n° 2008-31

Evolution of Obesity
and Change in Social Inequalities
in France

T. de SAINT POL[1]

---

[1] Observatoire Sociologique du Changement (Sciences po, CNRS) et Laboratoire de Sociologie Quantitative (CREST-INSEE).

EVOLUTION OF OBESITY
AND CHANGE IN SOCIAL INEQUALITIES IN FRANCE

Thibaut de Saint Pol

Laboratoire de Sociologie Quantitative
(CREST, INSEE)
Timbre J350, 3 avenue Pierre Larousse, 92245 Malakoff cedex, France

Observatoire Sociologique du Changement
(Sciences Po, CNRS)

Abstract

Background : Although France seems less affected by the rise in obesity than neighboring countries, the prevalence of obesity has increased, changing the distribution of this pathology in the population.
Objective: To evaluate the consequences of the rise in obesity on social inequalities in France.
Material : We analyze the data of the last three French national Health Surveys conducted in 1981, 1992 and 2003.
Results : The average body weight of both women and men has increased in France since 1981, with acceleration since the 1990s. Young as well as older populations have felt this trend. Nevertheless, this process has not affected all socioeconomic groups in the same way. Geographical differences have increased between on the one hand the North and East, where the prevalence of obesity is higher, and on the other hand the Mediterranean region, where it is lower. Likewise, the gap between socio-occupational categories has greatly widened: obesity has increased much faster among farmers and blue-collar workers than among managers and professionals. In contrast to women, poorer men are not more likely to be obese than others.
Conclusion : Our findings suggest that the disparities between social backgrounds have risen in France, in particular for women.

Keywords : **body mass index, socioeconomic inequalities, gender, longitudinal, France**

Résumé :

Contexte : Même si la France semble moins touchée par la croissance de l'obésité que les pays voisins, la prévalence de l'obésité a augmenté, changeant la distribution de cette pathologie dans la population.
Objectif : Évaluer les conséquences de l'augmentation de l'obésité sur les inégalités sociales en France.
Données : Nous analysons les trois dernières enquêtes Santé françaises, réalisées en 1981, 1992 et 2003.
Résultats : La corpulence des femmes comme des hommes a fortement augmenté en France depuis 1981, avec une accélération depuis les années 1990. Cette évolution concerne aussi bien les jeunes que les plus âgés. Toutefois ce processus n'a pas touché également tous les groupes sociaux. Les différences géographiques se sont renforcées entre le Nord et l'Est, où la prévalence de l'obésité est la plus forte, et l'Île-de-France et la zone méditerranéenne, où elle est plus faible. De même, l'écart entre les catégories socioprofessionnelles s'est fortement accru : l'obésité augmente beaucoup plus vite depuis 1992 chez les agriculteurs ou les ouvriers que chez les cadres et professions intellectuelles supérieures. Contrairement aux femmes, les hommes les plus pauvres ne sont pas les plus corpulents.
Conclusion : Notre étude suggère que les inégalités entre milieux sociaux ont augmenté en France, en particulier pour les femmes.

Mots-clés : **indice de masse corporelle, inégalités socio-économiques, genre, longitudinal, France**

Introduction

Even if France seems less affected by the rise in obesity than neighboring countries, the fight against this pathology has also recently become an essential issue for public health policies. However, there is little available data by which to measure the evolution of the prevalence of obesity in France over a long period. In fact, most of the tools for studying obesity have been set up only recently. That is true of both the Health and Nutrition Barometer designed by the *Institut national de prévention et d'éducation pour la santé* (INPES), which collected data for the first time in 1996, and the ObEpi survey conducted every three years since 1997 by Roche Laboratories. It is, however, essential to study the evolution of the prevalence of this disorder and its impact in terms of social disparities in order to devise an effective public health policy. This article sets out to draw the lessons from the Health Surveys conducted in France approximately every 10 years by the French National Institute for Statistics and Economic Studies (INSEE) to analyze the evolution of the prevalence of obesity in France between 1981 and 2003 and the disparities between social backgrounds.

