



HAL
open science

Attributable risk of carpal tunnel syndrome according to industry and occupation in a general population.

Yves Roquelaure, Catherine Ha, Guillaume Nicolas, Marie-Christine Pélier-Cady, Camille Mariot, Alexis Descatha, Annette Leclerc, Guy Raimbeau, Marcel Goldberg, Ellen Imbernon

► **To cite this version:**

Yves Roquelaure, Catherine Ha, Guillaume Nicolas, Marie-Christine Pélier-Cady, Camille Mariot, et al.. Attributable risk of carpal tunnel syndrome according to industry and occupation in a general population.. *Arthritis and Rheumatism*, 2008, 59 (9), pp.1341-8. 10.1002/art.24002 . inserm-00327497

HAL Id: inserm-00327497

<https://inserm.hal.science/inserm-00327497>

Submitted on 7 Sep 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Table 1. Incidence of CTS according to age and gender §

Age (yrs)	Women		Men	
	N	Incidence*	N	Incidence*
20-24	20	0.24	8	0.09
25-29	38	0.50	23	0.29
30-34	68	0.91	33	0.44
35-39	111	1.42	49	0.63
40-44	124	1.60	57	0.73
45-49	142	1.86	47	0.61
50-54	174	2.47	56	0.81
55-59	138	2.90	47	1.03
Alltogether	815	1.40	320	0.55

* Data represent number (n) and mean population based annual incidence rate of CTS per 1.000 person-years;

§ Incidence computed with the 815 females and 320 males having completed the questionnaire.

Table 2. Age-adjusted relative risks and attributable risk fractions of CTS in exposed persons according to industry sector in the general population #

