind turbulence noise due to the habit of driving with the windows down, which often dates back to before air conditioning was widespread, but is still common practice today.

As far as lumbosacral disc disease is concerned, we considered whether there had been exposure, with significant duration and intensity, to occupational risk factors, for example, manual handling of loads. We did not take into account physiological age-related spinal changes, or alterations due to accidents or congenital deformities. We were able to collect very little information on previous exposure to vibrations, because the only available data were recent and in just a very few cases were slightly above the “action level” for hand-arm and whole-body vibration; therefore, we considered exposure to vibration as a complementary risk factor when the driver had been working in the sector for at least 10 years.

Figure 1 shows also the prevalence of occupational spinal disease broken down by age bracket and, similarly, the prevalence of NIHL.

Considering also drivers with no fully documented occupational risk factors for lumbosacral disorders, a total of 42 drivers had a MRI scan allowing diagnosis of lumbosacral disc herniation. Prevalence broken down by age bracket is shown in figure 2.

As regards metabolic disorders, we observed 28 cases of diabetes mellitus, most of which (71.4%) were a first diagnosis or previously-diagnosed diabetes that was not satisfactorily controlled. In one recent study, we recorded a standardized prevalence ratio for diabetes mellitus amongst drivers of 2.13 (95% CI 1.29 to 2.96) in individuals aged 35 to 59 (37).

We found 103 cases of poorly-controlled high blood pressure (hypertension), most of which (54%)
were diagnosed for the first time. The median Body Mass Index (BMI) of our population was 28 Kg/m$^2$; 175 individuals or 26% had a BMI over 30 Kg/m$^2$, 36 individuals or 5.4% a BMI over 35 Kg/m$^2$ and 9 individuals or 1.3% over 40 Kg/m$^2$.

In our investigation regarding sleep disorders, a thorough medical history focused on the quality of sleep and a physical exam (including an examination of neck, trunk, throat, etc.) proved to be more effective than the Epworth Sleepiness Scale (ESS) in identifying individuals at risk of Obstruction Sleep Apnea Syndrome (OSAS), in our experience. Indeed, no driver in our study had an ESS questionnaire score of over 10; therefore, we took the score into account as a complement to the medical history and physical examination. Nonetheless, in many cases, the ESS score proved to be a hindrance in the diagnosis of OSAS, because drivers with normal results were not keen to undertake further diagnostic tests. For this reason, second-tier testing after a working hypothesis of OSAS was not always feasible, and ultimately a total of 6 individuals were diagnosed with OSAS and subsequently prescribed treatment.

The prevalence of tobacco consumption in our study was 40.1%, of which 54% (or 21.7% of the total) said they smoked an average of at least 20 cigarettes a day; 27.6% of drivers said they were ex-smokers and 32.3% said they had never smoked.

Table 2 - Recreational drug use (anamnestic data)

| Drug Use | n (%) | Mean Age** (SD) | Mean Time of use** (SD) | Mean time of abstinence** (SD) | Way of use | Substance the worker admitted to use* |
|----------|-------|-----------------|-------------------------|-------------------------------|-----------|-------------------------------------|
| Never    | 568 (84.4) | 44.4 (9.7) | - | - | Occasional | COC | 93 |
| Yes      | 105 (15.6) | 40.8 (8.4) | 5.2 (5.4) | 16.1 (9.6) | Abuse/ Addiction | THC | 12 |

* Some individuals take more than one simultaneously
** Expressed in years

Table 3 - Alcohol consumption, (anamnestic data)

| Alcohol consumption | n (%) | Mean age**(SD) | Frequent consumptions of liquors (%) |
|---------------------|-------|----------------|-------------------------------------|
| Non-drinker         | 291 (43.3) | 43.7 (10.1) | - |
| Occasional drinker  | 149 (22.1) | 41.6 (8.3) | - |
| Frequent drinker*   | ≤ 3 AU/die | 224 (33.3) | 45.3 (9.3) | 9 |
|                     | > 3 AU/die | 9 (1.3) | 48.2 (7.7) | 1 |

* An Alcohol Unit (AU) represents 10 ml or 8 grams of ethanol, a quantity approximately contained in a beer can (330 ml), a glass of wine (125 ml), or a small glass of liquor (40 ml), at the usual pure alcohol concentrations for these drinks.
** Expressed in years
ations, we ultimately assessed: 594 workers as being fit for work or fit for work with medical prescriptions (88.3% of the study population), 71 as being fit for work with limitations (10.5%) and 8 as being unfit for work (1.2% of the study population).

