

Health Benefits of Plant-based Diets: Evidence from Big Data Analysis

Yen-Feng Chiu

Institute of Population Health Sciences

National Health Research Institutes



國家衛生研究院
National Health Research Institutes

Global Trend of Veganism

● **vegan**
搜尋字詞

● **vegetarian**
搜尋字詞

+ 新增比較字詞

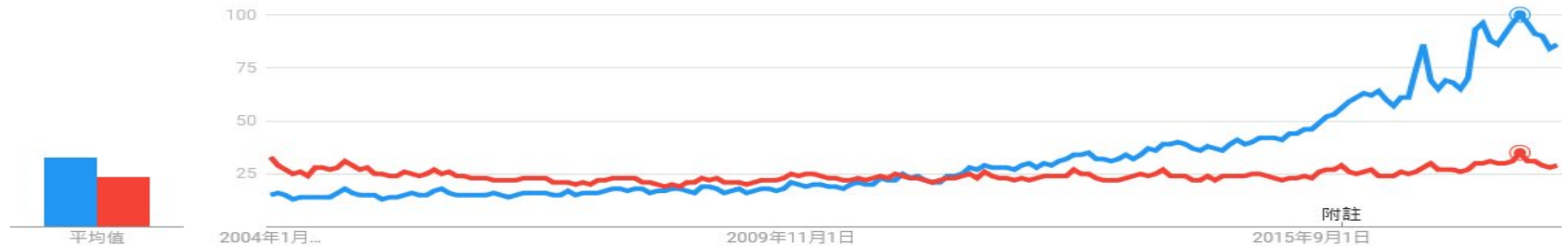
全球 ▼

2004至今 ▼

所有類別 ▼

Google 網頁搜尋 ▼

搜尋熱度的趨勢變化 ?



