Is hospital care involved in inequalities in coronary heart disease mortality? Results from the French WHO-MONICA Project in men aged 30-64

Thierry Lang, Pierre Ducimetière, Dominique Arveiler, Philippe Amouyel, Jean Ferrières, Jean Bernard Ruidavets, Michèle Montaye, Bernadette Haas, Annie Bingham

Abstract

Objectives—The goal of the study was to assess whether possible disparities in coronary heart disease (CHD) management between occupational categories (OC) in men might be observed and contribute to the increasing inequalities in CHD morbidity and mortality reported in France.

Methods—The data from the three registers of the French MONICA Collaborative Centres (MCC-Lille, MCC-Strasbourg, and MCC-Toulouse) were analysed during two periods: 1985-87 and 1989-91. Acute myocardial infarctions and coronary deaths concerning men, aged 30-64 years, were included. Non-professionally active and retired men were excluded. Results were adjusted for age and MCC, using a logistic regression analysis.

Results—605 and 695 events were analysed for 1985-87 and 1989-91, respectively. Out of hospital cardiac arrests, with or without cardiac resuscitation, and 28 day case fatality rates were lower among upper executives in both periods. A coronary angiography before the acute event had been performed more frequently in men of this category and the proportion of events that could be hospitalised was higher among them. In both periods, the management of acute myocardial infarctions in hospital and prescriptions on discharge were similar among occupational categories.

Conclusions—For patients who could be admitted to hospital, the management was found to be similar among OCs, as was the 28 day case fatality rate among the hospitalised patients. In contrast, lower prognosis and higher probability of being hospitalised after the event among some categories suggest that pre-hospital care and the patient's conditions before the event are the primary factors involved.

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Increasing disparities in coronary heart disease (CHD) mortality and morbidity have been observed between socioeconomic categories for the past 20 years in several industrialised countries.¹⁻³ Understanding the reasons for these trends is required to tackle this public health problem. Many contributing factors have been identified or suspected. The role of the general social and economic evolution of

societies, facing unemployment and job instability, the growing importance of private sphere compared with public domain especially in Eastern countries, have been emphasised.⁴ The role of classic cardiovascular risk factors (hypertension, cigarette smoking, cholesterol) has been evaluated and has been found to account only partially for the disparities observed.⁵ In France, hypertension control and tobacco smoking, unlike cholesterol and HDL-cholesterol concentrations, were shown to account, at least partly, for the social disparities in coronary events distribution between categories.⁵ It should be emphasised that these disparities concern incidence as well as case fatality rates.⁵ As the efficacy of coronary care has improved dramatically during the past 10 years, some variations related to care might be involved. Strong differences in health care utilisation have been observed between occupational categories (OCs) in France despite a wide system of health insurance coverage, the "Sécurité Sociale".⁶⁻⁸ Persons from lower classes tend to underuse preventive care as well as specialised health care services. They consult more often general practitioners than specialists.^{6,7} Increasing copayment by the patients in the past 10 years in France⁸ might have reinforced the cultural and educational factors at the origin of these different behaviours. Finally, even within the health care structure, socioeconomic variations in health delivery or quality of care have been reported.^{9,10}

Data on routine medical care delivered for acute myocardial infarction (AMI) episodes have been collected since 1985 in three French medical regions, within the framework of the MONICA Project.¹¹ These data, standardised and prospectively collected, provide a good insight into both use and delivery of coronary care.

Using these data, the goal of our study was thus to assess whether possible disparities in CHD management between OCs might be observed and contribute to the increasing inequalities in CHD morbidity and mortality reported in the French active population.

Methods

REGISTERS

Three MCCs have participated in the WHO MONICA Project in France: MCC-Lille (LIL), MCC-Strasbourg (STR), and MCC-Toulouse (TOU). The geographical areas are respectively the Urban Community of Lille

INSERM U258,
Hôpital Broussais, 96
rue Didot, 75014 Paris,
France

T Lang
P Ducimetière
A Bingham

Lille
MONICA-Collaborating
Centre, France
P Amouyel
M Montaye

Strasbourg
MONICA-Collaborating
Centre, France
D Arveiler
B Haas

Toulouse
MONICA-Collaborating
Centre, France
J Ferrières
J B Ruidavets

Correspondence to:
Dr T Lang.

