

# FOOD INTAKE OF ZINC AND CADMIUM IN A NORTHERN ITALY POPULATION

Carlotta Malagoli<sup>1</sup>, Marcella Malavolti<sup>1</sup>, Sabina Sieri<sup>2</sup>, Vittorio Krogh<sup>2</sup>, Ilaria Bottecchi<sup>1</sup>,  
Tommaso Filippini<sup>1</sup>, Marina Modenesi<sup>3</sup>, Luciano Vescovi<sup>3</sup>, Marco Vinceti<sup>1</sup>

<sup>1</sup>Environmental, Genetic and Nutritional Epidemiology Research Center, Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy; <sup>2</sup>Epidemiology and Prevention Unit, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy; <sup>3</sup>Gruppo IREN, Reggio Emilia e Piacenza, Italy.



## BACKGROUND

Some trace elements are essential for humans; their deficiency may cause abnormal biological functions, whereas excessive intakes may produce adverse health effects. The aim of this study was to estimate the daily intake through diet of zinc (Zn) and cadmium (Cd) in a Northern Italy population and verify the compliance with recommended levels of intake for Italian population recently updated by Italian Society of Human Nutrition (SINU) and European Food Safety Authority (EFSA).

## METHODS

We investigated dietary intake of Zn, and Cd in 719 residents of five provinces of Emilia Romagna region in Northern Italy, using a validated semi-quantitative food frequency questionnaire designed to capture eating behaviors in Italy, specifically developed as part of the European Prospective Investigation into Cancer and Nutrition study, for the Northern Italy population.

Figure 1. EPIC Food Frequency Questionnaire for the assessment of cadmium and zinc intake