按區域比較細分資料

區域 ▼

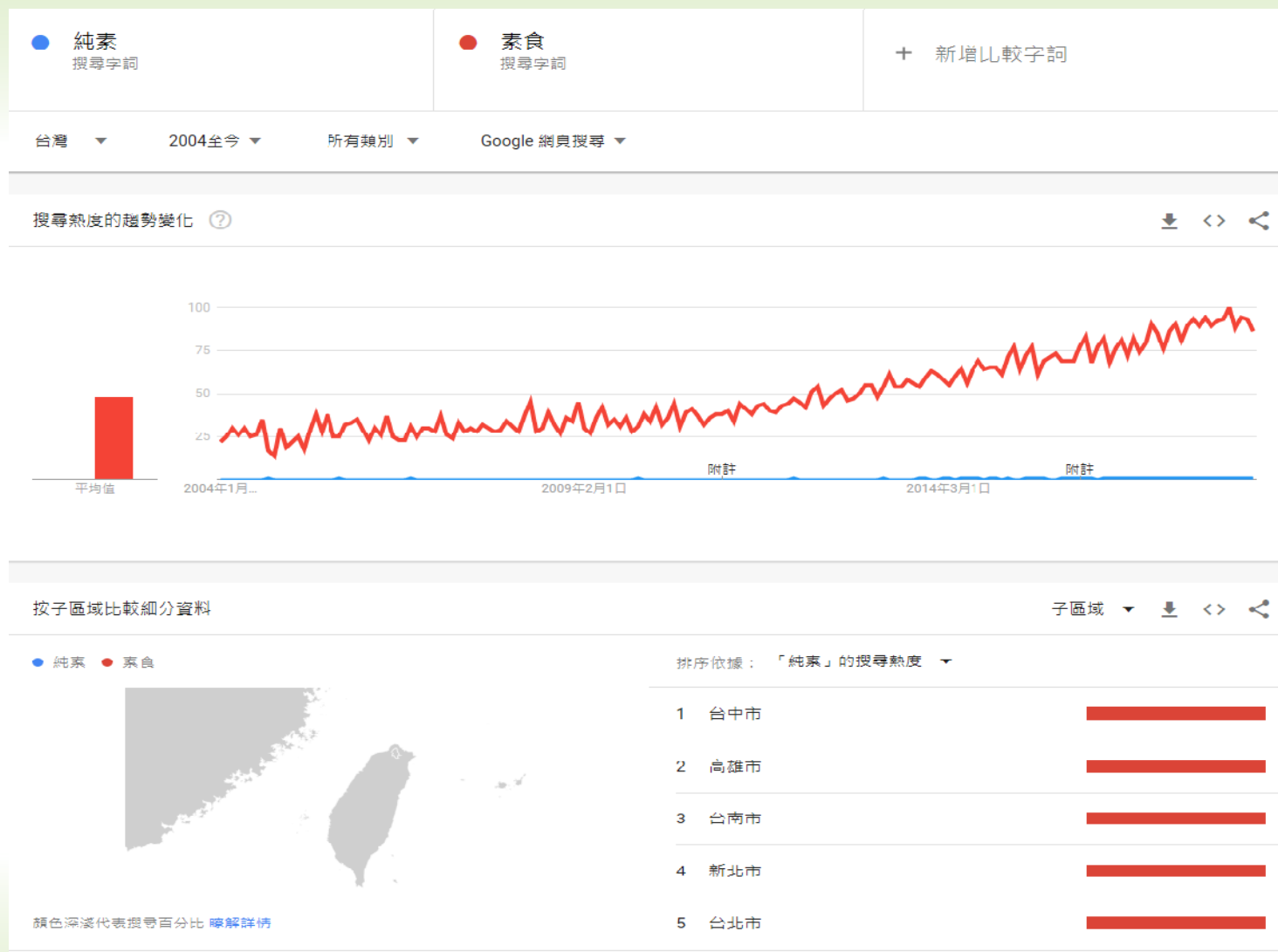
● **vegan** ● **vegetarian**



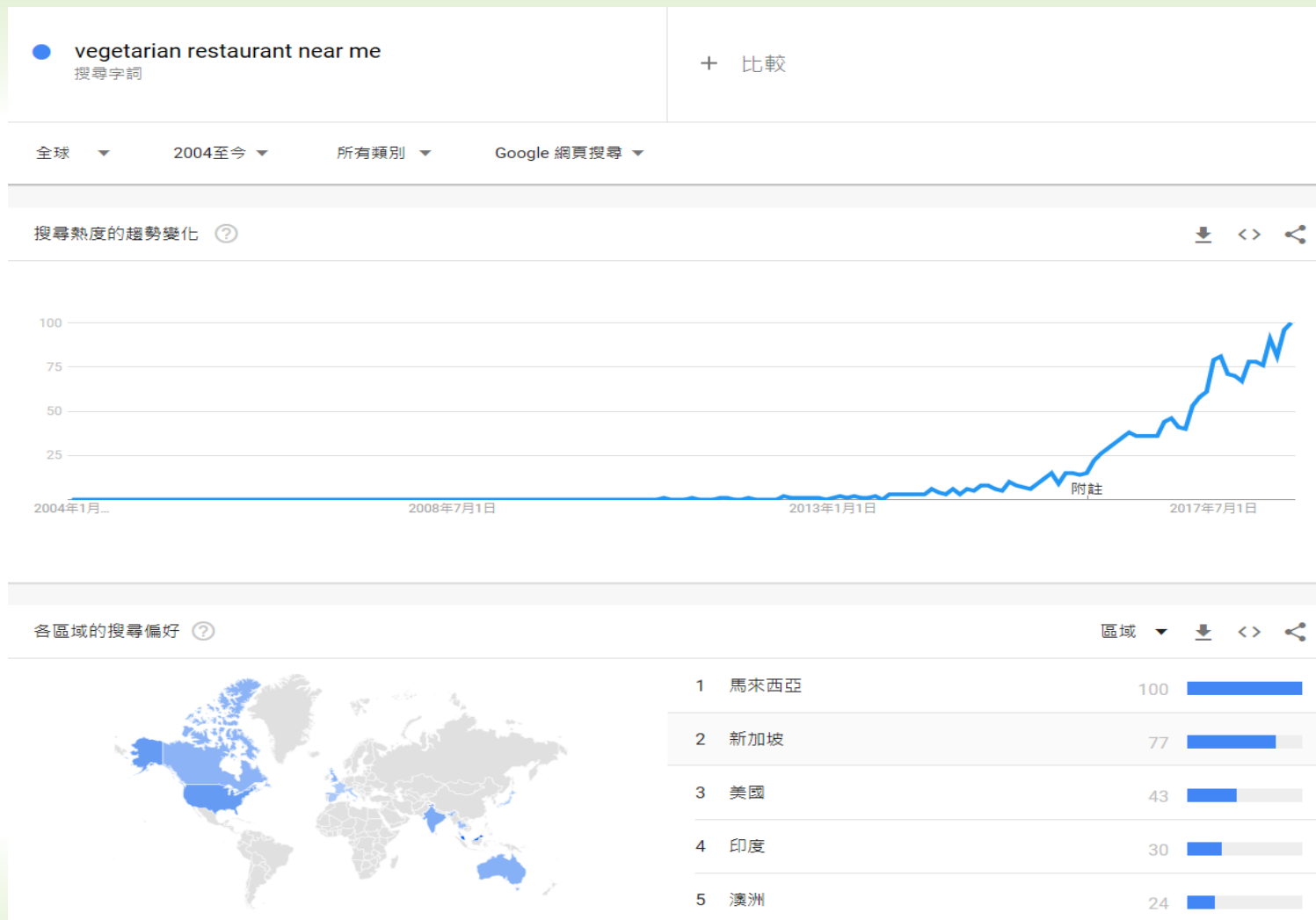
顏色深淺代表搜尋百分比 [瞭解詳情](#)

排序依據：「vegan」的搜尋熱度 ▼





Global Trend



● **vegan restaurant**
搜尋字詞

+ 比較

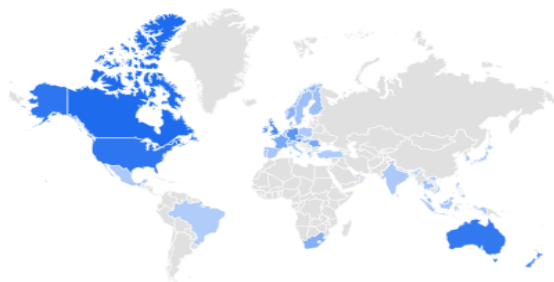
全球 ▾ 2004至今 ▾ 所有類別 ▾ Google 網頁搜尋 ▾

搜尋熱度的趨勢變化 ?



