

ORIGINAL REPORT

Evolution of drug consumption in a sample of French workers since 1986: the ‘Drugs and Work’ study[†]

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SUMMARY

Purpose France is known to have a relatively high prescription rate for medicines. Few studies have investigated drug use among a healthy worker population. The aim of this study was to describe the changing patterns of drug use in French workers since 1986 and to evaluate the impact of programs developed to reduce drug consumption.

Method A cross-sectional survey has been performed every 10 years since 1986 among workers from the Toulouse metropolitan area (Southwestern, France) using an anonymous questionnaire given to workers during their compulsory annual medical visit. Results of the 2006 survey (2213 workers) were compared to those obtained in 1986 and 1996. A multivariate analysis was performed to investigate factors associated to the modification of drug use with time.

Results During the last ten years, prevalence of overall drug consumption decreased (40.7% in 2006 vs. 46.7% in 1996, $p < 0.001$) in contrast to the increase observed between 1986 and 1996. Since 1986, patterns of drug use have been modified with a decrease in anti-infectious (OR = 0.24) digestive (OR = 0.54), psychotropic (OR = 0.54), endocrine (OR = 0.57) and cardiotropic (OR = 0.68) drug use. In contrast, there was a significant increase in musculoskeletal (OR = 2.16) drug use. Whatever the period, overall drug consumption was related to age, gender or extraprofessional problems.

Conclusions This study illustrates the changing patterns of drug use in a population of workers during the last 20 years and underlines the importance of awareness raising campaigns on prescription patterns. Copyright © 2009 John Wiley & Sons, Ltd.

KEY WORDS—drug use patterns; workers; socio-professional category; cross-sectional survey

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INTRODUCTION

For several years, drug utilization studies have been identified as a major source of interest in pharmacoepidemiology.^{1,2} This kind of work enables the tracking of drug consumption in relation to the development and marketing of new agents, the influence of medical and non-medical factors. Thus, drugs are no longer just medical items, but are also consumer items in a market.^{3,4}

Many studies have underscored the high level of drug consumption in France.⁵ In a recent assessment of drug consumption in five European countries, France yet again came first.⁶ This study underlined the importance of taking into consideration the pharmaceutical class when estimating drug consumption. The growth domestic product (GDP) of a country is one of the ways of measuring drug consumption. In 2003, spending on pharmaceutical products represented 2.11% of the GDP in France versus 1.86% in Italy or 1.62% in Germany or 1.22% in the United Kingdom.⁶ In 1998, the National Drug Observatory in France underlined the high consumption of anti-infectious and anti-depressant drugs, which were particularly harmful when the prescription was inadequate.^{7,8} These data

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were confirmed by the European study indicating that France was the first country for anti-biotic consumption.⁹ Several programs were introduced in France to reduce drug consumption, such as the anti-infectious campaign in 2002.¹⁰

In developed countries during the last decade, production methods and working conditions with firms have been extensively modified.¹¹ Workers are exposed to the intensification of work and increased professional constraints.¹² Physical and psychological problems are increasing and stressful work is responsible for a growing number of work-related health problems. A study by the European Agency of Security and Work revealed that work-related strain could generate different sorts of health disorders such as muscular pain, migraine, tiredness or depression leading therefore to drug utilization.¹³ Moreover, medication could be used as a way of facing up to work difficulties.¹⁴ Few studies have investigated drug consumption in working people. The majority of published surveys have focused on psychoactive drug utilization in this population.^{14–19}

Every 10 years since 1986, we have performed a cross-sectional survey (called 'Drugs and Work'), which was repeated in a sample of workers from the Toulouse metropolitan area (Southwestern France).^{20,21} The present study was performed in order to evaluate the effects of the different programs developed in France to reduce drug consumption during the last 20 years (1986–2006). Moreover, we also investigated the role of non-medical factors (age, gender, extraprofessional problems, profession and hardness of work) in drug use.