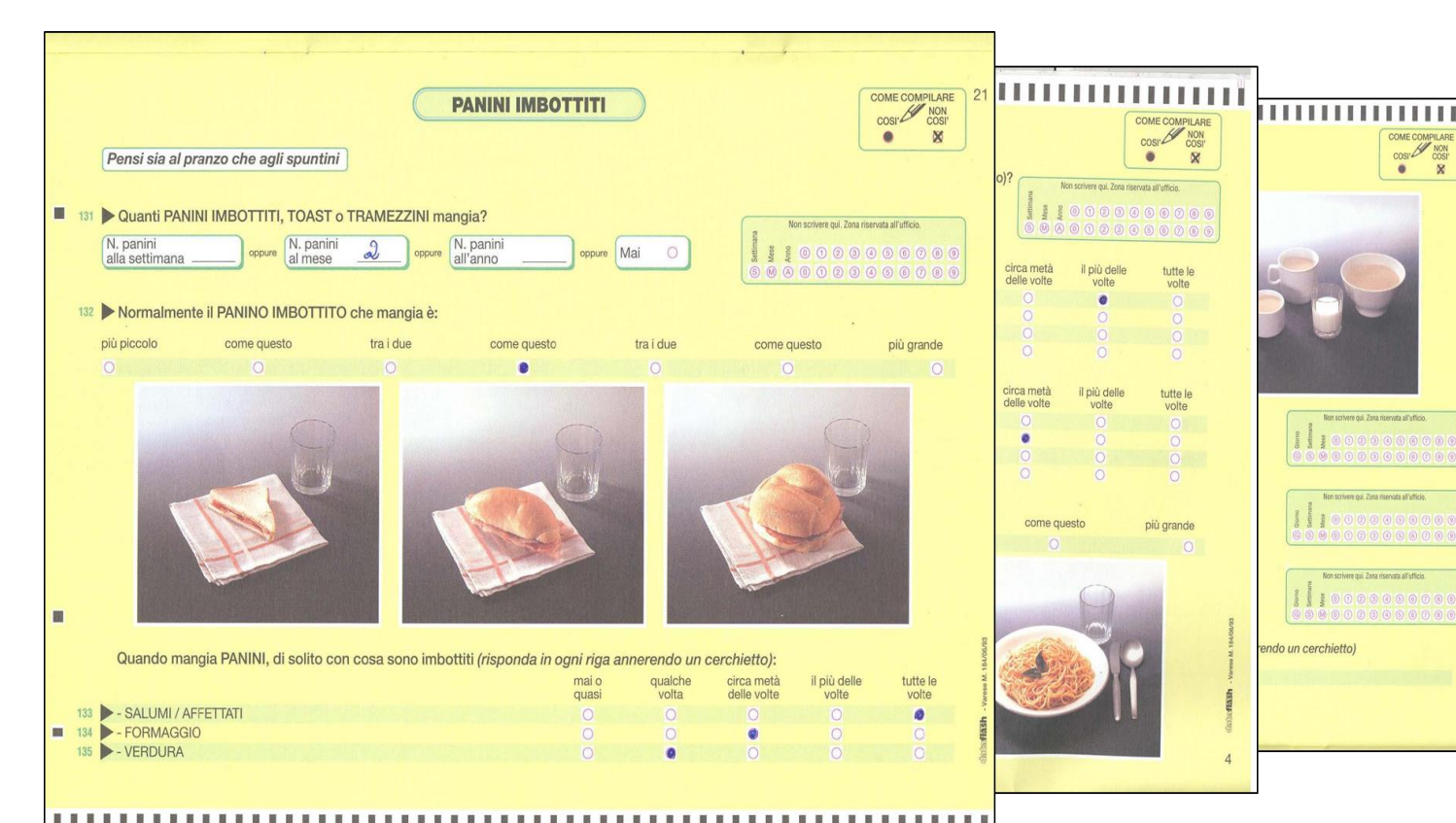


Figure 1. Emilia Romagna region, Northern Italy

Emilia Romagna

Provinces:

Bologna  
Ferrara  
Modena  
Parma  
Reggio Emilia



## RESULTS

We analyzed the diet of 319 men and 400 women, mean ( $\pm$ SD) aged 59.0 ( $\pm$  14.0) and 52.3 ( $\pm$ 14.1) respectively. The daily average ( $\pm$ SD) intake of Zn was 11.99 ( $\pm$ 4.31) mg/day in men and 10.83 ( $\pm$ 4.06) mg/day in women. The weekly/kg body weight average ( $\pm$ SD) intake of Cd was 1.34 ( $\pm$ 0.75)  $\mu$ g/kg body weight in men and 1.44 ( $\pm$ 0.79)  $\mu$ g/kg body weight in women.

Food intake levels of Zn were above the recommended values and well below the upper safe levels set by SINU for healthy adults. Cd intake did not exceed the safety limits established by European Food Safety Authority (EFSA).

Figure 2. Zinc daily food intake (mg/day) in men and women, Emilia Romagna, Italy

