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# Hospital admissions in migrant and native groups in the Netherlands

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The views expressed in this paper are those of the authors and do not necessarily reflect the policies or position of Statistics Netherlands

# Introduction

New data have become available on migrant health in the Netherlands by linking records of the Hospital Discharge Register (HDR) of Prismant with the Population Register (PR) by Statistics Netherlands. With the information in the Population Register, data on the ethnic origin of patients could be added to the information on hospital admissions from the HDR.

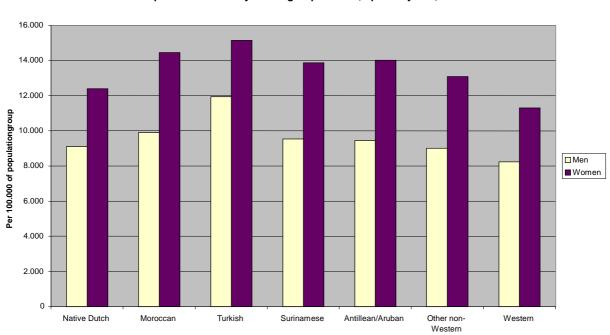
# Methods

The HDR 1995-2001 was linked to the PR 1995-2001 on the basis of the date of birth, sex and postal code of patients. This resulted in 87.6% unique linkages, 8.7% multiple linkages and 3,6% non-linked records. In order to make these uniquely linked records representative for the total population of HDR-records a weighting procedure was applied. This procedure took into account the different linkage probabilities of population groups by country of birth, year of birth, age and sex.

Data on country of origin from the PR were added to the uniquely linked HDR-records. Ethnic origin was derived from these data. Natives were defined as persons whose parents were born in the Netherlands, irrespective of their own country of birth. All other persons were considered to have a foreign background (here also called migrants) of whom the origin is determined by the country of birth of the person; or, in case the latter is the Netherlands, by the country of birth of the father. Hospital admission data of different ethnic groups were compared by means of direct standardisation by age and sex and the population studied was limited to 0-50 years. The latter was done because most migrant population numbers in the older age groups are as yet too small in the Netherlands to reliably describe their admission rates.

## Results

Figure 1 gives the distribution of all hospital admissions of men and women up to age 50, for the 7 main ethnic groups by sex and per 100.000 persons of the corresponding population.

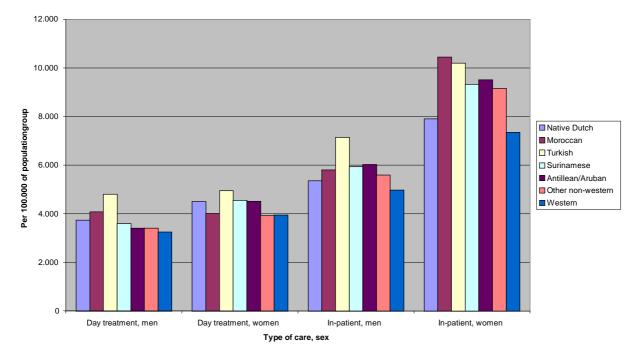


#### 1. Hospital admissions by ethnic group and sex, up to 50 years, 1955-2001

Turkish men have the highest average number of admissions among men. This is followed by men of Moroccan, Surinamese, Antillean/Aruban, native, other non-western and western origin. Among women the highest number of admissions is also found among the Turks. This is followed by women of Moroccan, Antillean/Aruban, Surinamese, other non-western, native and western origin. Apart from admissions of Surinamese and Antillean/Aruban people, of which the calculated 95% confidence margins slightly overlap, all differences are statistically significant.

### Type of care

Hospital admissions can be subdivided in day treatments and in-patient admissions. Day treatments relate to planned hospital care of some hours for research and or treatment on the same day. Clinical or in-patient admissions are all other hospital admissions, usually longer than one day. Figure 2 gives the distribution of hospital admissions for the 7 different ethnic groups, by type of care and sex.



#### 2. Hospital admissions by ethnic group, type of care and sex, up to 50 years, 1995-2001

The number of in-patient admissions is higher among women than men. Turkish people have most hospital admissions, except that Moroccan women have most in-patient admissions. People of western origin have the lowest number of admissions all-over.

