Dietary habits of the Italian population across the last 30 years: main features and room for improvement

Matteo Perillo[1], Marco Amato[1], Elisa Umbertini[1], Elaheh Javadi Arjmand[2,3], Lars Thore Fadnes[2,3], Antonello Lorenzini[1]

[1]Department of Biomedical and Neuromotor Sciences, University of Bologna, Bologna, Italy
[2]Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway
[3]Bergen Addiction Research, Department of Addiction Medicine, Haukeland University Hospital, Bergen, Norway

matteo.perillo2@unibo.it

Abstract

Dietary habits and alcohol consumption, jointly, are the behavioural risk factors causing the most DALYs and deaths among Italians. Describing such dietary patterns is crucial for designing effective strategies to reduce mortality. Our aim is to **define the "typical Italian diet" and compare it with some "healthy diets"** in terms of estimated life expectancy.

We estimated the gender-specific average daily intake of **19 food groups** based on ten observational studies reporting consumption data of the Italian population during the last three decades. We updated the **Food4HealthyLife predictive model**, which estimates the life expectancy of a population based on the reported daily intake of 15 food groups. This model combines age-specific mortality rates with hazard and risk ratios taken from meta-analyses. This allowed to quantify the life expectancy gain associated with switching from typical Italian diet to **four diets: F4HL optimal, EAT Lancet, CREA guidelines, and IIS Mediterranean guidelines**.

We estimate that switching from typical to F4HL optimal diet for 40-year-old Italian men and women results in a **6.4 and 7.7-year gain in life expectancy**, respectively. **The largest gains are expected from an increased consumption of whole grains, legumes, and nuts**. Switching to EAT Lancet, CREA, and Mediterranean guidelines, would result in a gain between 3.4 and 5.8 years of life expectancy.