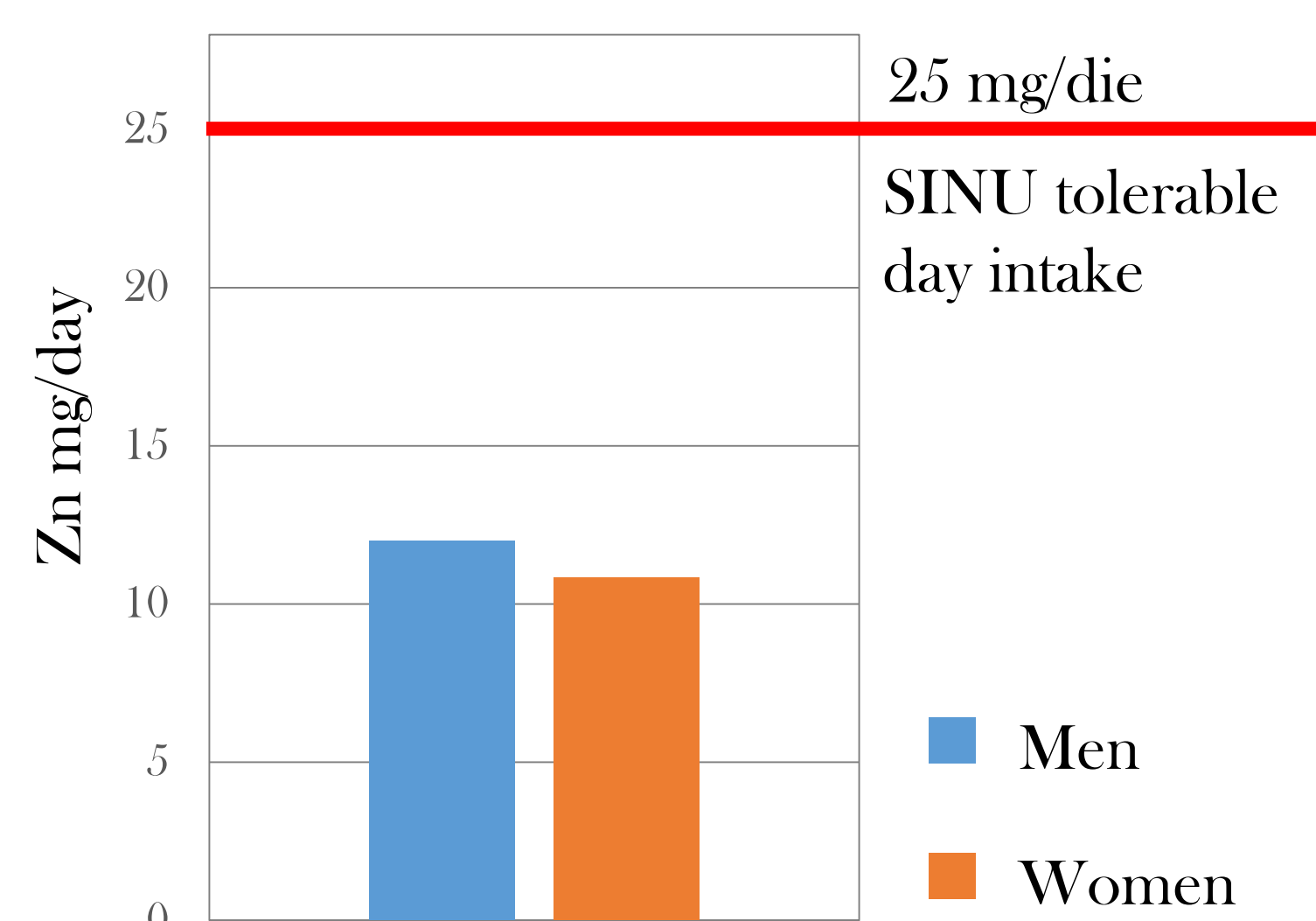
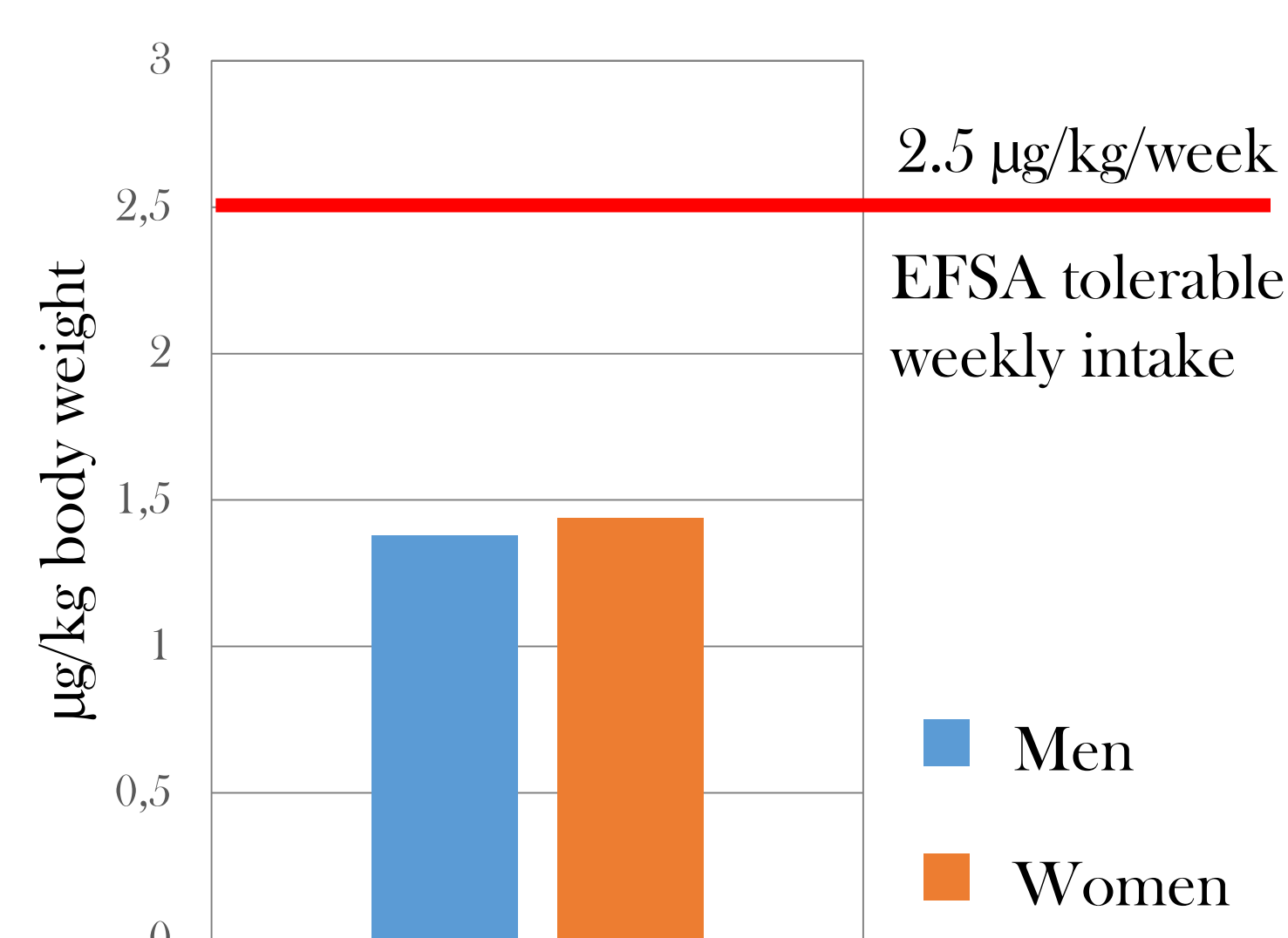