METHODS

The 'Drugs and Work' survey questionnaire

In 2006, the cross-sectional survey was conducted from June to September 2006 in a sample of workers from the Toulouse metropolitan area. The study was performed by 25 (out of the 57) occupational practitioners from the Service Medical Interentreprises of Toulouse. As previously,^{20,21} we excluded illiterate and non-French workers to ensure that the questions were well understood. The workers were free to participate or not. We used the same protocol as in 1986²⁰ and 1996.²¹

Subjects recruited were the first 100 workers seen by the occupational practitioner during their annual medical visit (which is compulsory in France). They were asked to complete an anonymous questionnaire with the help of the medical secretary. As was previously done,^{20,21} the questionnaire included

several questions about socio-demographic and professional information. A visual analogue scale (between 0 and 10) evaluated the hardness of work. Workers with the hardest work were defined as scoring over 5 (corresponding to the median of the distribution). To evaluate extraprofessional problems, we asked the volunteers to report whether they had extraprofessional problems at the time of the survey or not. Two changes were made to the questionnaire in comparison with the two previous studies.^{20,21} The first is the classification of socio-professional category (white collars, blue collars, executives, technicians or supervisors). In the previous surveys,^{20,21} the subjects only reported on whether their work was manual or non-manual, which did not allow us to know their exact socio-professional category. Thus, in the 2006 questionnaire, we identified the socio-professional category using the official nomenclature.²² As in previous surveys, drug exposure was evaluated with the help of a self-administered questionnaire. First, we asked participants whether they had used at least one drug during the previous week. If the answer was positive, we asked about the name of the drugs, the reason for consumption and the regularity of drug use during the last month. The second improvement in the questionnaire was the possibility of identifying the pharmacological class with more precision from the name of the drugs using the anatomical, therapeutic and chemical (ATC) classification. As in previous studies, we excluded oral contraceptive pills from our analysis.

Statistical Analysis

Data were analysed using SAS[®] statistical software version 9.1. Firstly, we described and compared the characteristics and drug use obtained in the 2006 survey with those of the 1986 and 1996 surveys in univariate analysis. χ^2 test for categorical variables and Student's *t*-test for continuous variables, with a significance level of $p < 0.05$, were used to examine the bivariate association between the 2006 data and the previous data. Drug consumption was described according to socio-professional category and the main pharmacological classes reported in 2006. Secondly, multiple logistic regression models were applied to identify the evolution of patterns and associated factors over a 20-year period. We present odds ratio and their 95% confidence intervals (with a significance level equal to $p < 0.05$). Dependent variables were the main classes of drugs (digestive, cardiotropic, endocrine, anti-infectious, analgesic, pulmonary, musculoskeletal, psychotropic, hypnotic and anxiolytic). For each multivariate analysis, independent variables were years

of survey (1986, 1996 and 2006), age, gender, kind of profession (manual vs. non-manual), hardness of work (≥ 5 in the visual analogue scale) and extraprofessional problems (yes/no). In our study, manual workers were defined as 'blue collars' when comparing 2006 data with 1996 and 1986 results.

RESULTS

Sample characteristics

In the 2006 survey, 2213 subjects (53% of men) participated (1.7% refused to answer the questionnaire). Number of participants was similar for the three surveys and their sex ratio was comparable (Table 1). Socio-demographic characteristics were similar, except that the 2006 sample was older (39.3 ± 10.0 years). Prevalence of extraprofessional problems has decreased since 1986: 12.4% of subjects had extraprofessional problems in 2006 versus 16.4% in 1986. However, the mean value of hardness of work increased significantly during the last 10 years (4.9 ± 2.2 in 2006).

Drug utilization

The prevalence of drug users according to pharmacological classes for each survey is shown in Table 2. Among workers, the prevalence of overall drug consumption decreased during the last 10 years (40.7% in 2006 vs. 46.7% in 1996, $p < 0.001$). Prevalence of use of several classes of drugs was modified. During the last 20-year period, we observed a decrease in anti-infectious (1.4% in 2006 vs. 4.8% in 1986, $p < 0.001$), psychotropic (6.1 vs. 9.0%, $p < 0.001$) (mainly hypnotics: 1.8 vs. 4.4%, $p < 0.001$), endocrine (5.8 vs. 7.7%, $p < 0.05$) and digestive (3.6 vs. 5.3%, $p < 0.05$) drug consumption. In contrast, prevalence of use has increased since 1986 for musculoskeletal

Table 2. Prevalence of drug users according to anatomic therapeutic chemical (ATC) classification

