Supplemental table 1 Nutritional characteristics of the 100 pizza clusters

Cluster	Number of pizzas	Average composition per 100g										Isoenergetic substitution †		Non-Isoenergetic substitution ‡	
		Energy (Kcal)	Whole grains (g)	Refined grains (g)	Dairy products (g)	Green leafy vegetables (g)	Other vegetables (g)	Fish (g)	Red meat (g)	Processed meat (g)	Olive oil (g)	1st best or worst (*n*)	2nd best or worst (*n*)	1st best or worst (*n*)	2nd best or worst (*n*)
#1	4	200.6 ± 6.5	0	28.5 ± 0.3	12.7 ± 4.1	0	4.6 ± 1.9	0	0	11.6 ± 1.5	0				
#2	6	200.5 ± 7.7	0	30.0 ± 0.7	10.7 ± 3.5	0	19.5 ± 3.0	0	0	12.8 ± 0.7	0				
#3	14	241.9 ± 11.6	0	29.8 ± 1.1	24.7 ± 2.2	0	23.0 ± 2.2	0	0	0	0				
#4	8	229.9 ± 12.0	0	28.1 ± 0.6	13.5 ± 2.5	0	24.2 ± 2.3	0	0	13.2 ± 0.5	0				
#5	4	186.8 ± 2.9	0	27.8 ± 0.6	8.5 ± 0.7	0	32.1 ± 2.5	0	0	8.9 ± 0.2	0				
#6	7	243.4 ± 9.7	0	27.1 ± 0.9	19.7 ± 2.3	0	22.7 ± 2.0	0	0	9.8 ± 0.8	0				
#7	7	208.6 ± 6.3	0	27.6 ± 1.3	18.8 ± 1.9	0	33.1 ± 2.5	0	0	0	0				
#8	2	219.3 ± 1.0	0	36.7 ± 0.0	4.5 ± 0.0	0	17.4 ± 0.0	0	0	14.8 ± 0.0	0				
#9	9	213.9 ± 10.6	0	23.1 ± 0.8	16.2 ± 1.4	0	29.4 ± 3.0	0	0	12.3 ± 1.6	0				
#10	12	202.3 ± 7.4	0	24.3 ± 1.3	16.0 ± 1.8	0	21.5 ± 1.4	0	0	18.1 ± 2.3	0		2 [w]		
#11	5	258.0 ± 13.4	0	25.0 ± 0.9	18.4 ± 0.9	0	19.5 ± 2.2	0	0	16.5 ± 1.0	0				
#12	13	198.8 ± 7.7	0	25.2 ± 1.0	12.1 ± 1.3	0	31.3 ± 2.2	0	0	11.2 ± 0.8	0				
#13	8	236.4 ± 12.1	0	22.4 ± 0.6	36.4 ± 2.7	0	23.0 ± 4.8	0	0	0	0				
#14	13	257.6 ± 10.8	0	25.7 ± 0.8	31.6 ± 2.0	0	23.6 ± 3.0	0	0	0	0				
#15	6	209.7 ± 5.0	0	25.8 ± 0.9	11.0 ± 4.1	0	31.1 ± 2.7	0	0	6.9 ± 1.1	0				
#16	6	230.5 ± 8.3	0	32.2 ± 2.6	10.6 ± 2.9	0	22.1 ± 3.1	0	0	9.5 ± 0.9	0				
#17	10	193.3 ± 5.5	0	27.0 ± 0.7	16.8 ± 2.1	0	26.3 ± 1.5	0	0	9.2 ± 1.9	0				
#18	4	186.5 ± 5.4	0	25.4 ± 0.8	4.0 ± 3.3	0	40.9 ± 2.5	0	0	2.2 ± 4.5	0				
#19	12	224.4 ± 6.4	0	27.7 ± 1.2	28.6 ± 3.2	0.04 ± 0.1	20.4 ± 3.2	0	0	0.6 ± 2.0	0				
#20	6	269.2 ± 8.0	0	25.5 ± 1.3	12.2 ± 4.4	0	26.9 ± 2.4	0	0	14.1 ± 1.0	0				
#21	4	227.3 ± 8.4	0	30.8 ± 1.2	15.2 ± 1.0	0	24.6 ± 1.7	0	0	8.2 ± 1.6	0				
#22	3	259.3 ± 3.1	12.5 ± 0.2	12.5 ± 0.2	36.6 ± 1.6	0	19.6 ± 1.1	0	0	0	0	8 [b]	146 [b]		
#23	2	195.0 ± 5.7	0	32.9 ± 0.2	0	0	33.7 ± 0.3	0	0	0	0				

† Number of participants for whom the cluster was identified as the first or second best (b) / worst (w) pizza for isoenergetic substitutions

‡ Number of participants for whom the cluster was identified as the first or second best (b) / worst (w) pizza for non-isoenergetic substitutions

Cluster	Number of pizzas	Average composition per 100g										Isoenergetic substitution †		Non-Isoenergetic substitution ‡	
		Energy (Kcal)	Whole grains (g)	Refined grains (g)	Dairy products (g)	Green leafy vegetables (g)	Other vegetables (g)	Fish (g)	Red meat (g)	Processed meat (g)	Olive oil (g)	1st best or worst (*n*)	2nd best or worst (*n*)	1st best or worst (*n*)	2nd best or worst (*n*)
#24	4	258.5 ± 5.3	0	30.0 ± 0.4	31.4 ± 1.4	0	16.9 ± 1.7	0	0	0	0				
#25	7	248.7 ± 8.5	0	25.1 ± 0.3	23.5 ± 4.5	0	21.7 ± 2.7	0	0	4.1 ± 2.0	0				
#26	4	216.1 ± 5.5	0	32.3 ± 0.8	16.6 ± 0.5	0	12.4 ± 4.7	0	0	16.6 ± 3.6	0				
#27	4	239.0 ± 6.6	0	22.5 ± 0.5	28.4 ± 2.1	0	18.0 ± 6.3	0	0	8.2 ± 1.2	0				
#28	5	237.0 ± 4.1	0	22.5 ± 1.0	19.2 ± 2.8	0	22.1 ± 2.2	0	0	17.4 ± 1.4	0				
#29	2	262.0 ± 0.0	0	23.3 ± 1.1	14.0 ± 0.0	0	30.9 ± 0.2	8.9 ± 0.1	0	0	0				
#30	2	238.5 ± 3.5	0	27.0 ± 0.8	27.1 ± 1.2	0	0	0	0	0	0				
#31	4	169.0 ± 1.4	0	24.3 ± 1.8	8.7 ± 3.3	0	34.8 ± 2.7	0	0	14.7 ± 2.2	0				
#32	5	230.0 ± 15.5	0	31.6 ± 3.2	11.8 ± 1.9	0	26.8 ± 2.9	0	0	0	0				
#33	4	191.7 ± 8.0	0	25.2 ± 1.1	8.7 ± 2.2	0	36.1 ± 2.1	0	9.7 ± 0.4	0	0				
#34	2	199.2 ± 7.3	0	33.0 ± 0.0	17.2 ± 0.2	0	26.1 ± 1.9	0	0	0	0				
#35	6	220.3 ± 14.7	0	26.1 ± 0.8	19.4 ± 3.6	0	22.1 ± 1.8	0	0	0	0				
#36	5	268.6 ± 9.7	0	27.2 ± 1.7	27.5 ± 1.5	0	12.4 ± 2.3	0	0	12.8 ± 1.4	0				
#37	4	209.3 ± 7.0	0	29.5 ± 0.6	9.7 ± 2.6	0	29.6 ± 3.3	0	0	7.9 ± 1.5	0				
#38	3	272.0 ± 7.2	0	23.3 ± 2.0	39.2 ± 1.8	0	18.1 ± 2.9	0	0	0	0				
#39	4	196.5 ± 5.1	0	23.6 ± 0.7	11.5 ± 4.0	0	38.2 ± 3.3	0	0	0	0				
#40	3	225.5 ± 12.6	0	27.0 ± 0.0	17.8 ± 2.7	0	20.9 ± 3.3	12.1 ± 1.0	0	0	0				
#41	3	224.0 ± 4.6	0	29.0 ± 0.9	34.8 ± 2.4	0	11.2 ± 2.8	0	0	0	0				
#42	3	226.7 ± 5.8	0	24.6 ± 1.6	9.1 ± 2.9	0	28.4 ± 2.8	0	0	17.7 ± 0.8	0				
#43	4	200.4 ± 14.7	0	26.6 ± 1.0	4.4 ± 3.3	0	26.5 ± 4.2	0	0	14.2 ± 3.2	0				
#44	3	248.0 ± 10.5	0	31.3 ± 0.4	19.3 ± 2.8	0	14.8 ± 2.0	0	0	12.7 ± 2.2	0				
#45	4	204.3 ± 3.4	0	28.6 ± 0.9	9.2 ± 3.6	0	22.0 ± 3.7	0	0	0	0				
#46	4	213.3 ± 5.4	0	26.1 ± 2.4	9.7 ± 0.9	0	32.5 ± 2.2	0	8.0 ± 0.7	0	0				
#47	3	226.7 ± 7.1	0	27.8 ± 1.6	26.6 ± 2.8	0	0	0	0	0	0				
#48	3	201.9 ± 9.1	0	31.0 ± 3.5	9.2 ± 3.0	0	22.8 ± 4.5	0	0	9.8 ± 0.3	0				
#49	4	205.8 ± 14.8	0	28.4 ± 0.9	12.4 ± 0.9	0	2.7 ± 3.1	0	0	11.0 ± 1.1	0				