#### Diagnosis

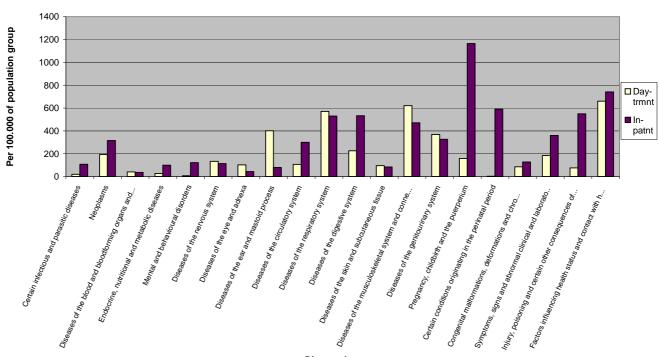
The hospital admission data can be broken down by diagnosis. This is done according to the recommended Hospital Data Project classification, based on the International Classification of Diseases, Injuries and Causes of Death, 9<sup>th</sup> revision, Clinical Modification (ICD-9, CM). Table 1 shows the 20 main groups with their corresponding ICD-codes.

Table 1

HDP diagnostic main groups with corresponding ICD-9 codes

Diagnostic group	ICD-9 codes
1 Certain infectious and parasitic diseases	001-033, 034.1-099.2, 099.5-134.9, 136.0, 136.2-139.8, 279.5-279.
2 Neoplasms	140-239
3 Diseases of the blood and bloodforming organs and disorders involving immune	135, 279.0-279.3, 279.8-279.9, 280-289
4 Endocrine, nutritional and metabolic diseases	240-278
5 Mental and behavioural disorders	290-319
6 Diseases of the nervous system	320-359, 435
7 Diseases of the eye and adnexa	360-379
8 Diseases of the ear and mastoid process	380-389
9 Diseases of the circulatory system	390-434, 436-445, 447-459
10 Diseases of the respiratory system	034.0, 460-519
11 Diseases of the digestive system	520-579
12 Diseases of the skin and subcutaneous tissue	680-709
13 Diseases of the musculoskeletal system and connective tissue	099.3, 136.1, 279.4, 446, 710-739
14 Diseases of the genitourinary system	099.4, 580-598, 599.0-599.6, 599.8-599.9, 600-629, 788.0
15 Pregnancy, childbirth and the puerperium	630-676
16 Certain conditions originating in the perinatal period	760-779
17 Congenital malformations, deformations and chromosomal abnormalities	740-759
18 Symptoms, signs and abnormal clinical and laboratory findings, not elswhere classified	599.7, 780-787, 788.1-788.9, 789-799
19 Injury, poisoning and certain other consequences of external causes	800-999
20 Factors influencing health status and contact with health services	V01-V82

Figure 3 shows differences in admission rates for the 20 HDP diagnostic main groups by type of care. This gives an overview of the relative contribution of a certain diagnostic group to all admissions. Some groups, like *diseases of the blood and bloodforming organs* contribute little to the total of admissions, while others, like *pregnancy, childbirth, and the puerperium,* have a high contribution. Figure 3 also gives the distribution of day treatments and in-patient admissions per diagnostic group. It shows e.g. that for *diseases of the ear* mainly day treatments occur, while for *pregnancy, childbirth and the puerperium* as well as for *certain conditions originating in the perinatal period* there are mainly in-patient admissions.



#### 3. Admission rates by diagnostic group and type of care, up to 50 years, 1995-2001

Diagnostic group

In order to find out whether or not hospital admissions differ for the seven ethnic groups by diagnosis, admission rates with corresponding 95% confidence margins (1,96 x standard error) were calculated for all 20 main groups and underlying 130 subgroups. The results per diagnostic main group, type of care and sex are given in the tables 2a, 2b, 2c and 2d (see Annex). Results per diagnostic subgroup are available on request. The most important findings per ethnic group are summarized here.

The **native Dutch** population has the most admissions for *diseases of the musculoskeletal system and connective tissue*. With respect to day treatments this mainly relates to *internal derangement of knee*. The in-patient admissions mainly concern *intervertebral disc disorders*. Natives also have the most admissions for *diseases of the nervous system*, particularly due to *multiple sclerosis*. Additionally they have the most day treatments for *diseases of the ear* (*otitis media*) and among men also for *congenital malformations of the sex organs*.