1) Method

1.1) Data

The data studied in this article were culled from the last three INSEE surveys on health and medical care ("*Enquêtes sur la santé et les soins médicaux*"), conducted in 1980-1981, 1991-1992 and 2002-2003. A particular characteristic of these surveys is that the

sample of households interviewed is drawn at random from the INSEE master sample, i.e. an extract from the general French population census. The answers were gathered in face-to-face interviews in the course of three surveyor visits to the respondents' homes throughout France over a one-year period.

During the most recent Health Survey, which took place between October 2002 and March 2003, 16 800 households, i.e. nearly 40 000 individuals, were interviewed on topics as various as healthcare consumption, tobacco use and perceived state of health. Among the people interviewed during the 2003 Health Survey, 22 600 individuals between the ages of 18 and 65 gave their height and weight. 13 400 did so in 1992 and 12 400 did so in 1981. Data on height and weight are self-reported, not measured by the surveyor.

1.2) Analytical tools

Individual corpulence is assessed using the body mass index (BMI), which is found by dividing a person's weight in kilograms by height in meters squared. Obesity is defined according to the threshold recommended by the World Health Organization (WHO) as a BMI of over 30. Likewise, overweight is defined as a BMI of between 25 and 30, and underweight as a BMI below 18 [1]. These thresholds are applicable to individuals over 18 years old and preferably to those younger than 65, which is why the population studied was restricted to the 18-65 age bracket.

This study will endeavor to describe changes in the prevalence of obesity with regard to the main individual characteristics which are gender, age, place of residence, socio-occupational category, educational level and standard of living. Place of residence is

indicated by regional study and planning area (*zones d'études et d'aménagement du territoire-ZEAT*). The ZEAT, established in 1967, correspond to a division of metropolitan France into eight major geographic areas. They are made up of one or more regions and correspond to level 1 of the European Nomenclature of Territorial Units for Statistics (NUTS). The protocol for gathering data in a Health Surveys does not in fact guarantee representativeness at the mere level of administrative regions, but at the ZEAT level. The socio-occupational nomenclature used is PCS, i.e. professions and socio-occupational categories, established in 1982. The French socio-occupational categories (CSP) used in the 1981 Health Survey were converted to PCS. Standard of living is the annual household income divided by its number of units of consumption. It thus enables income comparisons by taking into account the number of people living on it.

2) Results

2.1) Evolution of weight, height and body mass

Average height declared in 2003 by men between 18 and 65 years of age was 1m75, and for women it was 1m63. Their height was 1m74 and 1m62 in 1992 and 1m72 and 1m61 in 1981 respectively. Women and men have thus grown 1 cm per decade since 1981. Their average weight has also increased: men on average reported weighing 77 kg in 2003 and women 63 kg, which corresponds to a BMI of 25 kg/m^2 for a man 1m75 tall and 24 for a woman 1m63 tall. This average weight was 74 and 60 kg in 1992, and 72 and 59 kg in 1981.

Figure 1
Body mass index by gender and age

Women

Men
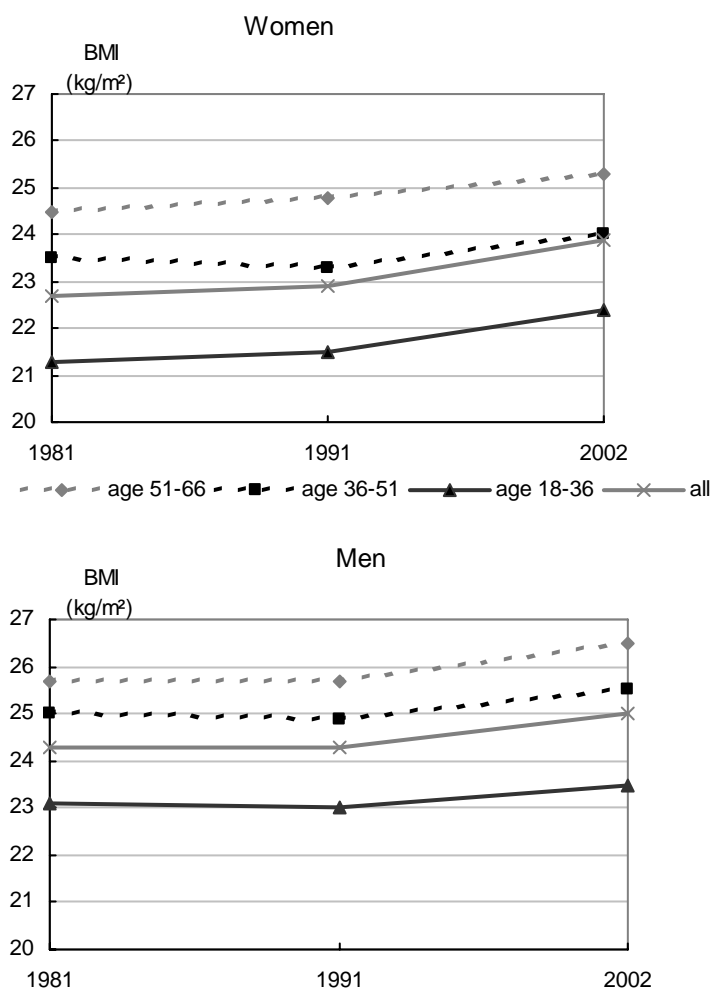
Interpretation: In 1981, average male BMI was 24.3 kg/m² between ages 18 and 35, it was 23.1 between ages 36 and 50 it was 25, and between ages 51 and 65 it was 25.7 kg/m².
Field: Individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.

