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MONITORING OCCUPATIONAL ACCIDENTS IN THE NETHERLANDS: DOES IT WORK FOR PREVENTION?

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Abstract - Although a number of surveillance systems and national surveys collect data on occupational accidents in the Netherlands, a national figure could hardly be presented in the past. This resulted in inability to evaluate the effects of preventive policies on actual worker safety and inability to set priorities for the protection of the most vulnerable categories of the workforce. From 2000 onwards, the Dutch ministry of Social Affairs and Employment funded several studies in order to improve this situation.

Starting from the reference year 2002 the Monitor Occupational Accidents is published yearly. The Monitor aims to provide clear and unambiguous national key figures on occupational accidents from existing national sources on a structural basis. It provides the government with the possibility to monitor main trends and risk groups, and stakeholders with data to benchmark their own safety performance. This article shows the main results of these studies and discusses the results in light of prevention possibilities.

INTRODUCTION

The Netherlands' Act on Occupational Safety and Health (OSH) obliges Dutch employers to organise their working conditions in such a way that workers are protected against hazardous working conditions. One part of this obligation is to prevent accidents at work. In order to evaluate the effects of this legislation and to present stakeholders (employers organisations, employee unions, branch organisations, occupational health and safety services, safety professionals) with suggestions on how to improve the safety level, information is needed on the number and characteristics of the injuries and the accidents that caused them.

Due to changes in the Dutch Social Security system there is no longer a need for employers to report all work injuries to the OSH-Inspectorate (Bloemhoff & Otten, 1999; Popma & Venema, 2006). In the Netherlands' OSH-Act it is still compulsory to report serious injuries (leading to hospital admission and/or permanent injury) and deaths resulting from work injuries to the OSH-Inspectorate. As a result, the OSH-Inspectorate holds a data base on fatal and severe injuries, based on these reports and follow up investigation on the work site by inspectors of the Inspectorate.

Other national databases exist that hold information on occupational injuries (see Table 1). For example Statistics Netherlands holds statistic of external causes of injury and poisoning in the Netherlands based on coroner's reports on a yearly basis. Deaths as a result of occupational accidents can be selected from this database. A cross validation with the occupational deaths data from the Inspectorate is part of the procedure.

Table 1 Major occupational injury databases in the Netherlands

Owner	Name	Description
OSH-Inspectorate	OSH-Inspectorate database	Data base with fatal and severe accident and injury reports
Statistics Netherlands	Statistics of external causes of injury and poisoning	National database with mortality data
Consumer Safety Institute	LIS (Injury Surveillance System)	Surveillance system in sample of hospitals
Statistics Netherlands	EBB (Labour Force Survey)	Nation-wide survey among Dutch workers

Data on occupational accidents with less severe outcomes can be taken from the Dutch Injury Surveillance System (LIS) run by the Consumer Safety Institute at Emergency Departments of a subset of Dutch hospitals (Consumer Safety Institute, 2006). Finally, in the year 2000 the Ministry of Social Affairs and Employment has requested Statistics Netherlands to include an occupational accidents questionnaire into their Labour Force Survey among a subset of Dutch working population.

These four sources vary in the way they collect their data and in the degree of coverage. Unfortunately, they also differ in the population they refer to and the definitions and classifications they use. As a result of this, it is difficult to come up with a set of key figures on occupational injuries in the Netherlands. This results in:

- Difficulties to formulate preventive policies and evaluate the effects of these policies on actual worker safety, and
- Inability to set priorities for the protection of those categories of the workforce that are most at risk.

From 2001 we explored the possibility of using information from these different sources to provide the Dutch government and stakeholders with key figures on work injuries on a yearly basis. The aim was to provide on a yearly basis national key figures on work injuries from existing national sources of work injury data for the government and relevant stakeholders[1].

METHOD

The study started by comparing the main surveillance systems and surveys on their target population, definitions and classifications and assessing the overall quality of the data. These results were compared to each other and to a set of requirements preset by the ministry. A final decision was taken on the most useful and reliable sources. A standard method was developed for the calculation of some key figures on work injuries, overcoming the discrepancies found.

Requirements

The requirements preset by the ministry included the requirements on type of data needed in light of European harmonisation of injury data (Eurostat, 2001):

- Characteristics of the worker and the company involved;
- Characteristics on the accident and injury mechanism and specific circumstances and objects involved;
- Characteristics of injury and its consequences in terms of absenteeism and disability to work.