In conclusion, the Italian population would significantly benefit from switching towards the four proposed healthy diets. The food groups presenting most room for improvement are grains, legumes, and nuts, while fruit consumption is already close to the desirable intake.
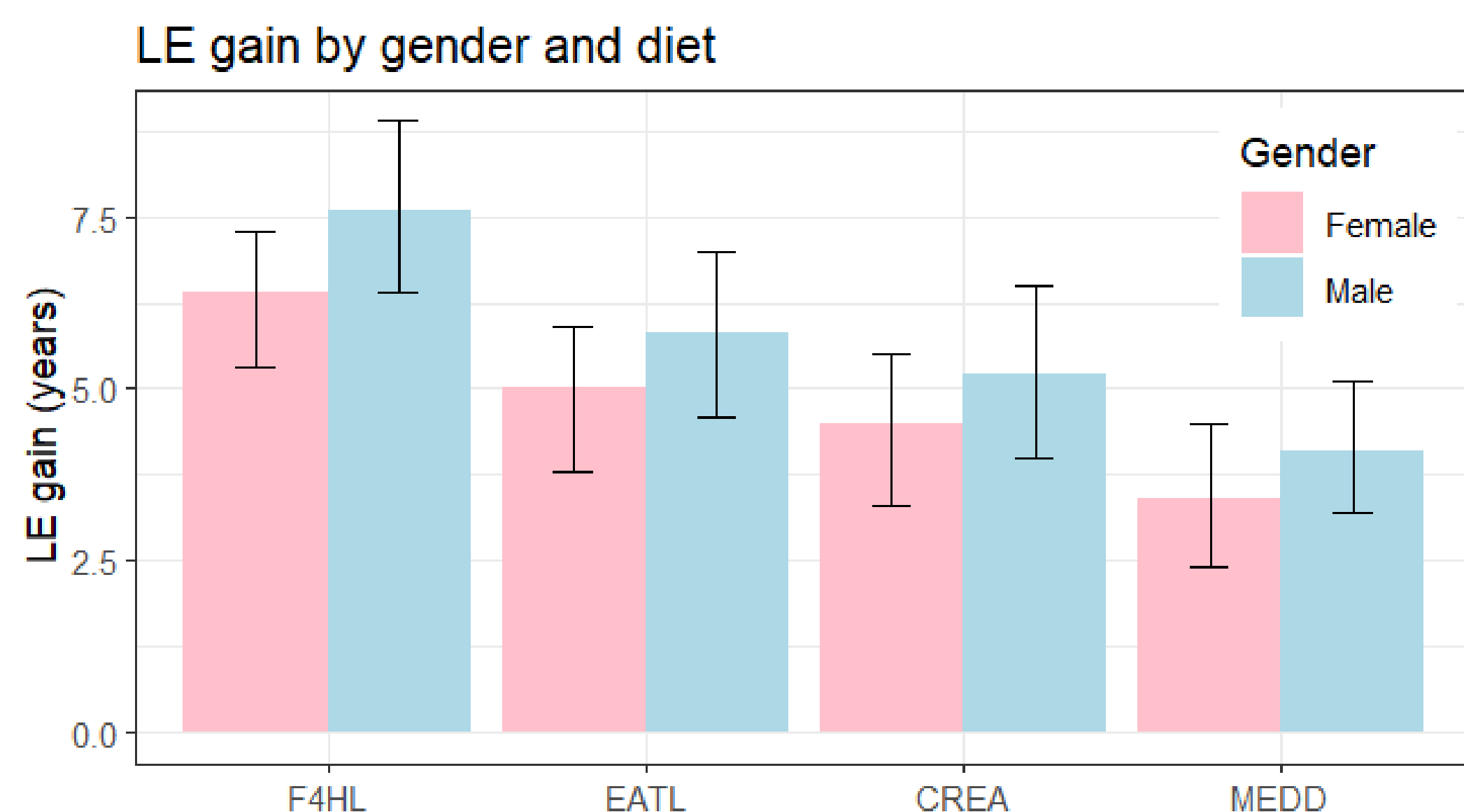
Figure 1: Overall estimated gains associated to a switch from the typical Italian diet to each of the healthy diets, for the reference women and men described in the Methods section. The F4HL optimal diet has the highest estimated impact: 6.4 years for the reference women and 7.7 years for the reference men. The EAT Lancet diet is predicted to have the second highest impact (5 years for women and 5.8 years for men), followed by the CREA guidelines diet (4.5 and 5.2 years for women and men, respectively), and ISS Mediterranean diet (3.4 and 4.1 years for women and men, respectively).
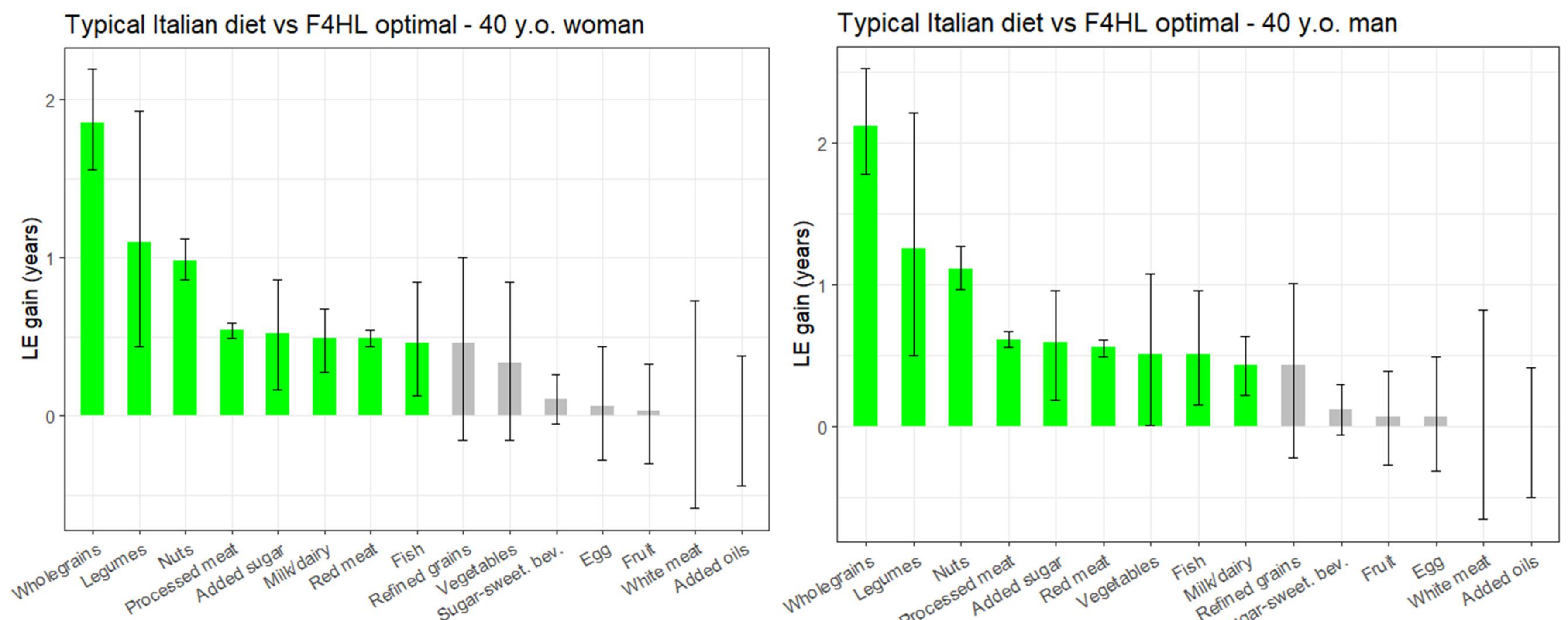
Figure 2: Food group-wise estimated gains associated to a switch from the typical Italian diet to the F4HL optimal diet for the reference 40 year old women (a) and men (b) described in the Methods section. The food groups ranking based on the estimated gain is very similar across genders. Whole grains, legumes, nuts, processed meat and added sugar are the food groups associated with the largest potential gain, while the average consumption of fruit and sugar sweetened beverages is very close to the optimal one.

