National standard for health assessment of rail safety workers: the first year

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ABSTRACT

Objective: To determine the prevalence of health problems in New South Wales train drivers and the impact of the new national health-assessment standard on train drivers' fitness for work.

Design, setting and participants: Retrospective audit of files of all RailCorp train drivers (743) and train driver recruits (283) who were assessed under the new national standard for health assessment of rail safety workers between February 2004 and February 2005.

Main outcome measures: Smoking status; prevalence of hypertension, heart disease, diabetes and obstructive sleep apnoea; alcohol use disorders; body mass index (BMI); total cholesterol level; fasting blood glucose level; cardiac risk score; fitness status.

Results: 25.2% of drivers and 27.9% of recruits were smokers; 43.8% of drivers and 21.9% of recruits were hypertensive; 34.6% of drivers and 31.4% of recruits had high total cholesterol levels (> 5.5 mmol/L). Median BMI values were 29 kg/m^2 (range, 18–59 kg/m^2) for drivers and 28 kg/m^2 (range, 19–55 kg/m^2) for recruits. The prevalence of obesity (BMI $\geq$30.0 kg/m^2) was higher in both male drivers and recruits compared with the general male population. At initial assessment, 65.1% of drivers and 88.0% of recruits were certified as unconditionally fit for work; 12.4% of drivers and 7.1% of recruits were assessed as temporarily unfit; and 22.5% of drivers and 4.6% of recruits were considered fit subject to review (after periods ranging from 3 to 12 months). Two per cent of drivers and 2.5% of recruits were subsequently deemed to be permanently unfit, the most common reasons being heart conditions, psychiatric disorders, orthopaedic problems, colour vision impairment and sleep apnoea.

Conclusions: Cardiovascular risk factors and cardiovascular disease are the most significant health issues affecting train drivers' fitness for work. With the more stringent health assessment and regular review required by the new standard, most drivers can continue with their duties, with the added benefits of improved personal health and greater safety to the rail network and the public.

MJA 2007; 187: 394–397

In January 2003, a passenger train travelling between Sydney and Port Kembla on the New South Wales south coast derailed on a curve at high speed, killing the driver and six passengers.

The inquiry into the incident identified a number of contributing factors. The critical event was the sudden incapacity of the driver when he suffered an episode of ventricular fibrillation.[1] The investigation also revealed that the train guard had failed to operate the emergency brake. He had a pre-existing psychological impairment that may have contributed to his failure to respond adequately to the emergency situation.[2]

The inquiry was critical of the system of train driver medical examinations that had been in use since 1995. Several areas requiring attention were identified, including the absence of a predictive element in the periodical medical assessments to help determine the risk of sudden incapacitation, and the absence of basic psychological screening.[2]

Following the inquiry, a project was initiated to develop a national standard for the Australian rail industry, to replace individual state-based standards. The *National standard for health assessment of rail safety workers*[3] was adopted by all states and territories in April 2004.

The new medical assessments commenced in NSW in February 2004 in anticipation of the recommendations of the inquiry. The initial results of testing were alarming and indicated that a fifth of drivers were temporarily unfit (reasons for unfitness are summarised in Box 4).[2] The newspapers at the time carried headlines such as "Crush hour as more trains cut",[4] "Tests expose 70% of train drivers as high risk",[5] and "Fight to the last kebab. . .".[6] The initial loss of 52 drivers who were certified as unfit was disruptive to rail services and raised further outcry in the media.

Here we report the results of the first year of the new medical examinations at RailCorp, one of Australia's largest rail operators.

METHODS

We retrospectively reviewed the files of all RailCorp train drivers and driver recruits who were assessed under the new standard between February 2004 and February 2005. All data were de-identified. Information extracted included the following: age, sex, smoking status, hypertension, heart disease, diabetes, obstructive sleep apnoea, Epworth Sleepiness Scale score,[3] Alcohol Use Disorders Identification Test score,[3] Kessler Psychological Distress Scale (K10) score (a screening tool to detect severe cases of anxiety or depression),[3] visual acuity, Ishihara's test result, visual field testing results, hearing, body mass index (BMI), blood pressure, total cholesterol level, high-density lipoprotein (HDL) cholesterol level, fasting blood glucose level, referral for oral glucose tolerance test, cardiac risk score, and fitness for duty.

Subjects were defined as being hypertensive if they were receiving antihypertensive treatment or had a systolic blood pressure of $\geq$ 140 mmHg. A normal total cholesterol level was defined as $\leq$ 5.5 mmol/L.

BMI measurements of drivers and recruits were classified according to age group for normal (BMI <25.0 kg/m^2), overweight (BMI 25.0–29.9 kg/m^2) and obese (BMI $\geq$30.0 kg/m^2) subjects, and then compared with BMI findings of the AusDiab study[7] for ages 25 years and over using the χ^2 test. Given that most drivers and recruits were men, for the purposes of this comparison only male drivers and recruits were included in the analysis.