Figure 3 shows the percentage of individuals with limitations according to age bracket.

Figure 4 refers to the most common conditions observed amongst individuals who were deemed to be fit for work with limitations and the occurrence of the same conditions amongst individuals judged to be fit for work without limitations.

The reasons for judging an individual to be unfit for work in our assessments were: in 4 cases, positive toxicological screening for recreational drugs. As mentioned above, these workers decided of their own accord to quit their job and did not undertake any second-level tests, making it impossible to reassess their fitness for work after a therapeutic or monitoring process; in 2 cases, the presence of sight impairment which, even after correction, did not allow the individual to achieve sufficient visual acuity for the specific driving licenses required; in 1 case, a blood disorder for which the driver refused further investigation or treatment (more specifically, he refused to have a blood transfusion); in 1 case, for concomitantly cardiovascular and metabolic conditions and vision impairment, which, combined, made it impossible to guarantee that the driver was fit for duty.

**DISCUSSION**

The health protocol we applied in our study, as validated previously by the guidelines issued by the Italian Society of Occupational Medicine (SIML), proved, in our opinion, to be effective for the purposes set. We consider the high number of second-level tests we had to perform as reliable proof of its efficacy. The outcomes of the clinical examination, medical history, laboratory tests and diagnostic procedures provided for by our protocol proved to be highly sensitive in identifying those health issues associated with specific occupational risk factors, and with the potential of impairing the individual’s fitness for work.

![Figure 3 - Percentage of workers in the different age groups who were considered fit-for-work with limitations](image-url)
Cardiovascular and metabolic disorders (especially diabetes mellitus) were the most common conditions, and were often poorly controlled by treatment or had not yet been diagnosed. In our opinion, the importance of an early diagnosis of any chronic or degenerative disease, besides the potential impact on driving safety, also lies in the ability to maintain, in the long term, fitness to work, which, without early intervention would inevitably deteriorate, with serious health and economic repercussions for the worker. We consider the long-term maintenance of the ability to work an extremely important issue in our field, because of both the epidemiological transition (increased life expectancy of the working population), and the scope of practice of occupational physicians, who in our opinion will be increasingly called on to pursue long-term objectives.

The paucity of second-level testing involving the musculoskeletal system is not surprising: musculoskeletal syndromes, particularly when they affect the lumbosacral region of the spine, are typically symptomatic at an early stage and can be debilitating (33), meaning that, in most cases, workers consult their general practitioner or a specialist, undertake diagnostic procedures and before long are provided with a clear diagnosis. Spinal disorders, therefore, have both a high prevalence and an important effect on the fitness for work, but, at the same time, are the only conditions that have usually already been well investigated. One possible shortcoming in this respect is a failure to inform the relevant authorities of an occupational condition, probably due to an underestimation of its occupational origin and repercussions, by the clinicians who diagnosed and treated it.

In our study, we found a high prevalence of work-related noise-induced hearing loss and lumbosacral disc disease, particularly in the 40- to 59- years age
group. Amongst the older individuals, we observed a non-statistically significant apparent decrease in work-related conditions, which can be explained by the well-known healthy worker effect and by the fact that it is more difficult to associate with the workplace a late diagnosis of a condition that can be caused in part by physiological ageing and in part by certain occupational risk factors, to which the worker was often exposed a long time beforehand. Moreover, our sample of older workers is too small to be significant. In our study, we identified a relative small number of people with OSAS. It is worth noting that this could be due to the inadequacy of clear tests to be used to identify it, such as those that exist for other conditions.

We were able to recruit a larger number of workers than in our first study of this kind. Nevertheless, we believe that studies with even larger samples are warranted in order to validate the efficacy of this method.

As in our previous works (35, 36) we would like to stress the high prevalence of diabetes mellitus and hypertension (which are often misdiagnosed or poorly controlled by therapy), together with the high prevalence of obesity and tobacco smoking, compared to the general population. We are all well aware of the impact these conditions and the associated metabolic syndrome have on our ageing population, as regards both quality of life and the costs in terms of productivity. Occupational doctors can play an important role with active health surveillance and also through programs of Workplace Health Promotion (WHP) (12, 36). The WHO recognizes the concept of WHP as increasingly relevant in a globalizing marketplace, as the development of WHP will be a pre-requisite for sustainable social and economic development.