Introduction

According to the GBD study, **in 2019, dietary risk factors were the second most impactful behavioural category in terms of DALY and deaths caused within the Italian population** [1]. If considered jointly with alcohol consumption, they become the most impactful risk factor. Thus, it is important to identify and correct the most common unhealthy dietary habits to improve the health status of the population.

The aim of this work was to **define the "typical Italian diet"** and to **identify the food groups whose typical consumption levels are farthest from the desirable levels**. To do so, we estimated the potential gains in terms of life expectancy resulting from switching from the typical diet to a list of "healthy diets".

Methods

To define the typical Italian diet, we conducted a literature review of observational studies reporting the food consumption habits of Italian people over 18 years old from 1995 until today.

We defined **19 groups of foods and beverages** (alcoholic and non-alcoholic) combining the groups and subgroups available in the reviewed studies. For each group, we computed the **"typical daily intake"**, both global and gender-specific, as a weighted average of the intakes reported in the studies. Moreover, we retrieved some **"healthy diets"** and **"guideline diets"** defined by scientific articles or national institutions.

After performing some data processing to guarantee comparability, we **estimated the gains in terms of life expectancy associated with switching from the typical Italian diet to each of the healthy diets**. Reference subjects for the model were 40-year-old men with 175 cm height and 70 kg weight, and 40-year-old women with 165 cm height and 60 kg weight, both with a moderate physical activity level.

The estimation was performed using an updated version of the **Food4HealthyLife predictive model** [2], which quantifies the life expectancy of a population based on their daily intake of 15 food groups. The updated version of the calculator is tailored on Italian population and is based on the **Italian age-specific mortality rates**, taken from the GBD study [1], and on the hereby defined typical diet.

Results

Ten observational studies, with a total sample size of 80801, were reviewed [3–12]. Three studies, for a total of 61443 individuals, provided gender-specific food consumption estimates, which made possible to define **gender-specific typical diets** [4,5,11].

The Italian diet is dominated by the consumption of **refined grains, milk/dairy, fruit, and meat**, with minor differences between genders (Table 1): men consume more refined grains, meat (all types), and alcoholic beverages than women, while women consume more milk.

