

# A case-control study on colorectal cancer in Belgium. Preliminary results

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The study on colorectal cancer in Belgium is part of a large national research project on nutrition and health under the auspices of the National Fund for Scientific Research. It is known as the "Etude Interuniversitaire sur l'Alimentation et la Santé" (EIAS). Two main groups of diseases are concerned: cardiovascular diseases and cancers of the digestive tract; these include colon and rectal cancer.

The present report deals with the latter only; it describes the methodological problems encountered and also presents a few results which must, however, be considered as very preliminary.

**Methods.** The project consisted of a case-control study which was carried out in two provinces of the country: Oost-Vlaanderen in the Flemish part and Liège in the Walloon part of Belgium. These two provinces were selected firstly because they represent the two major collectivities fairly well, and secondly because of the existence of nutritional experience and the services available in each region (Prof. Verdonk in Gent and Prof. Reginster in Liège). The schools of dieticians provided the qualified manpower needed for carrying out the interviewing of patients and controls after appropriate complementary training.

The interviewing covered food intake during a "normal" week at the time of the interview for controls and before the disease for patients. There were some 157 food items listed in the questionnaire.

The food tables used for the calculation of nutriment intake were basically those available from the Netherlands, complemented by those of Paul and Southgate for fibre content.

**Material.** The cases were recruited from the University Hospitals in Gent and Liège and from the major hospitals in the two provinces. The estimated coverage was 50.0% for colon and 48.5 for rectum.

The controls were a rectangular sample of the adult population in both provinces; the response rate was 65% in Liège and 74% in Oost-Vlaanderen.

The total number of people interviewed appears in Table 1.

The initial analyses were performed at the School of Public Health in Brussels using the computer of the Free University of Brussels.

**Results.** The greater number of cases and controls in the Flemish province as compared with those in Liège (Table 1) simply reflects the difference in size of the population in each province.

		Colon cancer	Rectum cancer	Population controls
Oost-Vlaanderen	Male	168	172	1126
	Female	214	140	1096
	Both sexes	382	312	2222
Liège	Male	141	110	659
	Female	156	106	642
	Both sexes	297	216	1301
Both provinces	Male	309	282	1785
	Female	370	246	1736
	Both sexes	679	528	3521

Table 1. Number of patients and controls interviewed.

In both provinces there were more female cases of colon cancers than males and the reverse for rectal cancer. The proportion of rectal cancer was higher in Oost-Vlaanderen as compared with Liège; this confirmed an earlier finding based on mortality figures.

The effect of nutriment intake has been expressed in Table 2 in terms of relative risks for "heavy consumers" versus "light consumers".

	Colon cancer		Rectal cancer	
	R.R.	Confid. interv.	R.R.	Confid. interv.
Total calories	.79	.66 - .96	1.02	.82 - 1.26
Proteins	.74	.60 - .92	.85	.67 - 1.08
Carbohydrates	.93	.77 - 1.13	1.25	1.01 - 1.54
Lipids	.79	.65 - .96	1.02	.82 - 1.27
Alcohol	1.04	.81 - 1.32	1.04	.80 - 1.36
Cholesterol	1.08	.90 - 1.31	1.24	1.00 - 1.52
Fibres	.62	.58 - .75	.72	.58 - .88
Vitamin A	.90	.70 - 1.17	.99	.74 - 1.32
Vitamin B <sub>1</sub>	.62	.50 - .78	.73	.57 - .94
Vitamin B <sub>2</sub>	.90	.72 - 1.12	.98	.76 - 1.25
Vitamin B <sub>6</sub>	.70	.58 - .86	.81	.65 - 1.01
Nicotinamide	.99	.81 - 1.21	1.07	.86 - 1.32
Vitamin C	.74	.61 - .92	.68	.55 - .85

Table 2. Nutrients. Relative risks. "Heavy" versus "Light" consumers.

A reduced risk of colon cancer was associated with high total caloric intake, high intake of proteins and lipids, while an excess risk of rectal cancer was associated with high intake of carbohydrates (Table 2). There was no effect of alcohol for either of the two cancer sites but there was an increased risk of rectal cancer associated with cholesterol intake. Fibres had a

protective effect for both colon and rectal cancer. There was also a decreased risk associated with high intake of vitamin B1 and vitamin C for both sites and with vitamin B6 for colon cancer only.

Food items have been examined in the same way in Table 3. There was a decreased risk of colon and rectal cancer associated with high consumption of fresh fruit and most vegetables, with the exception of pod vegetables.

