



Dietary Cadmium Intake in an Italian Population

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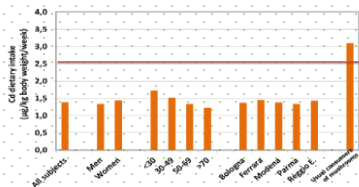
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Objectives: Cadmium has been recognized as a carcinogen on the basis of occupational studies. The main source of exposure to cadmium, except for smokers and for occupationally-exposed individuals, is food. It has been reported that more than 80% of food-based cadmium comes from cereals and vegetables. The average cadmium intake from food generally varies between 8 and 25 µg/day. However, the amount of exposure may differ among individuals. Limited evidence about current main sources of cadmium intake in the Italian population, however, is available.

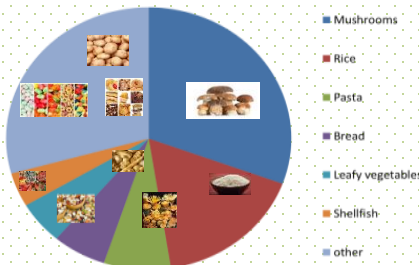
Results: Daily average cadmium intake was 14.04 (±7.82) µg, 0.21 µg/kg body weight in women and 0.19 µg/kg body weight in men. These values are lower than those reported for the whole European population (0.36 µg/kg body weight/die) and they are unequivocally below the limit of 1 µg/kg established by the Joint FAO/WHO Expert Committee on Food. In fact, in the current study food categories that most contributed to cadmium intake were mushrooms (30.6%), rice (16.9%), pasta (7.6%), bread (6.1%), leafy vegetables (5.3%) and shellfish (4.2%).



Graphic 1. Annual average Cd dietary intake (µg/kg body weight/week)

Food	Cd intake
Mushrooms	30,6%
Rice	16,9%
Pasta	7,6%
Bread	6,1%
Leafy vegetables	5,3%
Shellfish	4,2%

Table 2. Food categories which gave the major contribution to Cd dietary intake



Conclusions: Our analysis suggests that cadmium exposure to this northern Italy population is lower than that expected on the basis of the European average intake.

Materials and Methods: We estimated cadmium intake in 719 residents of Bologna, Ferrara, Modena, Parma and Reggio Emilia, five provinces of Emilia Romagna region in northern Italy. We used a validated food frequency questionnaire specifically developed as a part of the European Prospective Investigation into Cancer and Nutrition (EPIC) study specific for the Northern Italy population.

Participants were asked to respond to 248 questions about 188 different food items, including seasonal foodstuffs, and to indicate the number of times a given item was consumed (per day, week, month, or year). The food items were then linked to the Italian Food Tables to obtain estimates of Cd dietary intake. We calculated the cadmium dietary intake and we identified the food categories or single foods which gave a major contribution to cadmium intake.

	n	(%)	Mean±SD (min-max)
All subjects	719	(100.0)	1.39±0.8 (0.16-5.62)
Gender			
Men	319	(44.4)	1.34±0.7 (0.20-5.62)
Women	400	(55.6)	1.44±0.8 (0.16-5.20)
Age (years)			
<30	15	(2.1)	1.72±0.7 (0.68-2.99)
30-49	257	(35.7)	1.52±0.8 (0.34-5.20)
50-69	327	(45.5)	1.34±0.7 (0.16-4.34)
≥70	120	(16.7)	1.23±0.9 (0.19-5.62)
Province			
Bologna	198	(27.5)	1.37±0.8 (0.16-5.20)
Ferrara	93	(12.9)	1.45±0.7 (0.40-4.12)
Modena	234	(32.6)	1.38±0.8 (0.19-5.62)
Parma	57	(7.9)	1.34±0.7 (0.36-4.59)
Reggio E.	137	(19.1)	1.43±0.7 (0.24-3.75)
Usual consumer of mushrooms*	12	(1.7)	3.1±0.9 (1.95-4.63)

Table 1. Annual average Cd dietary Intake (µg/kg body weight/week)

Nordberg, G.F.; Nogawa, K.; Nordberg, M.; Friberg, L.T. Foreword Metals—A new old environmental problem and Chapter 23: Cadmium. In Handbook on the Toxicology of Metals, 3rd ed.; Nordberg, G.F., Fowler, B.A., Nordberg, M., Friberg, L.T., Eds.; Academic Press: Burlington, MA, USA, 2011; pp. vii, 446-451, 463-470, 600-609.

Goyer, R.A.; Clarkson, T.W. Toxic effects of metals. In Casarett and Doull's Toxicology: The Basic Science of Poisons, 6th ed.; Klaassen, C., Ed.; McGraw-Hill Health Professions Division: New York, NY, USA, 2001; pp. 822-826
Joint FAO/WHO Expert Committee on Food