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‡ Number of participants for whom the cluster was identified as the first or second best (b) / worst (w) pizza for non-isoenergetic substitutions

Cluster	Number of pizzas	Average composition per 100g										Isoenergetic substitution †		Non-Isoenergetic substitution ‡	
		Energy (Kcal)	Whole grains (g)	Refined grains (g)	Dairy products (g)	Green leafy vegetables (g)	Other vegetables (g)	Fish (g)	Red meat (g)	Processed meat (g)	Olive oil (g)	1st best or worst (*n*)	2nd best or worst (*n*)	1st best or worst (*n*)	2nd best or worst (*n*)
#50	2	210. 5 ± 4.9	0	24.6 ± 1.7	8.2 ± 1.7	0	37.0 ± 0.5	12.4 ± 0.6	0	0	0				
#51	3	284.3 ± 15.8	0	29.0 ± 1.4	37.7 ± 4.7	0	11.9 ± 1.1	0	0	0	0				
#52	3	200.0 ± 11.5	13.1 ± 0.9	13.1 ± 0.9	11.2 ± 1.9	0	26.6 ± 4.5	0	0	15.4 ± 3.5	0				
#53	3	181.3 ± 11.0	0	26.9 ± 1.2	18.9 ± 4.7	0	19.2 ± 0.7	0	0	11.5 ± 2.8	0				
#54	2	202.5 ± 16.3	0	27.3 ± 0.5	15.4 ± 0.1	3.4 ± 0.1	19.7 ± 0.6	0	0	14.2 ± 0.1	0				
#55	6	226.7 ± 11.0	0	25.3 ± 1.2	21.4 ± 2.1	0.2 ± 0.3	15.7 ± 2.8	0	0	14.1 ± 3.4	0				
#56	2	210 ± 0.0	0	27.8 ± 2.2	19.0 ± 0.0	0	16.3 ± 3.2	17.0 ± 0.0	0	0	0				
#57	5	215.2 ± 19.1	0	31.2 ± 2.9	12.8 ± 1.2	0	10.4 ± 5.0	0	0	1.3 ± 1.8	0				
#58	3	229.0 ± 21.2	11.1 ± 0.8	11.1 ± 0.8	13.8 ± 2.6	0	36.8 ± 0.8	0	0	9.1 ± 0.5	0				
#59	3	226.0 ± 13.5	0	25.6 ± 0.3	12.8 ± 6.1	0	38.9 ± 5.3	0	0	0	0				
#60	2	193.0 ± 9.9	0	32.1 ± 0.4	7.4 ± 0.6	0	15.0 ± 2.1	8.3 ± 1.9	0	0	0				
#61	2	184.6 ± 6.5	0	29.1 ± 1.3	9.3 ± 0.3	0	34.3 ± 6.6	0	0	0	0				
#62	4	231.0 ± 12.4	13.9 ± 1.1	13.9 ± 1.1	13.5 ± 1.9	0	24.9 ± 3.0	0	0	12.6 ± 4.1	0				
#63	2	266.1 ± 2.6	0	31.8 ± 5.1	25.7 ± 3.3	0	5.0 ± 7.0	0	0	0	0				
#64	2	259.8 ± 9.5	0	31.2 ± 2.5	10.0 ± 4.4	0	20.8 ± 2.4	0	0	8.6 ± 1.1	0				
#65	2	244.0 ± 0.0	0	37.7 ± 3.3	19.5 ± 2.1	0	15.8 ± 3.2	0	0	0	0				
#66	2	260.5 ± 9.2	0	28.3 ± 0.6	24.7 ± 4.5	0	11.4 ± 0.2	0	11.8 ± 0.8	3.5 ± 4.9	0				
#67	2	245.5 ± 12.0	0	29.1 ± 0.4	24.6 ± 1.2	0	21.4 ± 1.3	0	0	1.5 ± 2.2	1.9 ± 0.2				
#68	2	214.0 ± 2.8	0	28.2 ± 1.7	17.8 ± 0.4	0	12.4 ± 0.4	0	14.5 ± 1.7	0	0				
#69	2	202.0 ± 8.5	0	25.9 ± 3.3	10.4 ± 0.4	0	13.8 ± 10.5	0	10.6 ± 0.0	1.3 ± 1.9	0				
#70	2	235.5 ± 0.7	0	30.3 ± 0.4	18.6 ± 2.0	0	25.4 ± 5.2	0	0	4.9 ± 6.9	0.4 ± 0.1				
#71	2	241.0 ± 15.6	13.8 ± 0.4	13.8 ± 0.4	27.0 ± 2.3	0	19.6 ± 3.3	0	0	5.2 ± 7.4	0				
#72	2	221.0 ± 18.4	7.8 ± 0.4	7.8 ± 0.4	22.5 ± 10.1	0	35.8 ± 1.4	0	0	0	0				
#73	2	227.5 ± 3.5	10.4 ± 0.2	10.4 ± 0.2	21.9 ± 6.7	0	26.1 ± 3.3	0	0	12.0 ± 7.3	0				
#74	1	217.0	0	30.0	4.0.0	0	21.5	15.5	0	0	0				

Cluster	Number of pizzas	Average composition per 100g										Isoenergetic substitution †		Non-Isoenergetic substitution ‡	
		Energy (Kcal)	Whole grains (g)	Refined grains (g)	Dairy products (g)	Green leafy vegetables (g)	Other vegetables (g)	Fish (g)	Red meat (g)	Processed meat (g)	Olive oil (g)	1st best or worst (*n*)	2nd best or worst (*n*)	1st best or worst (*n*)	2nd best or worst (*n*)
#75	1	221.0	0	24.6	10.9	0	31.3	16.8	0	0	0				
#76	1	201.0	9.0	9.0	14.0	0	37.1	0	0	11.9	0				
#77	1	196.0	0	27.6	25.1	0	11.6	11.3	0	0	0				
#78	1	269.0	0	25.1	32.3	0	0.7	0	0	25.1	0	820 **w**	60 w	19 **w**	789 w
#79	1	280.0	0	27.0	16.0	0	0	0	0	18.7	0				
#80	1	220.0	0	22.2	13.9	0	12.0	0	0	0	0				
#81	1	231.0	0	30.0	6.5	0	35.5	0	0	7.5	0.5				
#82	1	178.0	0	25.4	13.8	0	25.1	9.2	0	0	0				5 b
#83	1	210.0	0	25.8	9.1	0	17.7	4.6	0	0	0				
#84	1	320.0	0	19.8	29.0	0	12.2	0	0	24.5	0	60 **w**	818 w	861 **w**	19 w
#85	1	290.0	0	21.6	27.6	0	20.4	0	0	12.2	0				
#86	1	220.0	0	28.2	23.3	0	28.6	0	0	0	1.1				
#87	1	251.0	0	27.0	33.3	0	18.7	0	0	0	1.3				
#88	1	190.0	14.1	14.1	11.7	0	27.6	0	0	0	0	850 **b**	9 b	879 **b**	1 b
#89	1	210.0	12.3	12.3	14.2	0	7.1	0	0	0	0		44 b		253 b
#90	1	210.0	0	28.8	3.2	0	25.5	0	15.5	0	0				
#91	1	252.0	8.4	8.4	40.0	0	28.8	0	0	0	0				
#92	1	211.0	0	25.8	13.1	0	33.2	0	0	6.8	1.7				
#93	1	255.0	0	31.7	17.0	0	22.3	0	6.7	0	0				
#94	1	293.0	12.6	12.6	21.2	0	3.5	0	0	10.7	0				
#95	1	191.0	0	28.2	4.9	2.4	37.1	0	0	0	0				390 b
#96	1	235.0	0	27.0	35.2	3.3	6.6	0	0	0	0				
#97	1	250.0	0	29.4	36.2	0	0	10.7	0	0	0				
#98	1	203.0	0	23.4	10.4	5.2	45.4	0	0	0	0				21 b
#99	1	354.0	12.3	12.3	15.9	0	25.7	0	11.5	0	0	14 **b**	5 b		72 w
#100	1	227.0	0	31.2	15.0	9.0	24.0	0	0	0	0	8 **b**	676 b	1 **b**	210 b

