

# High burden of diabetes on mortality in the French overseas departments

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## Background

- While in metropolitan France the prevalence of diabetes has been estimated at 3% in 1998 in the overall population (based on medical claims for treatment), the prevalence reached:
  - 18% in people aged 30-69 years in La Réunion Island (Indian ocean) in 2000 (the Redia study, based on screening data);
  - 7% of people aged more than 18 years in Guadeloupe (Caribbean Island) in 1984-1985 (Inserm, based on screening data);
  - 5% of people aged more than 15 years in Martinique (Caribbean Island) in 2004 (the Escal Study, based on self-reported data).

## Aims

This study aims at describing the mortality related to diabetes in the French overseas departments and at comparing rates with those of metropolitan France.

## Methods

- French national mortality data for the years 2001 to 2003: all death certificates of French residents were extracted, including data about:
  - the underlying cause of death;
  - other causes contributing to the death (on average, 3.5 causes per death certificate);
  - socio-demographic data (age at death, sex, district of residence).
- Identification of deaths related to diabetes:
  - when diabetes was mentioned in a death certificate as the underlying cause of death;
  - when diabetes was mentioned among multiple causes of death (as the underlying cause or any other cause of death).
- We analysed all deaths related to diabetes in 5 different areas of residence: La Réunion Island, Guadeloupe, Martinique, French Guyana and metropolitan France.
- Data for the 3 years (2001 to 2003) were averaged to provide more precise estimates of death rates in each area due to low numbers in overseas departments:
  - the population living in each area, estimated by the French National Institute for Statistics and Economic Studies (Insee), was used as the denominator;
  - death rates were standardized based on the European population age structure (IARC-1976).
- Premature mortality related to diabetes occurring before age 65 years was calculated.
- The average number of years of potential life lost before age 65 years, in relation with diabetes, was calculated per person.

## Results

	2001		2002		2003	
	Diabetes as underlying cause	Diabetes among multiple causes	Diabetes as underlying cause	Diabetes among multiple causes	Diabetes as underlying cause	Diabetes among multiple causes
La Réunion Island	216 (5.8%)	493 (13.3%)	245 (6.1%)	555 (13.9%)	244 (6.0%)	587 (14.5%)
Guadeloupe	111 (4.3%)	258 (9.9%)	106 (3.8%)	277 (10.0%)	129 (4.9%)	292 (11.0%)
Martinique	126 (4.7%)	310 (11.5%)	136 (5.1%)	310 (11.7%)	117 (4.3%)	316 (11.6%)
French Guyana	18 (2.7%)	44 (6.7%)	18 (2.7%)	42 (6.3%)	24 (3.3%)	54 (7.5%)
Metropolitan France	11 018 (2.1%)	28 485 (5.4%)	11 177 (2.1%)	29 357 (5.5%)	11 801 (2.1%)	31 136 (5.7%)

- Each year, the percentage of deaths related to diabetes in the overall mortality was higher in overseas departments than in metropolitan France.
- In overseas departments as in metropolitan France, the percentage of deaths related to diabetes among multiple causes increased slightly from 2001 to 2003.
- In the overseas departments as in metropolitan France, each year, the number of deaths with diabetes was increased by a factor 2 to 3 when multiple causes rather than the underlying cause were considered.
- In 2001-2003, the average age at death, related to diabetes (among multiple causes of death), was younger in overseas departments than in metropolitan France (77 years):
  - 72 years in La Réunion Island;
  - 75 years in Guadeloupe;
  - 76 years in Martinique;
  - 70 years in French Guyana.

	Crude rates		Standardized rates	
	Diabetes as underlying cause	Diabetes among multiple causes	Diabetes as underlying cause	Diabetes among multiple causes
La Réunion Island	31.4	72.9	46.6	108.3
Guadeloupe	26.5	63.2	25.8	62.8
Martinique	32.5	80.3	26.3	65.7
French Guyana	11.4	26.6	25.7	63.3
Metropolitan France	19.0	49.7	12.0	32.0

- Standardized rates of mortality related to diabetes were twice higher in Guadeloupe, Martinique and French Guyana and more than 3 times higher in La Réunion Island, compared to those of metropolitan France.

	Diabetes as underlying cause			Diabetes among multiple causes		
	Men	Women	Men/Women ratio	Men	Women	Men/Women ratio
La Réunion Island	44.0	47.7	0.92	107.7	106.2	1.01
Guadeloupe	23.4	27.2	0.86	60.0	64.2	0.93
Martinique	27.4	25.0	1.10	68.3	63.0	1.08
French Guyana	19.2	30.1	0.64	50.7	72.7	0.70
Metropolitan France	14.7	9.9	1.48	41.5	24.8	1.67

- Rates were higher in La Réunion Island than in the other French overseas departments.
- In La Réunion Island, Martinique and Guadeloupe, mortality rates were almost similar in men and in women, while an excess of mortality was observed in men in metropolitan France. In French Guyana, an excess mortality was even observed in women.
- The difference in death rates between overseas departments and metropolitan France was wider among women than among men.