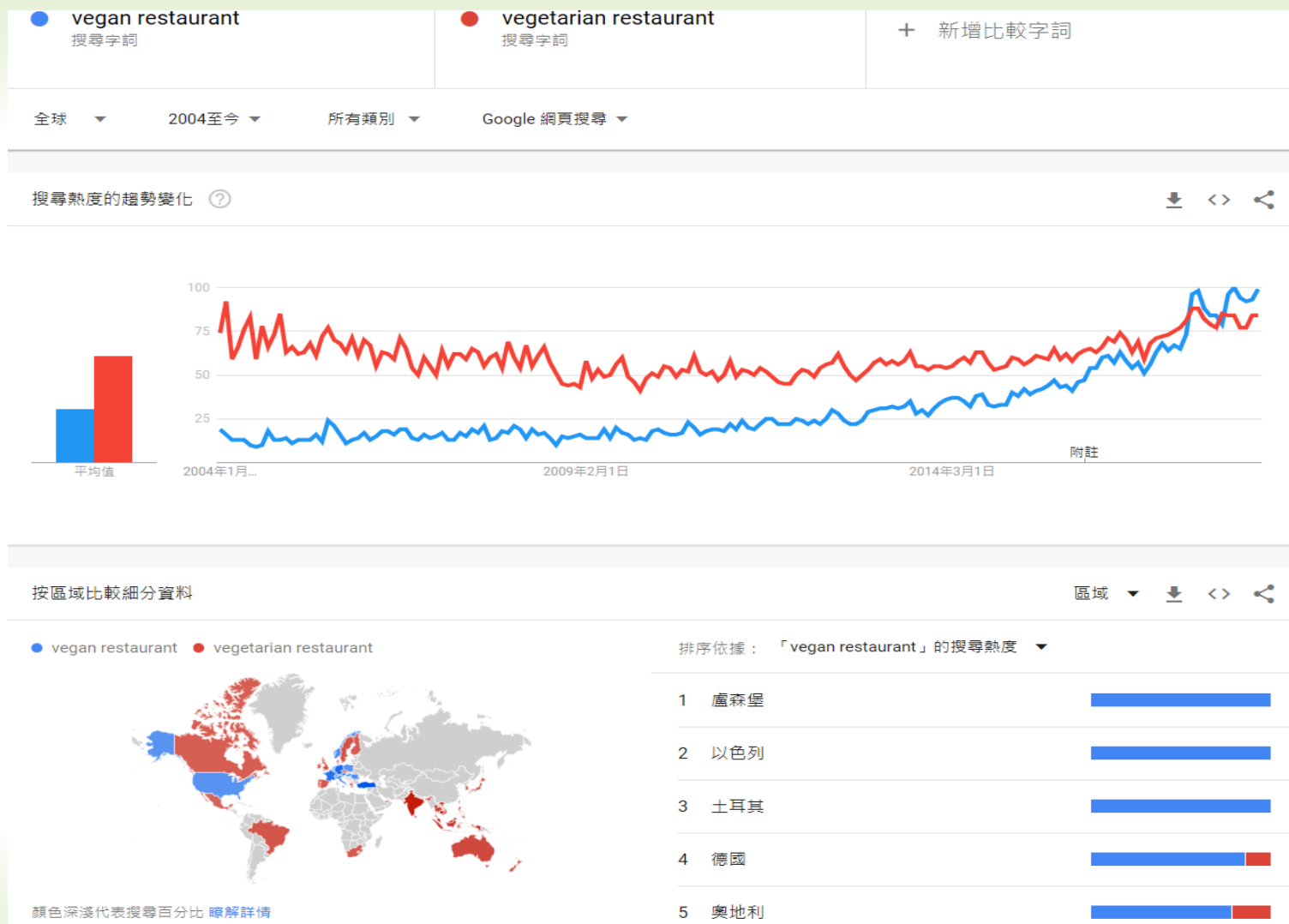
各區域的搜尋偏好 ?