† Number of participants for whom the cluster was identified as the first or second best (b) / worst (w) pizza for isoenergetic substitutions

‡ Number of participants for whom the cluster was identified as the first or second best (b) / worst (w) pizza for non-isoenergetic substitutions

Supplemental table 2 Nutritional characteristics of mixed dishes used for inter-categories substitutions

Mixed dish name	Proportion per 100 g												
	Energy (Kcal)	**Refined grains (g)**	**Green leafy vegetables (g)**	**Other vegetables (g)**	**Fruit (g)**	**Dairy products (g)**	**Fish (g)**	**Eggs (g)**	**Red meat (g)**	**Processed meat (g)**	**Potatoes (g)**	**Butter (g)**	**Olive oil (g)**
Canned cassoulet	136	1	0	5	0	0	0	0	6	20	0	0	0
Canned sauerkraut	110	0	0	27.5	0	0	0	0	7.5	14	10	0	0
Shepherd's pie	145	2.3	0	19	0	26	0	0	13	0	8	7.5	0
Sausages with lentils	131	0.5	0	4	0	0	0	0	13	13	0	0	0
Pot-au-feu	72.3	0	0	36.3	0	0	0	0	52.5	0	10.6	0	0
Meat ravioli with tomato sauce (canned product)	97.4	54.5	0	26.7	0	0	0	0	10	0	0	0	0.3
Garnished mutton couscous	148	30.5	0	26.5	0	0	0	0	30	0	0	0	1.5
Paella	169	50.5	0	14	0	0	6	0	0	3	0	0	0
Potato gratin	110	0	0	0	0	26.9	0	7.5	0	0	62	3.1	0
Milanese "osso bucco"	102	3.1	0	23.2	0	0	0	0	37	0	0	0	2.8
Hotpot from Auvergne (pork, sausages and vegetable)	88.4	0	0	40	0	0	0	0	20	8	23	0	0
Cannelloni with meat	154	22.8	0	25.3	0	12.7	0	0	25	0	1.5	0.3	0.3
Lasagne with bolognese sauce	140	44.0	0	14.6	0	11.8	0	0	13.5	0	0	0.2	0.1
Pasta bolognese	137	57	0	25.4	0	0	0	0	10	0	0	0	0
Fried rice	141	61	0	15	0	0	0	10	0	9	0	0	0
Basque chicken with rice	101	1	0	28.4	0	0	0	0	0	0	0	0	0
Basque chicken with pasta	96.6	9.4	0	21.6	0	0	0	0	0	0	0	0	0
Spaghetti with tomato sauce	67.4	47.5	0	13	0	0	0	0	0	0	0	0	0
Baked pasta	150	56.2	0	0	0	21.5	0	15	0	7	0	0	0
Moussaka	138	3.4	0	47	0	22.2	0	0	17	0	0	0.5	0
Lamb stew	139	1.5	0	41.4	0	0	0	0	47	0	0	0	0
Royal couscous with meat	149	31	0	28	0	0	0	0	10	5	0	0	1.5
Endive gratin with ham	90.9	1.4	0	31.6	0	41.7	0	0	0	23.5	0	1	0
Pasta carbonara	166	74.9	0	0	0	12	0	5	0	8	0	0	0
Tartiflette	144	0	0	4	0	31	0	0	0	3	61	0	0
Chicken couscous	158	31	0	29	0	0	0	0	0	0	0	0	1.5
Cheese ravioli	209	21.5	0	0	0	32.5	0	9	0	0	2	0	0
Vegetable gratin	107	1.9	0	81.7	0	5.3	0	3.2	0	0	0	1.07	0
Croque-monsieur (toasted ham and cheese sandwich)	290	25.6	0	0	0	28.7	0	0	0	24	0	0.2	0
Hot-dog	318	32.6	0	3	0	0	0	0	0	50	0	0	0
French quiche Lorraine	292	21	0	0	0	48.4	0	10	0	11	0	3	0

Hamburger	216	26.1	3.5	10.5	0	2.1	0	0	39.5	0	0	0	0
Cheeseburger	262	28.8	2.5	4.5	0	22.3	0	0	23	0	0	0	0
Double cheeseburger	297	24.6	5.5	7.5	0	24	0	0	25	0	0	0	0
Vegetable pie	237	22.1	7.5	30	0	28	0	8	0	0	0	4.3	0
Spring rolls	116	20.4	9	41	0	0	0	0	0	0	0	0	0
Kebab and raw vegetable	233	17.7	7	26.2	0	0	0	0	43	0	0	0	0
Tuna and raw vegetable sandwich	274	43.9	2.7	12.6	0	0	19.3	0.9	0	0	0	0	0
Ham panini with mozzarella and tomatoes	243	28.9	5	16	0	20.9	0	0	0	16.5	0	0	0
Cheese pie or quiche	263	22.4	0	0	0	48.5	0	16	0	0	0	8.8	0
Ham sandwich with boiled egg and raw vegetable	222	42.5	4.7	14.2	0	0	0	6.7	0	21	0	4.3	0
Chicken and raw vegetable sandwich	258	41.5	4	13	0	0	0	0.8	0	0	0	0	0
Smoked salmon, and butter sandwich	265	57.2	0	0	5.2	0	19.5	0	0	0	0	3.3	0
Chicken vol-au-vent with fish and seafood	208	7.9	0	17	0	37.2	16	0	0	0	0	2.7	0
Chicken nugget	188	9.2	0	0	0	0	0	19.4	0	0	0	0	0
Pan bagnat	245	32.7	0	30	0	0	8.7	5	0	0	0	0	10.2
Ham and butter sandwich	283	47.7	0	0	0	0	0	0	0	30	0	10	0
Cheese and butter sandwich	339	47.7	0	0	0	30	0	0	0	0	0	10	0
Pâté and pickle sandwich	299	41.3	0	0	0	0	0	0.9	9.4	0	0.4	0	0
Butter and dry sausage sandwich	375	47.7	0	0	0	0	0	0	0	30	0	10	0
Ham sandwich with emmental and butter	309	42.1	0	0	0	13	0	0	0	25	0	9	0
Sandwich with raw vegetable and mayonnaise	221	39.9	0	37	0	0	0	0.9	0	0	0	0	0
Turkey sandwich with raw vegetable	255	43.1	2	11	0	0	0	1.1	0	0	0	0	0
Egg and raw vegetable sandwich	247	43.9	2.7	12.6	0	0	0	20.2	0	0	0	0	0
Pork and raw vegetable sandwich	267	43.1	2	11	0	0	0	1.1	19	0	0	0	0
Sandwich with merguez, ketchup and mustard	282	39.7	0	0	0	0	0	0	0	42	0	0	0
Salami and butter sandwich	379	47.7	0	0	0	0	0	0	0	30	0	10	0
Croque-madame (toasted ham and cheese sandwich topped with a fried egg)	264	20.3	0	0	0	25.3	0	17.9	0	19	0	0.1	0
Flamenkueche (salted pie with bacon)	263	34	0	16	0	18	0	0.6	17	11.2	0	0	0
Stuffed pancake with bechamel, ham, cheese and mushroom	145	14	0	20	0	48.1	0	7.9	0	7	0	0.8	0
Leek pie	258	24.2	0	18.2	0	43.8	0	0	0	0	0	4.1	0
Tomato pie	218	25.2	0	45.5	0	8	0	4	0	0	0	4.9	0.8
Salmon and sorrel pie	230	21.7	14.5	16	0	33.1	17	0	0	0	0	4.5	0
Tuna salad with vegetable (canned product)	123	0.3	0	57.6	0	0	24.92	0	0	0	0	0	1.3
Potato salad	127	0.4	0	22	0	0	2.7	4.7	0	2	54.5	0	0

