Cancer mortality by migrant background in Belgium during the 2000s: Patterns and social determinants

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A B S T R A C T

Aim: To map and compare site-specific cancer mortality for Belgians and five of the largest immigrant groups in Belgium, and to look into the role of socio-economic position (SEP) and urbanisation.
Methods: We use linked Belgian census and register data for the period 2001–2011. Mortality from common cancer sites is studied for Belgians and individuals with a migrant background from Italy, France, the Netherlands, Morocco and Turkey aged 40 to 69. We use indirect standardisation and Poisson regression modelling, taking into account the effect of age, urbanisation and SEP. First- (FG) and second-generation (SG) immigrants are included.
Results: There is marked diversity in cancer mortality levels by migrant background, with oft-lower levels for FG Moroccan and Turkish immigrants, and levels usually closer to those of Belgians for European immigrants. Small increases are commonly observed by generation, although less clearly so for stomach and liver cancer. SEP plays an important role in the patterning of cancer mortality by migrant background.
Conclusion: Migrant background is associated with differences in site-specific cancer mortality levels in Belgium. The observed role of SEP warrants special attention to the most vulnerable socio-economic groups.

1. Introduction

Studies on cancer mortality in immigrants have recently gained recognition in Europe [1]. Such examinations can identify cancer-related healthcare needs of immigrants, and inform on cancer aetiology [2,3]. With growing shares of migrants and their descendants across Europe these questions become more acute. In Belgium, 20% of the population had foreign origins in 2016 [4]. Common countries of origin include neighbouring countries like France and the Netherlands, but also countries from which labour migrants were recruited in the 1950s and 1960s like Italy, Turkey and Morocco [5].

Common theories on differential mortality between immigrants and natives are based on the observation that mortality appears lower for adult immigrants from less industrialised countries to more industrialised ones [6]. Some authors explain this through selective re-emigration of unhealthy migrants (the *salmon-bias*) [1,6]. In contrast, others assign good physical and mental health for immigrants to selection processes before immigration *(the 'healthy migrant' effect)* [6,7]. However, advantages are thought to decrease over time due to *acculturation* to the host country lifestyle [8–11].

It has been shown that adult immigrants from less industrialised

countries settling in the EU have lower all-cancer mortality compared with natives, but with site-specific diversity [1]. Overall, these immigrants are more prone to infection-related cancers such as liver, cervical, and stomach cancer. In contrast, they are less likely to die from cancers related to a western lifestyle, e.g. colorectal, breast and lung cancer [1]. Belgian cause-specific mortality research in first-generation (FG) immigrants aged 25–54 during the 1990s pointed to lower breast and lung cancer mortality in immigrants from less industrialised countries compared with Belgians [2]. Mortality from cancer of the digestive tract was lower for Sub-Saharan Africans, Italians, Spaniards, and Moroccans. A recent study taking into account duration of residence and immigrant generation shows increased all-cancer and lung cancer mortality with longer residence in Belgium and in the second generation (SG) [12]. Additionally, socio-economic position (SEP) and urbanisation contribute to site-specific cancer mortality levels for all groups [12].

The evidence base on cancer mortality in immigrants is growing, but often suffers from a small scale of study [1]. Few analyses include migrants from more industrialised countries, SEP is rarely considered, research barely focuses on various cancer sites, and FG and SG migrants are unfrequently studied simultaneously. This paper aims to address

these gaps by, firstly, mapping out differences in cancer mortality for FG and SG migrants of different origins and the native Belgian population for a variety of cancer types for the period 2001–2011. Secondly, we aim to probe into the determinants of the observed patterns by accounting for urbanisation and SEP.

2. Materials and methods

We use an individual linkage between the Belgian 2001 census and follow-up data from the population and mortality registry for the period 2001–2011. A variety of socio-demographic and -economic variables is available at baseline. We selected all official inhabitants aged 40–69 of Belgian descent (4 464 475) and of five common immigrant groups: Italians (170 121), the French (87 792), Dutch (75 742), Moroccans (79 004) and Turks (43 224). We refer to Morocco and Turkey as less industrialised, whereas Italy, France and the Netherlands are more industrialised countries.

Migrant background is operationalised through country of origin and migrant generation. The first is based on nationality at birth of the individual or his/her parents, the second on country of birth. Individuals born abroad with a foreign country of origin are classified as FG immigrants. Belgian born individuals with foreign origin are SG immigrants.

Mortality from a selection of common causes of cancer death in Belgium is studied [17], using the underlying cause of death coded through the tenth revision of the International Classification of Diseases (ICD-10) in order to identify mortality from all cancers combined (C00-C95); cancer of the head and neck (C00-C14, C30-C32); stomach (C16); colorectal (C18-C20); liver (C22); lung, bronchus and trachea (C33-C34); breast (C50); and prostate cancer (C61).