INDUSTRY (NAF code)	WOMEN				MEN			
	Pe(%)	N (%)	RR [CI _{95%}]	AFE (%) [CI _{95%}] ^p	Pe(%)	N (%)	RR [CI _{95%}]	AFE (%) [CI _{95%}] ^p
Agriculture (NAF 1)	4.0	80 (10.9)	2.4 [1.9-3.0]	58.2 [47.3-66.8]	8.5	34 (11.0)	1.4 [1.0-2.0]	-
Stone and sand quarrying (NAF 14)	0.0	0 (0.0)	-	-	0.3	6 (1.9)	8.9 [4.0-20.1]	88.8 [74.8-95.0]
Manufacture of food products and beverages (NAF 15)	2.0	38 (5.2)	2.7 [2.0-3.8]	63.4 [49.3-73.6]	3.4	22 (7.1)	2.4 [1.5-3.6]	57.5 [34.3-72.5]
Manufacture of textiles, wearing apparel and dressing (NAF 17-18)	1.7	16 (2.2)	1.6 [0.9-2.6]	-	0.6	1 (0.3)	-	-
Manufacture of shoes and leather products (NAF 19)	2.5	30 (4.1)	1.7 [1.2-2.5]	41.5 [15.7-59.4]	1.5	11 (3.5)	3.1 [1.7-5.8]	68.2 [41.7-82.7]
Manufacture of wood and products of wood (except furniture) (NAF 20)	0.1	1 (0.1)	-	-	0.7	6 (1.9)	5.6 [2.5-12.6]	82.1 [59.6-92.1]
Manufacture of pulp, paper and paper products (NAF 21)	0.1	1 (0.1)	-	-	0.3	1 (0.3)	-	-
Publishing, printing and reproduction of recorded media (NAF 22)	0.3	5 (0.7)	3.6 [1.5-8.7]	72.5 [33.7-88.6]	0.7	2 (0.6)	-	-
Manufacture of chemicals and chemical products (NAF 24)	0.5	12 (1.6)	14.7 [8.5-25.5]	93.2 [88.2-96.1]	0.6	2 (0.6)	-	-
Manufacture of rubber and plastic products (NAF 25)	0.6	6 (0.8)	2.8 [1.3-6.3]	64.5 [20.3-84.2]	2.6	5 (1.6)	0.9 [0.4-2.3]	-
Manufacture of basic metals and fabricated metal products (NAF 27-28)	0.5	10 (1.4)	5.8 [3.1-10.9]	82.7 [67.6-90.8]	3.0	21 (6.8)	2.6 [1.7-4.1]	62.0 [40.5-75.7]
Manufacture of office machinery and computers (NAF 29-30)	0.5	8 (1.1)	2.4 [1.2-4.9]	59.2 [18.0-79.7]	2.7	10 (3.2)	2.8 [1.5-5.4]	64.8 [33.0-81.5]
M. of electrical, radio, television, medical, precision instruments (NAF 31-33)	1.3	15 (2.0)	1.8 [1.1-3.0]	44.8 [7.9-67.0]	2.1	5 (1.6)	2.6 [1.1-6.4]	61.6 [5.1-84.4]
Manufacture of transport equipment (NAF 34)	0.3	12 (1.6)	5.1 [2.9-9.1]	80.5 [65.5-89.0]	0.9	10 (3.2)	13.2 [6.8-25.7]	92.4 [85.3-96.1]
Manufacture of furniture. (NAF 36)	0.6	9 (1.2)	3.2 [1.7-6.2]	69.0 [40.2-83.9]	1.1	9 (2.9)	4.3 [2.2-8.3]	76.5 [53.9-88.0]
Electricity, gas and water supply (NAF 40-41)	0.1	1 (0.1)	-	-	0.7	4 (1.3)	-	-
Construction (NAF 45)	0.7	6 (0.8)	2.3 [1.0-5.2]	57.2 [4.2-80.9]	8.2	63 (20.3)	2.9 [2.2-3.9]	65.6 [54.4-74.0]
Sale, maintenance and repair of motor vehicles (NAF 50)	0.6	8 (1.1)	2.5 [1.2-5.0]	59.6 [18.8-79.9]	2.3	6 (1.9)	1.1 [0.5-2.5]	-
Whole sale trade and commission trade (NAF 51)	1.8	5 (0.7)	0.5 [0.2-1.3]	-	4.4	6 (1.9)	0.7 [0.3-1.6]	-
Retail trade (NAF 52)	5.4	66 (9.0)	2.0 [1.5-2.5]	49.2 [34.4-60.6]	3.7	10 (3.2)	1.2 [0.6-2.3]	-
Hotels and restaurants (NAF 55)	2.0	26 (3.5)	1.8 [1.2-2.6]	44.2 [17.5-62.2]	1.8	4 (1.3)	-	-
Transport and storage and communication (NAF 60-63)	0.6	5 (0.7)	6.0 [2.5-14.5]	83.4 [60.0-93.1]	3.2	8 (2.6)	1.6 [0.8-3.3]	-
Communication (NAF 64)	0.9	8 (1.1)	1.2 [0.6-2.4]	-	1.3	8 (2.6)	1.8 [0.9-3.7]	-
Insurance and pension funding, financial intermediation (NAF 65-66)	1.6	15 (2.0)	1.5 [0.9-2.5]	-	1.5	0 (0.0)	-	-
Real estate activities (NAF 70)	0.5	7 (1.0)	3.8 [1.8-8.0]	73.8 [44.6-87.6]	0.7	0 (0.0)	-	-
Labour recruitment, provision of personnel, industrial cleaning (NAF 74)	3.9	25 (3.4)	1.1 [0.7-1.7]	-	5.8	5 (1.6)	0.7 [0.3-1.8]	-
Public administration and defence, compulsory social security (NAF 75)	5.6	39 (5.3)	0.9 [0.6-1.2]	-	5.6	17 (5.5)	1.2 [0.7-1.9]	-
Education (NAF 80)	7.5	62 (8.4)	1.0 [0.8-1.3]	-	4.1	10 (3.2)	0.8 [0.4-1.5]	-
Human health and social activities (NAF 85)	13.5	164 (22.3)	1.6 [1.3-1.9]	35.9 [23.9-46.1]	3.6	10 (3.2)	1.1 [0.6-2.0]	-
Recreational, cultural and sporting activities (NAF 92)	0.6	6 (0.8)	3.2 [1.4-7.3]	69.2 [30.8-86.2]	0.9	4 (1.3)	-	-
Personal service activities (NAF 93)	1.1	17 (2.3)	2.9 [1.8-4.7]	65.7 [44.6-78.8]	0.3	3 (1.0)	-	-
Private households with employed persons (NAF 95)	1.5	19 (2.6)	1.6 [1.0-2.6]	39.4 [4.1-61.7]	0.0	0 (0.0)	-	-