區域 ▾ 下載 <> 分享



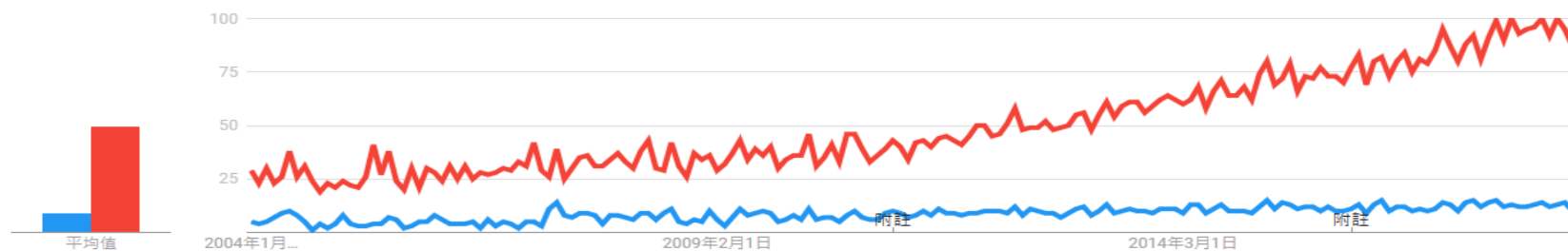
1	盧森堡	100	<div></div>
2	加拿大	83	<div></div>
3	美國	74	<div></div>
4	瑞士	73	<div></div>
5	澳洲	72	<div></div>





台灣 ▾ 2004至今 ▾ 所有類別 ▾ Google 網頁搜尋 ▾

搜尋熱度的趨勢變化 ?



按子區域比較細分資料

子區域 ▾ 下載 <> 分享

● 素食餐廳 ● 素食



顏色深淺代表搜尋百分比 [瞭解詳情](#)

排序依據：「素食餐廳」的搜尋熱度 ▾

1	台中市	<div><div></div><div></div></div>
2	台北市	<div><div></div><div></div></div>
3	桃園市	<div><div></div><div></div></div>
4	高雄市	<div><div></div><div></div></div>
5	新北市	<div><div></div><div></div></div>



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“Veganism: Why is it on the up?”

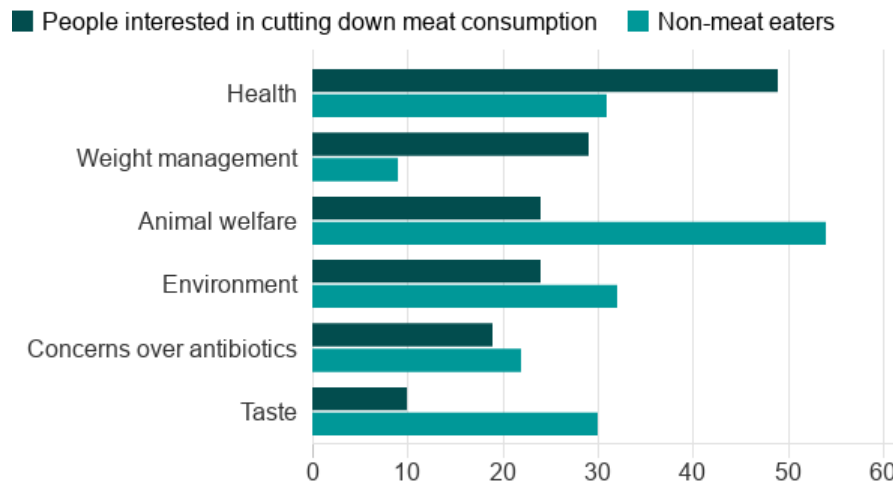
June 18, 2018

By Lora Jones Business Reporter, BBC News

<https://www.bbc.com/news/business-44488051>

People give a variety of reasons for eating less meat

% of respondents citing each reason (more than one could be given)