To account for the role of SEP in cancer mortality [12,15,16], we include educational level, housing status and employment status. Because immigrants do not settle in Belgium randomly [5], urbanisation is included as a categorical variable describing the area of settlement [12,18]. The number of children and age at first childbearing are included in the breast cancer analyses due to their known role as risk factors [19,20]. Because missing data is known to vary by migrant background [12], we include categories for missing values on the abovementioned variables.

We assess cancer-specific mortality of different migrant background groups by calculating indirectly standardised mortality rates (ISMRs), adjusted to age-specific rates of the native population [16]. Poisson regression models are fitted separately for men and women to calculate cancer mortality rate ratios (MRRs). The number of cancer deaths is the dependent variable, person-years at risk the offset, and migrant background the independent variable. A first series of models adjusts for age. In a second series, we take urbanisation and SEP into account. The original data set was expanded by 5-year age groups in order to account for attained age [21].

3. Results

3.1. Study population

Table 1 describes the study population. FG Moroccan and Turkish migrants generally live in urban areas, have lower educational and employment levels, and are more likely to rent low comfort housing. FG Italian migrants have lower educational levels and employment as well. The proportion of missing information is highest for FG and SG migrants from less industrialised countries.

3.2. Cancer mortality by migrant background: patterns

Tables 2 and 3 show ISMRs per 100,000 person years by migrant background and cancer site. FG Moroccans and Turks of both sexes have the lowest ISMRs for all-cancers and colorectal cancer. For men, cancer of the head and neck mortality is also lowest, for women lung and breast cancer mortality complete this list. In contrast, stomach cancer mortality for these groups is highest as well as for FG Italians. FG Italians also have the highest liver cancer ISMR (men: 40.1 [34.5–46.4]; women: 18.1 [14.1–22.9]) but a low ISMR for cancer of the head and neck (men: 17.1 [13.3–21.5]; women: 4.7 [2.7–7.5]). High all-cancer,

Table 1
Background characteristics: Percentages for urbanisation, educational level, housing comfort, and employment status by migrant background and total numbers.
Source: authors' calculations.

	Belgian	FG Italian	SG Italian	FG French	SG French	FG Dutch	SG Dutch	FG Moroccan	SG Moroccan	FG Turkish	SG Turkish
Urbanisation											
Urban	24.4	36.3	30.1	36.3	31.7	17.6	26.5	80.8	78.2	62.4	55.6
Urban agglomeration	11.8	28.1	27.8	10.1	12.0	10.2	12.7	6.7	8.8	8.0	9.2
Banlieue	15.2	9.7	12.8	10.3	13.0	19.4	19.4	3.1	4.0	3.2	4.2
Rural	21.9	9.0	11.5	14.5	16.0	20.0	18.5	4.4	4.9	8.8	10.2
Other	26.8	16.9	17.8	28.8	27.6	32.8	22.8	5.1	4.2	17.5	20.7
Educational level											
(Pre)primary	17.0	39.1	11.1	22.2	14.6	13.1	13.8	43.9	5.6	49.5	8.6
Lower secondary	25.3	25.5	31.6	23.9	24.0	25.0	22.9	15.6	26.4	17.5	32.4
Higher secondary	26.8	14.2	31.8	20.2	27.1	27.3	30.3	14.8	36.7	13.3	37.0
Tertiary	24.7	6.4	18.1	19.3	25.7	26.8	26.7	9.5	17.8	4.5	12.5
Missing	6.3	14.8	7.4	14.5	8.7	7.9	6.3	16.3	13.5	15.2	9.5
Housing comfort											
Tenant/low comfort	8.9	10.5	11.8	15.6	15.6	7.9	9.7	24.3	25.3	14.8	18.5
Tenant/mid comfort	5.5	5.0	6.1	7.9	7.9	7.5	7.2	10.6	13.1	6.2	8.3
Tenant/high comfort	4.8	3.8	4.6	9.3	6.5	10.1	6.3	6.8	7.3	5.0	5.9
Owner/low comfort	21.3	22.4	19.3	18.5	20.5	11.8	16.8	16.1	12.3	23.3	18.5
Owner/mid comfort	17.7	19.0	18.6	11.5	13.7	15.2	16.6	9.1	8.5	12.6	12.3
Owner/high comfort	33.4	27.7	29.5	21.5	24.6	37.7	34.5	15.7	13.1	22.2	20.0
Missing	8.5	11.6	10.2	15.7	11.3	9.9	9.0	17.5	20.4	15.8	16.6
Employment status											
Job	58.6	37.0	66.4	48.7	62.9	54.3	68.2	34.1	54.8	30.6	54.7
No Job	38.1	57.2	28.7	42.6	31.7	40.1	28.3	56.0	33.8	58.6	36.8
Missing	3.3	5.8	4.8	8.7	5.4	5.7	3.6	9.9	11.4	10.8	8.5
Total number	N = 4 464 475	N = 85 974	N = 84 147	N = 61 523	N = 26 269	N = 52 690	N = 23 052	N = 70 878	N = 8 126	N = 40 070	N = 3 154

FG: First generation; SG: Second generation.