Whereas average male corpulence as measured by BMI remained stable between 1981 and 1992, it rose significantly between 1992 and 2003 (Figure 1). This increase is noted at all ages and at a similar pace, indicating that the rise in average body mass is not only a factor of population aging. For women, an increase was already noted for those under 35 and those over 50 between 1981 and 1992. On the other hand, the average BMI of the 36-50 age bracket decreased. But since 1992, average female body mass is on the rise for all ages, the increase being even sharper for the younger generations.

4

Hand in hand with this overall phenomenon are an increase in obesity and overweight and a decrease of underweight among women (Table 1). In fact, although the proportion of underweight men remained stable between 1981 and 2003, it very clearly dropped among the female population. The most salient feature remains, however, the rise in the prevalence of obesity and overweight since the 1990s: the prevalence of obesity went from 5 to 10% for men and from 6 to 10% for women between 1992 and 2003. As for overweight, it still affects men (35 %) much more than women (21 %). On the other hand, there are more obese women today than underweight women.

Table 1
Prevalence of underweight, overweight and obesity by gender

		1981	1992	2003
Men	Underweight	1.9	1.7	1.8
	Overweight	30	30.9	34.8
	Obesity	5.3	5.5	9.8
Women	Underweight	8.5	7.8	6.7
	Overweight	16.3	17.9	21.2
	Obesity	5.3	6.2	10.2

Field: Individuals between ages 18 and 65, residing in metropolitan France.
Interpretation: In 1981, 1.9 % of men were underweight.
Source: Insee Health Surveys.

2.2) Geographic discrepancies

The number of obese people is on the rise in all areas (Figure 2). In 1981, the East and the North ZEATs in France had the highest prevalence of obesity: at the time 8% of the people were obese, compared to 4% for the greater Paris area (Ile-de-France) for instance. This was still the case in 2003: the East counted 13% and the North 14%, whereas the greater Paris area (Ile-de-France) only counted 8%. The Paris basin outside of Ile-de-France (Burgundy, center, Champagne-Ardenne, Basse et Haute

Normandie, Picardie), which already stood out in 1981, were just behind the East and the North in 2003 with 11% of obese people. Conversely, it is the Mediterranean area that displays the lowest prevalence of obesity, with less than 8%. Disparities between geographic areas have thus become more pronounced over the last two decades and remain considerable even when age, household standard of living and individual educational level are taken into account.

Figure 2
Prevalence of obesity by ZEAT (%)

Interpretation: In 1981, less than 5% of the population of Île-de-France (greater Paris) was obese.
Field: Individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.

There is a significant difference depending on type of town of residence: people living in rural areas have a greater body mass then those living in an urban setting (Table 2). For instance, a man living in Paris who is 1m75 tall weighs on average 2 kg less than a man of the same height and same age bracket, having an identical living standard and educational level, but living in a town with less than 2 000 inhabitants. That does not hold true for Parisian women for whom the difference with their rural counterparts is not significant.