	Colon cancer		Rectal cancer	
	R.R.	Confid. interv.	R.R.	Confid. interv.
Potatoes	.75	.63 – .91	.91	.74 – 1.11
Leaf vegetables, cooked	.19	.12 – .29	.25	.16 – .43
Leaf vegetables, raw	.52	.41 – .68	.62	.47 – .83
Root vegetables, cooked	.31	.20 – .41	.28	.19 – .41
Pod vegetables, cooked	1.01	.80 – 1.27	1.07	.83 – 1.37
Fruit vegetables, cooked	.67	.53 – .84	.70	.54 – .90
Fruit vegetables, raw	.51	.42 – .61	.53	.43 – .65
Fresh fruit, raw	.93	.75 – 1.16	.89	.70 – 1.13
Citrus fruit	1.18	.98 – 1.43	1.01	.82 – 1.24
Starchy food, pasta, rice	1.23	.96 – 1.56	1.41	1.07 – 1.87
Bread (all kinds)	.52	.43 – .65	.74	.58 – .94
Sweets	1.84	1.36 – 2.45	1.93	1.38 – 2.70
Milk (all kinds)	1.53	1.20 – 1.95	1.26	.98 – 1.63
Eggs	1.12	.90 – 1.41	1.21	.94 – 1.56
Butter	1.30	1.06 – 1.60	1.23	.99 – 1.54
Margarine	.77	.61 – .98	1.01	.76 – 1.33
Coffee, tea	.73	.61 – .88	.76	.62 – .93

Table 3. Intake of food. Relative risks. "High" versus "Light" consumers.

Among the starchy foods, the risk for both cancers was decreased for bread consumption and increased with high consumption of sweets. There was a higher risk of rectal cancer associated with heavy consumption of pasta and rice and of colon cancer with milk and butter.

Neither for colon nor for rectal cancer was there any significant change in risk associated with any of the various kinds of meat.

There was a decreased risk associated with high consumption of coffee and tea (the latter being rarely consumed in Belgium).

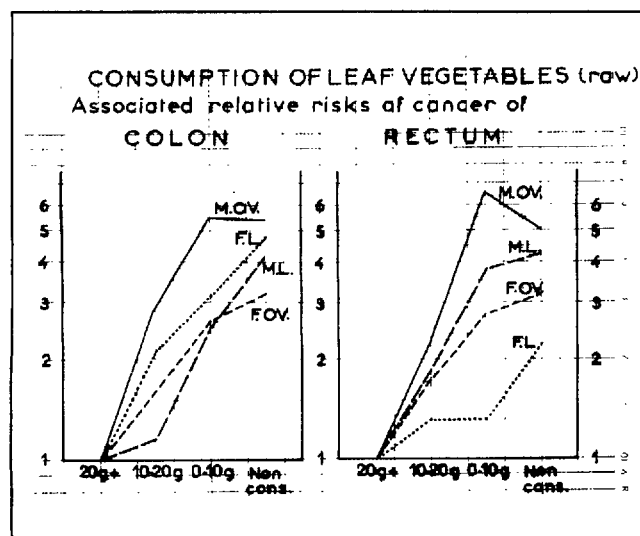
**Discussion.** The recruitment of cases was more difficult than anticipated, partly because of late notification and partly also because treating doctors and surgeons did not want the interviewers to interfere; whether this biased the representativity of the patients who were interviewed is unknown.

In contrast, the interviewing of population controls turned out to be much easier and more efficient than expected, in spite of the problems involved in meeting the people who had been selected at random in their homes.

The handling and processing of a considerable amount of data proved to be a cumbersome task, which

required multiple verification of tables and calculations in order to spot possible mistakes in coding or punching; this painful detection and the appropriate corrections took several months.

The results reported here are preliminary and should therefore be interpreted with caution, even though they are consistent with the findings of other authors. Many of the risks appearing in the tables are of modest dimension. In this preliminary analysis, adjustment was made for age but for no more. Previous studies have indicated that most nutrients are interrelated, thus resulting in indirect associations which may disappear after adjustment for other items which are significant.



For foods, this risk is not so great. Considering the level of the risks observed for several vegetables, their consistency and the existence of a dose-response gradient as shown in Figure 1 for leaf vegetables, these are likely to resist further adjustments and to be confirmed by more sophisticated analyses.

#### Summary

A case-control study on colorectal cancer in Belgium. Preliminary results.

Preliminary results of a case-control study in two Belgian provinces, involving 1207 cases of colorectal cancer and 3521 population controls are reported. An excess risk of colon cancer was associated with low intake of calories, proteins and lipids. High intake of vitamin B, vitamin C and fibres had a protective effect on both colon and rectal cancer. When foods were examined, most vegetables were found to have protective virtues, noticeable in all subgroups.

#### Resumé

Une étude cas-témoins sur le cancer colorectal en Belgique. Résultats préliminaires.

Le travail rapporte les résultats préliminaires d'une étude cas-témoins dans deux provinces belges, portant sur 1207 cas de cancers colo-rectaux et 3521 témoins de population. Un excès de risque de cancer du côlon était associé à un régime pauvre en calories, en protéines et en lipides. Une ration riche en vitamine B, en vitamine C et en fibres avait un effet protecteur sur les cancers du côlon et du rectum. Parmi les aliments examinés, la plupart des légumes avaient des vertus protectrices discernables dans tous les sous-groupes.