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Table 1 Characteristics of the patients, clinical and non-clinical findings at the first examination and prognosis in the two periods

	1985–87	1989–91	<i>p</i> Value
Number	605	695	
Age (y)	51.4 (8.3)	50.1 (8.3)	<0.001
Smokers (%)	66.9	62.3	NS
First measurement after the event			
Systolic blood pressure (mm Hg)	136.2 (33.3)	138.8 (33.2)	<0.001
Heart rate (beat/min)	88.4 (20.6)	90.9 (21.1)	<0.001
Creatinine phosphokinase (UI)	945 (986)	943 (948)	NS
ALAT	446 (452)	548 (725)	<0.001
Electrocardiographic finding			
Q wave (%)	40.9	39.2	NS
changes in anterior leads (%)	37.3	45.1	<0.01
Cardiac arrest			
before admission (%)	19.9	20.4	NS
within the hospital (%)	12.8	10.1	NS
Death at 28 days (%)	27.6	25.7	NS
Cases admitted to hospital			
Number (%)	506 (83.6)	580 (83.4)	NS
Admitted to intensive care unit (ICU) (%)	92.8	94.6	NS
Total length of stay in hospital	14.8 (8.9)	14.4 (9.3)	<0.05
Length of stay in ICU	6.7 (4.6)	6.2 (5.3)	<0.001
Death at 28 days (%)	13.9	10.5	NS

Data shown as mean (SD) and percentages.

(LIL) and two French districts: Bas-Rhin (STR), Haute-Garonne (TOU), of about one million inhabitants each. The MCCs collect data on mortality and incidence of myocardial infarction and on medical care within 28 days after the onset of the acute event. This data collection concerns the subjects living in the geographical area and in the 25–64 years age range. The details of the protocol have been published elsewhere.¹¹ Briefly, all efforts are made to recruit the events through a systematic screening of private and public hospitals as well as death certificates, including sudden death certificates. All the suspected events are reviewed by trained staff. Data are collected from the medical record. When it is unavailable, interviews are performed and information is collected during hospitalisation. An event is included as a new event if its apparent onset took place more than 28 days after any previous coronary event. Record linkage was used during this 28 day period to avoid duplication. Cardiac arrests were recorded and a distinction was made between pre-hospital and within hospital cardiac arrests. Technical definitions from the MONICA manual have been published in detail.¹¹ Diagnostic criteria included symptoms, history of previous AMI or CHD, electrocardiograms, enzyme activities, and necropsy findings. Coronary events were designated as fatal and non-fatal according to the date of death, before or after midnight between the 27th and the 28th day after the first event. Two different case fatality rates were analysed: (1) 28th day case fatality rate among all events and (2) 28th day case fatality rate in the sub-population of events who did not die before hospital admission and could be admitted to hospital. External quality control was performed by the WHO Reference Centre in Dundee (Professor Tunstall Pedoe) and the MONICA Data Center in Helsinki.¹¹ In addition, strict standardisation and quality assurance were monitored locally and between the three French centres.

The data from the registers were analysed during two periods: 1985–87 and 1989–91. No data had been recorded on medical care in

1988. MONICA events classified as category 1 (definite AMI) and deaths in category 2 (coronary death) were used for this analysis. The proportion of these two categories did not differ between OCS. All events concerning men, aged 30–64 years, were included. Non-professionally active and retired men were excluded. Given the small size of this group, farmers were not included in the analysis.

CLASSIFICATION OF OCCUPATIONAL CATEGORIES

Socioeconomic categories were coded in each region according to the INSEE (French National Statistical Institute) classification.¹² Information was collected from the medical record, from administrative files or near the relatives of the patient. Five categories were used in this analysis: craftsmen, upper executives, middle executives, employees, and workers. The INSEE classification, widely used for research and administrative purposes, has been in existence since the 19th century in France. The notions of trade associations, the distinction between public and private sectors and, recently, the hierarchy among wage earners have been progressively added to build this present measurement of social class. The categories have thus been built along three axes: occupation, income, and education. This classification has been described in detail previously.² Employees and workers have roughly the same income. Employees are defined negatively as working neither in the industrial, nor in the agricultural or craft sector and are mostly—but not exclusively—non-manual workers. The income increases progressively from middle executives, farmers and craft persons to upper executives. The educational level of employees, which is higher than that of workers, has increased less than that of the general population in the past 30 years.²

CORONARY CARE

Information was collected on medical treatments in the 28 days preceding the onset of the event. Procedures such as coronary angioplasty, coronary angiography, and bypass surgery were registered if they had been performed at any time before the event. Drugs and procedures are those prescribed or performed during the hospital stay, at any time after admission, in the subgroup of patients who were hospitalised. The medications on discharge concern the medications or procedures prescribed on the day of discharge. Information on survival was systematically surveyed 28 days after the acute event.