A standard list of variables and classifications was set up in order to produce the required statistics.

[1] Studies funded by the Dutch Ministry of Social Affairs and Employment

It was decided that the key figures preferably needed to include all fatal and serious occupational accidents and all other accidents resulting in injury and absence from work. All accidents by workers in working time were included. Like for example traffic accidents and accidents by non-residents. Salary workers and the self-employed were both included in the target population.

EVALUATION OF DATA SOURCES

After a first selection based on general quality and availability criteria, four different sources remained for further analysis. The comparison of the different sources revealed a number of positive and negative findings in comparison to the preset requirements. Table 2 gives an overview with respect to the level of detail, the national coverage and the target population involved.

Table 2 Comparison of occupational data sources

Name of the source	Level of detail	National coverage	Population covered
OSH-Inspectorate database	+	+/-	+/-
Statistics of external causes of injury and poisoning	-	+	+
LIS (Injury Surveillance System)	+	+/- (by extrapolation)	+
EBB (Labour Force Survey)	+/-	+ (by extrapolation)	+

The database of the OSH-Inspectorate has reliable and detailed background information on fatal and serious accidents. Fatal accidents are almost completely covered but non-fatal accidents are heavily underreported. With regard to the population covered it is found that self-employed workers are excluded while visitors and apprentices are included. Traffic accidents during work are also excluded.

The Dutch Statistics of external causes of injury and poisoning provide the most reliable data on fatal occupational accidents. But additional background information on the accident is scarce. Traffic accidents during work are excluded, but can partly be selected by screening the traffic accidents. Because the information on occupational deaths from the Inspectorate are used to cross validate the data in this data source, we decided to use the Dutch Statistics of external causes of injury and poisoning as the main source on fatal occupational accidents.

The Dutch Injury Surveillance System (LIS) gives reliable information on occupational accidents resulting in a visit to the Emergency Department followed by hospital admission. Medical information is registered very reliably; other information is based on the workers own report of the accident. LIS registers all occupational accidents in a sample of Dutch hospitals. National estimates can be calculated based on national data on medical treatment. It was decided to choose the LIS data on hospital admissions as the main source for the indication of serious occupational accidents.

The Labour Force Survey (EBB) has information on injured worker and work characteristics, and is the one source with information on work absence resulting from an occupational injury[2]. Not much information is available on the actual accident characteristics. Underreporting must be considered. Being the one source including absenteeism as a variable, we had no choice as to select this source to provide the government (and Eurostat) with data on occupational injuries resulting in absence from work.

Analysis

Selection and recoding procedures were set up to provide comparable data on the main variables. Key figures on work injuries for the year 2000 and 2001 were calculated. These data were seen as pilot data and were used by the Dutch Ministry only. From reference year 2002 the Monitor Occupational Accidents was published

[2] In 2003 and again in 2005 a new survey on occupational health and safety has been administered (Smulders & Van den Bossche, 2004; Van den Bossche & Smulders, 2004), including some questions on occupational accidents. It will be decided in the near future how this new data source can be used to further improve the Monitor Occupational Accidents.

for a broader public (Venema & Bloemhoff, 2004; Venema & Bloemhoff 2005, Venema & Bloemhoff, 2006). The latter publication included for the first time a trend analysis (2000-2004 data). Also a technical report was published to explain the method used and the choices made (Venema et al, 2004). Based on this method national key data on occupational accidents were calculated from the year 2000 onwards for three safety indicators: occupational deaths, hospital admissions and absence from work as a result of the accident. Risk groups were identified on the basis of the national estimates, the probability per 100,000 of the working population and the severity of the consequences. Trends over the years 2000-2004 were calculated using logistic regression techniques.

RESULTS

Resulting key figures

On the basis of these results key figures were constructed for the years from 2000 up to 2004.

In 2004 the Netherlands suffered 83 deaths as a result of an occupational accident (1,1 per 100,000 workers), 3,200 workers were severely injured (40 per 100,000 workers needed hospital admission for treatment of an occupational injury), and 85,000 workers were absent from work for at least one day (1,100 per 100,000).