Couscous salad	149	50	0	26	0.5	0	0	0	0	0	0	0	1.8
Rice salad	151	54.7	0	9	0	0	10.6	7.7	0	0	0	0	0.4
Vegetarian pasta salad	130	53.4	0	35.5	0	0	0	0	0	0	0	0	0

Supplemental table 3 Rates of change in risk of type 2 diabetes (percentage) in population subgroups for substitutions with the best and worst pizzas

Population	Isoenergetic substitution		Non-isoenergetic substitution	
	Men	Women	Men	Women
	1st Best pizza (#88)			
Age < 45 years	-4.2 (-5.2; -3.1)	-1.9 (-2.4; -1.4)	-5.4 (-7.0; -3.7)	-2.4 (-3.3; -1.4)
Age ≥ 45 years	-1.4 (-1.7; -1.0)	-0.9 (-1.1; -0.6)	-2.0 (-2.4; -1.5)	-1.3 (-1.6; -0.9)
Body mass index < 25	-3.2 (-4.0; -2.4)	-1.5 (-1.9; -1.1)	-3.2 (-4.7; -1.7)	-1.5 (-2.3; -0.6)
Body mass index ≥ 25	-2.0 (-2.5; -1.5)	-1.2 (-1.5; -0.8)	-3.3 (-3.8; -2.6)	-2.0 (-2.4; -1.6)
Fruit and vegetables consumption < 400g/day	-3.0 (-3.7; -2.2)	-1.6 (-2.0; -1.2)	-4.1 (-5.1; -2.9)	-2.3 (-3.0; -1.5)
Fruit and vegetables consumption ≥ 400g/day	-1.7 (-2.2; -1.3)	-0.9 (-1.1; -0.6)	-2.4 (-3.0; -1.8)	-1.2 (-1.6; -0.8)
Low adherence to the mPNNS-GS	-3.3 (-4.1; -2.4)	-1.5 (-1.8; -1.1)	-4.5 (-5.7; -3.1)	-2.0 (-2.6; -1.3)
Medium adherence to the mPNNS-GS	-2.1 (-2.6; -1.5)	-1.6 (-2.1; -1.2)	-2.9 (-3.6; -2.2)	-2.3 (-3.0; -1.5)
High adherence to the mPNNS-GS	-2.4 (-3.0; -1.8)	-1.2 (-1.5; -0.9)	-3.3 (-4.2; -2.4)	-1.7 (-2.1; -1.1)
Low adherence to the MEDI-LITE	-3.0 (-3.7; -2.2)	-1.5 (-1.9; -1.1)	-4.1 (-5.2; -2.9)	-2.2 (-2.9; -1.5)
Medium adherence to the MEDI-LITE	-2.9 (-3.6; -2.1)	-1.5 (-1.9; -1.1)	-4.0 (-5.0; -2.9)	-2.0 (-2.7; -1.3)
High adherence to the MEDI-LITE	-2.0 (-2.5; -1.5)	-1.2 (-1.5; -0.9)	-2.8 (-3.5; -2.0)	-1.6 (-2.1; -1.0)
Low adherence to the provegetarian FP	-2.8 (-3.6; -2.1)	-1.4 (-1.8; -1.1)	-4.0 (-5.0; -2.9)	-2.1 (-2.8; -1.4)
Medium adherence to the provegetarian FP	-2.6 (-3.3; -1.9)	-1.3 (-1.6; -1.0)	-3.7 (-4.6; -2.7)	-1.9 (-2.4; -1.3)
High adherence to the provegetarian FP	-2.3 (-2.9; -1.7)	-1.4 (-1.8; -1.1)	-3.2 (-4.0; -2.3)	-1.9 (-2.4; -1.2)
	2nd Best pizza (#100)			
Age < 45 years	-3.6 (-5.3; -1.8)	-1.7 (-2.5; -0.8)	-3.6 (-5.3; -1.8)	-1.6 (-2.5; -0.8)
Age ≥ 45 years	-1.2 (-1.8; -0.6)	-0.8 (-1.1; -0.4)	-1.2 (-1.8; -0.6)	-0.7 (-1.1; -0.3)
Body mass index < 25	-2.8 (-4.2; -1.4)	-1.3 (-2.0; -0.7)	-2.8 (-4.2; -1.4)	-1.3 (-2.0; -0.7)
Body mass index ≥ 25	-1.8 (-2.7; -0.9)	-1.0 (-1.5; -0.5)	-1.8 (-2.7; -0.9)	-1.0 (-1.5; -0.5)
Fruit and vegetables consumption < 400g/day	-2.6 (-3.9; -1.3)	-1.4 (-2.2; -0.7)	-2.6 (-3.9; -1.3)	-1.4 (-2.1; -0.7)
Fruit and vegetables consumption ≥ 400g/day	-1.5 (-2.2; -0.7)	-0.7 (-1.1; -0.3)	-1.5 (-2.2; -0.7)	-0.7 (-1.1; -0.3)
Low adherence to the mPNNS-GS	-2.9 (-4.3; -1.4)	-1.3 (-1.9; -0.6)	-2.9 (-4.3; -1.4)	-1.3 (-1.9; -0.6)
Medium adherence to the mPNNS-GS	-1.8 (-2.7; -0.9)	-1.5 (-2.2; -0.7)	-1.8 (-2.7; -0.8)	-1.4 (-2.2; -0.7)
High adherence to the mPNNS-GS	-2.1 (-3.2; -1.0)	-1.0 (-1.5; -0.5)	-2.1 (-3.1; -1.0)	-1.0 (-1.5; -0.5)
Low adherence to the MEDI-LITE	-2.6 (-3.9; -1.3)	-1.4 (-2.0; -0.7)	-2.6 (-3.9; -1.3)	-1.4 (-2.0; -0.7)
Medium adherence to the MEDI-LITE	-2.5 (-3.8; -1.2)	-1.3 (-1.9; -0.6)	-2.5 (-3.7; -1.2)	-1.2 (-1.9; -0.6)
High adherence to the MEDI-LITE	-1.7 (-2.6; -0.8)	-1.0 (-1.5; -0.5)	-1.7 (-2.6; -0.8)	-1.0 (-1.5; -0.5)
Low adherence to the provegetarian FP	-2.5 (-3.8; -1.2)	-1.3 (-2.0; -0.7)	-2.5 (-3.7; -1.2)	-1.3 (-2.0; -0.6)
Medium adherence to the provegetarian FP	-2.3 (-3.5; -1.1)	-1.1 (-1.7; -0.6)	-2.4 (-3.5; -1.2)	-1.1 (-1.7; -0.5)
High adherence to the provegetarian FP	-2.0 (-3.0; -1.0)	-1.2 (-1.8; -0.6)	-2.0 (-3.0; -0.9)	-1.2 (-1.8; -0.6)
	1st Worst pizza (#78)			
Age < 45 years	4.1 (2.9; 5.4)	1.9 (1.3; 2.4)	5.7 (3.7; 7.7)	2.6 (1.3; 3.7)
Age ≥ 45 years	1.3 (0.9; 1.7)	0.8 (0.5; 1.0)	2.1 (1.5; 2.7)	1.3 (0.9; 1.7)
Body mass index < 25	3.2 (2.2; 4.2)	1.5 (1.1; 2.0)	3.2 (1.3; 5.0)	1.4 (0.3; 2.5)
Body mass index ≥ 25	2.1 (1.4; 2.7)	1.1 (0.8; 1.4)	3.5 (2.8; 4.3)	2.2 (1.7; 2.6)
Fruit and vegetables consumption < 400g/day	2.9 (2.0; 3.8)	1.5 (1.1; 2.0)	4.3 (2.9; 5.7)	2.4 (1.4; 3.3)
Fruit and vegetables consumption ≥ 400g/day	1.8 (1.2; 2.3)	0.8 (0.6; 1.1)	2.7 (1.9; 3.4)	1.3 (0.8; 1.7)
Low adherence to the mPNNS-GS	3.3 (2.3; 4.2)	1.5 (1.0; 1.9)	4.8 (3.1; 6.3)	2.2 (1.2; 3.0)
Medium adherence to the mPNNS-GS	2.0 (1.4; 2.6)	1.6 (1.1; 2.1)	3.1 (2.2; 3.9)	2.5 (1.5; 3.4)
High adherence to the mPNNS-GS	2.5 (1.7; 3.3)	1.1 (0.8; 1.4)	3.6 (2.5; 4.7)	1.7 (1.1; 2.3)
Low adherence to the MEDI-LITE	2.8 (2.0; 3.7)	1.5 (1.0; 1.9)	4.3 (2.9; 5.6)	2.4 (1.5; 3.2)
Medium adherence to the MEDI-LITE	2.9 (2.0; 3.8)	1.4 (1.0; 1.8)	4.4 (3.0; 5.7)	2.1 (1.2; 2.9)
High adherence to the MEDI-LITE	2.1 (1.5; 2.7)	1.2 (0.8; 1.5)	3.0 (2.1; 3.9)	1.7 (1.0; 2.3)
Low adherence to the provegetarian FP	2.8 (1.9; 3.6)	1.4 (1.0; 1.9)	4.2 (2.9; 5.5)	2.3 (1.4; 3.1)
Medium adherence to the provegetarian FP	2.6 (1.8; 3.5)	1.3 (0.9; 1.6)	4.0 (2.7; 5.1)	2.0 (1.2; 2.6)
High adherence to the provegetarian FP	2.4 (1.6; 3.1)	1.3 (0.9; 1.7)	3.4 (2.3; 4.4)	1.9 (1.1; 2.7)