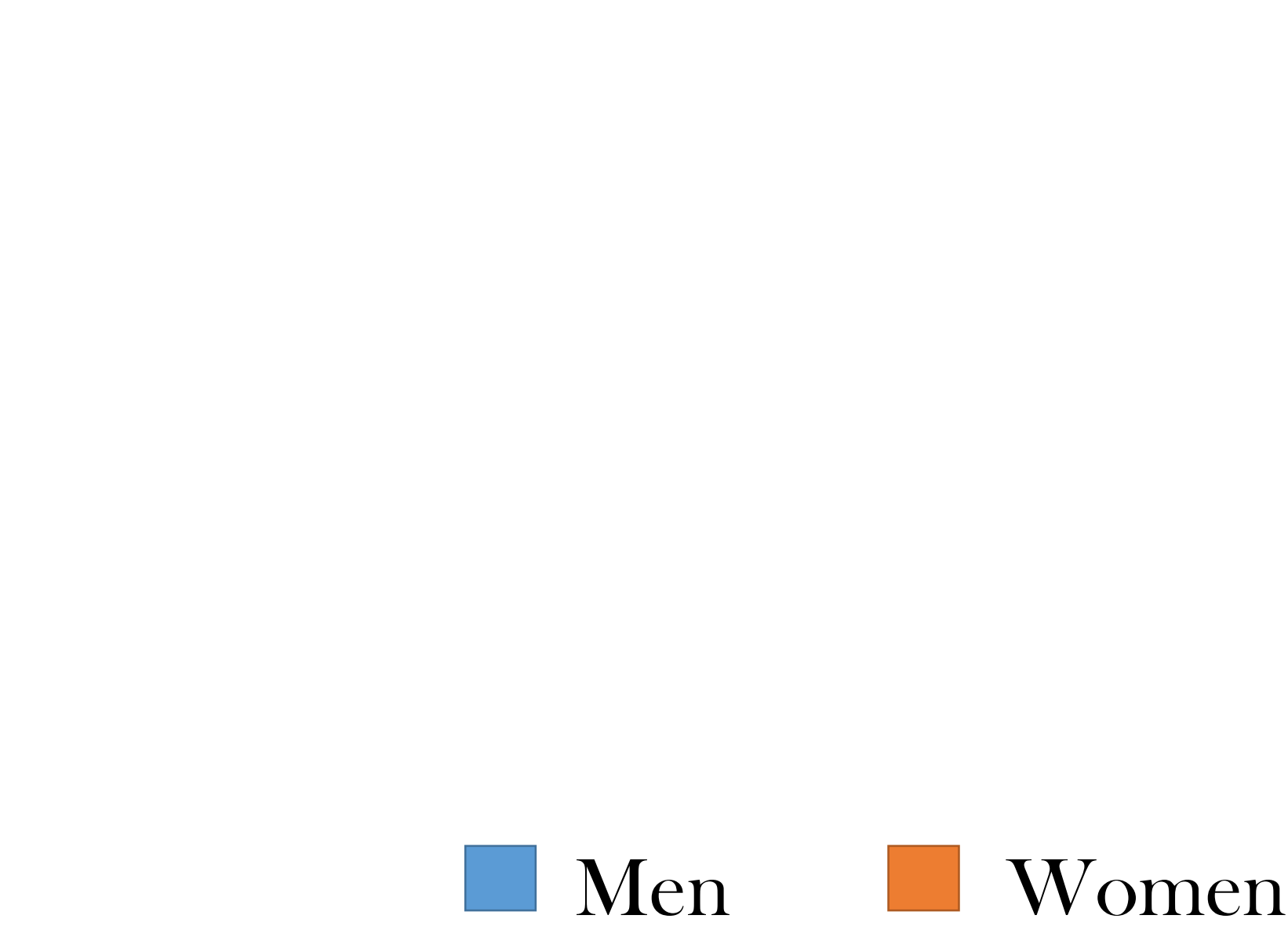
Figure 3. Cadmium weekly food intake ( $\mu$ g/kg body weight), in men and women, Emilia Romagna, Italy