Occupational physicians, while focusing on employees’ work-specific conditions, may overlook the bigger picture: conditions such as hypertension, diabetes, overweight and the associated metabolic syndrome have the potential, when they go unchecked, to severely impair an individual’s health as well as his fitness to work.

No potential conflict of interest relevant to this article was reported by the authors

REFERENCES

1. Adams-Guppy J, Guppy A: Truck driver fatigue risk assessment and management: a multinational survey. Ergonomics 2003; 46: 763-779
2. Akerstedt T, Haraldsson PO: International consensus meeting on fatigue and the risk of traffic accidents. The significance of fatigue for transportation safety is underestimated. Lakartidningen 2001; 98: 3014-3017
3. Appenzeller BM, Schneider S, Yegles M, et al: Drugs and chronic alcohol abuse in drivers. Forensic Sci Int 2005; 155: 83-90. Epub 2004 Dec 21
4. Barbé F, Pericas J, Muñoz A, et al: Automobile accidents in patients with sleep apnea syndrome. An epidemiological and mechanistic study. Am J Respir Crit Care Med 1998; 158: 18-22
5. Barbone F, McMahon AD, Davey PG, et al: Association of road-traffic accidents with benzodiazepine use. Lancet 1998; 352: 1331-1336
6. Bernhoft IM, Steentoft A, Johansen SS, et al: Drugs in injured drivers in Denmark. Forensic Sci Int 2005; 150: 181-9. Epub 2005 Apr 21
7. Bigert C, Klerdal K, Hammar N, et al: Time trends in the incidence of myocardial infarction among professional drivers in Stockholm 1977-96. Occup Environ Med 2004; 61: 987-991
8. Boffetta P, Silverman DT: A meta-analysis of bladder cancer and diesel exhaust exposure. Epidemiology 2001; 12: 125e30
9. Bramness JG, Skurtveit S, Mørland J: Clinical impairment of benzodiazepines-relationship between benzodiazepine concentrations and impairment in apprehended drivers. Drug Alcohol Depend 2002; 68: 131-141
10. Corbin M, McLean D, Mannette A, et al: Lung cancer and occupation: a New Zealand cancer registry-based case-control study. Am J Ind Med 2011; 54: 89e101
11. Costa G, Sartori S, Facco P, Apostoli P: Health conditions of bus drivers in a 6 year follow up study. J Hum Ergol (Tokyo) 2001; 30: 405-410
12. Cremaschini M, Moretti R, Brembilla G, et al: Assessment of the impact over one year of a workplace health promotion programme in the province of Bergamo. Med Lav 2015; 106: 159-171
13. Cristaldo A, Mosconi G, Riva MM, et al: Linee Guida per la valutazione del rischio e la sorveglianza sanitaria nel settore dei trasporti terrestri. Piacenza: Nuova Editrice Berti Srl, 2013
14. Cui R, Tanigawa T, Sakurai S, et al: Relationships between sleep-disordered breathing and blood pressure and excessive daytime sleepiness among truck drivers. Hypertens Res 2006; 29: 605-610
15. Dagan Y, Doljansky JT, Green A, Weiner A: Body Mass
Index (BMI) as a first-line screening criterion for detection of excessive daytime sleepiness among professional drivers. Traffic Inj Prev 2006; 7: 44-48

16. Dionne G, Desjardins D, Laberge-Nadeau C, Maag U: Medical conditions, risk exposure, and truck drivers’ accidents: an analysis with count data regression models. Accid Anal Prev 1995; 27: 295-305

17. Dryson E, ’t Mannetje A, Walls C, et al: Case–control study of high risk occupations for bladder cancer in New Zealand. J Cancer 2008; 122: 1340e6

18. Drummer OH, Gerostamoulos J, Batziris H, et al: The incidence of drugs in drivers killed in Australian road traffic crashes. Forensic Sci Int 2003; 134: 154-162