	2nd Worst pizza (#84)			
Age < 45 years	3.5 (2.4; 4.7)	1.6 (1.1; 2.2)	7.3 (3.4; 10.6)	3.2 (0.8; 5.4)
Age ≥ 45 years	1.2 (0.8; 1.5)	0.7 (0.5; 0.9)	2.9 (1.9; 3.8)	1.9 (1.0; 2.6)
Body mass index < 25	2.7 (1.8; 3.6)	1.3 (0.9; 1.8)	2.8 (-0.7; 6.4)	1.2 (-1.0; 3.4)
Body mass index ≥ 25	1.8 (1.2; 2.4)	0.9 (0.6; 1.2)	5.1 (4.0; 6.1)	3.3 (2.6; 4.0)
Fruit and vegetables consumption < 400g/day	2.5 (1.7; 3.3)	1.3 (0.9; 1.8)	5.7 (3.1; 7.9)	3.3 (1.3; 4.9)
Fruit and vegetables consumption ≥ 400g/day	1.6 (1.1; 2.1)	0.8 (0.6; 1.0)	3.6 (2.3; 4.8)	1.8 (0.8; 2.6)
Low adherence to the mPNNS-GS	2.7 (1.8; 3.6)	1.3 (0.8; 1.7)	6.2 (3.2; 8.8)	2.8 (1.0; 4.4)
Medium adherence to the mPNNS-GS	1.7 (1.2; 2.3)	1.4 (0.9; 1.8)	4.2 (2.5; 5.6)	3.4 (1.4; 5.0)
High adherence to the mPNNS-GS	2.2 (1.5; 2.9)	1.0 (0.7; 1.3)	4.8 (2.9; 6.5)	2.4 (1.1; 3.4)
Low adherence to the MEDI-LITE	2.4 (1.6; 3.1)	1.2 (0.8; 1.6)	5.7 (3.1; 7.9)	3.3 (1.6; 4.7)
Medium adherence to the MEDI-LITE	2.5 (1.7; 3.4)	1.2 (0.8; 1.6)	5.9 (3.4; 7.9)	2.9 (1.0; 4.4)
High adherence to the MEDI-LITE	1.9 (1.3; 2.5)	1.1 (0.7; 1.4)	4.0 (2.4; 5.5)	2.3 (0.9; 3.4)
Low adherence to the provegetarian FP	2.3 (1.5; 3.1)	1.2 (0.8; 1.6)	5.6 (3.2; 7.7)	3.2 (1.4; 4.6)
Medium adherence to the provegetarian FP	2.3 (1.5; 3.0)	1.1 (0.8; 1.5)	5.3 (3.1; 7.1)	2.7 (1.2; 3.9)
High adherence to the provegetarian FP	2.1 (1.5; 2.8)	1.2 (0.8; 1.6)	4.5 (2.5; 6.2)	2.6 (0.8; 4.0)

MEDI-LITE, Literature-based adherence score to the Mediterranean diet; ***mPNNS-GS***, modified Programme National Nutrition Santé Guideline Score; ***NIE substitution***, Non-isoenergetic substitution; ***Provegetarian FP***, Provegetarian food pattern. "Pizza" here stands for cluster of pizzas (*n*=100, out of 353 pizzas).

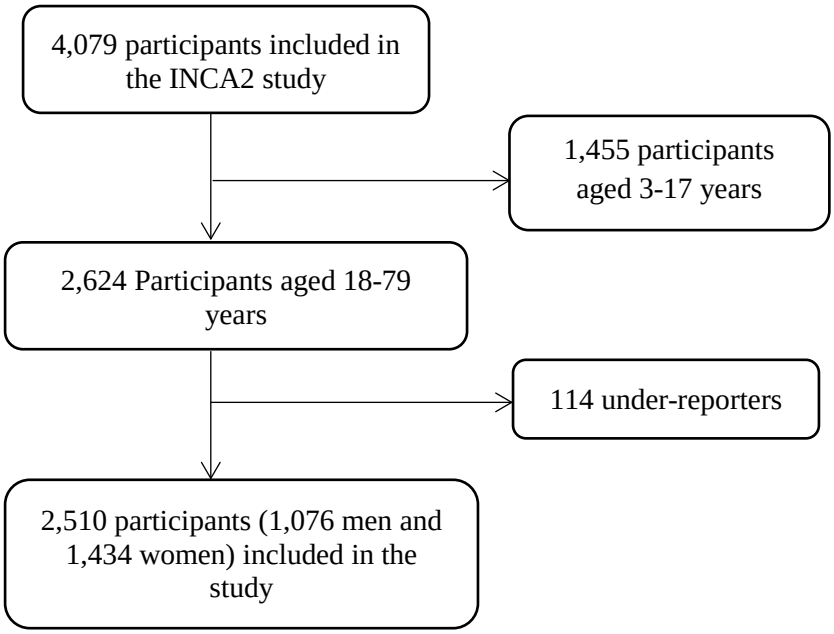
Supplemental table 4 Rates of change in risk of type 2 diabetes (in percentage) for inter-categories substitutions in the whole population and in population subgroups †