Persons employed during the last five years (735 women, 310 men); Pe (%): percentage of the general population of the region in this occupation; N (%): number and percentage of CTS incident cases; CI95 %: 95% confidence interval; Reference group: whole sample of subjects professionally active or not during the last 5 years. RRs were computed when at least five cases were diagnosed. RRs were computed when at least five cases were diagnosed. Sectors not presented: forestry, manufacture of tobacco products, recycling, sanitation, supporting and auxiliary transport activities, renting of machinery and equipment without operator, computer and related activities, research and development, activities of membership organizations Unspecified sector: 7 for women (1.0%) and 5 for men (1.6%); β : This range was computed using the lower and higher limits of the confidence interval of the RR of CTS in the formula (1).

Table 3. Age-adjusted relative risks and attributable risk fractions of CTS in exposed persons according to occupation in the general population #

OCCUPATION (PCS code)	WOMEN				MEN			
	Pe (%)	N (%)	RR [CI _{95%}]	AFE (%) [CI _{95%}] ^β	Pe (%)	N (%)	RR [CI _{95%}]	AFE (%) [CI _{95%}] ^β
Farmers (PCS 11-13)	1.9	19 (2.6)	1.0 [0.6-1.5]	-	4.8	14 (4.5)	1.2 [0.7-2.1]	-
Craftsmen, salesmen, small self employers (PCS 21,22,23,31)	2.8	12 (1.6)	0.5 [0.3-0.9]	-	7.4	14 (4.5)	0.5 [0.3-0.9]	-
Professionals (administrative, managerial & technical occupations)(PCS 33-38)	3.8	21 (2.9)	0.8 [0.5-1.2]	-	8.0	16 (5.2)	0.8 [0.5-1.3]	-
Teaching associate professionals (PCS 42)	3.6	8 (1.1)	0.3 [0.2-0.7]	-	2.0	2 (0.6)	-	-
Intermediate occupations (nursing, health and social activities)(PCS 43)	4.3	29 (3.9)	1.1 [0.7-1.5]	-	1.3	2 (0.6)	-	-
Administrative intermediate occupations of public companies (PCS 45)	1.1	6 (0.8)	0.8 [0.4-1.8]	-	1.1	0 (0.0)	-	-
Administrative intermediate occupations of private companies (PCS 46)	4.1	17 (2.3)	0.8 [0.5-1.2]	-	4.8	6 (1.9)	0.8 [0.3-1.8]	-
Technicians and associate professionals [§] (PCS 47)	0.7	1 (0.1)	-	-	4.7	11 (3.5)	0.9 [0.5-1.7]	-
Supervisors (PCS 48)	0.3	2 (0.3)	-	-	2.8	8 (2.6)	1.2 [0.6-2.6]	-
Government and public service employees (PCS 52)	10.6	141 (19.2)	1.7 [1.4-2.1]	42.5 [30.9-52.1]	2.7	13 (4.2)	1.9 [1.1-3.4]	48.1 [8.9-70.4]
Police and armed forces (PCS 53)	0.2	1 (0.1)	-	-	1.7	1 (0.3)	1.3 [0.2-9.7]	-
Employees of corporate administrative services (PCS 54)	8.5	65 (8.8)	1.2 [1.0-1.6]	-	1.6	4 (1.3)	-	-
Trade and commerce employees(PCS 55)	3.7	61 (8.3)	3.0 [2.3-4.0]	67.0 [57.1-74.7]	1.1	2 (0.6)	-	-
Personal services employees(PCS 56)	7.5	117 (15.9)	1.9 [1.5-2.3]	46.6 [35.0-56.2]	0.7	4 (1.3)	-	-
Skilled industrial blue-collar workers (PCS 62)	2.7	13 (1.8)	0.8 [0.4-1.3]	-	8.4	23 (7.4)	1.1 [0.7-1.6]	-
Skilled craft blue-collar workers (PCS 63)	0.7	7 (1.0)	2.5 [1.2-5.4]	60.7 [16.4-81.5]	8.3	55 (17.7)	2.5 [1.8-3.3]	59.3 [45.4-69.6]
Drivers (PCS 64)	0.2	3 (0.4)	-	-	3.5	10 (3.2)	1.6 [0.9-3.1]	-
Material handlers and related equipment workers (PCS 65)	0.2	11 (1.5)	8.6 [4.7-15.5]	88.3 [78.9-93.6]	1.9	21 (6.8)	3.8 [2.4-5.9]	73.5 [58.7-83.0]
Unskilled industrial blue-collar workers (PCS 67)	5.4	129 (17.6)	3.5 [2.9-4.2]	71.2 [65.2-76.1]	7.5	59 (19)	3.3 [2.5-4.4]	69.8 [59.8-77.4]
Unskilled craft blue-collar workers (PCS 68)	1.5	23 (3.1)	2.0 [1.3-3.0]	49.6 [23.8-66.7]	3.2	22 (7.1)	3.3 [2.2-5.2]	70.1 [53.6-80.7]
Unskilled agricultural blue-collar workers (PCS 69)	1.6	48 (6.5)	4.2 [3.2-5.7]	76.4 [68.4-82.4]	3.0	20 (6.5)	3.5 [2.2-5.5]	71.1 [54.3-81.8]

