Association of dietary quality and risk of cardiovascular disease and mortality in 218,000 people from over 50 countries

Andrew Mente, on behalf of the PURE, ONTARGET, TRANSCEND, INTERHEART and INTERSTROKE investigators

Duality of Interests

None to declare with regards this presentation

Background

- Most data on diet and health are from North America, Europe, China, Japan; Consensus that fruits and vegetables are protective
- Recent cohort studies with all geographic regions of the world including South America, Middle East, Africa and South Asia also indicate:
  - Moderate intakes of whole-fat dairy, unprocessed meat, fish, nuts (protective)
  - High starches (harmful)

Aims

- To develop and validate a diet quality tool in 218,000 that is applicable globally

4 Large International Studies (N=218,005)

	PURE	ONTARGET	INTERHEART	INTERSTROKE
	N=138,527	N=31,546	N=27,098	N=20,834
Design	Prospective cohort	Prospective cohort	Case-control	Case-control
Follow-up, y	8.1	4.7	N/A	N/A
No. of CVD events and total deaths	5466 CVD; 6821 deaths	5190 CVD; 3781 deaths	12,461 MI cases	10,402 stroke cases
Regions	Global (**21 countries**)	N and S Amer/ Europe; Asia (**40 countries**)	Global (**52 countries**)	Global (**36 countries**)

PURE Healthy Diet Score (N=138,527)

- Based on intake of foods associated with <u>lower</u> risk of mortality:
  - Vegs, fruit, legumes, nuts, fish, dairy, unprocessed red meat

Scoring scheme

- Each food receives a score of 1 (lowest), 2, 3, 4 or 5 (highest) based on quintiles of intake
- Total diet score: unweighted sum of each protective food
- Min score = 7; Max score = 35

What a <u>low</u> & <u>high</u> PURE diet score looks like

Unhealthy

Healthy

Healthy diet score		
Q1 (Low)	Foods or nutrients	Q5 (High)
1.8	Fruit & vegs [1]	8.4
0.7	Nuts & legumes [1]	2.5
0.6	Dairy [1]	3.0
0.3	Red meat [1]	1.4
0.2	Fish [1]	0.3
69.1	Carb, %E	54.0
18.5	Fats, %E	28.3
11.9	Protein, %E	17.9

[1] servings/day

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Statistical Methods

- Cox frailty analysis in PURE and ONTARGET/TRANSCEND

- Logistic regression in INTERHEART and INTERSTROKE accounting for clustering by centre

- Adjusted for:
  - Age and sex
  - Education, WHR, smoking, physical activity, energy
  - Diabetes, use of statin or BP lowering drugs

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Risk of __mortality__ by healthy diet score (PURE; N=138,527)

	Diet Quality Score					
	≤11	12 to 13	14 to 15	16 to 17	≥18	P-trend
No. events no. people (%)	1,433 22,678 (6.3)	1,546 26,313 (5.9)	1,490 29,241 (5.1)	1,161 26,471 (4.4)	1,191 33,824 (3.5)	
Age, sex adj.	1.0 (ref)	0.90 (0.84-0.97)	0.76 (0.70-0.82)	0.69 (0.63-0.75)	0.56 (0.51-0.61)	<0.0001
Fully adjusted	1.0 (ref)	0.94 (0.86-1.02)	0.82 (0.76-0.90)	0.82 (0.75-0.90)	0.75 (0.68-0.83)	<0.0001

Risk of __Mortality__ and __Major CVD__ by healthy diet score (PURE; N=138,527)