Drugs	2006 [§]	1996 (10-year period)	1986 (20-year period)
Any drugs	40.7	46.7**	41.5
Digestive	3.6	3.8	5.3*
Cardiotropic	8.4	7.5	8.1
Endocrine	5.8	9.2**	7.7*
Anti-infectious	1.4	5.2**	4.8**
Musculoskeletal	5.9	3.6**	3.0**
Analgesic	9.6	15.1**	8.7
Psychotropic	6.1	6.2	9.0**
Anxiolytic	2.9	4.0*	3.6
Hypnotic/Sedative	1.8	1.8	4.4**
Pulmonary	5.9	4.4*	3.8*
Homeopathy	1.8	2.1	2.7*
Other	4.8	4.3	6.9*

[§]Reference category.

* $p < 0.05$.

** $p < 0.001$.

(5.9% in 2006 vs. 3.0% in 1986, $p < 0.001$) and pulmonary (5.9 vs. 3.8%, $p < 0.05$) drugs. For analgesic drugs, prevalence increased in 1996 and returned to 1986's values in 2006 (9.6%).

Table 3 described the prevalence of drug users according to socio-professional categories in the 2006 survey (executives, technicians or supervisors, white and blue collars). Blue collars used significantly less drugs than white collars (29.5 vs. 43.4%, $p < 0.001$) and particularly less cardiotropic ($p < 0.05$), endocrine ($p < 0.001$) or anxiolytic ($p < 0.05$) drugs. Like blue collars, executives used less endocrine ($p < 0.001$) or anxiolytic ($p < 0.05$) drugs than did white collars. Prevalence of drug consumption among technicians or supervisors was similar to that of white collars.

Main drugs used in 2006

The drugs reported at least 10-fold in the 2006 sample are shown in Table 4. First, we found paracetamol ($n = 130$, 5.8% of users) followed by levothyroxine sodium ($n = 115$, 5.2%) and ibuprofen ($n = 44$, 2.0%). 0.8% of the 2006 sample had used dextropropoxyphen in the previous month with 67% of regular consumers (data not shown). Among the different drug classes, benzodiazepines were very present with bromazepam in fourth position ($n = 29$, 1.3%) followed by tetra-zepam in 12th position ($n = 12$, 0.5%), prazepam and alprazolam in the 14th position ($n = 10$, 0.5%). Hypocholesterolemic drugs were also very present: i.e. atorvastatin (9th position, $n = 15$, 0.7%), pravastatin and fenofibrate (11th position, $n = 13$, 0.6%) and rosuvastatin (14th position, $n = 10$, 0.5%). In 2006, most of the drugs reported by workers were used for

Table 1. Characteristics of the 2006 sample versus 1986 and 1996 samples

	2006 [§]	1996 (10-year period)	1986 (20-year period)
Number of physicians	25	23	19
Number of subjects	2213	2681	2221
Men/Women (%)	53/47	54/46	54/46
Mean age (years)	39.3 ± 10.0	$37.1 \pm 9.8^*$	$35.7 \pm 10.3^*$
Hardness of work (score 1–10)	4.9 ± 2.2	$4.7 \pm 2.3^*$	4.8 ± 2.3
Extraprofessional problems (%)	12.4%	17.6%**	16.4%**

[§]Reference category.

* $p < 0.05$.

** $p < 0.001$.

Table 3. Prevalence of users according to socio-professional category in 2006

Drugs	Drug users in 2006			
	White collars [§] (%) n = 776	Executives (%) n = 594	Technicians/Supervisors (%) n = 492	Blue collars (%) n = 272
Any drugs	43.4	41.2	44.7	29.5**
Digestive	3.5	3.5	4.1	3.3
Cardiotropic	8.5	9.1	10.0	3.7*
Endocrine	9.8	2.9**	6.1	1.5**
Anti-infectious	1.6	1.2	1.4	1.1
Musculoskeletal	5.3	6.1	7.1	5.5
Analgesic	9.5	9.6	10.8	8.8
Psychotropic	8.4	4.7*	6.1	3.3*
Anxiolytic	4.1	2.2*	3.3	1.5*
Hypnotic/Sedative	1.8	1.9	1.4	1.8
Pulmonary	5.7	7.2	5.3	5.5
Homeopathy	1.6	2.2	1.6	0.7
Other	4.9	4.0	4.9	2.9

[§]Reference category.