RESULTS

The files of 1026 subjects were reviewed between June and August 2005 by one of us (RM). The study group comprised 743 drivers (out of a total population of 1145 as at 1 February 2004), together with all train driver recruits assessed during the study period (283). The 743 existing drivers

1 Prevalence of health conditions and level of fitness for work of train drivers and recruits

	Number (%) of drivers	Number (%) of recruits	Population prevalence in Australian adults (prevalence in males)
Smoking	187 (25.2%)	79 (27.9%)	19.5% (20.1%)[8]
Pre-existing heart disease at assessment	23 (3.1%)	0	1.9% (2.4%)[8]
Pre-existing diabetes at assessment	41 (5.5%)	2 (0.7%)	7.6% (8.0%)[8]
Hypertension	326 (43.8%)	62 (21.9%)	28.6%[9] (32.0%)[8]
Receiving antihypertensive treatment at assessment	170 (22.9%)	4 (1.4%)	13.4%[9]
Total cholesterol level > 5.5 mmol/L	257 (34.6%)	89 (31.4%)	52.0% (51.0%)[8]
Obstructive sleep apnoea	14 (1.9%)	2 (0.7%)	
AUDIT score ⩾ 8	17 (2.3%)	1 (0.4%)	
Psychiatric conditions	18 (2.4%)	5 (1.8%)	
BMI (kg/m^2)			
< 25.0	143 (19.2%)	86 (30.4%)	40.2% (32.5%)[7]
25.0–29.9 (overweight)	305 (41.0%)	107 (37.8%)	39.0% (48.2%)[7]
⩾ 30.0 (obesity)	295 (39.7%)	90 (31.8%)	20.8% (19.3%)[7]
Fit for duty at initial assessment	484 (65.1%)	249 (88.0%)	
Temporarily unfit at initial assessment	92 (12.4%)	20 (7.1%)	
Fit, subject to review, at initial assessment	167 (22.5%)	13 (4.6%)	
Permanently unfit at initial assessment	0	1 (0.4%)	
Permanently unfit at completion of assessment process	15 (2.0%)	7 (2.5%)	

AUDIT = Alcohol Use Disorders Identification Test.[3] BMI = body mass index. ◆

included about 200 drivers identified prior to testing as being at higher risk of disease on the basis of age, excess weight, or having known medical conditions. The remaining drivers reviewed were chosen on the basis of when their next periodical medical assessment was due. (The regulatory time frame set for the completion of all driver assessments was 31 December 2005.) Drivers and recruits were assessed separately to estimate the extent to which their health parameters differed.

The median age was 48 years (range, 23–72 years) for drivers and 31 years (mean, 18–56 years) for recruits; 97.4% of drivers and 92.9% of recruits were men.

The prevalence of health problems detected and the level of fitness for work of drivers and recruits are summarised in Box 1. Where available, comparative data for the Australian adult population and for Australian men (derived from AusDiab[7,9] and Australian Institute of Health and Welfare data[8]) are also listed. New conditions that were diagnosed as a result of the health assessments are listed in Box 2. A comparison between the BMI findings of drivers and recruits and those of the AusDiab study[7] is shown in Box 3.

Hypertension

Twenty-three per cent of drivers and 1.4% of recruits were receiving treatment for hypertension at the time of assessment, and 61.5% of those being treated had systolic blood pressure readings of ⩾ 140 mmHg.

Cholesterol

Median total cholesterol levels were 5.2 mmol/L (range, 2.1–14.8 mmol/L) for drivers and 4.9 mmol/L (range, 2.4–9.0 mmol/L) for recruits.

BMI

Median BMI values were 29 kg/m^2 (range, 18–59 kg/m^2) for drivers and 28 kg/m^2 (range, 19–55 kg/m^2) for recruits.

The prevalence of obesity was greater in both male drivers and recruits than in the general male population (Box 3).

Fitness for work

The initial fitness-for-work determinations made at the health assessment are summarised in Box 1, and reasons for being certified temporarily unfit are detailed in Box 4. In some cases there was more than one reason for temporary unfitness. The majority of drivers who were assessed as being temporarily unfit subsequently returned to work, subject to a review within 12 months.

The most common reasons for being assessed as *permanently* unfit were heart conditions, psychiatric disorders, orthopaedic problems, colour vision impairment and sleep apnoea.

DISCUSSION

It is of concern that the prevalence of obesity in the study population was higher than the population average, given the known association between excess weight and cardiac risk.[11]

The proportion of drivers who were hypertensive (43.8%) was greater than the Australian population prevalence of 28.6% for adults aged ⩾ 25 years.[9] The fact that 61.5% of those being treated for hypertension still had systolic blood pressure ⩾ 140 mmHg raises questions about compliance and effectiveness of treatment.