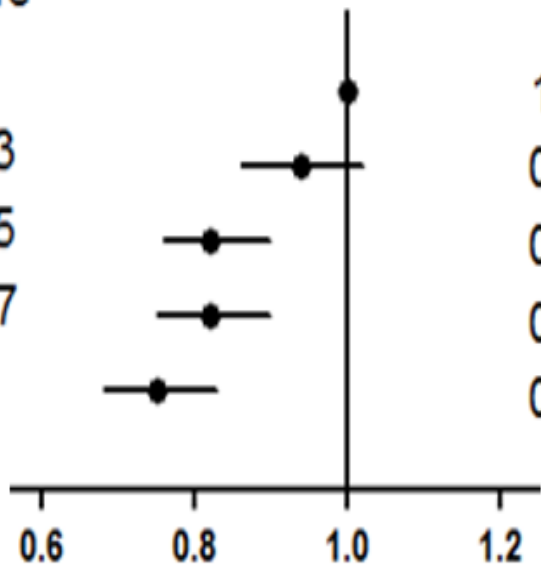**Total mortality**

P-trend <0.0001

Diet Score	HR (95% CI)
≤11	1.0 (ref)
12 to 13	0.94 (0.86, 1.02)
14 to 15	0.82 (0.76, 0.90)
16 to 17	0.82 (0.75, 0.90)
≥18	0.75 (0.68, 0.83)

Major CVD

P-trend =0.0413
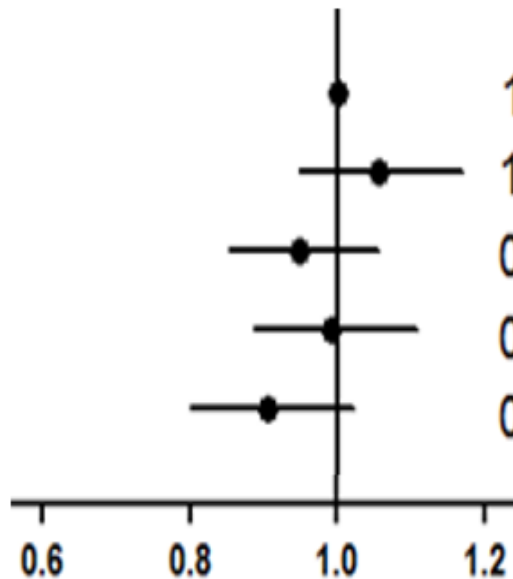
HR (95% CI)
1.0 (ref)
1.05 (0.95, 1.16)
0.95 (0.86, 1.05)
0.99 (0.89, 1.10)
0.91 (0.81, 1.02)

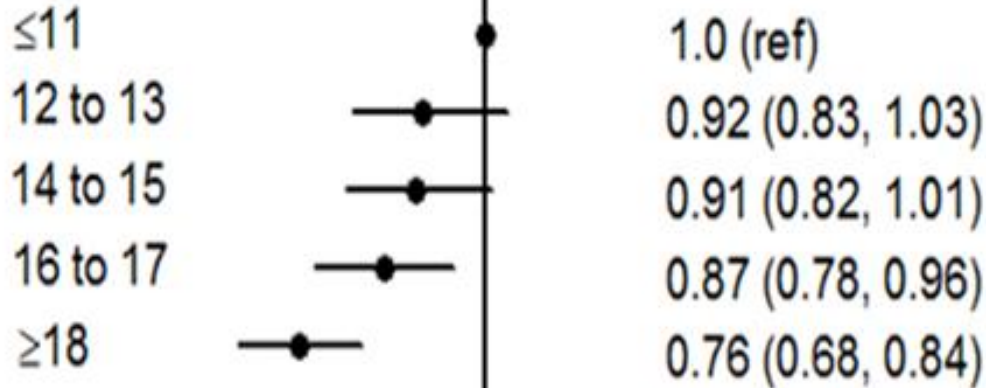HR (95% CI)   HR (95% CI)