Trends

Trends in occupational accidents resulting in injury and absence from work were tested with logistic regression. It was tested whether the proportion of occupational accidents differed across years, using polynomial contrasts (linear trend, quadratic trend, cubic trend, and so on). The overall test of the differences across years is significant ($p < .001$), as well as the linear trend ($p < .001$). Other polynomial contrasts were not significant ($p > .07$). As can be seen in Figure 1, there is a significant decrease in the proportion of occupational accidents with injury and absence over the years 2000 till 2004.

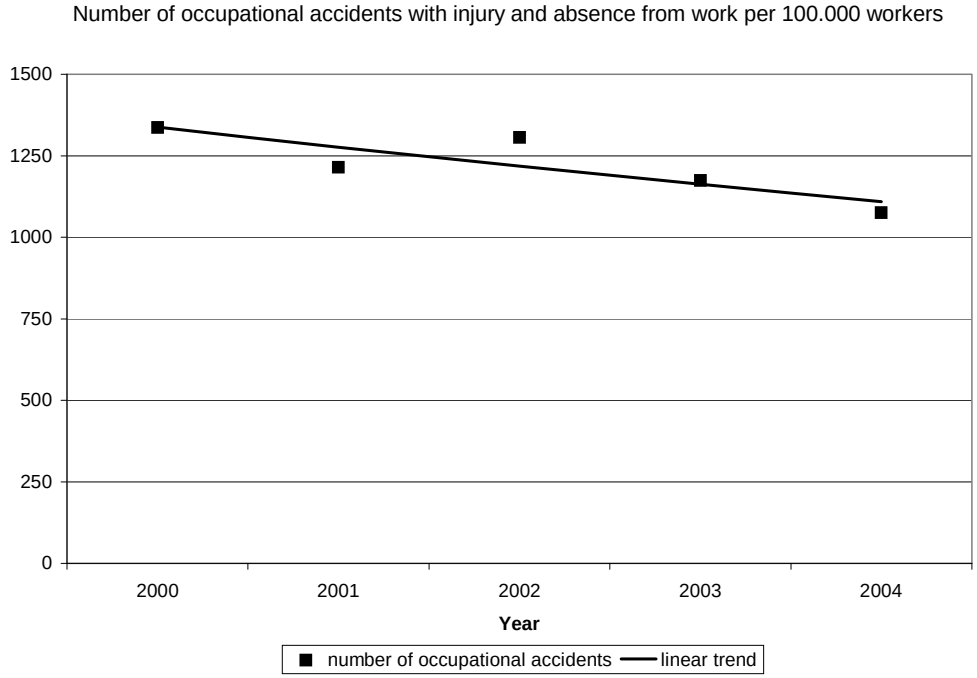
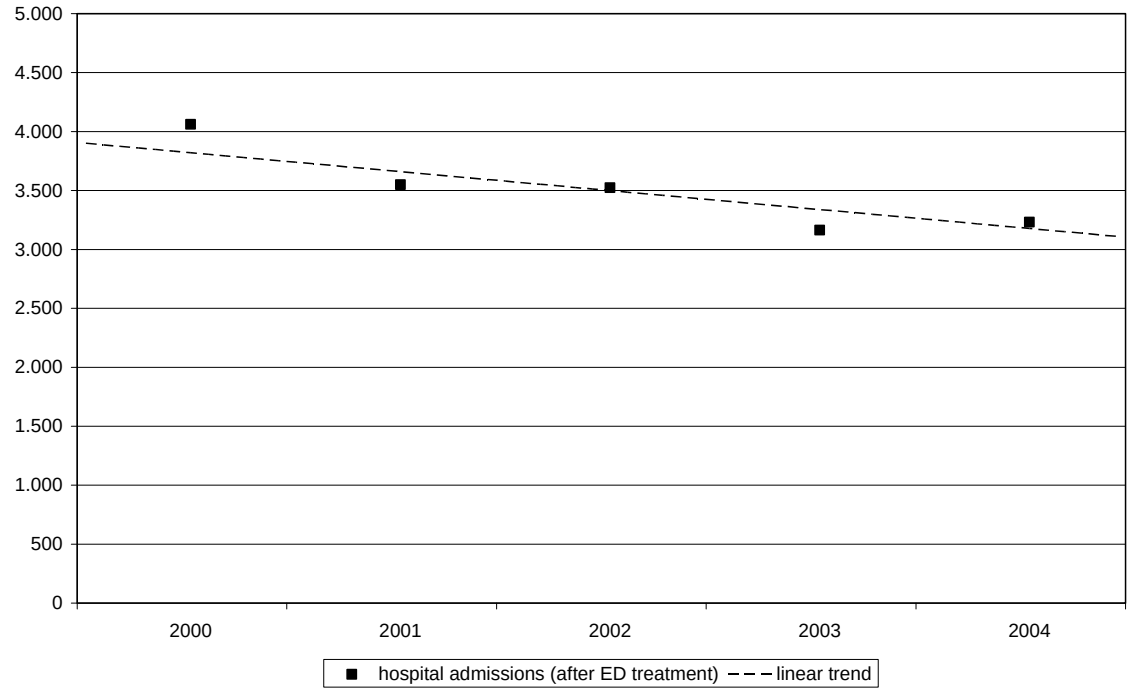