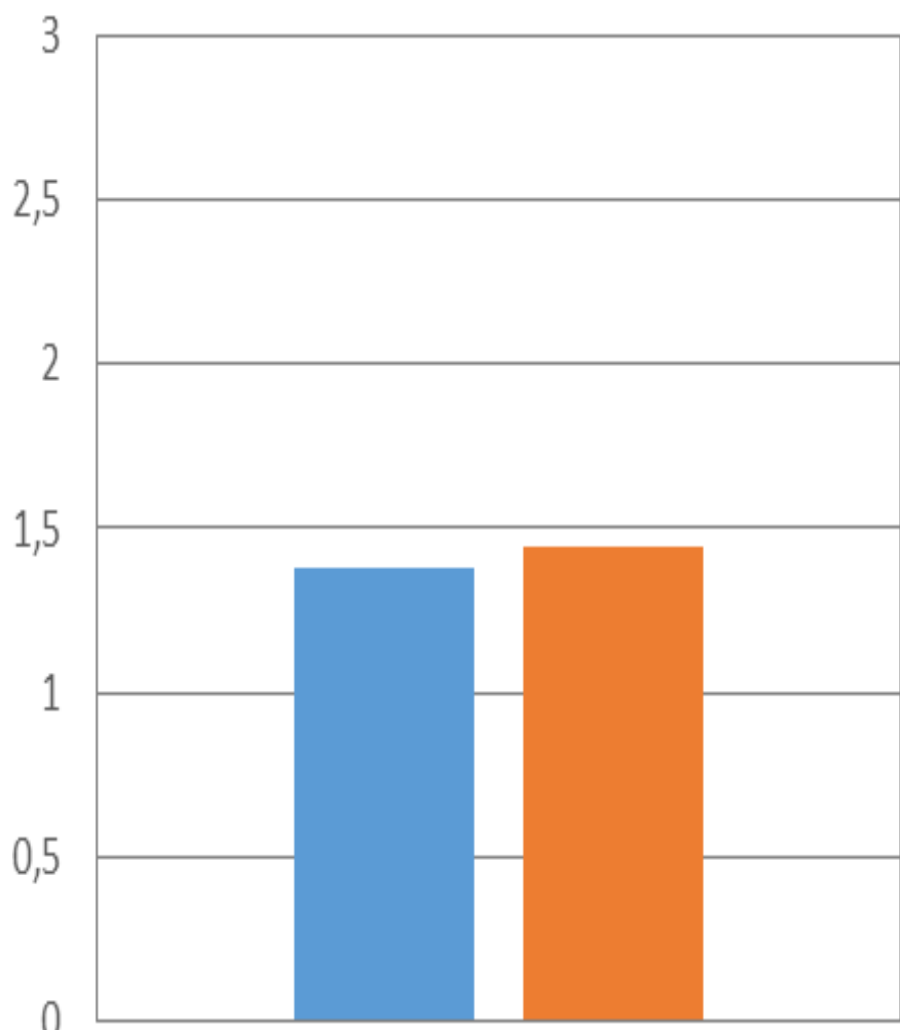
## CONCLUSIONS

Our analysis suggested that exposure through food to the above-mentioned essential and toxic trace elements characterizing this Northern Italy population is within the range defined as safe by SINU and EFSA.