Table 2
Specific effect of sociodemographic variables on BMI.

Variable	Modality	Male population		Female population	
		Estimated parameter	Effect on the weight of a man 1.75m tall	Estimated parameter	Effect on the weight of a woman 1.63m tall
	Constant	24.12	73.9 kg	22.11	58.8 kg
Age bracket	*Age 18 - 35*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
	Age 36 - 50	1.47	+ 4.5 kg	1	+ 2.6 kg
	Age 51 - 65	2.45	+ 7.5 kg	2.08	+ 5.5 kg
Equivalized income	1st quartile	-0.3	- 0.9 kg	0.93	+ 2.5 kg
	2nd quartile	-0.17	- 0.5 kg	0.7	+ 1.9 kg
	3rd quartile	ns.	ns.	0.38	+ 1.0 kg
	4th quartile	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Educational level	Secondary cert. or none	0.6	+1.8 kg	1.47	+ 3.9 kg
	Vocational or equiv	0.35	+ 1.1 kg	0.62	+ 1.6 kg
	Bac. or equivalent	*Ref.*	*Ref.*	*Ref.*	*Ref.*
	Higher ed.	-0.31	- 0.9 kg	-0.44	- 1.2 kg
Size of agglomeration of place of residence	*Pop. less than 2,000*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
	2,000 to 19,999	ns.	ns.	-0.25	- 0.7 kg
	20,000 to 99,999	-0.36	- 1.1 kg	-0.29	- 0.8 kg
	100,000 to 1,999,999	-0.42	- 1.3 kg	-0.41	- 1.1 kg
	Greater Paris	-0.65	- 2.0 kg	ns.	ns.

Note : linear regression of body mass on age bracket, equivalized household income, educational level and geographical area of residence, when "ns" = non significant; the other coefficients given are significant at the threshold of 5 % and Ref. means the reference situation.

Interpretation: a man 1.75 m tall aged between 36 and 50 has a BMI of 1.47 kg/m2 greater than a man between the age of 18 and 35, in the same standard of living quartile and educational level and residing in the same geographical area, i.e. 4.5 kg more.

Field: Individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.

## 2.3) Social-cultural and economic factors

<u>Socio-occupational categories</u>

The rise in obesity between 1981 and 2003 has affected all social milieus, but significant differences remain. Thus the gap between farmers, the socio-occupational category most affected by obesity, and higher managers and professionals, the least affected, have grown more pronounced (Figure 3). This evolution began in the 1990s. During the previous decade, the prevalence of obesity had increased faster among

higher managers and professionals, which suggested that there would be convergence between socio-occupational categories in the long run. But the opposite occurred: the gap widened. The prevalence of obesity among farmers in fact increased more than seven points between 1992 and 2003, whereas it rose by only two points among managers. Today, after farmers come workers, then craftsmen, shopkeepers and entrepreneurs and employees. The 2003 ranking remained unchanged with respect to 1981: there are still fewer obese among managers than among workers and farmers, but the disparities between these categories have increased significantly.