* $p < 0.05$.

** $p < 0.001$.

Table 4. List of drugs most frequently reported in 2006

Name of drugs	Numbers reported n (% of users)	
	Drug use during the last week	Regular use during the last month
Paracetamol	130 [†] (5.8)*	47 [‡] (36.2) [§]
Levothyroxine sodium	115 (5.2)	98 (85.2)
Ibuprofen	44 (2.0)	18 (40.9)
Bromazepam	29 (1.3)	16 (55.2)
Acetylsalicylic acid	28 (1.3)	10 (35.7)
Desloratadine	28 (1.3)	21 (75.0)
Capillary stabilizing agents [#]	22 (1.0)	15 (68.2)
Ascorbic acid	18 (0.8)	7 (38.9)
Cetirizine	18 (0.8)	12 (66.7)
Dextropropoxyphenene combination, Valerian	17 (0.8)	11 (64.7)
Atorvastatin	15 (0.7)	14 (93.3)
Venlafaxine	14 (0.6)	13 (92.9)
Pravastatin	13 (0.6)	12 (92.3)
Fenofibrate	13 (0.6)	11 (84.6)
Ketoprofen,	12 (0.5)	6 (50.0)
Tetrazepam, Salbutamol	12 (0.5)	7 (58.3)
Propranolol	11 (0.5)	10 (90.9)
Prazepam	10 (0.5)	7 (70.0)
Alprazolam	10 (0.5)	10 (100.0)
Rosuvastatine	10 (0.5)	10 (100.0)

[†]130 means that among the 2213 workers included in the study, paracetamol was used 130-fold.

^{*}5.8 means that among the 2213 workers included in the study, 5.8% used paracetamol.

[‡]47 means that among 130 paracetamol reported, 47 was regularly used during the last month.

[§]36.2 means that among 130 paracetamol used, 36.2% were regularly used during the last month.

[#]Ginkgo biloba, flavonoids, rutoside combinations, troxerutin combinations, diosmin, grapes, hamamelis, viburnum, hydrastis, methesculetol, brow of India, broom.

anxiety disorders, pain, respiratory problems (like allergies or asthma) or hypercholesterolemia. Table 4 also described regular use of these drugs.

Evolution of drug utilization between 1986 and 2006

Results of the multivariate analysis are presented in Table 5. The results show a significant decrease in drug use during this 20-year period. Between 2006 and 1986, odds ratio for overall drug use was of 0.75 [0.65–0.87]. This decrease occurred from 1996 to 2006 [OR = 0.76 (0.67–0.87), $p < 0.001$]. Significantly associated variables were age, female gender and extra-professional problems. From 1986, we observed a significant decrease in anti-infectious [OR = 0.24 (0.15–0.37), $p < 0.001$], digestive [OR = 0.54 (0.39–0.74), $p < 0.001$], psychotropic [OR = 0.54 (0.41–0.70), $p < 0.001$], endocrine [OR = 0.57 (0.43–0.75), $p < 0.001$] and cardiotropic [OR = 0.68 (0.52–0.87), $p < 0.05$] drug use.

For digestive, cardiotropic and psychotropic drug use, the decrease occurred between 1986 and 1996 with no change in 2006. The decrease in endocrine and anti-infectious drug use was more recent. In contrast, we observed a significant increase in musculoskeletal drug use since 1996 [OR = 2.11 (1.56–2.84), $p < 0.001$]. For pulmonary and analgesic drug use, there was a significant increase between 1986 and 1996 with return to 1986's values in 2006.

Whatever the year, there was an association between overall drug use and age [OR = 1.45 (1.38–1.53), $p < 0.001$], female gender [OR = 1.96 (1.77–2.18), $p < 0.001$] and extraprofessional problems [OR = 2.30

Table 5. Risk estimation for drug use over 20 years (1986, 1996 and 2006) according to the different associated factors (Odds Ratio with their Confidence Interval [CI])