Four healthy diets were identified for the comparison: **F4HL optimal diet** [2]; **EAT-Lancet sustainable diet** [13]; **Italian guideline diet**, defined by the Italian Council for Agricultural Research (CREA) [14]; **Mediterranean diet** (MEDD), as defined by the Italian Ministry of Health (ISS) [15].

As shown in Figure 1, **the estimated life expectancy gain** for the reference men and women defined above **ranges from 3.4 years** (women switching from typical diet to MEDD diet) **to 7.7 years** (men switching from typical diet to F4HL optimal diet). **The healthy diet estimated to provide the largest benefit in terms of life expectancy is the F4HL optimal diet**, followed by EAT-Lancet, CREA guidelines, and Mediterranean guidelines.

For both genders, **most of the gains** associated with the F4HL optimal diet **are due to the increased consumption of whole grains, legumes, and nuts**. Vegetables is the only food group with a significant estimated effect on only one gender (men) (Figure 2).

Discussion

The presented results suggest that **a significant gain in terms of life expectancy can be achieved** by switching from the hereby defined Italian typical diet to each of the four proposed healthy diets.

The **differences in terms of estimated gain** between different healthy diets are mainly due to a suboptimal suggested intake of fish and legumes for the EAT-Lancet, CREA and Mediterranean diet, refined grains for EAT Lancet diet, nuts for the CREA guidelines, and whole grains for the Mediterranean diet.

	ITAT	ITAW	ITAM	F4HL	EATL	CREA	MEDD
Grains (ready to eat)						607	100-533
Whole grains	7	6	9	227	233	347	100
Refined grains	512	454	624	167	0	260	433
Vegetables (yes potatoes)				400	350	407	≥ 280
Vegetables (no potatoes)	148	144	155		300	350	≥ 280
Tubers or starchy vegetables	30	27	34		50	57	≤ 85.7
Fruits	342	344	338	400	200	375	150-300
Nuts and seeds	1	1	2	25	50	9	30-60
Legumes (ready to eat)	24	25	21	200	75	43	≥ 42.9
Fish	27	26	28	200	28	31	≥ 31
Eggs	17	17	17	25	13	7	14.2-28.6
Milk and dairy (converted*)	619	622	615	200	250†		250-500
Milk and yogurt	149	163	123		250	250	
Cheese and other dairy	63	61	66		0	21	
White meat	29	25	36	50	29	29	28.6
Red meat					14		
Unprocessed red meat	55	48	67	0	14	14	< 28.6
Processed red meat	26	23	31	0	0	7	≤ 7.1
Added plant oils	31	30	32	25	40	30	10.0-20.0
Sugars and other sweeteners					≤ 31		
Sweets	33	32	34	0	≤ 11	≤ 13	≤ 11.4
Sugar-sweetened beverages	64	60	72	0	≤ 21	≤ 24	≤ 24
Coffee, tea, infusion	121	123	117				
Alcoholic beverages	139	89	234				

Table 1. Italian typical diet, overall (ITAT) and gender-wise (ITAW for women and ITAM for men), and four healthy diets: Food4HealthyLife, EAT-Lancet, CREA guidelines, ISS Mediterranean guidelines. The diets are defined as the average consumption (g/day) of 15 food groups and 4 beverages groups.

The food groups used by the F4HL calculator for the life expectancy estimation have their name highlighted in green. To increase comparability across diets, some quantities were estimated as a combination of values available in the original source and intakes suggested by the F4HL optimal diet. The quantities estimated in this way are highlighted in orange.

Some intakes in the healthy diets were presented as a range. In this case, for the life expectancy estimation, we used value in the range which is closest to the "Overall typical diet" value.

*Converted diary intake (g/day) is computed as: milk and yogurt intake + 7.5*cheese and other dairy intake.

† The total intake of milk and dairy was reported as a raw sum in the EAT Lancet diet.

Future directions: towards personalized guidelines

The major strength of the predictive model used in this work is that it can be used to **compare any pair of diets**, so providing targeted suggestions and estimations of gains and losses.

In order to keep improving the accuracy of the provided feedback, we are currently working on updating and expanding the calculator. This will be done **refining the methodology for the definition of the typical diet**, **expanding the sources of evidence** used to build the predictive model, and **adding new food groups and lifestyle determinants**, such as alcohol consumption.