Figure 3
Prevalence of obesity by socio-occupational category
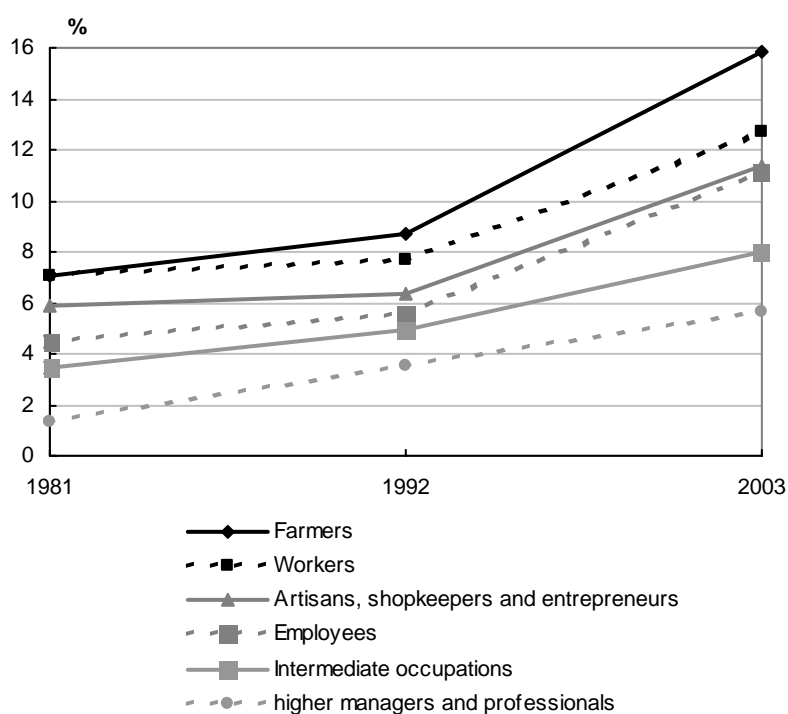
Interpretation: In 1981, 7 % of farmers had a BMI of over 30 kg/m², corresponding to the WHO obesity threshold.
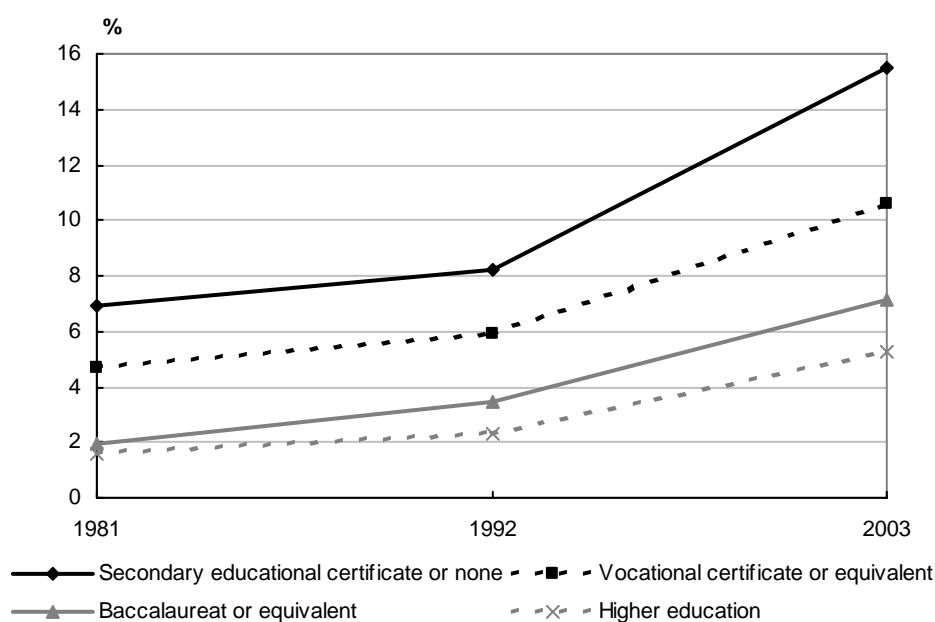Field: Active individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.
<u>Educational level</u>

The rise in disparities among social groups is mirrored in educational level and standard of living. In 2003, 15% of respondents with no degree or having at best a

secondary education certificate were obese, whereas only 5% of people with a university degree are in this case (Figure 4). There is a 10-point gap: it doubled between 1981 and 2003. The less education an individual has, the greater the risk of obesity. This correlation holds true in general for body mass (Table 2): the less educated have higher BMI, with more significant gaps among the female population. For instance, a woman who is 1m63 weighs on average 3.9 kg more if she has only a secondary education certificate or no degree and 1.2 kg less if she has a university degree with respect to a woman of the same age, standard of living and geographical area but holding a baccalaureate.