Factors	Any drugs	Digestive ^a	Cardiotoxic	Endocrine	Anti-infectious	Pulmonary	Musculoskeletal
2006 versus 1986	0.75** [0.65-0.87]	0.54** [0.39-0.74]	0.68* [0.52-0.87]	0.57** [0.43-0.75]	0.24** [0.15-0.37]	1.29 [0.95-1.74]	2.16** [1.52-3.08]
2006 versus 1996	0.76** [0.67-0.87]	0.89 [0.65-1.21]	0.95 [0.76-1.20]	0.52** [0.41-0.66]	0.26** [0.17-0.40]	1.45* [1.11-1.90]	2.11** [1.56-2.84]
1996 versus 1986	0.99 [0.87-1.12]	0.61** [0.45-0.81]	0.71* [0.56-0.90]	1.10 [0.87-1.38]	0.91 [0.70-1.19]	0.89 [0.66-1.19]	1.03 [0.73-1.45]
Age	1.45** [1.38-1.53]	1.22* [1.08-1.38]	2.68** [2.42-2.96]	2.03** [1.84-2.24]	0.86* [0.76-0.98]	0.95 [0.84-1.06]	1.40** [1.24-1.58]
Gender (women vs. men)	1.96** [1.77-2.18]	1.42* [1.11-1.82]	1.49** [1.24-1.80]	4.58** [3.67-5.72]	1.17 [0.91-1.51]	0.73* [0.58-0.91]	1.36* [1.05-1.74]
Profession (manual vs. non-manual)	1.00 [0.89-1.13]	0.85 [0.64-1.13]	0.94 [0.75-1.17]	1.06 [0.85-1.33]	1.23 [0.95-1.61]	0.94 [0.72-1.23]	1.57* [1.17-2.10]
Hardness of work (≥ 5)	1.11 [1.00-1.23]	1.25 [0.97-1.62]	1.05 [0.86-1.27]	0.94 [0.77-1.15]	0.97 [0.75-1.25]	1.12 [0.89-1.42]	1.48* [1.12-1.95]
Extraprofessional problems	2.30** [1.99-2.66]	1.21 [0.89-1.65]	1.46* [1.17-1.84]	1.30* [1.03-1.63]	1.32 [0.96-1.81]	1.35* [1.01-1.80]	1.61* [1.20-2.16]
Factors	Analgasic ^b		Psychotropic		Hypnotic ^c		Anxiolytic ^d
2006 versus 1986	1.12 [0.89-1.41]		0.54** [0.41-0.70]		0.35** [0.22-0.55]		0.85 [0.58-1.27]
2006 versus 1996	0.64** [0.53-0.78]		1.03 [0.80-1.33]		1.27 [0.78-2.04]		0.71 [0.51-1.00]
1996 versus 1986	1.75** [1.43-2.13]		0.54** [0.41-0.70]		0.28** [0.19-0.41]		1.20 [0.85-1.69]
Age	0.94 [0.87-1.02]		1.43** [1.29-1.58]		1.19* [1.00-1.40]		1.69** [1.47-1.94]
Gender (women vs. men)	1.22* [1.04-1.43]		2.59** [2.09-3.20]		1.58 [1.11-2.24]		2.54** [1.88-3.42]
Profession (manual vs. non-manual)	1.32* [1.11-1.57]		0.88 [0.70-1.12]		1.04 [0.72-1.51]		0.79 [0.57-1.09]
Hardness of work (≥ 5)	1.14 [0.97-1.34]		1.36** [1.10-1.69]		1.65* [1.12-2.42]		1.61** [1.18-2.18]
Extraprofessional problems	1.14 [0.93-1.40]		4.61** [3.76-5.66]		4.22** [3.00-5.95]		3.09** [2.32-4.11]

* $p < 0.05$.** $p < 0.001$.^aExcept vitamins and mineral supplements.^bAdjusted on musculoskeletal drugs.^cAdjusted on anxiolytic drugs.^dAdjusted on hypnotic drugs.

(1.99–2.66), $p < 0.01$] but not between profession (manual vs. non-manual) nor hardness of work. Similar associations were found for cardiotropic and endocrine drugs. Hardness of work was associated with musculoskeletal [OR = 1.61 (1.20–2.16), $p < 0.05$] and psychotropic [OR = 1.36 (1.10–1.69), $p < 0.001$] drug use.