Note: Survey of 1,040 British adults. Source: Lightspeed/Mintel

BBC

% of vegetarians: 14%

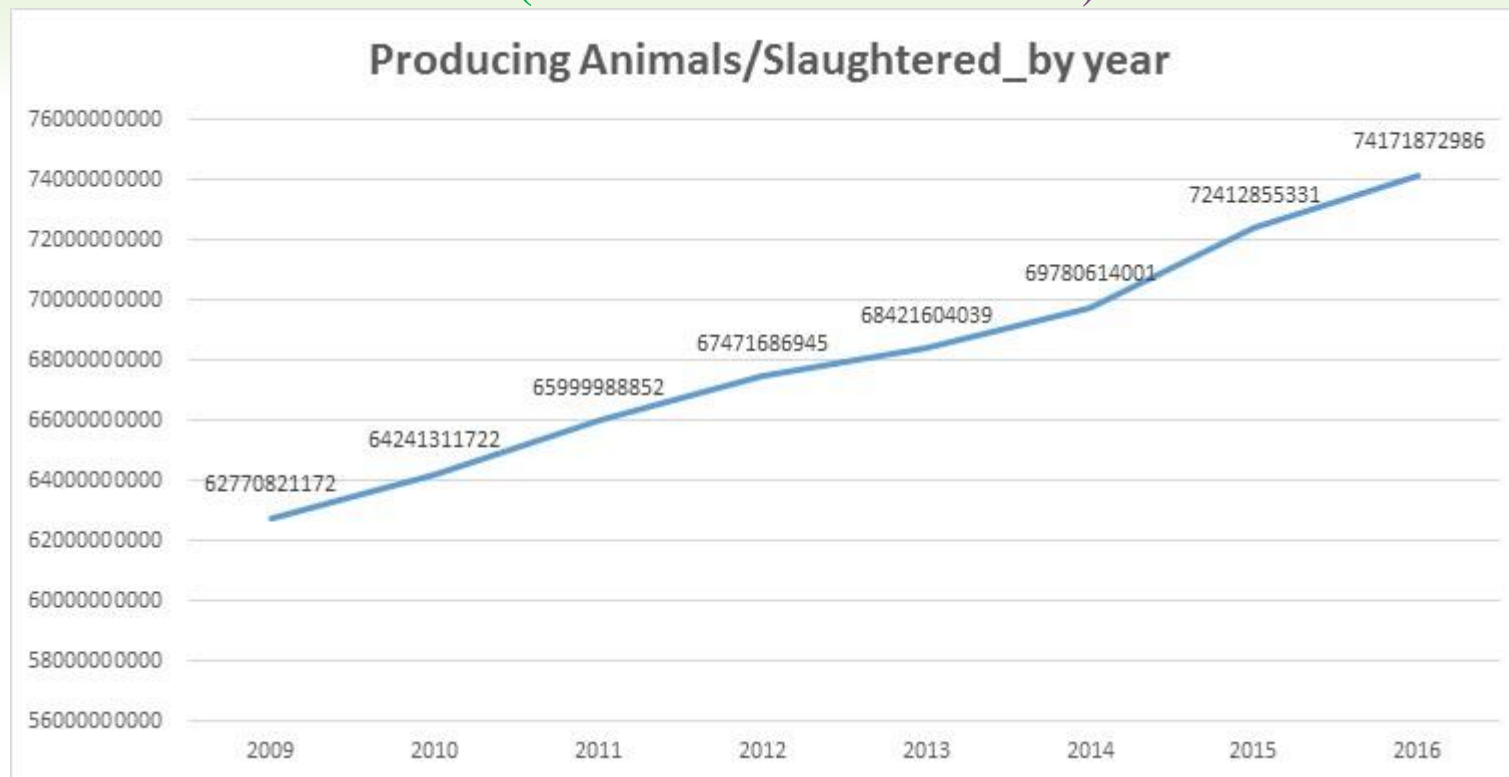


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https://en.wikipedia.org/wiki/Vegetarianism_by_country

https://www.comparethemarket.com/car-insurance/content/cars-against-humanity/?awc=7896_

(Marine life not included)



Source: Food and Agriculture Organization (FAO)
of the United Nations (UN)



“Reducing food’s environmental impacts through producers and consumers”

by J. Poore* and T. Nemecek

Science 360, 987–992 (2018), **1 June 2018**

“Most strikingly, impacts of the lowest-impact animal products typically exceed those of vegetable substitutes, providing new evidence for the importance of dietary change.”



“Reducing food’s environmental impacts through producers and consumers”

by J. Poore* and T. Nemecek.,
Science 360, 987–992 (2018), 1 June 2018

Lead author Professor Joseph Poore (Department of Zoology, University of Oxford) said:

“A vegan diet is probably the single biggest way to reduce your impact on planet Earth, not just greenhouse gases, but global acidification, eutrophication, land use and water use.”

<https://www.independent.co.uk/life-style/health-and-families/veganism-environmental-impact-planet-reduced-plant-based-diet-humans-study-a8378631.html>



Health assessment of plant-based diets by meta-analysis

Table 2. Effects of **vegetarian diet** on risk factors for chronic degenerative diseases in case-control studies, expressed as weighted mean difference (WMD).

Outcome	N studies	Vegetarians (n)	Omnivores (n)	WMD	95% CI	P value
BMI (kg/m ²)	71	57 724	199 230	−1.49	−1.72 to −1.25	<0.0001
Total cholesterol (mg/dL)	64	5 561	23 573	−28.16	−31.22 to −25.10	<0.0001
LDL-cholesterol (mg/dL)	46	5 583	22 934	−21.27	−24.27 to −18.27	<0.0001
HDL-cholesterol (mg/dL)	51	6 194	23 660	−2.72	−3.40 to −2.04	<0.0001
Triglycerides (mg/dL)	55	4 008	22 083	−11.39	−17.42 to −5.37	0.02
Blood glucose (mg/dL)	27	2 256	2 192	−5.08	−5.98 to −4.19	<0.0001

Table 3. Effects of **vegan diet** on risk factors for chronic degenerative diseases in case-control studies, expressed as weighted mean difference (WMD).