Persons employed during the last five years (735 women, 310 men); Pe (%): percentage of the general population of the region in this occupation; N (%): number and percentage of CTS incident cases; CI95 %: 95% confidence interval; Reference group: whole sample of subjects professionally active or not during the last 5 years. RRs were computed when at least five cases were diagnosed. § Technicians and associate professionals perform mostly technical and related tasks and teach at certain educational levels. Most occupations in this group require skills at the third ISCO level (education which begins at the age of 17 or 18 years and leads to an award not equivalent to a first university degree). β : This range was computed using the lower and higher limits of the confidence interval of the RR of CTS in the formula (1).

Table 4. Age-adjusted RRs and AFEs of CTS in exposed persons according to detailed occupation (4-digit PCS codes) in the general population #

OCCUPATION (PCS_CODE)	WOMEN			MEN			
	Pe (%)	N (%)	RR [C _{95%}] ^p	Pe (%)	N (%)	RR [C _{95%}] ^p	AFE (%) [C _{95%}] ^p
Government and public service employees (PCS 52)							
-Low grade government tax and excise clerks (PCS 5213)	0.3	5 (0.7)	4.1 [1.7-9.9]	75.9	42.1-89.9]	0.1	0 (0.0)
-Government administrative secretaries (PCS 5214)	2.3	16 (2.2)	1.0 [0.6-1.6]	-	-	0.3	2 (0.6)
-Low grade government clerks (PCS 5215)	0.4	10 (1.4)	4.1 [2.2-7.7]	75.8	[54.9-87.0]	0.1	1 (0.3)
-School cleaners and related cleaners (PCS 5216)	1.4	26 (3.5)	2.6 [1.7-3.8]	61.0	[42.2-73.6]	0.6	2 (0.6)
-Public services caretakers and cleaners (PCS 5217)	0.9	7 (1.0)	1.6 [0.8-3.4]	-	-	0.6	2 (0.6)
-Nurses' aides and personal care workers (PCS 5221)	2.4	38 (5.2)	2.3 [1.7-3.2]	56.7	[39.9-68.8]	0.2	1 (0.3)
-Hospital cleaners (PCS 5222)	2.2	32 (4.4)	1.9 [1.4-2.8]	48.2	[26.2-63.7]	0.3	1 (0.3)
Trade and commerce employees (PCS 55)							
-Salespersons in food shops (PCS 5512)	0.7	12 (1.6)	2.9 [1.6-5.1]	65.6	[39.1-80.5]	0.1	0 (0.0)
-Salespersons in equipment shops (PCS 5514)	0.6	8 (1.1)	4.6 [2.3-9.3]	78.3	[56.3-89.2]	0.1	0 (0.0)
-Employees of self-service stores (PCS 5518)	0.8	11 (1.5)	3.7 [2.0-6.7]	72.8	[50.6-85.0]	0.3	1 (0.3)
-Cashiers (PCS 5519)	0.8	18 (2.4)	5.4 [3.4-8.6]	81.5	[70.5-88.4]	0.0	0 (0.0)
Personal services employees (PCS 56)							
-Waitresses and bartenders (PCS 5611)	0.9	16 (2.2)	3.5 [2.2-5.8]	71.7	[53.7-82.8]	0.4	3 (1.0)
-Hairdressers (PCS 5622)	0.5	6 (0.8)	7.5 [3.4-16.6]	86.6	[70.3-94.0]	0.1	0 (0.0)
-Nursery school assistants and child care workers (PCS 5631)	4.2	64 (8.7)	1.6 [1.3-2.1]	39.1	[21.3-52.9]	0.0	0 (0.0)