**Moroccan** women are admitted mostly in connection with *pregnancy*, *childbirth and the puerperium*. Furthermore women have most in-patient admissions for *diseases of the digestive system* (especially *gallstone disease*). Moroccan and Turkish men have the most day treatments for *circumcisions* (partly registered in the HDR in the group *diseases of the genitourinary system*, partly in *factors influencing health status and contact with health services*). They have also most admissions for *endocrine*, *nutritional and metabolic diseases*, mainly because of *diabetes*.

**Turks** have the most admissions for *diseases of the respiratory system*. These admissions relate to *chronic diseases of tonsils and adenoids* and *other diseases of upper respiratory tract*. Furthermore Turks have more in-patient admissions because of *diseases of the digestive system* (among men mainly *hernia ingualis* and *diseases of the appendix* and among women gallstone *disease*). Together with Surinamese people they also have the most admissions for *diseases of the circulatory system*. Turkish and Moroccan men have most day treatments for *circumcisions*. Furthermore Turkish men and women have the most admissions for *symptoms, signs and abnormal clinical and laboratory findings*. Finally Turks relatively often are admitted as inpatients because of *diseases of the ear and mastoid process* and *congenital malformations, deformations and chromosomal abnormalities*.

**Surinamese** people have the most admissions for *certain conditions originating in the perinatal period*. Together with Turks, they also have the most admissions for *diseases of the circulatory system* and most day treatments because of *diseases of the skin and subcutaneous tissue*. Surinamese women, together with Antillean/Aruban women, have the most admissions for *diseases of the genitourinary system* and most in-patient admissions for *neoplasms* (especially *leiomyoma of uterus*) and *obesity*. Surinamese women also have more in-patient admissions for *sickle cell anaemia*.

Antillean/Aruban and Surinamese women have the most hospital admissions for *diseases of the genitourinary system, neoplasms* and *obesity*. Antillean/Aruban men are most often admitted as in-patients because of *sickle cell anaemia* and for *injury, poisoning and certain other consequences of external causes*. Besides this they have also more day treatments for *diseases of the eye and adnexa* and for *infectious and parasitic diseases* (mainly *HIV*) than men of other ethnic groups.

In the group **other non-western migrants** the high number of in-patient admissions for *infectious and parasitic diseases* is striking (mainly *tuberculosis* and *malaria*, and for women also because of *HIV*). They also have relatively many day treatments for *thalassaemia*. In

addition to this, women of non-western origin have comparatively many admissions due to *pregnancy, childbirth and the puerperium.* 

Of all ethnic groups **western migrants** have fewest hospital admissions and in this regard, they seem a relatively healthy group. Subdivided by diagnostic group no highlights are found. For the greater part they resemble the native population, except they don't have a peak for diseases of the musculoskeletal system and connective tissue.

# Discussion

By means of record linkage of the Hospital Discharge Register to the Population Register important additional information could be obtained on health of migrant population groups. This study shows that people of Turkish origin are admitted to hospital most frequently, and differentiated by diagnosis there are also clear differences in admission rates between the distinguished ethnic groups.

A major advantage of this type of study, when compared to special surveys among migrants, is that it is based on existing register data. This is cost-effective (no new data collection required) and it enables analyses on large numbers (in this case nearly all hospital admissions of the entire registered population up to 50 years). In addition, the use of national medical registers provides objective health characteristics, and the variable used to characterize ethnic origin (country of birth) is systematically recorded in the population register. There are also limitations in using country of birth (of the person or its parents) to define ethnic origin. It can e.g. well be used for migrants from countries with a population that is ethnically rather homogeneous (like Moroccans, Turks), but in migrant groups that are of heterogeneous ethnic origin (like Surinamese people) existing ethnic health differences may become indiscernible in the total group. On the other hand, even in these groups this study did produce some expected ethnic differences, like the higher admission rates for sickle cell anaemia among Surinamese and Antillean/Aruban people (negroid race) and for thalassaemia among other non-western migrants (South-East Asians). Other results of this study are also comparable with those found elsewhere, like the higher prevalence of diabetes among migrant groups (especially Moroccans) and of cardiovascular diseases among Surinamese and Turkish people.