Risk of <u>Mortality</u> and <u>Major CVD</u> by PURE healthy diet score (ONTARGET; N=31,546)
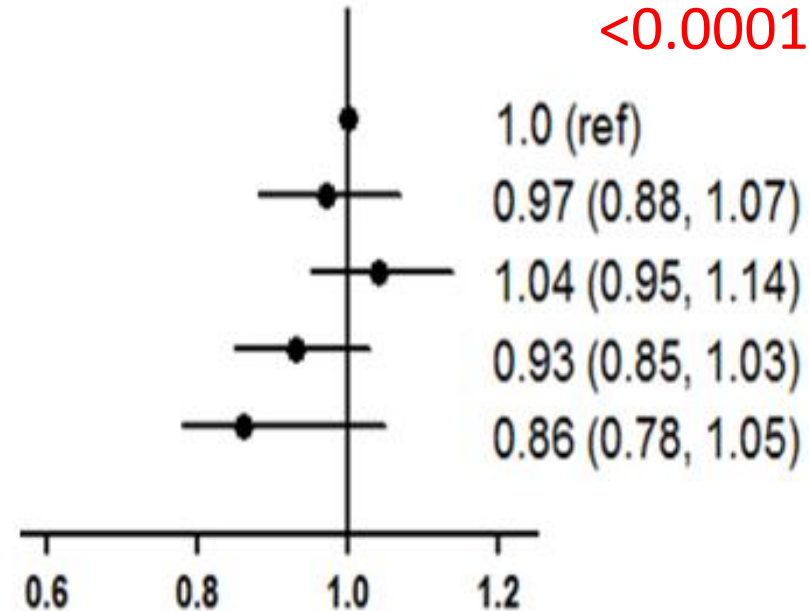

Total mortality

P-trend <0.0001

Diet Score	HR (95% CI)
≤11	1.0 (ref)
12 to 13	0.92 (0.83, 1.03)
14 to 15	0.91 (0.82, 1.01)
16 to 17	0.87 (0.78, 0.96)
≥18	0.76 (0.68, 0.84)

Major CVD

P-trend <0.0001

Diet Score	HR (95% CI)
≤11	1.0 (ref)
12 to 13	0.97 (0.88, 1.07)
14 to 15	1.04 (0.95, 1.14)
16 to 17	0.93 (0.85, 1.03)
≥18	0.86 (0.78, 1.05)

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Risk of <u>MI</u> by PURE healthy diet score in INTERHEART (N=27,098)

	Diet Quality Score					
	≤11	12 to 14	15 to 16	17 to 18	≥19	P-trend
N	3969	6087	5289	5162	6591	
Cases (%)	2153 (54.3)	2909 (47.8)	2438 (46.1)	2245 (43.5)	2716 (41.2)	
Age, sex adj.	1.0 (ref)	0.77 (0.71-0.84)	0.72 (0.66-0.78)	0.65 (0.60-0.71)	0.60 (0.55-0.65)	<0.0001
Fully adjusted	1.0 (ref)	0.86 (0.79-0.94)	0.84 (0.77-0.93)	0.81 (0.73-0.89)	0.78 (0.71-0.85)	<0.0001

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Risk of <u>stroke</u> by PURE healthy diet score in INTERSTROKE (N=20,834)

	Diet Quality Score					
	≤10	11 to 13	14 to 15	16 to 18	≥19	P-trend
N	2712	4723	3597	4879	4923	
Cases (%)	1420 (52.4)	2560 (54.2)	1878 (52.2)	2384 (48.9)	2160 (43.9)	
Age, sex adj.	1.0 (ref)	1.07 (0.98-1.18)	0.98 (0.89-1.08)	0.85 (0.78-0.94)	0.69 (0.62-0.76)	<0.0001
Fully adjusted	1.0 (ref)	1.09 (0.98-1.20)	0.95 (0.86-1.06)	0.87 (0.78-0.96)	0.75 (0.68-0.84)	<0.0001

Conclusions

- The PURE healthy diet score comprised of higher intakes of fruit, vegs, nuts, legumes, fish, dairy, and meats is associated with lower mortality and CVD globally

- Consistency across 4 international studies using different designs involving 218,000 people from 50 countries

- Consistent results in those with and without prior CVD

- Some elements of the PURE healthy diet score (such as dairy and meats) differs from current advice derived from earlier studies & performed mostly in high-income countries