



Rijksinstituut voor Volksgezondheid
en Milieu
*Ministerie van Volksgezondheid,
Welzijn en Sport*

A. van Leeuwenhoeklaan 9
3721 MA Bilthoven
Postbus 1
3720 BA Bilthoven
www.rivm.nl
KvK Utrecht 30276683
T 030 274 91 11
F 030 274 29 71
info@rivm.nl

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By
Caroline van Rossum
Marja Beukers
Gerda van Donkersgoed

Centrum voor Voeding, Pre-
ventie en Zorg
VCP@rivm.nl

memo

Caffeine intake in the Netherlands
Results based on DNFCS 2012-2016

Key findings

- The mean intake of caffeine is 3.2 gram per kg body weight for the whole population.
- The mean intake of caffeine is the highest for people aged 51-69 years and higher for men than for women.

Introduction

In response to a question of the Netherlands Nutrition Centre (Voedingscentrum) the mean intake of caffeine is analyzed for different age-sex groups of the DNFCS 2012-2016.

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Method

There are many foods, including beverages, that can constitute the daily intake of caffeine. To assess the expected intake of caffeine from the diet, not including supplements, a chronic dietary intake assessment for the general population was performed using the Monte Carlo Risk Assessment (MCRA) calculation tool (version 8.3; MCRA, 2019).

Consumption data of foods containing caffeine were obtained from the Dutch National Food Consumption Survey (DNFCS) 2012-2016 (Van Rossum, 2018). In this DNFCS, 4313 persons aged 1 to 79 have reported the food and drinks they have consumed on two non-consecutive days. Body weight was self-reported, except for the 1-15- and 71-79-year-olds; for these age groups body weight was measured during a home visit. Average caffeine values in foods were obtained from EFSA (2015; see Appendix) and linked to the consumption data (see also Buijtenhuijs, 2020).

The chronic exposure to caffeine was calculated using the Observed Individual Means (OIM) model as implemented in MCRA (De Boer et al., 2019). First, the consumed amount of each caffeine containing food item per person-day was multiplied with the average caffeine concentration. Subsequently the intakes per food were summed to obtain the total intake of caffeine per person-day. These daily exposures were averaged across the days per person which resulted in a distribution of mean daily exposures per person (OIMs). These mean daily exposures were calculated per person and per kg bodyweight. This distribution of mean daily exposures was quantified by calculating the mean, the median (P50) and 95th percentile (P95) of exposure in accordance with the EFSA opinion of 2015. This distribution of mean exposure per day reflects the chronic exposure.

The mean daily exposures were weighed for age, sex, region, education, level of urbanization, day of the week and season using weighing factors. This ensured that the estimates were representative for the Dutch population and for the entire year. All available days (including days when no foods containing caffeine were consumed) from the DNFCS were included in the exposure assessment.

Results

The results are presented in Table 1 to 3. The average estimated chronic intake of caffeine for the whole population amounted to 252 mg per person per day (and 646 at the P95), corresponding to 3 mg/kg body weight per day (Table 1).

The intake varied by age, the highest mean estimated chronic intake of caffeine amounted to 371 mg per person per day for men and 321 mg per person per day for women, both aged 51-69 years (Table 2 and 3).

The intake among boys/men was higher than that of girls/women.

The tables shows also the percentage of the population with a caffeine intake above the limit. For adults about 1 out of 4 had a value above the limit. For children, this percentage was about 7%.

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Table 1. Chronic dietary intake of caffeine for different age groups (DNFCs 2012-2016)

Age group	n	Average		50th percentile		95th percentile		Limit		%>limit
		mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	
1-3 years	372	16	1.10	5	0.33	62	4.47		3	12
4-8 years	520	22	0.92	8	0.35	78	3.23		3	7
9-13 years	519	38	0.90	23	0.52	127	3.05		3	5
14-18 years	524	76	1.20	50	0.8	265	3.99		3	8
19-30 years	514	205	2.75	169	2.32	500	6.71	400		12
31-50 years	523	302	3.71	265	3.15	700	8.35	400		25
51-69 years	501	345	4.25	307	3.73	729	8.67	400		32
70-80 years	538	292	3.68	277	3.41	608	7.38	400		20
Whole population	4313	252	3.23	218	2.75	646	7.93			

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Table 2. Chronic dietary intake of caffeine for boys/men in different age groups (DNFCs 2012-2016)

Age group	n	Average		50th percentile		95th percentile		Limit		%>limit
		mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	mg/day	mg/kg bw per day	
1-3 years	332	14	0.96	4	0.3	59	4.37		3	10
4-8 years	261	21	0.87	8	0.35	68	3.15		3	6
9-13 years	259	41	0.95	23	0.53	128	3.21		3	6
14-18 years	270	80	1.22	50	0.75	268	3.83		3	8
19-30 years	260	224	2.83	192	2.46	521	6.67	400		14
31-50 years	259	338	3.90	293	3.28	756	8.55	400		31
51-69 years	251	371	4.25	328	3.69	784	8.78	400		37
70-80 years	273	315	3.66	290	3.42	637	7.37	400		26
Whole population	2165	274	3.29	244	2.85	703	7.99			

Table 3. Chronic dietary intake of caffeine for girls/women in different age groups (DNFCs 2012-2016)

Age group	n	Average		50th percentile		95th percentile		Limit		%>Limit
		mg/ day	mg/ kg bw per day	mg/ day	mg/ kg bw per day	mg/ day	mg/ kg bw per day	mg/ day	mg/ kg bw per day	%
1-3 years	340	17	1.23	5	0.37	65	4.59		3	14
4-8 years	259	24	0.97	8	0.35	84	3.42		3	7
9-13 years	260	37	0.86	22	0.51	123	2.84		3	5
14-18 years	254	72	1.18	48	0.82	252	4.04		3	8
19-30 years	256	185	2.67	149	2.15	478	6.91	400		9
31-50 years	264	264	3.52	231	2.94	638	8.23	400		20
51-69 years	250	321	4.24	285	3.77	677	8.60	400		28
70-80 years	265	271	3.70	261	3.38	498	7.36	400		14
Whole population	2148	230	3.18	196	2.67	583	7.88			

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References

D.W. Buijtenhuijs et al. Risk assessment of caffeine in food supplements. Bilthoven, RIVM, 2020. RIVM report 2020-0022.

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EFSA (2015). Scientific Opinion on the safety of caffeine. EFSA NDA Panel (EFSA Panel on Dietetic Products, Nutrition and Allergies), 2015. EFSA Journal 2015; 13(5): 4102, 120 pp.

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Appendix

Average concentration levels of caffeine in caffeine containing products, taken from EFSA (2015)

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Table 1 Caffeine concentrations in food and beverage

Groups	Subgroups	Caffeine concentration used in the intake assessment (mg/L or mg/kg)
Chocolate	Chocolate bar	111
	Milk chocolate	168
	Chocolate snacks	168
	Cocoa beverage based on cocoa powder	168
	Cocoa beverage based on cocoa-beverage preparation powder	42
	Dark chocolate	525
Coffee	Coffee drink	445
	Cappuccino	273
	Espresso coffee	1340
	Decaffeinated and imitations	21
	Instant coffee, ready to drink	445
Tea	Black tea	220
	Green tea	151
	Tea (unspecified)	165
	Tea, decaffeinated	25
Cola beverages (caffeinated)		108
'Energy drinks'		320