This supports the utility of this type of linked data to describe differences in health status and use of health care services among migrant and native population groups.

## References

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Annex Table 2a, 2b, 2c and 2d

#### Table 2a

Standardised number of in-patient admissions of men up to 50, by ethnic group per 100.000 persons of corresponding population group (95% confidence margin in italic)

HDP-code	Diagnostic group	Native Dutch	Ν	Moroccon	Т	Turkish Surinamese			ntillean/ ruban	other non-Western			Western	Total		
0100	Certain infectious and parasitic diseases	111	1	162	13	164	10	163	10	172	18	265	10	120	5	121 1
0200	Neoplasms	204	2	144	19	203	14	162	11	196	22	179	10	187	6	200 2
0300	Diseases of the blood and bloodforming organs and certain disorders involving the immune mechanism	30	1	44	7	77	7	81	7	171	18	56	5	31	2	35 1
0400	Endocrine, nutritional and metabolic diseases	70	1	150	15	113	9	113	9	104	14	99	7	65	3	74 1
0500	Mental and behavioural disorders	97	1	102	12	121	9	124	9	112	15	107	7	112	4	101 1
0600	Diseases of the nervous system	107	1	100	12	95	8	87	7	91	12	76	6	91	4	104 1
0700	Diseases of the eye and adnexa	46	1	55	10	50	6	70	7	66	12	57	5	46	3	47 1
0800	Diseases of the ear and mastoid process	87	1	86	11	137	10	63	6	44	8	97	6	67	3	85 1
0900	Diseases of the circulatory system	340	2	268	27	558	25	501	19	310	27	296	13	324	6	342 2
1000	Diseases of the respiratory system	519	3	807	30	1032	25	592	18	656	33	676	16	495	9	545 3
1100	Diseases of the digestive system	544	3	639	33	779	24	577	19	580	33	581	16	489	9	548 3
1200	Diseases of the skin and subcutaneous tissue	86	1	108	11	179	11	116	8	108	14	105	7	86	4	91 1
1300	Diseases of the musculoskeletal system and connective tissue	504	3	337	25	447	19	355	15	410	28	294	11	393	7	481 2
1400	Diseases of the genitourinary system	149	2	197	20	268	15	196	11	199	19	177	9	139	5	154 <i>1</i>
1500	Pregnancy, childbirth and the puerperium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
1600	Certain conditions originating in the perinatal period	633	3	589	13	575	12	692	16	624	24	645	10	589	9	628 2
1700	Congenital malformations, deformations and chromosomal abnormalities	146	2	130	8	156	8	122	8	108	12	126	6	122	5	143 1
1800	Symptoms, signs and abnormal clinical and laboratory findings, not elswhere classified	338	2	394	24	581	21	448	17	425	28	388	13	326	7	349 2
1900	Injury, poisoning and certain other consequences of external causes	653	3	755	30	746	22	706	21	890	39	614	16	621	10	658 3
2000	Factors influencing health status and contact with health services	696	3	740	21	850	19	770	19	764	31	753	14	674	10	707 3
Total	All causes	5358	8	5806	81	7133	64	5937	52	6030	92	5590	42	4978	25	5411 7

Table 2b

Standardised number of in-patient admissions of women up to 50, by ethnic group per 100.000 persons of corresponding population group (95% confidence margin in italic)