STATISTICAL ANALYSIS

The analysis was performed among all cases as far as prognosis, admission to hospital, medical treatments and procedures before the events were concerned. Medical management during the event was analysed only in the subgroup of patients who have been hospitalised. Qualitative variables were compared between groups, using the χ^2 test. The length of hospital stay was compared after a logarithmic transformation. To test the hypothesis that OC was related to the performance of a specific procedure, two

Table 2 Procedures and drug treatment before, during, and after the event in 1985–87 and 1989–91

Procedures and drug treatments	1985–87			1989–91		
	Before the event	During hospitalisation	On discharge	Before the event†	During hospitalisation†	On discharge†
Inotropic agents	3.3	21.4	3.5	1.7	17.1***	2.1
Nitrates	19.9	92.6	71.4	17.3	52.3***	68.9
Diuretics	10.1	25.5	12.1	8.4	26.6	10.1
Antiarrhythmic agents	3.7	50.1	14.4	3.4	49.5	8.0**
Anticoagulants	6.0	91.4	46.0	5.6	93.2	39.2*
Antiplatelet agents	7.3	26.9	34.0	3.6**	31.1	29.1
Aspirin	—	—	—	—	83.9	76.1
β blockers	16.2	47.5	43.5	17.0	69.2***	64.1***
Calcium channel blockers	13.9	70.1	66.0	15.7	44.1***	31.1***
ACE inhibitors	—	—	—	9.2	24.5	20.4
Hypolipidaemic agents	—	—	—	12.3	12.9	14.6
Fibrinolytic agents	—	25.7	—	—	47.7***	—
Coronary angiography	13.1	57.6	21.9	17.1‡	77.9***	10.3***
angioplasty	1.8	11.3	1.9	4.6**	33.3***	3.9
Bypass surgery	2.7	5.6	7.6	3.5	4.8	5.8
Formal rehabilitation	—	—	32.0	—	—	45.6***

†Statistical significance of the differences between the two periods: ‡p<0.1; **p<0.01; ***p<0.001.

logistic models were compared: one included age, MCC, and period; the second one included age—in three age groups—, MCC, period, and four dummy variables for the five OCs. The likelihood of these two models were then compared.¹³ If the model with OCs was significantly different from the other one, the relative risks of receiving a drug or undergoing a procedure in a given OC was then estimated by odds ratios (ORs). Middle executives were used as the reference group for the four other OCs. Statistical analysis was performed with the SAS statistical package.¹⁴

Results

ACUTE MYOCARDIAL INFARCTION AND CORONARY CARE IN THE WHOLE POPULATION IN 1984–87 AND 1989–91

Six hundred and five events in 1984–87 and 695 events in 1989–91 were analysed (table 1). In the second period, patients tended to be younger and a higher percentage of events with changes in the anterior leads was observed on

the ECG. Among all events, a cardiac arrest occurred for one event out of five. A cardiac arrest was recorded in 80.1% of the fatal events. These percentages remained stable from one period to the other. The case fatality rate was also similar in the two periods. Death occurred at 28 days for one event out of four.

The delay between symptoms and first care was not reduced significantly (mean (SD) 4.5 (10.6) hours in 1985–87 compared with 3.6 (8.9) hours in 1989–91, NS). An increased utilisation of emergency care mobile units was observed (25.1% in 1985–87 compared with 37.2% in 1989–91, p<0.001). However, the percentage of patients admitted to hospital or to the intensive care unit was stable between the two periods. The total length of hospital stay decreased slightly, whereas the length of stay in ICU decreased significantly (table 1). Death occurred at 28 days for one of 10 events who could be admitted to hospital. Within the hospital a cardiac arrest was recorded for one of 10 events.