Outcome	N studies	Vegans (n)	Omnivores (n)	WMD	95% CI	P value
BMI (kg/m ²)	19	8 376	123 292	−1.72	−2.21 to −1.22	<0.0001
Total cholesterol (mg/dL)	19	1 272	12 213	−31.02	−34.82 to −27.21	<0.0001
LDL-cholesterol (mg/dL)	13	728	11 670	−22.87	−29.92 to −15.82	<0.0001
HDL-cholesterol (mg/dL)	15	1 175	12 114	−1.54	−2.96 to −0.12	0.61
Triglycerides (mg/dL)	13	483	10 110	−9.35	−20.28 to 1.57	0.09
Blood glucose (mg/dL)	4	83	125	−6.38	−12.35 to −0.41	0.04

BMI: body mass index; To convert mmol/L cholesterol to mg/dL, we multiplied mmol/L by 38.67. To convert mmol/L triglyceride to mg/dL, we multiplied mmol/L by 88.57. To convert mmol/L blood glucose to mg/dL, we multiplied mmol/L by 18.

Other meta-analysis findings

- Lower blood pressure ([*JAMA Intern Med.* 2014](#))
- Lower total, LDL, HDL and non-HDL cholesterol (*Nutr Rev.* 2017; *Am J Clin Nutr.* 2015)
- Improve glycemic control in type 2 diabetes ([*Cardiovasc Diagn Ther.* 2014](#))
- Lower prevalence of overweight and obesity ([*Crit Rev Food Sci Nutr.* 2017](#))
- Lower risk of ischemic heart disease, diabetes, diverticular disease (憩室病) and eye cataract ([*Crit Rev Food Sci Nutr.* 2017](#))



Other meta-analysis findings

- Lower total cancer ([*Crit Rev Food Sci Nutr.* 2017](#))
 - Lower serum concentrations of hs-CRP (Public Health Nutr. 2017)
 - Weight reduction ([*Nutr Rev.* 2017](#); *J Acad Nutr Diet* 2015; [*J Gen Intern Med.* 2016](#))
- ... etc.



To study how several sub-types of vegetarian diets affect metabolic traits — including

- 身體質量指數(Body Mass Index, BMI)
- 腰圍(waist circumference, WC)
- 血壓 (收縮壓與舒張壓, systolic and diastolic blood pressures, SBP & DBP)
- 空腹血糖 (fasting glucose; FBG)
- 三酸甘油脂 (Triglycerides; TG)
- 總膽固醇 (total cholesterol, TC)
- 高密度脂蛋白膽固醇 (high density lipoprotein; HDL)
- 低密度脂蛋白膽固醇 (low density lipoprotein; LDL)

[\(Br J Nutr. 2015 Oct 28;114\(8\):1313-20\)](#)



Materials and methods

- This study used the MJ Health Screening database, which was collected from 1994 to 2008 in Taiwan with 918,718 check-up records from 473,997 subjects, 315,033 remained after data cleaning.
- Nonsmoking adults with 4415 lacto-ovo vegetarians, 1855 lacto vegetarians, and 1913 vegans. In order to control for potential confounding effects, we matched each vegetarian with 5 non-vegetarians on age, sex, and study site, resulting in a total of 49,098 participants for the final analyses.
- Regression modeling using GEE approaches was used in the analysis.