Bibliography

1. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2020. (Available at https://vizhub.healthdata.org/gbd-results/)
2. Fadnes LT, Øklund J-M, Haaland ØA, Johansson KA. Estimating impact of food choices on life expectancy: A modeling study. PLoS Med. 2022;19: e1003889. doi:10.1371/journal.pmed.1003889
3. Bonaccio M, Bonanni AE, Di Castelnuovo A, De Lucia F, Donati MB, de Gaetano G, et al. Low income is associated with poor adherence to a Mediterranean diet and a higher prevalence of obesity: cross-sectional results from the Moli-sani study. BMJ Open. 2012;2: e001685. doi:10.1136/bmjopen-2012-001685
4. Pala V, Sieri S, Palli D, Salvini S, Berrino F, Bellegotti M, et al. Diet in the Italian EPIC cohorts: presentation of data and methodological issues. Tumori. 2003;89: 594–607. doi:10.1177/030089160308900603
5. Pounis G, Bonanni A, Ruggiero E, Di Castelnuovo A, Costanzo S, Persichillo M, et al. Food group consumption in an Italian population in using the updated food classification system FoodEx2: Results from the Italian Nutrition & Health Survey (INHES) study. Nutrition, Metabolism and Cardiovascular Diseases. 2017;27: 307–328. doi:10.1016/j.numecd.2017.01.004
6. Marventano S, Godos J, Platania A, Galvano F, Mistretta A, Grosso G. Mediterranean diet adherence in the Mediterranean healthy eating, aging and lifestyle (MEAL) study cohort. Int J Food Sci Nutr. 2018;69: 100–107. doi:10.1080/09637486.2017.1332170
7. Bo S, Ponzo V, Goitre I, Fadda M, Pezzana A, Beccuti G, et al. Predictive role of the Mediterranean diet on mortality in individuals at low cardiovascular risk: a 12-year follow-up population-based cohort study. J Transl Med. 2016;14: 91. doi:10.1186/s12967-016-0851-7
8. Talegawkar SA, Bandinelli S, Bandeen-Roche K, Chen P, Milaneschi Y, Tanaka T, et al. A Higher Adherence to a Mediterranean-Style Diet Is Inversely Associated with the Development of Frailty in Community-Dwelling Elderly Men and Women. J Nutr. 2012;142: 2161–2166. doi:10.3945/jn.112.165498
9. Turrini A, Saba A, Perrone D, Cialfa E, D'Amicis A. Food consumption patterns in Italy: the INN-CA Study 1994–1996. Eur J Clin Nutr. 2001;55: 571–588. doi:10.1038/sj.ejcn.1601185
10. Azzini E, Polito A, Fumagalli A, Intorre F, Venneria E, Durazzo A, et al. Mediterranean Diet Effect: an Italian picture. Nutr J. 2011;10: 125. doi:10.1186/1475-2891-10-125
11. Leclercq C, Arcella D, Piccinelli R, Sette S, Le Donne C. The Italian National Food Consumption Survey INRAN-SCAI 2005–06: main results in terms of food consumption. Public Health Nutr. 2009;12: 2504–2532. doi:10.1017/S1368980009005035
12. Sette S, D'Addezio L, Piccinelli R, Hopkins S, Le Donne C, Ferrari M, et al. Intakes of whole grain in an Italian sample of children, adolescents and adults. Eur J Nutr. 2017;56: 521–533. doi:10.1007/s00394-015-1097-5
13. Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. The Lancet. 2019;393: 447–492. doi:10.1016/S0140-6736(18)31788-4
14. Rossi L. et al. Dossier Scientifico delle Linee Guida per una sana alimentazione (Edizione 2018). 2018. ISBN 978-88-96597-01-9. (Available at https://www.crea.gov.it/)
15. Pezzana A. et al. Dieta mediterranea come modello di dieta tradizionale, sana e sostenibile e prevenzione delle malattie croniche non trasmissibili. 2022. (Available at https://www.salute.gov.it/)