Figure 1 Trend in number of occupational accidents resulting in absence from work per 100.000 workers in the Netherlands

Figure 2 shows a decreasing linear trend[3] in the yearly number of occupational accidents leading to hospital admission after ED treatment (excluding fatal injuries) between 2000 and 2004. When adjusted for changes in the age and gender distribution of the Dutch population the significant decrease is 22% ($P<0.01$).

[3] For this trend analysis we use Dutch Injury Surveillance accident data per month and adjust for weather



Source: Dutch Injury Surveillance System 2000-2004, Consumer Safety Institute

Figure 2 Trend in yearly number of occupational accident resulting in hospital admission after ED treatment (excluding fatal accidents) in the Netherlands

Trends in fatal occupational accidents were tested with logistic regression, in which the total working population of the Netherlands was regarded as the sample. It was tested whether the risk of a fatal accident differed across years, using polynomial contrasts. The overall test of the differences across years was significant ($p = .039$), as was the linear trend ($p = .006$). The other polynomial contrasts were not significant ($p > .12$). As can be seen in Figure 3, there is a significant decrease in the risk of fatal accidents over the years 2000 till 2004.

changes and if necessary for changes in gender and age distribution in the Dutch population. .

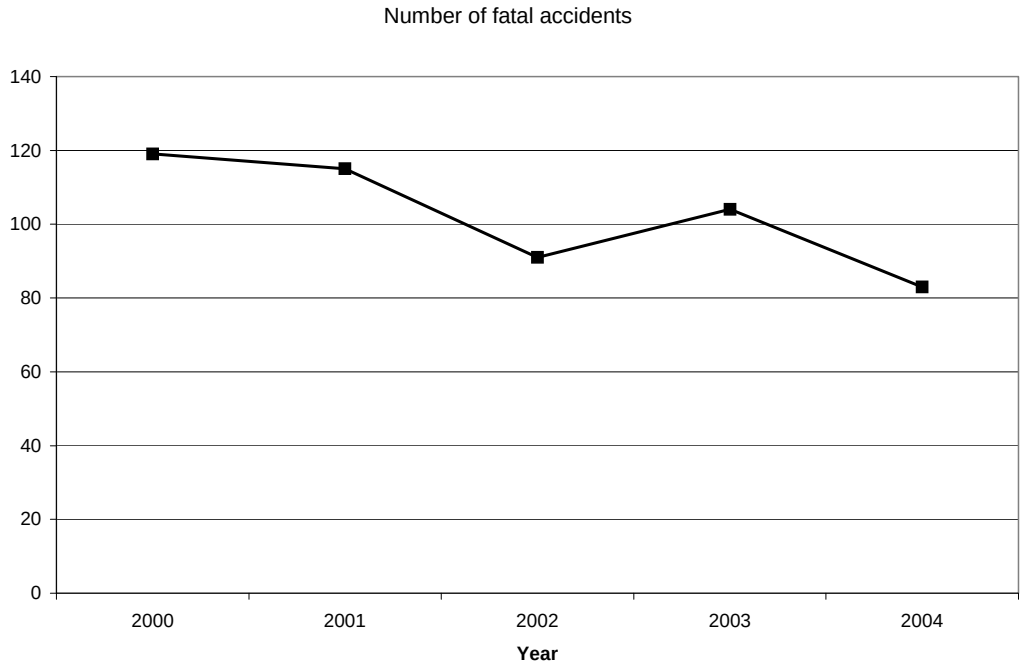


Figure 3 Trend in number of fatal occupational accidents in the Netherlands

Priorities

The following risk groups emerge from the data:

- Elderly workers (for severe and fatal accidents);
- Younger workers (for accidents resulting in injury and absence from work);
- Men;
- Workers in manufacturing; construction; transport; trade and agriculture;
- Workers in large and medium size enterprises (10 workers and more);
- Immigrant workers;
- Workers with lower education;
- Employees (compared to the self-employed).