	Men							
	Diabetes as underlying cause				Diabetes among multiple causes			
	< 45 yrs	45-64 yrs	65-84 yrs	≥ 85 yrs	< 45 yrs	45-64 yrs	65-84 yrs	≥ 85 yrs
La Réunion Island	1.1	39.6	282.3	519.5	2.9	113.0	670.1	1 062.7
Guadeloupe	0.7	21.2	149.3	268.8	0.9	55.4	378.6	770.6
Martinique	1.7	27.0	146.6	490.8	3.0	64.9	380.0	1 218.6
French Guyana	1.7	22.9	110.9	128.7	2.1	57.2	286.2	643.5
Metropolitan France	0.5	11.2	83.3	320.8	0.9	33.2	243.9	817.0

	Women							
	Diabetes as underlying cause				Diabetes among multiple causes			
	< 45 yrs	45-64 yrs	65-84 yrs	≥ 85 yrs	< 45 yrs	45-64 yrs	65-84 yrs	≥ 85 yrs
La Réunion Island	1.0	45.0	265.7	921.6	2.1	91.5	635.2	1 843.1
Guadeloupe	1.5	23.8	147.3	561.5	2.1	54.1	381.4	1 123.0
Martinique	0.8	16.7	139.6	635.9	1.6	45.6	361.6	1 443.0
French Guyana	0.9	25.5	159.3	716.3	1.3	77.4	353.5	1 719.2
Metropolitan France	0.2	5.1	54.5	305.4	0.5	14.1	140.8	688.8

- The standardized rates of mortality related to diabetes were higher in overseas departments (and in particular in La Réunion) than in metropolitan France, whatever the age and sex. Compared to metropolitan France, this excess was maximal by age 45-64 years and decreased thereafter. For example, in La Réunion Island compared to metropolitan France (considering multiple causes):
  - in men aged 45-64 years and 65-84 years, mortality rates were about 3 times higher;
  - in women aged 45-64 years and 65-84 years, mortality rates were 6 and 4 times higher respectively.

	Diabetes as underlying cause				Diabetes among multiple causes			
	Men		Women		Men		Women	
	< 45 yrs	45-64 yrs	< 45 yrs	45-64 yrs	< 45 yrs	45-64 yrs	< 45 yrs	45-64 yrs
La Réunion Island	12.4	13.9	35.2	28.4				
Guadeloupe	6.7	8.1	17.0	17.5				
Martinique	9.2	5.5	21.2	14.6				
French Guyana	8.0	8.2	18.4	23.7				
Metropolitan France	3.6	1.7	10.4	4.5				

- Standardized rates of mortality related to diabetes and occurring before age 65 years were higher in men than in women in La Réunion and Martinique (as in metropolitan France) but not in Guadeloupe and French Guyana.
- In overseas departments, compared to metropolitan France, premature mortality related to diabetes was 2 to 3 times higher in men and 3 to 5 times higher in women.

	Men (years)	Women (years)
	La Réunion Island	3.4
Guadeloupe	1.6	1.6
Martinique	2.4	1.3
French Guyana	3.9	2.9
Metropolitan France	1.6	0.7

- The average number of years of potential life lost before age 65 years was higher in overseas departments, especially in La Réunion Island and French Guyana where the number of years was more than twice that of metropolitan France.
- Among death certificates with diabetes reported among multiple causes, diseases of the circulatory system were the most frequent underlying causes of death reported, in metropolitan France as in overseas departments:
  - in metropolitan France: 29% of death certificates related to diabetes;
  - in La Réunion Island: 33%;
  - in Guadeloupe: 30%;
  - in Martinique: 30%;
  - in French Guyana: 29%.

## Limits

- The quality of certification and codification of death certificates has improved over the recent years. However, diabetes is still likely to be under-reported in death certificates.
- The quality of diabetes reports may vary across areas: diabetes may be more often reported in death certificates in overseas departments where diabetes is recognized as a major public health problem.

## Conclusion

- The burden of diabetes on overall mortality is higher in overseas departments than in metropolitan France:
  - standardized rates of mortality are twice higher in the French Caribbean Islands and 3 times higher in La Réunion Island, where cultural and historical backgrounds differ;
  - the excess of mortality observed in men in metropolitan France is not observed in overseas departments where an equal burden of diabetes is reported in men and in women;
  - deaths related to diabetes occur 1 to 7 years earlier in overseas departments than in metropolitan France;
  - premature mortality is 2 to 6 times higher.
- Those specific results related to diabetes are similar to those observed when studying overall mortality: all causes of death considered, the age at death is lower in the French overseas departments, whatever the sex. However, these results may also reflect the higher prevalence of diabetes observed in overseas departments