It is possible that the prevalence of hypertension may have been overestimated, as blood pressure was measured on only one occasion. However, systolic blood pressure levels of > 160 mmHg have been shown to remain elevated in over 85% of cases after three reviews.[12] Moreover, Framingham Heart Study results have shown that maximum blood pressure readings are as predictive of long-term cardiovascular outcomes as minimum or average blood pressure values at screening.[9]

The relationship between hypertension, obesity and sleep-disordered breathing is well established. The prevalence of obstructive sleep apnoea in the study group was somewhat lower than would have been expected

2 New conditions diagnosed as a result of the health assessment

Condition	Number of cases
Ischaemic heart disease	2
Conduction defects	7
Valvular heart disease	3
Diabetes	9
Impaired glucose tolerance	12
Diabetic nephropathy	1
Pre-existing diabetes requiring treatment changes	3
Obstructive sleep apnoea	2
Other	3

3 Body mass index (BMI) of male train drivers and recruits compared with AusDiab population figures,[7,10] by age group

Age (years)	Number (%*) of male drivers				Number (%*) of male recruits				Number (%*) of male AusDiab population		
	BMI (kg/m^2)			P†	BMI (kg/m^2)			P†	BMI (kg/m^2)		
	< 25.0	25.0–29.9	⩾ 30.0		< 25.0	25.0–29.9	⩾ 30.0		< 25.0	25.0–29.9	⩾ 30.0
< 25	0	1 (50.0%)	1 (50.0%)		23 (41.8%)	12 (21.8%)	20 (36.4%)				
25–34	22 (33.8%)	24 (36.9%)	19 (29.2%)	ns	33 (31.1%)	40 (37.7%)	33 (31.1%)	< 0.01	229 (38.9%)	258 (43.7%)	103 (17.4%)
35–44	36 (17.7%)	78 (38.4%)	89 (43.8%)	< 0.001	18 (24.3%)	33 (44.6%)	23 (31.1%)	< 0.025	386 (35.3%)	512 (46.8%)	195 (17.8%)
45–54	48 (17.0%)	127 (45.0%)	107 (37.9%)	< 0.001	7 (25.9%)	16 (59.3%)	4 (14.8%)	ns	378 (28.1%)	687 (51.1%)	280 (20.8%)
55–64	31 (19.3%)	66 (41.0%)	64 (39.8%)	< 0.001	0	0	1 (100%)	ns	237 (25.5%)	454 (48.9%)	237 (25.5%)
65–74	2 (18.2%)	4 (36.4%)	5 (45.5%)	ns	0	0	0		194 (26.5%)	392 (53.6%)	145 (19.9%)

ns = not significant. * Per cent of age group. † Compared with corresponding male AusDiab age group. ◆

given the prevalence of hypertension and obesity. This may be a result of under-reporting of sleep apnoea and/or under-reporting on the Epworth Sleepiness Scale.

All of the psychiatric disorders reported were detected on the basis of history. No new conditions were diagnosed as a result of the K10 score, and most of the drivers with pre-existing psychiatric conditions scored below the level that triggers further action (as specified in the standard). Notwithstanding this, eight people were certified as temporarily unfit and four as permanently unfit because of psychiatric conditions.

There were no cases in which alcohol usage was found to have an impact on fitness for work, and no illicit drug use was detected. This may be due to under-reporting or may reflect the impact of the organisation's drug and alcohol policy and the *Rail Safety (Drug and Alcohol Testing) Regulation 2003* (NSW).

4 Reasons for drivers and recruits being certified temporarily unfit

	Drivers	Recruits
Heart disease (diagnosed or suspected)	43	6
Diabetes	22	1
Obstructive sleep apnoea	9	1
Hearing impairment	10	0
Psychiatric conditions	6	2
High fasting blood glucose level	5	2
Orthopaedic problems	3	3
Vision impairment	3	1
Colour vision impairment	0	4
Other	3	0
Total	*104*	*20*

Of the existing drivers tested in the first year of the new assessments, over a quarter were identified prior to testing as being at higher risk of disease. It is possible that, if the study were extended beyond the initial 12-month period to include all 1145 drivers, the proportion of drivers with certain conditions and the proportion of drivers made temporarily unfit would be less.

Impact of the standard on fitness for work

On initial assessment, 12.4% of existing drivers were found to be temporarily unfit. Although this figure is not as high as that initially reported to the Commission of Inquiry, it still represents a significant proportion of drivers being taken off driving duties.

Two per cent of drivers and 2.5% of recruits were found to be permanently unfit for driving duties. This figure is perhaps smaller than would have been expected from the initial fear reflected in media reports surrounding the implementation of the standard. The conclusion that can be drawn from this is that fitness for train driving depends on demonstrating good control of medical conditions and arranging regular reviews commensurate with risk.

The two most common reasons for drivers being made permanently unfit were heart conditions and psychiatric disorders. These findings are significant in light of the focus of the Commission of Inquiry on these conditions.

As a result of the new standard, cardiovascular risk factors and cardiovascular conditions have been shown to be the most significant health issues in both prevalence and impact on fitness for work. Only a minority of drivers were deemed permanently unfit, and therefore most drivers were able to continue their duties with the added benefits of improved personal health and improved safety to the rail network and the public.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

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(Received 12 Oct 2006, accepted 28 Jun 2007) ❑