DISCUSSION

The aim of this study was to describe changing patterns of drug consumption in a population of healthy workers during the last 20 years in France. From these results, we wished to illustrate the effect of various measures taken to reduce drug consumption in France and evaluated the role of non-medical factors (age, gender, extraprofessional problems, profession and hardness of work) in drug use. France is still one of the European countries with a high level of drug use.^{5,6,23} Prevalence of overall drug consumption decreased during the last 10 years mainly for anti-infectious, endocrine and analgesic drugs. In contrast, we observed an increase in musculoskeletal and pulmonary drug use with no change in psychotropic, digestive and cardiotropic drugs since 1996. Our results need to be commented.

Firstly, prevalence of overall drug consumption (contraceptive pills excluded) among workers was 40.7% in 2006. We found significant modifications in drug consumption during the last 10 years with a decrease in drug consumption between 1996 and 2006. There is little data about drug consumption in the French general population.^{1,6} A recent report found a decrease in the percentage of spending on pharmaceutical products in the GDP between 2003 and 2005 (2.11% in 2003 vs. 1.8% in 2005).²³ Nevertheless, France remains in first position for drug consumption⁶ but the gap with other European countries has decreased since 2003. In France, 'medicamentation' seems to be more widespread in comparison with neighbouring countries⁴: 90% of consultations with general practitioners end with a drug prescription versus 72% in Germany and only 43% in the Netherlands.²⁴ So, the high level of drug consumption in the general population is also to be found in working subjects. In a survey conducted 10 years ago in the United States (Slone Survey), Kaufman *et al.* reported a 50% past-week prevalence of prescription drugs.²⁵ Moreover, according to literature,^{20,21,25–28} we detected gender difference in drug use in our survey with more frequent use among women (50.5%) versus men (32.6%). We also observed a high risk of consumption in women for nearly all drugs (except for pulmonary drugs more often used by men).

Secondly, blue collars were the lowest drug users in our study. This finding was unexpected since we presupposed that manual workers used more drugs than non-manual ones. In fact, in the 1986 and 1996 surveys, we found no significant difference in overall drug consumption according to the kind of work, but we observed differences for some classes of drugs. In 2006, blue collars and executives used less psychotropic drugs than did white collars. We hypothesize that this unexpected result could be explained by an increase in psychotropic drug consumption by white collars. In fact, some studies have underlined the effect of work organization on mental health in a white collar population.^{11,15,17,18}

Thirdly, we found that extraprofessional problems (i.e. personal, familial, or other difficulties outside work) play a more important role in drug consumption than hardness of work (only positively related to musculoskeletal and psychotropic drugs). The presence of extraprofessional problems was associated with the consumption of overall drugs (except for digestive, anti-infectious and analgesic ones).

Fourthly, this study also made it possible to discuss the drugs most frequently used by workers. The four most frequently used drugs were paracetamol, levothyroxine, ibuprofen and bromazepam. In a study performed in 2002,²⁵ Kaufman *et al.* found that the drugs most often used in the United States were paracetamol followed by ibuprofen, aspirin and levothyroxine. These two lists differ according to the use of bromazepam, a benzodiazepine drug. It is also interesting to discuss this list according to the different pharmacotherapeutic classes of drugs. The most frequently listed classes were benzodiazepines with four drugs (bromazepam, tetrazepam, prazepam and alprazolam), hypocholesterolemic drugs (with three statins: atorvastatin, pravastatin, rosuvastatin and one fibrate: fenofibrate) and analgesics (with paracetamol, acetylsalicylic acid and dextropropoxyphene being all in the top 10). Two anti-allergic (anti-H1) drugs were also found (desloratadine, cetirizine) with two non-steroidal anti-inflammatory drugs (ibuprofen, ketoprofen) and only one anti-depressant (venlafaxine). Valerian was found in the 10th position, thus underlying the growth of herbal drug use by workers.²⁹