Population	Isoenergetic substitution		Non-isoenergetic substitution	
	Men	Women	Men	Women
Pan bagnat				
Whole population	-2.6 (-3.7; -1.5)	-1.4 (-1.9; -0.8)	-2.1 (-3.2; -1.0)	-1.1 (-1.7; -0.4)
Pizza consumers	-6.5 (-9.1; -3.9)	-4.3 (-6.0; -2.5)	-5.4 (-8.1; -2.6)	-3.4 (-5.3; -1.4)
Participants who consumed pizza once	-5.0 (-7.0; -3.0)	-3.7 (-5.2; -2.2)	-4.1 (-6.2; -1.9)	-2.9 (-4.6; -1.2)
Participants who consumed pizza twice	-9.6 (-13.3; -5.7)	-6.2 (-8.6; -3.7)	-8.0 (-12.0; -3.9)	-5.3 (-8.2; -2.4)
Participants who consumed pizza more than twice	-13.5 (-18.6; -8.0)	-9.7 (-13.4; -5.8)	-11.6 (-17.0; -5.8)	-7.7 (-11.9; -3.4)
Age < 45 years	-4.1 (-5.7; -2.4)	-1.9 (-2.6; -1.1)	-3.5 (-5.2; -1.7)	-1.6 (-2.5; -0.7)
Age ≥ 45 years	-1.4 (-1.9; -0.8)	-0.9 (-1.2; -0.5)	-1.0 (-1.6; -0.4)	-0.6 (-1.0; -0.2)
Body mass index < 25	-3.2 (-4.5; -1.9)	-1.5 (-2.1; -0.9)	-3.2 (-4.6; -1.7)	-1.6 (-2.3; -0.8)
Body mass index ≥ 25	-2.1 (-2.9; -1.2)	-1.2 (-1.6; -0.7)	-1.5 (-2.3; -0.6)	-0.7 (-1.1; -0.2)
Fruit and vegetables consumption < 400g/day	-3.0 (-4.2; -1.8)	-1.6 (-2.3; -1.0)	-2.4 (-3.7; -1.1)	-1.3 (-2.0; -0.5)
Fruit and vegetables consumption ≥ 400g/day	-1.7 (-2.4; -1.0)	-0.8 (-1.1; -0.5)	-1.3 (-2.0; -0.5)	-0.6 (-1.0; -0.2)
Low adherence to the mPNNS-GS	-3.3 (-4.6; -2.0)	-1.5 (-2.1; -0.9)	-2.7 (-4.1; -1.3)	-1.2 (-1.8; -0.5)
Medium adherence to the mPNNS-GS	-2.0 (-2.9; -1.2)	-1.7 (-2.3; -1.0)	-1.6 (-2.5; -0.7)	-1.3 (-2.0; -0.5)
High adherence to the mPNNS-GS	-2.4 (-3.3; -1.4)	-1.1 (-1.5; -0.7)	-1.9 (-2.9; -0.9)	-0.8 (-1.3; -0.3)
Low adherence to the MEDI-LITE	-3.0 (-4.2; -1.8)	-1.5 (-2.2; -0.9)	-2.4 (-3.7; -1.2)	-1.2 (-1.9; -0.5)
Medium adherence to the MEDI-LITE	-2.9 (-4.0; -1.7)	-1.4 (-2.0; -0.9)	-2.3 (-3.5; -1.0)	-1.1 (-1.8; -0.4)
High adherence to the MEDI-LITE	-1.9 (-2.8; -1.1)	-1.1 (-1.6; -0.6)	-1.6 (-2.4; -0.7)	-0.9 (-1.4; -0.4)
Low adherence to the provegetarian FP	-2.9 (-4.0; -1.7)	-1.5 (-2.1; -0.9)	-2.3 (-3.5; -1.1)	-1.1 (-1.8; -0.5)
Medium adherence to the provegetarian FP	-2.6 (-3.7; -1.6)	-1.3 (-1.8; -0.7)	-2.1 (-3.2; -1.0)	-1.0 (-1.6; -0.4)
High adherence to the provegetarian FP	-2.3 (-3.2; -1.3)	-1.4 (-1.9; -0.8)	-1.8 (-2.8; -0.8)	-1.1 (-1.7; -0.4)
Spring rolls				
Whole population	-2.1 (-3.3; -0.8)	-1.2 (-1.8; -0.5)	-5.1 (-7.3; -2.4)	-2.9 (-4.5; -1.0)
Pizza consumers	-5.2 (-8.1; -2.1)	-3.6 (-5.6; -1.6)	-11.4 (-16.9; -4.6)	-8.3 (-12.9; -2.4)
Participants who consumed pizza once	-4.0 (-6.2; -1.6)	-3.1 (-4.8; -1.4)	-8.9 (-13.1; -3.9)	-7.4 (-11.3; -2.4)
Participants who consumed pizza twice	-7.6 (-11.7; -3.1)	-5.1 (-7.9; -2.2)	-15.0 (-23.1; -4.8)	-8.9 (-16.6; 0.2)
Participants who consumed pizza more than twice	-11.0 (-16.8; -4.5)	-8.4 (-12.9; -3.7)	-21.6 (-32.9; -6.0)	-19.5 (-29.0; -6.3)
Age < 45 years	-3.2 (-5.0; -1.3)	-1.6 (-2.4; -0.7)	-6.8 (-10.6; -2.2)	-3.1 (-5.6; -0.3)
Age ≥ 45 years	-1.1 (-1.8; -0.5)	-0.7 (-1.1; -0.3)	-3.0 (-4.0; -1.7)	-2.0 (-2.8; -1.0)
Body mass index < 25	-2.6 (-4.0; -1.0)	-1.3 (-2.0; -0.6)	-2.4 (-6.4; 1.9)	-1.1 (-3.5; 1.5)
Body mass index ≥ 25	-1.7 (-2.6; -0.7)	-0.9 (-1.5; -0.4)	-5.2 (-6.5; -3.9)	-3.6 (-4.3; -2.7)
Fruit and vegetables consumption < 400g/day	-2.3 (-3.7; -0.9)	-1.3 (-2.1; -0.6)	-5.6 (-8.2; -2.5)	-3.4 (-5.2; -1.1)
Fruit and vegetables consumption ≥ 400g/day	-1.5 (-2.3; -0.6)	-0.8 (-1.1; -0.3)	-3.6 (-5.0; -2.0)	-1.8 (-2.8; -0.7)
Low adherence to the mPNNS-GS	-2.6 (-4.0; -1.0)	-1.2 (-1.8; -0.5)	-6.0 (-8.9; -2.4)	-2.8 (-4.5; -0.7)
Medium adherence to the mPNNS-GS	-1.7 (-2.6; -0.7)	-1.4 (-2.1; -0.6)	-4.2 (-5.9; -2.2)	-3.4 (-5.3; -1.1)
High adherence to the mPNNS-GS	-2.0 (-3.1; -0.8)	-1.0 (-1.6; -0.5)	-4.7 (-6.7; -2.3)	-2.6 (-3.7; -1.1)
Low adherence to the MEDI-LITE	-2.3 (-3.6; -0.9)	-1.2 (-1.9; -0.5)	-5.6 (-8.2; -2.5)	-3.5 (-5.0; -1.4)
Medium adherence to the MEDI-LITE	-2.4 (-3.7; -1.0)	-1.3 (-2.0; -0.6)	-5.7 (-8.1; -2.9)	-2.9 (-4.6; -0.9)
High adherence to the MEDI-LITE	-1.7 (-2.6; -0.7)	-1.1 (-1.6; -0.5)	-4.0 (-5.7; -2.0)	-2.3 (-3.6; -0.7)
Low adherence to the provegetarian FP	-2.2 (-3.5; -0.8)	-1.2 (-1.9; -0.5)	-5.5 (-8.0; -2.6)	-3.2 (-4.9; -1.1)
Medium adherence to the provegetarian FP	-2.1 (-3.3; -0.8)	-1.1 (-1.7; -0.5)	-5.3 (-7.5; -2.6)	-2.8 (-4.2; -1.1)
High adherence to the provegetarian FP	-2.0 (-3.1; -0.9)	-1.3 (-1.9; -0.6)	-4.4 (-6.4; -2.1)	-2.6 (-4.2; -0.7)
Spaghetti with tomato sauce				
Whole population	-1.1 (-1.5; -0.6)	-0.7 (-0.9; -0.4)	-5.4 (-8.1; -1.8)	-3.2 (-5.3; -0.6)
Pizza consumers	-2.7 (-3.9; -1.4)	-2.2 (-2.9; -1.4)	-11.4 (-18.4; -2.0)	-8.7 (-15.0; -0.6)
Participants who consumed pizza once	-2.1 (-3.0; -1.1)	-1.9 (-2.5; -1.2)	-9.1 (-14.3; -2.2)	-7.9 (-13.1; -1.0)
Participants who consumed pizza twice	-3.9 (-5.7; -2.0)	-2.9 (-4.0; -1.8)	-13.9 (-24.6; 0.6)	-8.1 (-18.6; 4.7)
Participants who consumed pizza more than twice	-5.7 (-8.2; -3.1)	-4.9 (-6.8; -3.0)	-19.7 (-34.9; 2.4)	-20.0 (-32.4; -1.7)
Age < 45 years	-1.6 (-2.3; -0.8)	-0.9 (-1.2; -0.6)	-6.7 (-11.6; -0.5)	-3.2 (-6.5; 0.8)
Age ≥ 45 years	-0.6 (-0.9; -0.4)	-0.5 (-0.7; -0.3)	-3.3 (-4.6; -1.7)	-2.3 (-3.3; -0.9)
Body mass index < 25	-1.3 (-1.9; -0.7)	-0.8 (-1.1; -0.5)	-1.0 (-6.5; 5.0)	-0.5 (-3.9; 3.2)