-Housekeepers (PCS 5632)	1.7	25 (3.4)	1.6 [1.1-2.4]	37.0	[6.1-57.8]	0.0	1 (0.3)
Skilled craft blue-collar workers (PCS 63)							
-Gardeners, horticultural and nursery workers (PCS 6301)	0.0	1 (0.1)	-	-	-	0.6	6 (1.9)
-Bricklayers and stonemasons (PCS 6341)	0.0	0 (0.0)	-	-	-	1.4	9 (2.9)
-Plumbers and pipe fitters (PCS 6344)	0.0	0 (0.0)	-	-	-	0.5	5 (1.6)
-Cooks (PCS 6354)	0.3	2 (0.3)	-	-	-	0.6	5 (1.6)
Material handlers and related equipment workers (PCS 65)							
-Fork-lift truck operators (PCS 6514)	0.0	3 (0.4)	-	-	-	0.7	7 (2.3)
-Storekeepers (PCS 6515)	0.2	8 (1.1)	11.2 [5.6-22.4]	91.1	[82.1-95.5]	1.1	10 (3.2)
Unskilled industrial blue-collar workers (PCS 67)							
-Electrical and electronic equipment assemblers (PCS 6711)	0.5	14 (1.9)	4.6 [2.7-7.8]	78.1	[62.9-87.1]	0.3	3 (1.0)
-Mechanical-machinery assemblers (PCS 6723)	0.2	13 (1.8)	10.8 [6.2-18.6]	90.7	[84.0-94.6]	0.8	15 (4.8)
-Chemical-, rubber- and plastic- product assemblers (PCS 6751)	0.3	7 (1.0)	7.0 [3.3-14.6]	85.6	[69.9-93.1]	0.8	2 (0.6)
-Meat- and food-processing machine operators (PCS 6754)	0.6	24 (3.3)	7.6 [5.1-11.4]	86.8	[80.3-91.2]	0.8	11 (3.5)
-Textile-product machine operators (PCS 6772)	0.6	12 (1.6)	2.9 [1.6-5.1]	65.1	[38.3-80.3]	0.0	0 (0.0)
-Shoemaking- and related machine operators (PCS 6773)	1.2	19 (2.6)	2.1 [1.4-3.4]	53.2	[26.3-70.3]	0.5	6 (1.9)
-Packers and packing related operators (PCS 6793)	0.4	23 (3.1)	8.4 [5.6-12.8]	88.2	[82.1-92.2]	0.9	0 (0.0)
Unskilled craft blue-collar workers (PCS 68)							
-Building construction laborers (PCS 6841)	0.0	0 (0.0)	-	-	-	0.6	12 (3.9)
-Construction and finishing laborers (PCS 6842)	0.1	1 (0.1)	-	-	-	0.7	6 (1.9)
-Cleaners (PCS 6891)	1.0	19 (2.6)	2.2 [1.4-3.4]	53.7	[27.1-70.6]	0.7	4 (1.3)
Unskilled agricultural blue-collar workers (PCS 69)							
-Animal producers and related laborers (PCS 6912)	0.2	7 (1.0)	7.3 [3.5-15.3]	86.3	[71.3-93.4]	0.5	4 (1.3)
-Gardening and horticultural laborers (PCS 6913)	0.9	24 (3.3)	4.4 [2.9-6.6]	77.1	[65.6-84.7]	1.0	3 (1.0)
-Orchard and vineyard laborers (PCS 6914)	0.3	17 (2.3)	8.8 [5.4-14.2]	88.6	[81.6-93.0]	0.9	10 (3.2)

Persons employed during the last five years (735 women, 310 men); Pe (%): percentage of the general population of the region in this occupation; N (%): number and percentage of CTS incident cases; C_{95%}: 95% confidence interval; Reference group: whole sample of subjects, professionally active or not during the last 5 years. RRs were computed when at least five cases were diagnosed. β : This range was computed using the lower and higher limits of the confidence interval of the RR of CTS in the formula (1).