Table 3 Prognosis, procedures, and treatments according to occupational categories

	Craftsmen (n=95) %(95%CI)	Upper executives (n=127) %(95%CI)	Middle executives (n=212) %(95%CI)	Employees (n=161) %(95%CI)	Workers (n=412) %(95%CI)	p Value
Cardiac arrest before admission	23 (8)	12 (6)	25 (5)	21 (6)	23 (4)	0.04
Alive at day 28	68 (9)	84 (6)	69 (6)	71 (7)	69 (4)	0.01
Hospitalised	82 (7)	90 (5)	79 (5)	83 (5)	80 (4)	0.08
Procedure during hospital stay						
Inotropic agents	33 (9)	16 (6)	25 (6)	22 (6)	25 (4)	0.08
Nitrates	89 (6)	94 (4)	83 (5)	89 (5)	88 (3)	0.07
Diuretics	32 (9)	22 (7)	16 (5)	22 (6)	28 (4)	0.005
Antiarrhythmic agents	52 (10)	52 (9)	43 (7)	44 (8)	46 (5)	0.4
Anticoagulants	87 (7)	88 (6)	80 (5)	87 (5)	85 (3)	0.23
Antiplatelet agents	38 (10)	37 (8)	27 (6)	26 (6)	26 (4)	0.03
Aspirin*	80 (12)	79 (10)	74 (8)	77 (9)	74 (5)	0.15
β blockers	45 (10)	61 (8)	50 (7)	54 (8)	57 (5)	0.08
Calcium channel blockers	44 (10)	61 (8)	53 (7)	48 (8)	51 (5)	0.13
ACE inhibitors*	22 (12)	14 (9)	22 (8)	26 (9)	22 (5)	0.51
Fibrinolytic agents	30 (9)	36 (8)	34 (6)	32 (7)	32 (5)	0.91
Coronary angiography	58 (10)	68 (8)	64 (6)	61 (8)	62 (5)	0.51
angioplasty	25 (9)	27 (8)	18 (5)	24 (6)	19 (4)	0.19
Bypass surgery	4 (4)	9 (5)	4 (3)	3 (3)	4 (2)	0.1
Prescriptions on discharge	(n=73)	(n=111)	(n=170)	(n=132)	(n=333)	
Nitrates	64 (11)	71 (8)	68 (7)	68 (8)	68 (5)	0.12
Antiplatelet agents	45 (11)	37 (9)	33 (7)	33 (8)	30 (5)	0.88
β blockers	56 (11)	59 (9)	52 (8)	57 (8)	56 (5)	0.32
ACE inhibitors*	15 (11)	15 (9)	15 (8)	20 (9)	24 (6)	0.32
Formal rehabilitation	39 (11)	40 (9)	44 (7)	43 (8)	45 (5)	0.81

*Period 1989–91 only.

Table 4 Procedures performed before the acute event according to occupational categories

	Occupational category					p Value
	Craftsmen (n=108) %(95%CI)	Upper executives (n=133) %(95%CI)	Middle executives (n=244) %(95%CI)	Employees (n=186) %(95%CI)	Workers (n=481) %(95%CI)	
Coronary						
angiography	18 (7)	24 (7)	15 (4)	15 (5)	11 (3)	0.01
angioplasty	3 (3)	7 (4)	0 (1)	3 (2)	3 (2)	0.01
Bypass surgery	5 (4)	6 (4)	2 (2)	4 (3)	2 (1)	0.07

Table 2 shows the treatments and procedures that have been analysed. Among medical treatments, fibrinolytic agents, and β blockers during the hospital stay and on discharge were used increasingly from the first to the second period. Calcium channel blockers, in contrast, were less used in 1989–91 than in 1985–87. Among procedures, the use of angiography during the hospital stay increased from 1985–87 to 1989–91 and its use after discharge from the hospital decreased. Angioplasty was increasingly performed before the event and during hospitalisation. In contrast, bypass surgery frequency did not show any major change with time (table 2).