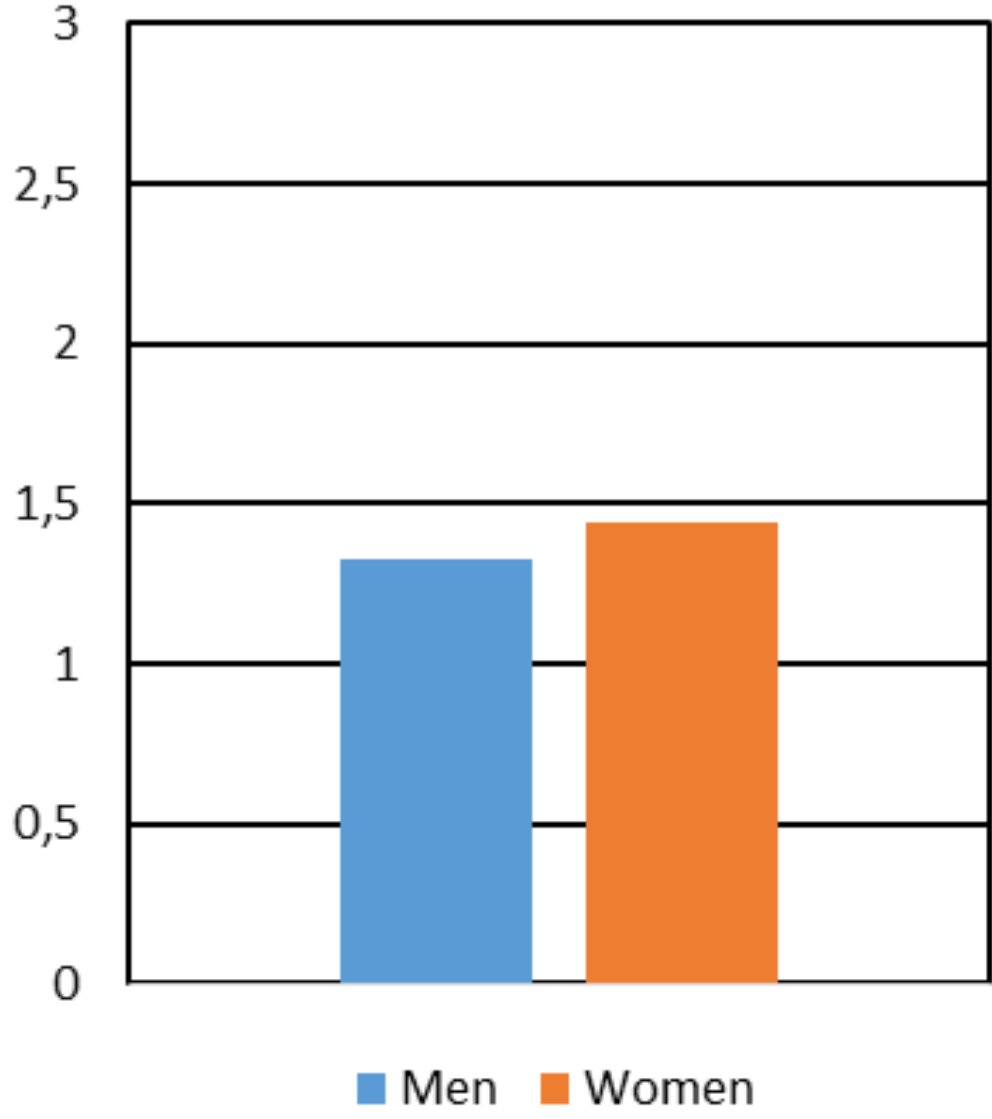




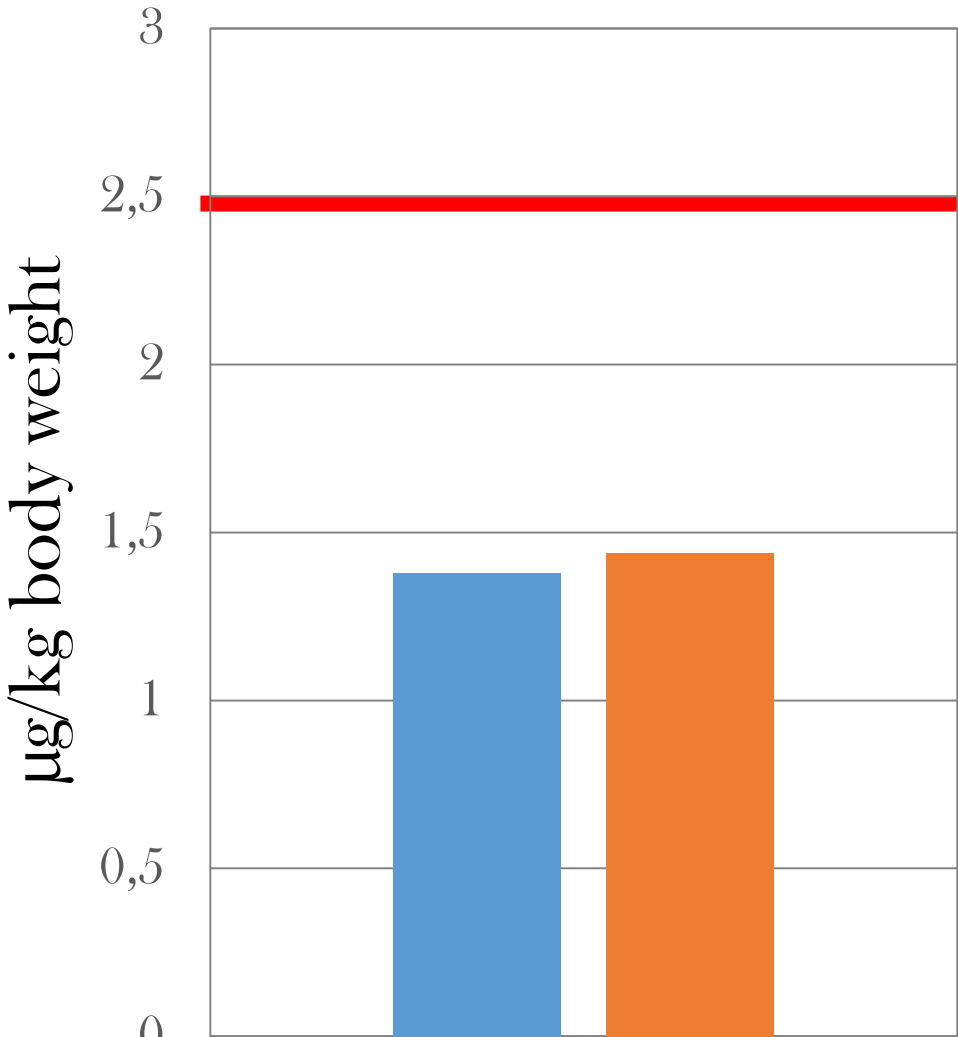