The patterns of WC, BMI, SBP, DBP, and FBG over age by dietary type

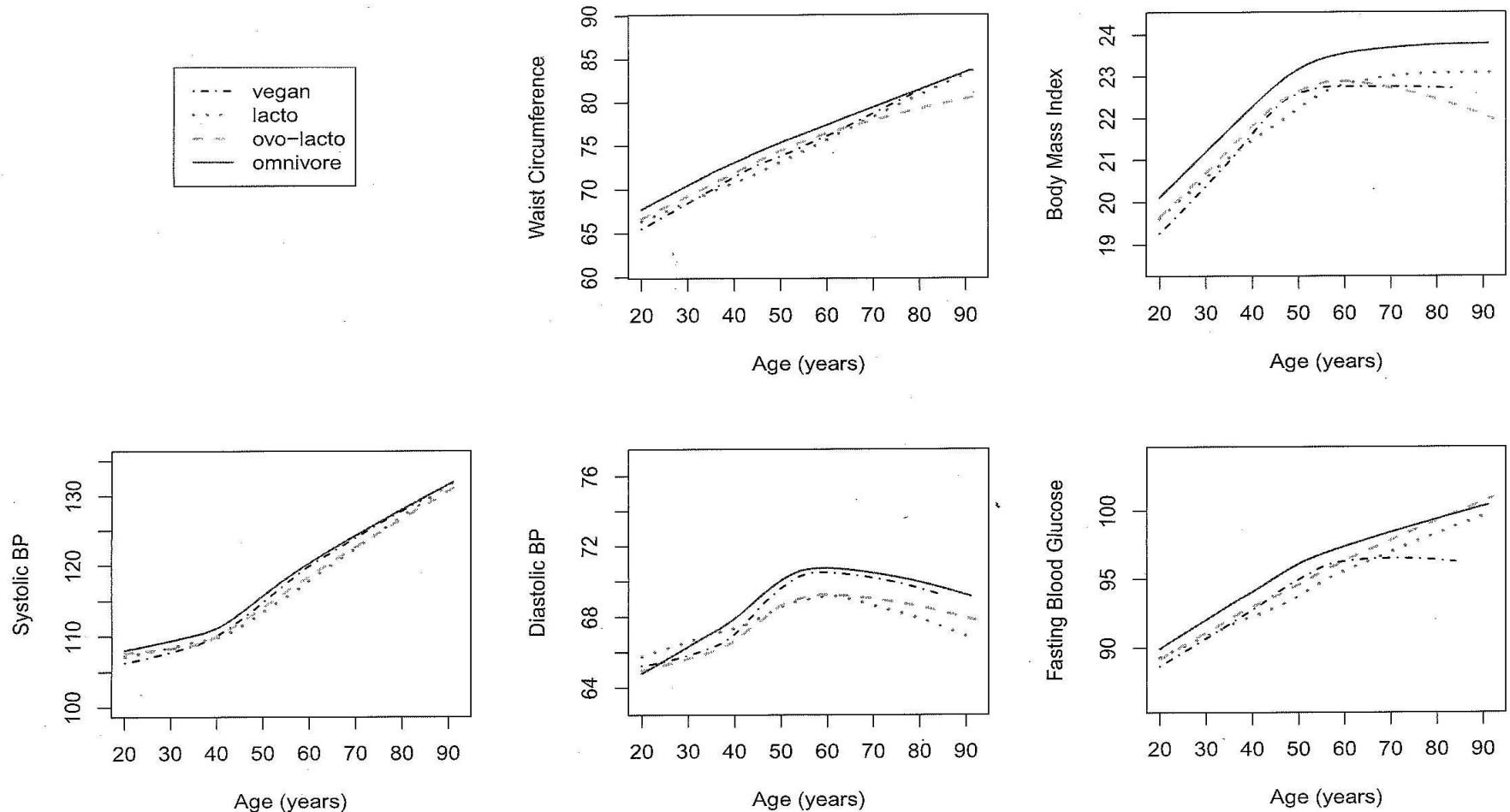