HDP-code	Diagnostic group	Native Dutch	N	loroccon	٦	Turkish Surinamese		Antillean/ Aruban		other non-Western					Western		Total
0100	Certain infectious and parasitic diseases	87	1	135	12	139	9	120	8	123	14	197	9	90	4	95 1	
0200	Neoplasms	432	3	316	29	387	21	558	19	632	38	458	17	424	8	435 2	
0300	Diseases of the blood and bloodforming organs and certain disorders involving the immune mechanism	32	1	74	14	96	9	155	9	96	13	91	7	33	2	39 1	
0400	Endocrine, nutritional and metabolic diseases	120	1	188	20	200	14	212	11	213	20	125	8	114	4	125 1	
0500	Mental and behavioural disorders	147	2	136	17	164	12	107	8	118	15	103	7	149	5	146 1	
0600	Diseases of the nervous system	130	1	85	10	109	9	93	7	115	14	82	6	102	4	124 1	
0700	Diseases of the eye and adnexa	41	1	54	10	70	8	69	7	54	11	46	5	36	2	42 1	
0800	Diseases of the ear and mastoid process	76	1	86	11	137	10	59	6	30	7	84	6	57	3	75 1	
0900	Diseases of the circulatory system	257	2	217	26	319	18	334	14	254	23	200	11	225	5	255 2	
1000	Diseases of the respiratory system	504	3	704	29	847	24	513	17	567	30	505	15	477	9	514 3	
1100	Diseases of the digestive system	517	3	800	43	724	25	539	17	576	32	488	16	464	8	519 3	
1200	Diseases of the skin and subcutaneous tissue	77	1	87	15	103	9	118	8	115	14	79	6	81	3	80 1	
1300	Diseases of the musculoskeletal system and connective tissue	485	3	267	28	398	19	374	15	365	26	239	12	384	7	461 2	
1400	Diseases of the genitourinary system	503	3	424	31	628	24	688	20	727	37	506	16	464	8	506 3	
1500	Pregnancy, childbirth and the puerperium	2266	6	4465	74	3184	42	2774	36	2975	67	3606	38	2101	16	2372 5	
1600	Certain conditions originating in the perinatal period	555	3	510	12	487	12	616	15	577	24	568	10	523	9	551 2	
1700	Congenital malformations, deformations and chromosomal abnormalities	113	1	101	8	121	8	99	7	87	11	104	6	98	4	111 1	
1800	Symptoms, signs and abnormal clinical and laboratory findings, not elswhere classified	362	2	479	27	609	22	482	17	479	29	401	14	347	7	372 2	
1900	Injury, poisoning and certain other consequences of external causes	433	3	393	25	525	19	476	16	495	29	419	14	437	8	438 2	
2000	Factors influencing health status and contact with health services	762	3	919	28	945	21	933	21	912	35	857	16	733	11	777 3	
Total	All causes	7898	10	10438	118	10189	78	9319	64	9508	116	9159	59	7339	30	8036 <i>9</i>	

#### Table 2c

Standardised number of day treatments of men up to 50, by ethnic group per 100.000 persons of corresponding population group (95% confidence margin in italic)

HDP-cod	e Diagnostic group	Native Dutch	Moroccon		Turkish	S	urinamese		ntillean/ ruban		ther on-Western	V	Vestern		Total
0100	Certain infectious and parasitic diseases	19	1 19	96	19	4	19	3	61	12	33	4	25	2	20 1
0200	Neoplasms	139	2 108	3 15	150	11	97	8	129	17	98	7	127	5	135 1
0300	Diseases of the blood and bloodforming organs and certain disorders involving the immune mechanism	40	1 46	5 5	70	6	80	7	71	11	101	6	54	3	46 1
0400	Endocrine, nutritional and metabolic diseases	21	1 17	75	17	3	25	4	13	5	13	2	22	2	21 1
0500	Mental and behavioural disorders	7	0 8	32	11	2	11	2	8	3	8	2	7	1	7 0
0600	Diseases of the nervous system	85	1 4	5 10	56	7	41	5	46	10	38	4	63	3	80 1
0700	Diseases of the eye and adnexa	87	1 107	7 13	127	10	121	9	153	18	104	7	75	4	89 1
0800	Diseases of the ear and mastoid process	489	3 197	7 10	293	11	293	12	252	17	236	8	352	8	446 2
0900	Diseases of the circulatory system	88	1 66	5 12	124	11	102	8	92	14	82	6	85	3	88 1
1000	Diseases of the respiratory system	621	3 572	2 16	801	18	538	16	482	24	554	13		10	612 3
1100	Diseases of the digestive system	249	2 285	5 19	308	14	250	12	272	21	232	10	224	6	248 2
1200	Diseases of the skin and subcutaneous tissue	91	1 82	2 11	134		224	12	165	19	109	6	90	4	95 1
1300	Diseases of the musculoskeletal system and connective tissue	718	3 429	28	530	21	481	17	524	32	342	12	544	9	676 3
1400	Diseases of the genitourinary system	237	2 484	1 16	474	15	305	13	286	20	346	10	257	7	262 2
1500	Pregnancy, childbirth and the puerperium	0	0 (	) 0	0	0	0	0	0	0	0	0	0	0	0 0
1600	Certain conditions originating in the perinatal period	4 (	0 4	1 1	4	1	4	1	5	3	5	1	4	1	4 0
1700	Congenital malformations, deformations and chromosomal abnormalities	116	1 92		93	6	81	6	73	10	78	5	88	4	110 1
1800	Symptoms, signs and abnormal clinical and laboratory findings, not elswhere classified	160	2 164	1 15	293	14	207	11	159	17	173	8	158	5	164 1
1900	Injury, poisoning and certain other consequences of external causes	91	1 103	3 11	114	8	100	8	99	13	83	6	88	4	92 1
2000	Factors influencing health status and contact with health services	472	3 125	5 30	1188	24	615	19	517	30	779	16	476	9	544 3
Total	All causes	3733	7 408	l 60	4805	51	3592	44	3405	74	3413	34	3254	22	3738 6