Figure 4
Prevalence of obesity by educational level

Interpretation: In 1981, 6.9 % of individuals with no educational degree or at most a secondary educational certificate had a BMI of over 30 kg/m², corresponding to the WHO obesity threshold.
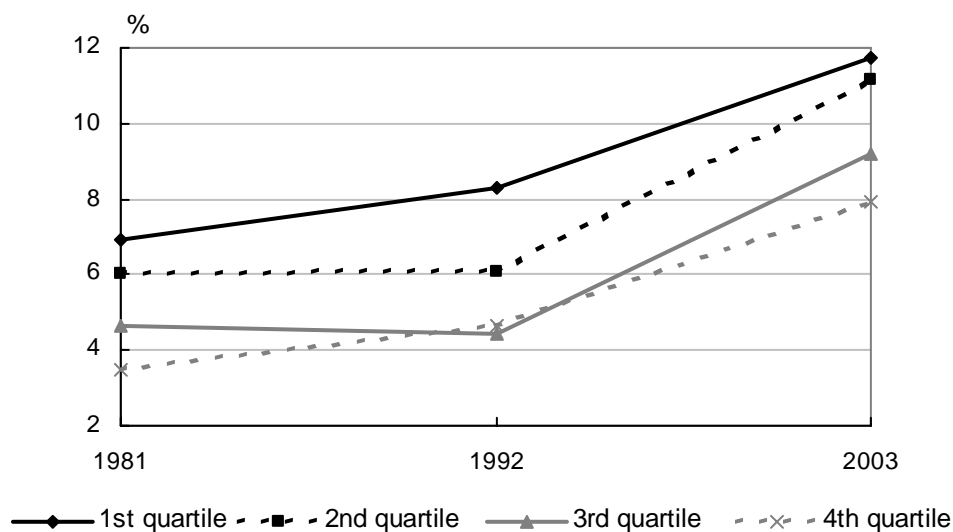Field: Individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.

Standard of living

By the same token, the prevalence of obesity according to individual standard of living presents considerable disparities. In 1981, 7% of individuals in the quarter of households with the lowest standard of living (1st quartile) were obese, compared to

less than 4% of those belonging to the quarter of households with the highest living standard (4th quartile - Figure 5). The prevalence of obesity was already on the rise in the first and fourth quartiles between 1981 and 1992, whereas that of the intermediate quartiles remained fairly stable. The stronger rise in the 1990s, however, affected all quartiles. In 2003, there was a clear overrepresentation of obese people among the poorest households with respect to those better off, and the gap even increased slightly. But actually the situations differ considerably according to gender: the prevalence of obesity among the poorest households (1st quartile) is 10% for men and 13% for women, whereas it is respectively 9 and 6% among the most affluent (4th quartile). The difference noted therefore holds true mainly for the female population.

Figure 5
Prevalence of obesity by household standard of living quartile

Interpretation: In 1981, 6.9 % of individuals belonging to a household where the standard of living is in the 1st quartile, i.e. belonging to the one-quarter of least well-off households, had a BMI of over 30 kg/m², corresponding to the WHO obesity threshold.
Field: Individuals between ages 18 and 65, residing in metropolitan France.
Source: Insee Health Surveys.

This finding is all the more interesting if one does not confine the analysis only to the obese; the link between corpulence and standard of living differs by gender (Table 2). In fact, taking into account age, educational level and population size of the place of

residence, the lower a woman's standard of living, the greater her body mass. A woman belonging to the lowest standard of living quartile who is 1m63 tall in 2003 weighs on average 2.5 kg more than a woman of the same height and age bracket, with an identical educational level and geographic area, but in the highest standard of living quartile. For men, on the other hand, those having the lowest standard of living are on average slightly less corpulent than their counterparts with a high standard of living. Age, educational level and area of residence being identical, the more corpulent men are not necessarily those who are the poorest.

3) Discussion

3.1) Advantage of the Health Survey

Since its sample is drawn from an extract of the general census of the French population, the Health Survey is the study that methodologically guarantees the best representativeness of findings on a nationwide scale in France. By way of comparison, the Obepi survey is conducted on the basis of a panel chosen according to the quota method that attempts to lend the sample a structure similar to that of the general population to ensure the representativeness. The 2002 Health and Nutrition Barometer sample was chosen by random selection from a database of telephone numbers. The Health Surveys are conducted by face-to-face interviews by a professional surveyor, whereas the Obepi survey is based on a self-administered questionnaire sent by mail, and the Health and Nutrition Barometers were conducted by telephone. These methods are less costly, but respondents may be more inclined to give inaccurate answers by telephone or by mail, regarding their self-reported height for instance, than with an interviewer sitting in front of them. Lastly, the sheer number

of people interviewed — 40 000 — provides for more precise analyses than on the basis of the INPES Health and Nutrition Barometer, the national sample of which is made up of 3 153 individuals aged 12 to 75, or the ENNS survey that only interviewed 4 000 adults and 2 000 children. However, Health Survey data suffer from the same defects as other self-reported data.