Finally, the most interesting results concern the evolution of drug use during the last 20 years in France and the impact of national programs on prescription patterns. In our study, we observed an increase in musculoskeletal drug consumption since 1996. Musculoskeletal disorders are the main reason for sick leave in developed countries. In 2002, one musculoskeletal disorder was diagnosed in France

among 13% of workers. Roquelaure *et al.* observed an increase in musculoskeletal disorders of around 20% every year since 1992.³⁰ Gillen *et al.* underlined that the risk for developing musculoskeletal disorders was more frequently associated with exposure to psychosocial factors or physically strenuous jobs rather than with socio-economic factors.³¹ At the same time, we observed a big decrease in analgesic consumption since 1996. This finding suggests replacement of analgesics by non-steroidal anti-inflammatory drugs (i.e. ibuprofen, acetylsalicylic acid, ketoprofen) for muscular diseases and pain. Indeed, pain is a current problem among workers: 29% of women and 24% of men suffered from chronic pain.³² Moreover, prevalence of anti-infectious consumption has significantly decreased only over the last 10 years. This decrease is the result of the sensitization campaign on anti-infectious resistance which was conducted in France in 2002. After an evaluation study performed in 1998, the French Medicine Agency has taken different measures to reduce anti-infectious prescription by general practitioners.⁷ Indeed, anti-infectious consumption is responsible for the emergence of bacterial resistance. France was the country with the highest anti-infectious prescription rate in Europe.⁹ The campaign has changed general practitioners' attitudes as well as patients' demands. In 2004, Grandfils *et al.*³³ showed a decrease in anti-infectious prescriptions in ambulatory care in France: 18% of general practitioners consultations ended in an anti-infectious prescription in 2002/2003 versus 27% in 1996/1998. The authors underlined changes in anti-infectious class use. Macrolides and quinolones seemed to increase in contrast with penicillins.^{33,34} In our study, amoxicillin remained the main anti-infectious drug reported by workers (data not shown). Psychotropic drug use was markedly modified during our 20-year survey: these drugs were most used in 1986. Their use decreased in the 1996 survey and the 2006 study revealed a stabilized rate. This finding is interesting due to the high level of psychotropic use in France.^{5,6,35,36} A limitation in our study was the absence of evaluation of anti-depressant drugs in 1986. So, we have been unable to evaluate their evolution for 20 years. A recent study underlined an increase in anti-depressant drug consumption that seems due to the emergence of new pharmacological specialties as replacement of some anxiolytics or hypnotics.³⁷ Despite stabilization in psychotropic drug consumption, benzodiazepines were the drugs most often reported by workers. Pelfrene *et al.* underlined an association between benzodiazepines use and psychosocial work characteristics such as high strain jobs.¹⁶

This study suffers from some mandatory methodological limitations. Results of our study cannot be generalized to the whole of French workers because, in our sample, we had more executives and less blue-collar workers compared with the distribution of socio-professional categories from the National Institute of Statistics and Economic Studies. Our survey relied on self-administered questionnaire, so information on drug consumption was based on recall of drug use in the previous week. We suspected a recall bias that could lead to underestimation of the prevalence of drug use. Moreover, the 'healthy worker effect' might be responsible for a selection bias that could also lead to underestimation of the prevalence because subjects with major health problems are not at work. In the three surveys, we used the same method for collecting data. The periods of data collection were similar (spring or early summer). Nevertheless, in contrast to previous studies on drug consumption in elderly population or patients,^{38–45} our work investigated drug use in a working population: subjects are relatively young and healthy enough to work. In addition, unlike the majority of studies among workers that focused on psychoactive drugs use,^{15,16,18,47,46} we were interested in all drugs. Besides, we included the socio-professional category in our drug use description.

CONCLUSION

In conclusion, this study illustrates modification of drug use patterns in a population of workers during the last 20 years. Use of some drugs (mainly anti-

KEYPOINTS

- France is known to have a relatively high prescription rate for medicines.
- The study was undertaken in order to evaluate the impact of the different programs developed in France to reduce drug consumption during the last 20 years (1986–2006).
- In 2006, prevalence of drug consumption among workers was 40.7%, versus 41.5% in 1986 and 46.7% in 1996.
- Since 1986, patterns of drug consumption have been modified with a decrease in anti-infectious, digestive, psychotropic, endocrine, cardiotropic drug use and a significant increase in musculoskeletal drug use.
- Blue collar workers used fewer drugs than white collar workers.
- Whatever the year, drug use was associated with age, female gender and extraprofessional problems.

infectious and psychotropic drugs) decreased potentially due to guidelines about more rational use. These results also underline the importance of some non-medical factors (presence of extraprofessional problems and, to a lesser extent, for some classes of drugs, hardness and kind of work) in drug use.

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