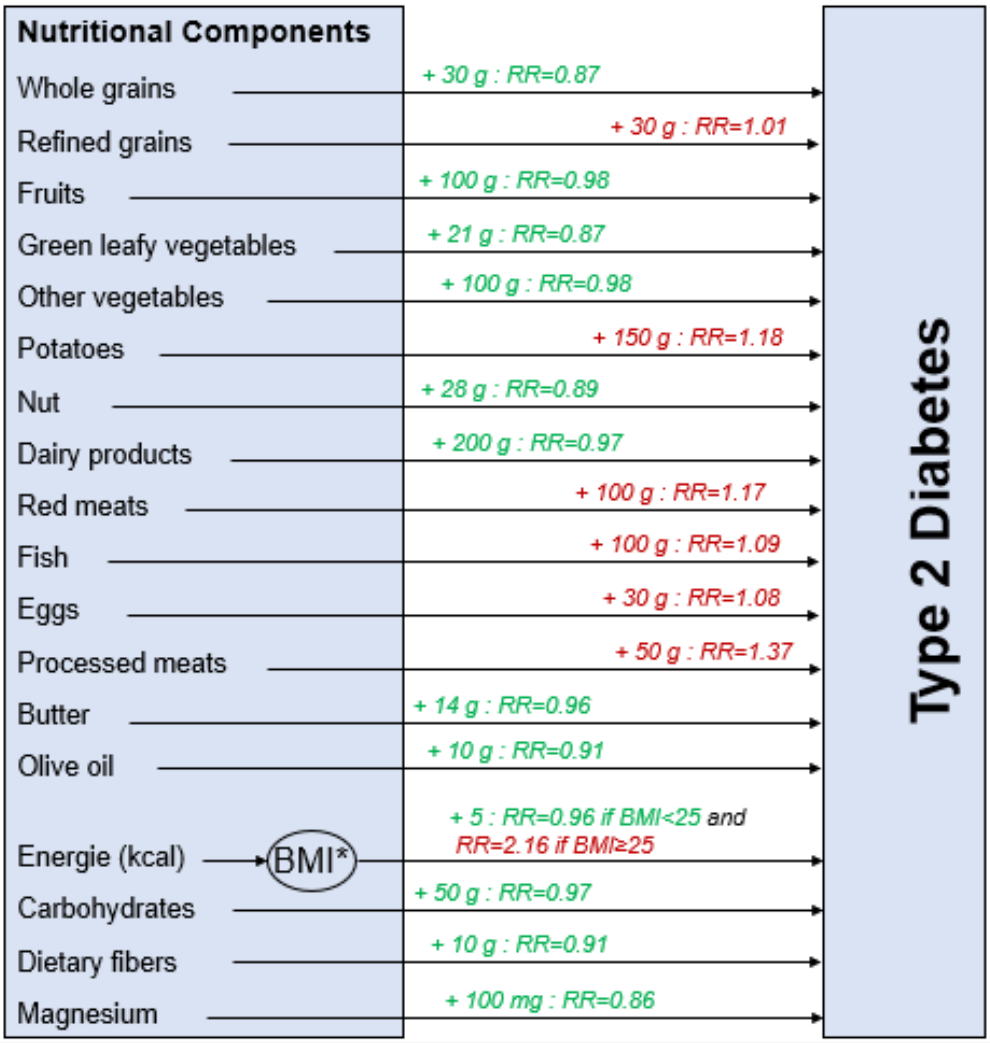
Body mass index ≥ 25	-0.9 (-1.4; -0.5)	-0.6 (-0.8; -0.4)	-6.0 (-7.4; -4.5)	-4.3 (-5.2; -3.3)
Fruit and vegetables consumption < 400g/day	-1.2 (-1.7; -0.6)	-0.8 (-1.0; -0.5)	-5.8 (-9.0; -1.7)	-3.7 (-6.1; -0.5)
Fruit and vegetables consumption ≥ 400g/day	-0.9 (-1.2; -0.5)	-0.5 (-0.7; -0.4)	-4.0 (-5.6; -1.9)	-2.1 (-3.3; -0.5)
Low adherence to the mPNNS-GS	-1.2 (-1.8; -0.6)	-0.6 (-0.9; -0.4)	-6.1 (-9.9; -1.2)	-3.0 (-5.3; -0.1)
Medium adherence to the mPNNS-GS	-0.9 (-1.2; -0.5)	-0.8 (-1.1; -0.5)	-4.6 (-6.6; -1.9)	-3.8 (-6.2; -0.6)
High adherence to the mPNNS-GS	-1.1 (-1.6; -0.7)	-0.7 (-0.9; -0.5)	-5.0 (-7.5; -1.9)	-2.9 (-4.5; -0.8)
Low adherence to the MEDI-LITE	-1.1 (-1.5; -0.6)	-0.6 (-0.9; -0.4)	-5.9 (-9.1; -1.7)	-3.9 (-5.9; -1.1)
Medium adherence to the MEDI-LITE	-1.3 (-1.8; -0.7)	-0.8 (-1.0; -0.5)	-6.1 (-9.0; -2.3)	-3.2 (-5.5; -0.3)
High adherence to the MEDI-LITE	-1.0 (-1.4; -0.6)	-0.7 (-0.9; -0.5)	-4.2 (-6.4; -1.6)	-2.5 (-4.3; -0.3)
Low adherence to the provegetarian FP	-1.0 (-1.5; -0.5)	-0.6 (-0.9; -0.4)	-5.8 (-8.9; -1.9)	-3.6 (-5.8; -0.7)
Medium adherence to the provegetarian FP	-1.1 (-1.5; -0.6)	-0.6 (-0.9; -0.4)	-5.6 (-8.3; -2.1)	-3.2 (-5.0; -0.8)
High adherence to the provegetarian FP	-1.2 (-1.6; -0.7)	-0.9 (-1.1; -0.6)	-4.6 (-7.1; -1.5)	-2.8 (-5.0; -0.1)
	Hot-dog			
Whole population	6.5 (4.2; 9.1)	3.2 (2.1; 4.4)	9.5 (6.3; 12.8)	4.9 (2.9; 6.7)
Pizza consumers	16.2 (10.5; 22.4)	10.1 (6.7; 13.6)	24.2 (15.6; 32.9)	15.5 (9.0; 21.6)
Participants who consumed pizza once	11.6 (7.6; 15.7)	8.5 (5.7; 11.5)	17.3 (11.3; 23.2)	13.2 (7.81; 18.2)
Participants who consumed pizza twice	24.5 (15.7; 34.2)	14.7 (9.6; 20.0)	37.1 (23.8; 51.3)	20.5 (10.2; 30.8)
Participants who consumed pizza more than twice	42.1 (25.8; 61.8)	26.9 (17.3; 37.4)	64.5 (39.9; 93.0)	44.8 (27.1; 62.5)
Age < 45 years	10.4 (6.6; 14.6)	4.5 (2.9; 6.1)	14.3 (8.9; 19.9)	6.1 (3.2; 8.8)
Age ≥ 45 years	3.3 (2.1; 4.5)	1.9 (1.2; 2.6)	5.0 (3.5; 6.6)	3.1 (2.0; 4.1)
Body mass index < 25	7.9 (5.1; 11.1)	3.6 (2.4; 4.9)	8.1 (3.5; 12.9)	3.5 (1.0; 6.0)
Body mass index ≥ 25	5.1 (3.3; 7.2)	2.6 (1.7; 3.6)	8.5 (6.3; 10.9)	5.0 (3.9; 6.3)
Fruit and vegetables consumption < 400g/day	7.3 (4.7; 10.2)	3.7 (2.5; 5.2)	10.6 (6.9; 14.4)	5.7 (3.4; 7.9)
Fruit and vegetables consumption ≥ 400g/day	4.4 (2.8; 6.2)	2.0 (1.3; 2.7)	6.5 (4.4; 8.7)	3.0 (1.8; 4.0)
Low adherence to the mPNNS-GS	8.3 (5.3; 11.6)	3.5 (2.3; 4.8)	11.8 (7.6; 16.3)	5.1 (2.9; 7.2)
Medium adherence to the mPNNS-GS	4.9 (3.2; 6.7)	3.8 (2.5; 5.2)	7.4 (5.0; 9.6)	5.8 (3.4; 8.0)
High adherence to the mPNNS-GS	6.1 (3.9; 8.5)	2.6 (1.7; 3.6)	8.7 (5.8; 11.8)	4.0 (2.5; 5.4)
Low adherence to the MEDI-LITE	7.2 (4.6; 10.0)	3.5 (2.3; 4.8)	10.6 (6.9; 14.4)	5.6 (3.5; 7.6)
Medium adherence to the MEDI-LITE	7.3 (4.7; 10.3)	3.3 (2.2; 4.5)	10.7 (7.1; 14.5)	5.0 (2.9; 7.0)
High adherence to the MEDI-LITE	5.1 (3.3; 7.0)	2.8 (1.8; 3.9)	7.2 (4.9; 9.7)	4.0 (2.3; 5.6)
Low adherence to the provegetarian FP	7.0 (4.5; 9.7)	3.5 (2.3; 4.8)	10.4 (6.8; 13.9)	5.4 (3.3; 7.4)
Medium adherence to the provegetarian FP	6.6 (4.2; 9.4)	3.0 (2.0; 4.1)	9.7 (6.4; 13.2)	4.6 (2.8; 6.3)
High adherence to the provegetarian FP	5.8 (3.8; 8.0)	3.2 (2.1; 4.4)	8.2 (5.4; 11.0)	4.6 (2.6; 6.4)