CHARACTERISTICS AND MANAGEMENT OF AMI ACCORDING TO OCCUPATIONAL CATEGORIES

Adverse events and prognosis of AMI

Out of hospital cardiac arrests, with or without cardiac resuscitation, were lower among upper executives in both periods (12.7 and 11.5% compared with 22.8 and 23.9% respectively in the whole active population. The OR adjusted for age, MCC, and period was 0.40 ($p<0.01$) for upper executives (tables 3 and 4). During both periods, the 28 day case fatality rate was lower among upper executives in both periods (19.4 and 12.3% compared with 31.0 and 30.1% respectively in other categories of the population (adjusted OR: 0.39, $p<0.001$) (tables 3 and 5).

Medical treatment and procedures before the acute event

Although previous angina, AMI or acute coronary event were not reported more frequently in any OC (18%), a coronary angiography had been performed more often among upper executives (18.0% in 1985–87 and 30.2% in 1989–91; OR: 1.81, $p<0.05$), compared with 12.1 and 14.9% respectively in other OCs. The same was true for angioplasty (6.6% and 7.9%. OR: 15.9, $p<0.01$), com-

KEY POINTS

- After an acute coronary event, 28 day survival rates were higher among upper executives, because of a higher probability of surviving during the pre-hospital phase, and a lower frequency of cardiac arrests during this phase.
- Among the sub-population of patients who survived the pre-hospital phase after an acute coronary event and thus could be admitted to hospital, 28 day survival rates, hospital management of the event, drug prescription, and procedures did not differ between occupational categories (OCs).
- In contrast, a higher frequency of coronary angiography and angioplasty before the acute coronary event suggests that ambulatory management of patients was different, more procedures being performed among upper OCs.
- More attention and more data are needed concerning the ambulatory management of coronary diseases and the pre-hospital phase to reduce inequalities in coronary mortality between OCs.

pared with 0.9 and 3.7% in other OCs (tables 4 and 5). The results obtained after exclusion of events with a previous AMI were similar (data not shown).

The use of other antihypertensive agents, the association between diuretics and inotropic drugs, β blockers, calcium channel inhibitors or nitrate agents did not differ between OCs. Before the event, a diuretic treatment had been prescribed more often in two categories, the employees (11.4% in 1985–87 and 10.0% in 1989–91; OR: 3.41, $p<0.01$), and workers (12.6% and 9.4% respectively; OR: 3.03, $p<0.01$), compared with 6.7 and 5.4% respectively in other OCs.

Access to acute care, hospitalisation and severity of AMI

The delays between symptoms and first care or hospitalisation, the percentage of cases for which the emergency care mobile teams was called, did not differ between OCs. Among all events, 83.7% were hospitalised in 1985–87 and 83.4% in 1989–91. The proportion of events that could not be hospitalised was lower among upper executives (13.4% in 1985–89

Table 5 Prognosis, procedures, and treatments according to occupational categories. Odds ratio from a logistic regression analysis, adjusted for age, period, and region

Procedure†	Occupational category odds ratio (95% CI)				
	Craftsmen	Upper executives	Middle executives	Employees	Workers
28 days survival rate	1.03 (0.62, 1.69)	2.53*** (1.46, 4.38)	1	1.13 (0.74, 1.73)	1.01 (0.72, 1.42)
Diuretic treatment before the event	2.43 (0.90, 6.57)	2.32 (0.88, 6.14)	1	3.41** (1.43, 8.10)	3.03** (1.40, 6.57)
Cardiac arrest before hospitalisation	0.85 (0.48, 1.49)	0.40** (0.22, 0.75)	1	0.75 (0.47, 1.20)	0.9 (0.62, 1.31)
Coronarography before the event	1.14 (0.60, 2.15)	1.81* (1.03, 3.18)	1	1.02 (0.58, 1.79)	0.7 (0.44, 1.13)
Angioplasty before the event	5.84 (0.59, 57.44)	15.9** (1.97, 128.26)	1	7.51 (0.89, 63.38)	6.81 (0.88, 52.75)
Being hospitalised	1.35 (0.74, 2.44)	2.5** (1.29, 4.82)	1	1.36 (0.83, 2.23)	1.06 (0.72, 1.57)
Diuretic treatment within hospital	2.18** (1.21, 3.93)	1.38 (0.78, 2.45)	1	1.52 (0.89, 2.59)	1.91** (1.24, 2.95)

†Procedures were included if the model including occupational categories was significantly different from that not including them. The following variables were analysed: cardiac arrest before admission; alive at day 28; hospitalised; procedures during hospital stay: inotropic agents, nitrates, diuretics, antiarrhythmic agents, anti-coagulants, antiplatelet agents, aspirin, β blockers, calcium channel blockers, ACE inhibitors, and fibrinolytic agents; coronary angiography and angioplasty, bypass surgery before the acute event and during hospital stay. * $p<0.05$; ** $p<0.01$.

and 6.2% in 1989–91; OR: 0.40, $p < 0.01$), compared with 38.3 and 20.0% in other OCs (tables 3 and 5).