19. Ewing JA: Detecting alcoholism. The CAGE questionnaire. JAMA 1984; 252: 1905-1907

20. Ferrara SD, Zancaner S, Frison G, et al: Alcohol, drugs, pharmacologic agents, and street safety. Ann Ist Super Sanita 2000; 36: 29–40

21. Garshick E, Laden F, Hart JE, et al: Lung cancer and vehicle exhaust in trucking industry workers. Environ Health Perspect 2008; 116: 1327e47

22. Guilllemin MP, Herrera H, Huynh CK, et al: Occupational exposure of truck drivers to dust and polynuclear aromatic hydrocarbons: a pilot study in Geneva, Switzerland. Int Arch Occup Environ Health 1992; 63: 439e47

23. Gustavsen I, Mørland J, Bramness JG: Impairment related to blood amphetamine and/or methamphetamine concentrations in suspected drugged drivers. Accid Anal Prev 2006; 38:490-5. Epub 2005 Dec 15

24. Hartvig P, Midttun O: Coronary heart disease risk factors in bus and truck drivers. A controlled cohort study. Int Arch Occup Environ Health 1983; 52: 353-360

25. Howard ME, Desai AV, Grunstein RR, et al: Sleepiness, sleep–disordered breathing, and accident risk factors in commercial vehicle drivers. Am J Respir Crit Care Med 2004; 170: 1014-1021

26. Jarvholm B, Midtrun O: Coronary heart disease risk factors in bus and truck drivers. A controlled cohort study. Int Arch Occup Environ Health 1983; 52: 353-360

27. Johns MV: A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep 1991; 14: 540-545

28. Longo MC, Hunter CE, Lukan RJ, et al: The prevalence of alcohol, cannabinoids, benzodiazepines and stimulants amongst injured drivers and their role in driver culpability: part I: the prevalence of drug use in drive the drug–positive group. Accid Anal Prev 2000; 32: 613-622

29. Longo MC, Hunter CE, Lukan RJ, et al: The prevalence of alcohol, cannabinoids, benzodiazepines and stimulants amongst injured drivers and their role in driver culpability: part II: the relationship between drug prevalence and drug concentration, and driver culpability. Accid Anal Prev 2000; 32: 623-632

30. Malinauskiene V: Truck driving and risk of myocardial infarction. Przegl Lek 2003; 60 Suppl 6: 89-90

31. Manju L, George PS, Mathew A: Urinary bladder cancer risk among motor vehicle drivers: a meta-analysis of the evidence, 1977-2008. Asian Pac J Cancer Prev 2009; 10: 287e94

32. Marello G, Bartolucci GB, Buccelli C et al: Aspetti penalistici delle ipoacusie di rilevanza medico-legale. Rivista degli infortuni e delle malattie professionali 1992; 3: 231-246

33. Miyamoto M, Shirai Y, Nakayama Y, et al: An epidemiologic study of occupational low back pain in truck drivers. J Nippon Med Sch 2000; 67: 186-190

34. Philip P: Sleepiness of occupational drivers. Ind Health 2005; 43: 30-33. Review

35. Riva MM, Marchetti FA, Giupponi V, Mosconi G: Health surveillance of truck drivers: it is not just a question of drugs. Description of a one-year experience. Med Lav 2010; 101: 207-217

36. Riva MM, Santini M, Borleri D, et al: Diabete mellito in attività lavorative critiche. Med Lav 2016; 107: 293-299

37. Songer TJ, Lave LB, LaPorte RE: The risks of licensing persons with diabetes to drive trucks. Risk Anal 1993; 13: 319-326

38. Terán-Santos J, Jiménez-Gómez A, Cordero-Guevara J: The association between sleep apnea and the risk of traffic accidents. Cooperative Group Burgos-Santander. N Engl J Med 1999; 340: 847-851

39. Toennes SW, Kauert GF, Steinmeyer S, Moeller MR: Driving under the influence of drugs - evaluation of analytical data of drugs in oral fluid, serum and urine, and correlation with impairment symptoms. Forensic Sci Int 2005; 152: 149-155

40. Van der Beek AJ: World at work: truck drivers. Occup Environ Med 2012; 69: 291-295

41. Viegas CA, de Oliveira HW: Prevalence of risk factors for obstructive sleep apnea syndrome in interstate bus drivers. J Bras Pneumol 2006; 32: 144-149