MEDI-LITE, Literature-based adherence score to the Mediterranean diet; ***mPNNS-GS,*** modified Programme National Nutrition Santé Guideline Score; ***NIE substitution,*** Non-isoenergetic substitution; ***Provegetarian FP,*** Provegetarian food pattern

† Results are the observed risk variations for the best and worst mixed dishes identified for isoenergetic and non-isoenergetic substitutions.



Supplemental Figure 1 Flow chart of participant selection



Supplemental Figure 2 Structure and parameters of the macrosimulation model

*The change in BMI was calculated as indicated by Scarborough et al., but at constant physical activity.

References

Scarborough P, Harrington RA, Mizdrak A, Zhou LM, Doherty A. The Preventable Risk Integrated ModEl and Its Use to Estimate the Health Impact of Public Health Policy Scenarios. *Scientifica* (2014) **2014**:748750. doi:10.1155/2014/748750

Schwingshackl L, Hoffmann G, Lampousi A-M, Knüppel S, Iqbal K, Schwedhelm C, Bechthold A, Schlesinger S, Boeing H. Food groups and risk of type 2 diabetes mellitus: a systematic review and meta-analysis of prospective studies. *Eur J Epidemiol* (2017) **32**:363–375. doi:10.1007/s10654-017-0246-y

Schwingshackl L, Schwedhelm C, Hoffmann G, Boeing H. Potatoes and risk of chronic disease: a systematic review and dose-response meta-analysis. *Eur J Nutr* (2019) **58**:2243–2251. doi:10.1007/s00394-018-1774-2

Pimpin L, Wu JHY, Haskelberg H, Del Gobbo L, Mozaffarian D. Is Butter Back? A Systematic Review and Meta-Analysis of Butter Consumption and Risk of Cardiovascular Disease, Diabetes, and Total Mortality. *PloS One* (2016) **11**:e0158118. doi:10.1371/journal.pone.0158118

Li M, Fan Y, Zhang X, Hou W, Tang Z. Fruit and vegetable intake and risk of type 2 diabetes mellitus: meta-analysis of prospective cohort studies. *BMJ Open* (2014) **4**:e005497. doi:10.1136/bmjopen-2014-005497

InterAct Consortium. Dietary fibre and incidence of type 2 diabetes in eight European countries: the EPIC-InterAct Study and a meta-analysis of prospective studies. *Diabetologia* (2015) **58**:1394–1408. doi:10.1007/s00125-015-3585-9

Greenwood DC, Threapleton DE, Evans CEL, Cleghorn CL, Nykjaer C, Woodhead C, Burley VJ. Glycemic index, glycemic load, carbohydrates, and type 2 diabetes: systematic review and dose-response meta-analysis of prospective studies. *Diabetes Care* (2013) **36**:4166–4171. doi:10.2337/dc13-0325

Dong J-Y, Xun P, He K, Qin L-Q. Magnesium intake and risk of type 2 diabetes: meta-analysis of prospective cohort studies. *Diabetes Care* (2011) **34**:2116–2122. doi:10.2337/dc11-0518

mPNNS-GS (Kesse-Guyot et al., 2011a ; Estaquio C. et al, 2009) †

Food intake recommendations	Moderation in consumption	Penalty
Fruit and vegetables without potatoes (0-2), starchy foods (0-1), whole grain products (0-1), milk and dairy products (0-1), meat, poultry, fish, eggs, and seafood (0-1), seafood (0-1), vegetable fat (0-1), water vs soda (0-1)	Sweetened foods (-0.5-1), salt (-0.5-1.5), added fats (0-2), alcohol (0-1)	Deduction of points if energy intake exceeded energy needs by 5%
The mPNNS-GS score is the sum of components minus penalty (range: 0-13.5 points)		

MEDI-LITE (Sofi F. et al, 2013) ‡

Desirable components (0-2 points for each component)	Undesirable components (0-2 points for each component)
Fruit, vegetables without potatoes, grains, legumes, fish, olive oil, moderate alcohol consumption	Meat/meat products, dairy products
The MEDI-LITE score is the sum of components (range: 0-18 points)	

Provegetarian food pattern (Martínez-González. et al, 2014) §

Vegetable food groups (1-5 points for each food group)	Animal food groups (1-5 points for each food group)
Fruit, vegetables, legumes, cereals, potatoes, nuts, olive oil	Meats/meat products, eggs, animal fats for cooking or as a spread, Fish and other seafood, dairy products
The Provegetarian FP is the sum of the sex-specific quintile values of the 12 food groups (range: 12-60 points)	

MEDI-LITE *Literature-Based Adherence Score to the Mediterranean Diet;* ***mPNNS-GS*** *modified Programme National Nutrition Santé Guideline Score.*

† Values were assigned by using fixed portion numbers for each food group, with a maximum of points attributed for high consumption of "desirable" components

‡ Values were assigned to food groups by using fixed cut-off points (portion sizes multiplied by the number of servings per day/week) determined from an extensive published review of the literature. A maximum of points is attributed for high consumption of "desirable" components and the scoring was reversed for the "undesirable" components.

§ Consumption (g/d) of each food group was energy-adjusted using the residual method and divided into sex-specific quintiles. A value between 1 and 5 was assigned to each quintile, with a maximum of points attributed for high consumption of "vegetable food groups". The scoring was reversed for the "animal food groups".

Supplemental Figure 3 Computation of diet quality scores