The variables that were available to assess the initial severity did not differ between OCs. The percentages of changes in the anterior leads, the presence of a Q wave on the ECG, the level of enzymes, initial heart rate or blood pressure levels did not differ significantly between OCs.

Management of AMI during hospitalisation

In both periods, the total duration of hospital stay, and the duration in intensive care did not differ between OCs. Performing coronary angiography, angioplasty or coronary bypass surgery was independent of OC. β Blockers, antiplatelet agents, and thrombolytic therapy were used with the same frequency, whatever the OC (tables 3 and 5). Among patients who were admitted to hospital, the 28 day survival did not differ between OCs.

Prescriptions on discharge

In both periods, anticoagulants, β blockers, calcium inhibitors, antiarrhythmic treatments, antiplatelet agents, and formal rehabilitation were used with the same frequency in all OCs (tables 3 and 5).

Discussion

As a whole, the hospital management of acute coronary events was not found to be different between OCs during both periods. The performance of major invasive procedures (angiography, angioplasty) and the use of treatments that proved to be effective in recent years, such as β blockers, thrombolytic therapy, antiplatelet agents¹⁵ were not related to OC. Similarly, the percentage of patients admitted to intensive care units, their duration of stay and prescriptions on discharge were similar among OCs. For patients admitted to hospital, no variation in the case fatality rate was found according to OCs.

In contrast, some differences between OCs were observed concerning the pre-hospital phase. A lower case fatality rate, a lower rate of cardiac arrests, and a lower proportion of events that could not be hospitalised was found in the category of upper executives. One could hypothesise that the time between first symptoms and access to care might depend on OCs. However, the delays between appearance of symptoms and hospital admission as well as the frequency of call of mobile emergency care unit did not vary between OCs. Behaviours do not seem to vary much between OCs in regard to seeking emergency care. The lack of relation between OC and delay in seeking care after symptoms is not surprising in view of previous reports. Education has been reported to neither increase nor decrease delay time.¹⁶ In contrast, low socioeconomic status has been shown to increase delay time, in countries where health insurance coverage is low among disadvantaged groups.¹⁶

The importance of resuscitation before admission is suggested in our study, as the proportion of events that could be hospitalised

might theoretically be improved for all OCs to that reached for upper executives. This aspect has been observed in other countries. For example, in New Zealand, 16% of the avoided deaths between 1974 and 1981 were attributed to cardiac resuscitation.¹⁷

The differences concerning the case fatality rate and the use of treatments and investigations might be related to the severity of events or the extent of the atherosclerotic disease. Unfortunately, few data were available to assess the initial severity of events. The percentage of patients under diuretic treatment before the acute event might be related to a higher frequency of cardiac failure, but also to a higher prevalence of treated arterial hypertension. A high percentage in the use of diuretics during the hospital stay suggests a higher severity among craftsmen. A higher severity of events or arterial disease, or both, among some OCs with high fatality rate might thus be one aspect of the findings. If this was true, these findings would further emphasise the importance of the pre-hospital phase. This is true for workers as well as for craftsmen during both periods. Indeed, the use of ambulatory care by this latter category has been reported to be low in France, possibly because of time and financial constraints.⁶

Some limitations of the study should be underlined. Data on OC were obtained from the medical record or the patient's relatives. This variable was thus subject to measurement error. A high frequency of misclassification errors might explain that some differences between OCs might be undetected in our study, because of a lack of power. This effect is probably marginal because with the same methodology, important differences were observed in relation to incidence and case fatality of acute myocardial infarction.^{2–5} Thus, differences observed between OCs for the incidence with MONICA data,⁵ quite concordant with disparities in mortality² were not observed for hospital care. The second main limitation is the lack of information on the appropriateness of the investigations, procedures, and treatments noted in this study. For example, angiography had been more often performed among upper executives in the last period than among other OCs. The interpretation is not straightforward. This may be because of an excess of inappropriate procedures in this category as well as a lack of necessary procedures in other categories¹⁸ or, more probably, to both these possibilities.