Men Women



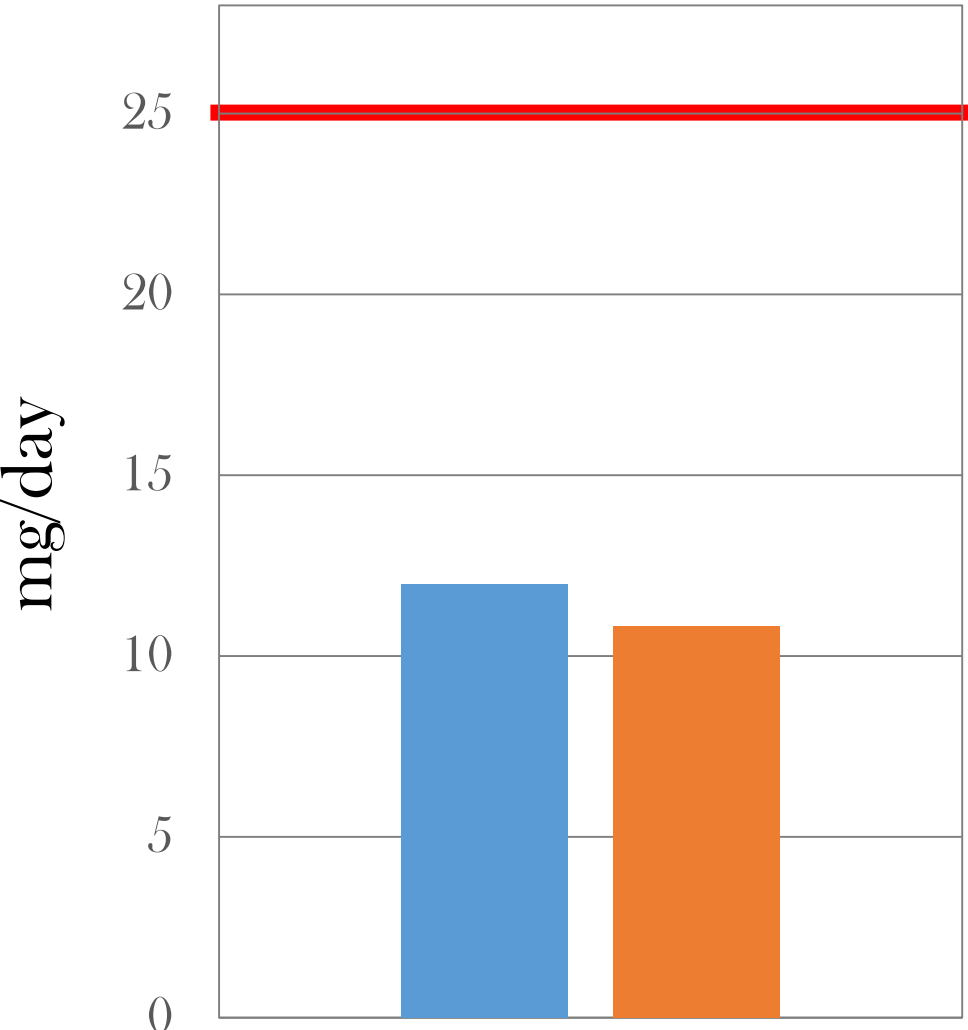
Cadmium weekly intake (µg/kg body weight)



