

Supplementary Appendix

Supplementary Table S1. Red and processed meat items used in the comparative risk assessment.

Red meat, 14 items

Meat, Cattle; Offals of cattle; Meat of cattle, boneless; Meat of sheep; Offals of sheep; Goat meat; Offals of goats; Pig meat; Offals of pigs; Pork; Horse meat; Meat of asses; Rabbit meat; Game meat

Processed meat, 6 items

Sausages of Beef and Veal; Beef and Veal Preparations nes; Bacon and Ham; Sausages of Pig Meat; Pig Meat Preparations; Meat, Dried

Supplementary Table S2. Relative risk parameters by age in both morbidity and mortality for colorectal cancer, diabetes mellitus, and ischemic heart disease with two dietary risk factors: For example, in the age group of 25-29 years, red meat consumption of 100g per day increases diabetes mellitus type 2 by 20% (relative risk=1.2; 95% confidence intervals, 1.13 to 1.27). Data source: Murray, et al.¹⁷.

Age	Diets high in red meat (100g/day)			Diets high in processed meat (50g/day)		
	colorectal cancer	diabetes mellitus type 2	ischemic heart disease	colorectal cancer	diabetes mellitus type 2	ischemic heart disease
25-29	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.34 (1.14–1.56)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.17 (1.01–1.31)
30-34	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.34 (1.14–1.56)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.17 (1.01–1.31)
35-39	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.34 (1.14–1.56)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.17 (1.01–1.31)
40-44	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.27 (1.12–1.44)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.13 (1.01–1.25)
45-49	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.26 (1.11–1.42)	1.08 (1.03–1.13)	1.731 (1.313–2.182)	1.13 (1.01–1.24)
50-54	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.24 (1.1–1.38)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.12 (1.01–1.22)
55-59	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.2 (1.09–1.32)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.1 (1.01–1.18)
60-64	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.17 (1.08–1.28)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.09 (1.01–1.16)
65-69	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.15 (1.07–1.25)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.08 (1.01–1.14)
70-74	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.14 (1.06–1.22)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.07 (1.01–1.13)
75-79	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.13 (1.06–1.2)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.06 (1.01–1.12)
80+	1.16 (1.08–1.25)	1.2 (1.13–1.27)	1.13 (1.06–1.2)	1.08 (1.03–1.13)	1.2 (1.12–1.27)	1.06 (1.01–1.12)

95% confidence intervals in parenthesis

Supplementary Table S3. Major partners and their proportions of red and processed meat imports in the top ten countries.

Rank	Risk suffered in 1993-1995	Death			DALY			
		Major partners	Risk suffered in 2016-2018	Major partners	Risk suffered in 1993-1995	Major partners	Risk suffered in 2016-2018	Major partners
1	Tonga	New Zealand (93.1 %) Australia (4.0 %) USA (2.2 %)	Netherlands	Germany (36.5 %) Brazil (11.9 %) United Kingdom (6.7 %)	Tonga	New Zealand (93.1 %) Australia (4.0 %) USA (2.2 %)	Netherlands	Germany (36.5 %) Brazil (11.9 %) United Kingdom (6.7 %)
2	United Arab Emirates	India (33.6 %) Australia (28.8 %) Ireland (9.9 %)	Bahamas	USA (70.5 %) Brazil (7.5 %) Australia (5.1 %)	United Arab Emirates	India (33.6 %) Australia (28.8 %) Ireland (9.9 %)	Bahamas	USA (70.5 %) Brazil (7.5 %) Australia (5.1 %)
3	Barbados	New Zealand (37.2 %) Canada (23.4 %) USA (10.7 %)	Tonga	Australia (45.3 %) New Zealand (35.0 %) Brazil (14.9 %)	Barbados	New Zealand (37.2 %) Canada (23.4 %) USA (10.7 %)	Denmark	Germany (49.0 %) Netherlands (17.3 %) Poland (11.2 %)
4	Fiji	New Zealand (79.4 %) Australia (20.5 %) China (<0.1 %)	Denmark	Germany (49.0 %) Netherlands (17.3 %) Poland (11.2 %)	Fiji	New Zealand (79.4 %) Australia (20.5 %) China (<0.1 %)	Tonga	Australia (45.3 %) New Zealand (35.0 %) Brazil (14.9 %)
5	Gabon	France (38.0 %) Netherlands (11.3 %) United Kingdom	Antigua and Barbuda	USA (78.6 %) Canada (7.3 %) Brazil (3.9 %)	Bahamas	USA (44.0 %) New Zealand (15.4 %) United Kingdom	Antigua and Barbuda	USA (78.6 %) Canada (7.3 %) Brazil (3.9 %)

		(9.5%)				(12.8 %)		
6	Bahamas	USA (44.0 %) New Zealand (15.4 %) United Kingdom (12.8 %)	Seychelles	Brazil (32.2 %) Australia (14.5 %) South Africa (11.7 %)	Greece	Netherlands (38.0 %) France (23.6 %) Denmark (11.9 %)	Malta	Italy (27.1 %) Spain (19.7 %) Netherlands (17.1 %)
7	Greece	Netherlands (38.0 %) France (23.6 %) Denmark (11.9 %)	United Arab Emirates	India (24.5 %) Australia (21.0 %) Brazil (18.9 %)	Gabon	France (38.0 %) Netherlands (11.3 %) United Kingdom (9.5%)	Seychelles	Brazil (32.2 %) Australia (14.5 %) South Africa (11.7 %)
8	Malta	Ireland (41.5 %) Denmark (11.6 %) New Zealand (8.0 %)	Singapore	Brazil (35.4 %) Australia (24.3 %) Netherlands (8.3 %)	Malta	Ireland (41.5 %) Denmark (11.6 %) New Zealand (8.0 %)	Croatia	Germany (23.9 %) Netherlands (13.8 %) Spain (12.9 %)
9	Brunei Darussalam	Singapore (38.4 %) Malaysia (27.3 %) Australia (21.2 %)	Croatia	Germany (23.9 %) Netherlands (13.8 %) Spain (12.9 %)	Brunei Darussalam	Singapore (38.4 %) Malaysia (27.3 %) Australia (21.2 %)	Singapore	Brazil (35.4 %) Australia (24.3 %) Netherlands (8.3 %)
10	Saint Lucia	New Zealand (24.4 %) United Kingdom (24.0 %) USA (12.6 %)	Greece	Netherlands (33.5 %) France (21.0 %) Germany (14.3 %)	Saint Lucia	New Zealand (24.4 %) United Kingdom (24.0 %) USA (12.6 %)	Greece	Netherlands (33.5 %) France (21.0 %) Germany (14.3 %)

In parenthesis, the percentage of red and processed meat imports from major partners to total imports in each country