The evolution between the two periods shows a rapid evolution of the prescriptions in each OC. The rapidity of the diffusion of prescriptions might be related to OC, higher among the more affluent. In our data however, no interaction was observed between OCs and period.

Our results do not show differences in hospital management according to OC. This result is not surprising, although it was not obvious. Such variations in delivery of hospital care have been reported in various countries and health care systems. In the United States, a higher probability of substandard medical care

has been reported among low socioeconomic status patients.⁹ In the Corpus Christi Heart Project, Mexican Americans received less cardiovascular medications after myocardial infarction than non-Hispanic whites, after adjustment on risk factors and presence of congestive heart failure.¹⁹ Using national data from Australia, Scott²⁰ has shown that patients of higher socioeconomic status were more likely to receive tests and less likely to receive drug prescriptions than other patients. In France, a high OC has been reported to be associated with more frequent prescription of calcium, iron, vitamin D, and blood transfusions in patients hospitalised for haemodialysis. However, the case fatality rate did not differ between OCs in that study.¹⁰

Similarly, in our study, the case fatality rate did not differ between OCs among those patients who did not die before admission and thus could be hospitalised. This result is not in contradiction with previous reports showing a reduced survival after myocardial infarction for patients in the lower socioeconomic status or with shorter education^{21, 22} or angiographically reported coronary disease.²³ Indeed, our data relate to the short-term, closely related to hospital care. Psychosocial influences might have a much greater impact on the long term—three years²¹—or four to six years.²² Similarly, poor control of high blood pressure might increase the case fatality rate of AMI in the long term through left ventricular hypertrophy.

This lack of social disparities for the hospital management of AMI are in contrast with the wide regional variations that have been found in France and in United States for these medical procedures.^{15, 24} These results showing a lack of disparities for hospital medical care among hospitalised patients and pointing to pre-hospital care and conditions are concordant with previous data on health care use by social categories in France. Variations in use of ambulatory care have been shown to be important between OCs. Upper categories tend to use more specialised medicine.^{6, 7} Similarly, prevention has been shown to be lower among categories with a low socioeconomic status.⁵ In contrast with ambulatory care and prevention, the use of hospital care has been shown to be frequent among lower categories in France and even to be a substitute for ambulatory care.^{6, 7, 25} So, in contrast with ambulatory care, for which patient characteristics are important, use of hospital care seems to be linked mostly to external factors—availability of care and medical practices.²⁴ These results are indeed very close to those observed in Finland. In that country, as in France, a debate on inequity in health has been hampered by the belief that universal access to care through a national health insurance system could guarantee equal use of health services. In Finland, the use of hospital services was found to be neutral to socioeconomic status.²⁶ In contrast, inequity was observed concerning rates of common surgical procedures,²⁷ which were performed in both private and public hospitals. These differences were thought to be related to different referral patterns from ambulatory care to hos-

pital. As in France, lower social status patients consult general practitioners and the more affluent consult private specialists. The probability to be referred by these two physicians might thus be different.²⁷ It should be kept in mind that our results were obtained among active men. The contrasts between OCs among them might be smaller than those between active and inactive men. Indeed, in an Irish study, the mean duration of medical management before angiography among economically inactive patients was twice as long as for the economically inactive.²⁸

In conclusion, for patients who could be admitted to hospital, the management of AMI was found to be similar among OCs. Worse prognosis, lower frequency of cardiac arrests, and higher probability of being hospitalised after the event among some categories suggest that pre-hospital care and patient's conditions before the event are the primary factors involved. Our data suggest that to attain the low incidence and low case fatality rate of AMI that have been reported among upper executives,⁵ further research should focus on the utilisation of ambulatory care, prevention of cardiovascular risk factors, and the general health status of the patients before the acute event. The incidence of cardiac arrests and the proportion of events that can be hospitalised are also possible targets for improvement, focusing on pre-hospital resuscitation. Further improvements in reducing inequalities might come from prevention, ambulatory care, and rapid access to hospital after the event.

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