Men Women



2.5 µg/kg/week  
EFSA tolerable weekly intake



25 mg/die  
SINU tolerable day intake

Zincum daily intake



**Pensi sia al pranzo che alla cena?**

12 ► Normalmente quanto volte mangio un PRIMO PIATTO DI PASTA o RISO (escluso le minestre in brodo)?

N. volte alla settimana  giorni N. volte al mese  giorni N. volte all'anno  giorni Mai

**PRIMI PIATTI ASCIUTTI**

COME COMPLETARE  
QUESTA  
SCHEDA

Non scrivere mai, disegnare o dipingere.

Normalmente che tipo di PRIMO PIATTO ASCIUTTO mangio?

13 ► PASTASCIUTTA o PASTA (risponde in ogni riga annerendo un cerchietto):

mai o quasi	qualche volta	circa metà volte	il più delle volte	tutte le volte
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14 ► PASTASCIUTTA  
15 ► PASTA ALL'UOVO  
16 ► PASTA RIPiena o AL FORNO (Tortellini, Cannelloni, Ravioli, Lasagne)  
17 ► RISO e RISOTTI

Quando mangio un PRIMO PIATTO DI PASTASCIUTTA lo condisco

18 ► (risponde in ogni riga annerendo un cerchietto):

mai o quasi	qualche volta	circa metà volte	il più delle volte	tutte le volte
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19 ► AL MACON  
20 ► AL SUGO DI POMODORO  
21 ► AL RAGU  
22 ► ALTRI SUGHI

23 ► Normalmente mangio un piatto di PASTASCIUTTA:

mai	come questo	tra i due	come questo	tra i due	come questo	più grande
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## CAFFÈ, LATTE E DOLCI

**112** Nella foto ci sono una tazza piccola, una media, una grande e un bicchiere.

**113** Pensi alla colazione, ai pasticcini e ai fuoripasto.

COME COMPLETARE  
QUESTA PAGINA

1. **COPIA** il tuo  
nome e cognome  
sulla riga

**114** Quanti bicchieri di LATTE BIANCO beve (risponda pensando al bicchiere della foto)?

1. **Bicchiere alla settimana**  **Bicchiere al mese**  **Bicchiere al giorno**

**115** Quanti CAPPUCCINI (tipo Bar) beve?

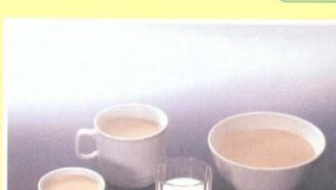
1. **Tazze al giorno**  **Tazze alla settimana**  **Tazze al mese**  **Mil o quali**

**116** Quante tazze di CAFFELATTE beve?

1. **Tazze al giorno**  **Tazze alla settimana**  **Tazze al mese**  **Mil o quali**

**117** Quando beve CAFFELATTE che tazza usa? (guardi la fotografia ed indichi la tazza usata annerendo un cerchietto)

tazza piccola      tazza media      tazza grande



**Non scrivere sul lato retrostante della pagina.**

1. **COPIA** il tuo  
nome e cognome  
sulla riga

**Non scrivere sul lato retrostante della pagina.**

1. **COPIA** il tuo  
nome e cognome  
sulla riga

**Non scrivere sul lato retrostante della pagina.**