As an example of the process of priority setting Table 3 shows the national 2003 data by economic activity. It can bee seen that construction scores in the top three in each of the columns, manufacturing in five out of six, agriculture in three out of six and trade and transport in two out of six columns.

Table 3 Occupational accidents by economic activity 2003

Outcome	Injury resulting in absenteeism		Hospital admission after treatment at ED		Fatal accident	
	Number	Number per 100,000	Number	Number per 100,000	Number	Number per 100,000
Agriculture and fishing	3,500	1,600	250	110	13	5.9
Manufacturing, mining and quarrying	23,000	2,200	500	47	23	2.2
Construction	11,000	2,300	550	120	23	4.9
Trade	12,000	950	300	24	5	0.40
Hotels and restaurants	2,900	990	70	23	-	-
Transport, storage and communication	8,300	1,800	290	62	12	2.6
Financial intermediation	1,400	490	-	-	-	-
Public administration	5,000	930	180	33	7	1.3
Education	1,600	320	<10	1.6	2	0.39
Health and social work	8,400	720	50	4.2	2	0.17
Other	10,000	750	150	11	8	0.58
Unknown	5,400		830		9	
Total	93,000	1,200	3,200	40	104	1.3

Source: Monitor Occupational Accidents 2003, including data from the Labour Force Survey 2003, Statistics Netherlands; Dutch Injury Surveillance System 2003, Consumer Safety Institute; Dutch Statistics of external causes of injury and poisoning 2003, Statistics Netherlands including data from the Dutch Labour Inspectorate

As a further step in-depth analyses are being performed on the risky economic activities. As a part of The Monitor Occupational Accidents 2004 (Venema & Bloemhoff, 2006) in-depth analyses are performed for agriculture and transport. Risk factors are identified for both groups and the main accident scenarios per sector are derived from the available data. For these analyses data from 2000-2004 were aggregated in order to ensure sufficient cases.

DISCUSSION AND CONCLUSIONS

It is possible to calculate unambiguous Dutch key figures on work injuries and to follow trends in time. Risk groups can be identified. For example on gender, age and work situation of the workers involved and the main economic activities involved. There has always been a good deal of discussion on the level of detail needed to be able to focus preventive measures on the actual mechanisms and causes of accidents. It is clear that the key figures do not provide the detail needed. However they are the first step to direct the attention of all stakeholders to occupational safety and health. Risk groups can be identified and for each risk group risk factors and accident scenario's. The effects of preventive measures can be monitored over the years.

On the basis of these outcomes stakeholders should be invited to take their responsibility and perform the additional activities necessary to overcome the most important risks. This includes studies into the actual causes of accidents and the underlying mechanisms and intervention studies into effective ways of prevention. In the Netherlands a recent example of cooperation between relevant stakeholders (e.g.governmental agencies, branche organisations and employers and employees in individual companies) have been undertaken under the umbrella of the governmental Policy Program Improving Occupational Safety in the so-called Safety Improvement Projects.

(see this conference). Also publications and workshops are methods used to increase the sense of urgency of relevant stakeholders.

Improvement of our key national data is ongoing. One aspect of improvement is the timeliness of the data. National data on the year x are available in the beginning of the year X+2. In order to set the political agenda and to promptly react to new risks this delay should be shortened. Secondly, improvement in the level of detail can possibly be found in the combination at case level of data from different sources. Future trends and the forecast of new risks should be investigated by studying occupational and societal developments and discuss these with health and safety experts.

Finally, as a result of increased attention to costs/benefit analysis, available data on societal (Meerding et al., 2000; Mossink & De Greef, 2002) and company costs (Brouwer et al, 2005) of occupational accidents should be incorporated in our key national data set.

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