3.2) Self-reported data

In fact, although the Health Surveys provide information on the height and weight of a large swathe of the French population by which to analyze the evolution of the prevalence of obesity, these data were gathered by respondent declaration. The biometric data on which the BMI was calculated were not recorded by direct measurement of the individuals. There thus results a discrepancy with respect to the actual numbers due to rounded figures and the tendency of some individuals to see themselves as slightly taller or to subtract a few kilos, a discrepancy that may vary over time and depend on social background.

During the last Health Survey, a methodological operation was performed to study this bias. The respondents were given the opportunity to undergo a health examination in a health center on a volunteer basis. For a certain number of individuals, it was thus possible to compare reported values with the actual values in the course of the survey. Discrepancies in the reporting of height or weight led to an underestimation of the prevalence of obesity. Out of a sample of volunteers, the prevalence of obesity is 13.7% on the basis of measurements, compared to 9.7% on the basis of self-reported numbers [2]. This sample being skewed and small in size, these results obviously cannot be extrapolated to the entire population. They nevertheless underscore the

existence of a gap between self-reported values and reality, and the fact that the prevalence of obesity is probably somewhat higher than what the surveys measure.

It is also important to note that the data used present another limitation: the INSEE only interviews ordinary households and thus not people who are in institutions (i.e. prison, boarding school, etc.). Nor does this statistics institute interview homeless people.

3.3) The WHO thresholds

The categories constructed by the WHO and the corresponding thresholds reflect health risk levels associated with BMI values and are a practical tool used internationally to study obesity. However, they in no way constitute an aesthetic judgment on body mass, and their use requires obliges the analyst to take a certain number of limits into account [3]. In particular, these thresholds are the same for both men and women, whereas fatty mass at the threshold of overweight represents a higher percentage among women than men, so that theoretically a difference of a few kg/m^2 should be introduced between the two sexes [4]. Likewise, BMI intervals are the same for all ages. Now, among adults, the BMI rises until age 50, increasing by about $1 \ kg/m^2$ per decade [5], without that necessarily inducing greater health risks. Despite these limitations, the WHO thresholds remain the easiest and most effective manner to measure obesity over a large population.

4) Conclusion

A few salient points can be drawn from these findings which bring to light real issues for a public policy regarding obesity. Average body mass is increasing faster and faster, all the more so among younger generations. Obesity, although unevenly distributed, has increased on a nationwide scale in France. The disparities between socio-occupational categories are widening. Lastly, standard of living contrasts men and women as regards corpulence. Even if differences in body mass, and particularly in obesity, are partly related to genetic factors, these do not explain the sudden increase in body weight, which has more to do with social, economic and cultural factors. People living in a similar milieu share similar lifestyles and habits, which is in particular reflected in their body mass.

References

1. World Health Organization. *Obesity: Preventing and Managing the Global Epidemic*. Report of a WHO Consultation on Obesity. Geneva: WHO Technical Report Series, **894**, 2000.

2. Dauphinot V, Naudin F, Gueguen R, Perronnin M, Sermet C., Écarts entre morbidité déclarée et morbidité diagnostiquée: l'exemple de l'obésité, de l'hypertension artérielle, et de l'hypercholestérolémie. *Questions d'économie de la santé* 2006 ; **114**:1-8.

3. de Saint Pol T. Corps et appartenance sociale: la corpulence en Europe. *Données sociales - La société française* 2006 ; Insee, 649-656.

4. Wellens RI, Roche AF, Khamis HJ, Jackson AS, Pollock ML, Siervogel RM. Relationships between the Body Mass Index and body composition. *Obes Res*. 1996; **4**: 35-44.

5. Bray GA. Overweight is risking fate. Definition, classification, prevalence and risks. Ann N Y Acad Sci. 1987; **499**:14-28.