#### Table 2d

Standardised number of day treatments of women up to 50, by ethnic group per 100.000 persons of corresponding population group (95% confidence margin in italic)

HDP-cod	e Diagnostic group	Native Dutch	Morocc	on	Turkish	Su	urinamese		Antillean/ Aruban	other non-We	stern	V	Vestern		Total
0100	Certain infectious and parasitic diseases	21	1	37 12	29	4	20	3	18	5	25	3	25	2	21 1
0200	Neoplasms	255 2	21	77 19	9 214	14	274	13	235	22	227	12	252	6	253 2
0300	Diseases of the blood and bloodforming organs and certain disorders involving the immune mechanism	33	1	53 a	81	7	64	6	43	9	96	7	26	2	37 1
0400	Endocrine, nutritional and metabolic diseases	32	1	39 12	2 30	5	45	5	36	8	29	4	31	2	32 1
0500	Mental and behavioural disorders	6 0	0	7 2	? 6	2	5	2	4	2	5	2	4	1	6 <i>0</i>
0600	Diseases of the nervous system	201 2	2	98 14	4 159	12	97	8	174	18	70	6	151	4	188 2
0700	Diseases of the eye and adnexa	119	1 1	10 13	3 127	10	120	8	119	15	99	7	96	4	117 1
0800	Diseases of the ear and mastoid process	391 2	21	54 10	) 227	10	221	10	174	15	170	7	272	7	354 2
0900	Diseases of the circulatory system	130	1 1	01 17	7 126	11	116	8	110	15	81	7	109	4	126 1
1000	Diseases of the respiratory system	542 3	3 4	83 17	650	17	446	15	418	23	452	12	447	9	530 3
1100	Diseases of the digestive system	202 2	2 2	23 18	3 274	14	237	11	247	20	191	9	189	5	203 2
1200	Diseases of the skin and subcutaneous tissue	96	1	59 7	7 90	8	140	9	77	11	78	6	95	4	96 1
1300	Diseases of the musculoskeletal system and connective tissue	602 3	3 2	44 24	437	21	370	15	481	31	248	12	450	8	562 3
1400	Diseases of the genitourinary system	471 :	3 4	70 33	3 564	22	604	18	637	35	557	17	466	8	479 2
1500	Pregnancy, childbirth and the puerperium	293 2	26	13 31	512	18	553	17	536	29	620	16	310	6	323 2
1600	Certain conditions originating in the perinatal period	2 (	0	2 1	2	1	2	1	2	2	2	1	2	1	2 0
1700	Congenital malformations, deformations and chromosomal abnormalities	63	1	43 5	5 58	5	56	6	49	9	48	4	56	3	61 1
1800	Symptoms, signs and abnormal clinical and laboratory findings, not elswhere classified	202 2	2 2	22 20	293	15	262	12	274	23	199	10	191	5	205 2
1900	Injury, poisoning and certain other consequences of external causes	58	1	50 9	9 57	6	62	6	59	10	57	5	53	3	58 1
2000	Factors influencing health status and contact with health services	778 3	3 8	21 40	0 1011	29	855	22	817	39	666	18	728	10	780 3
Total	All causes	4495 8	8 40	06 81	4944	59	4549	48	4510	87	3919	42	3953	23	4432 7