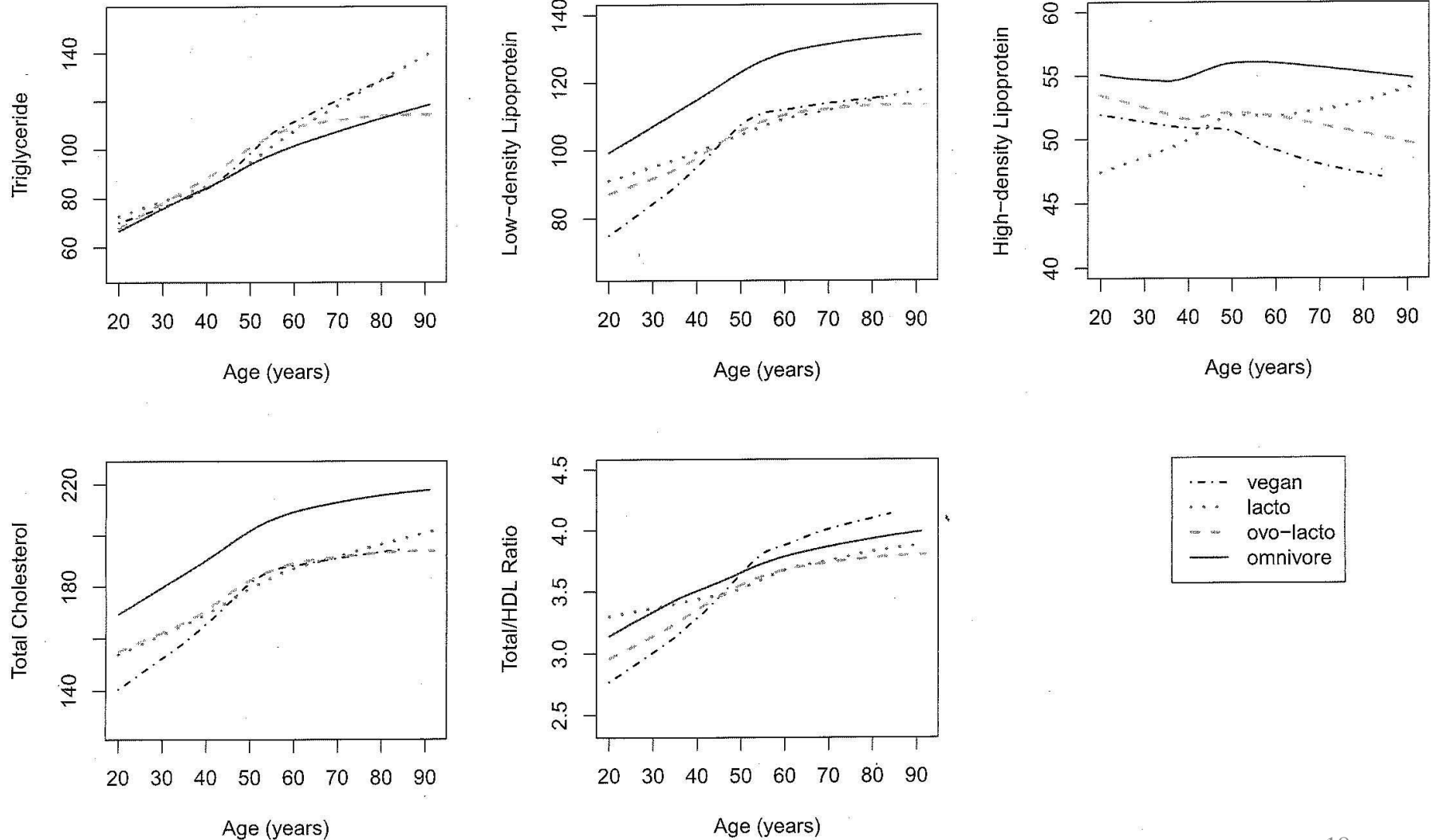
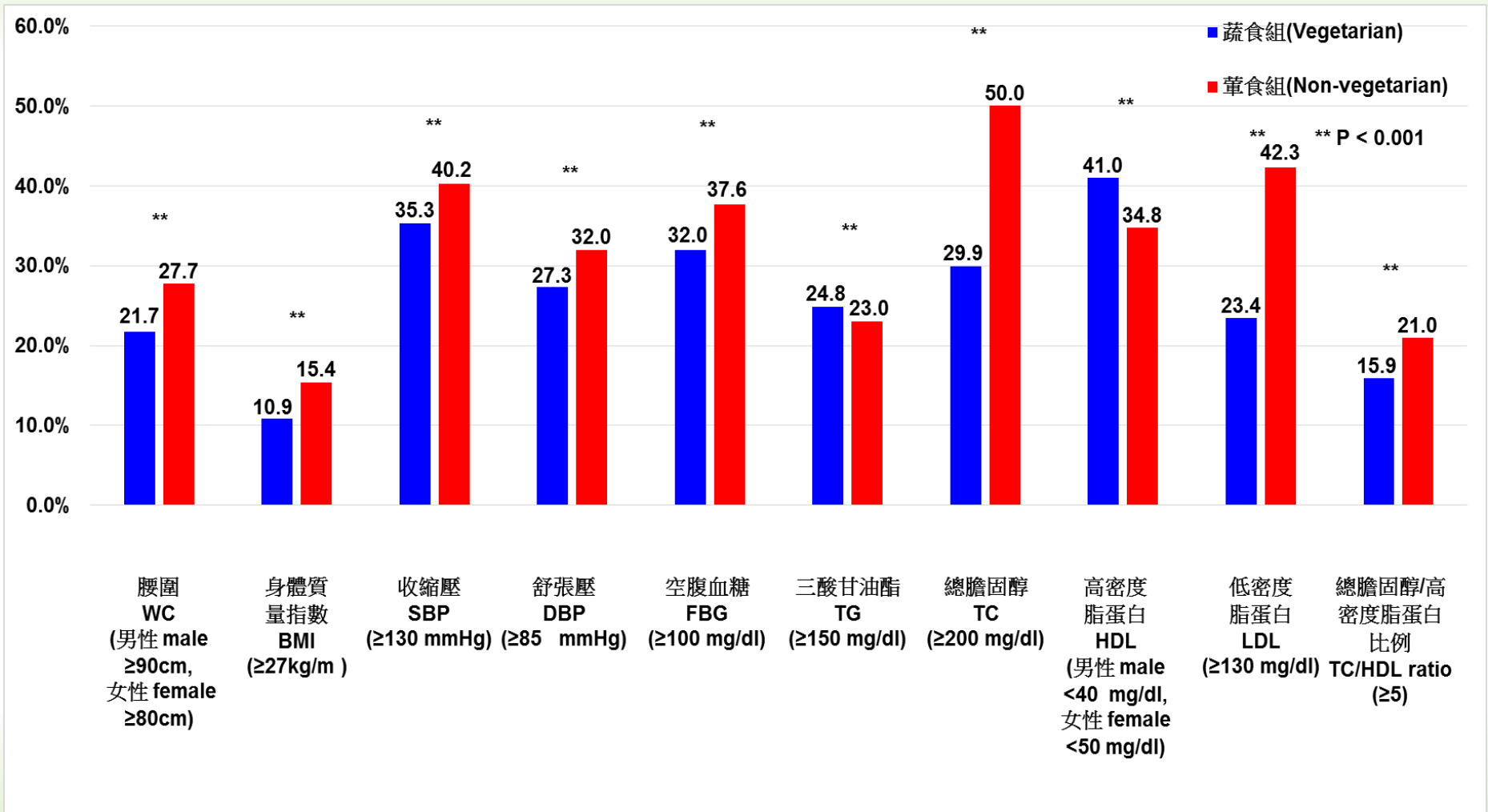


Figure 1(a)

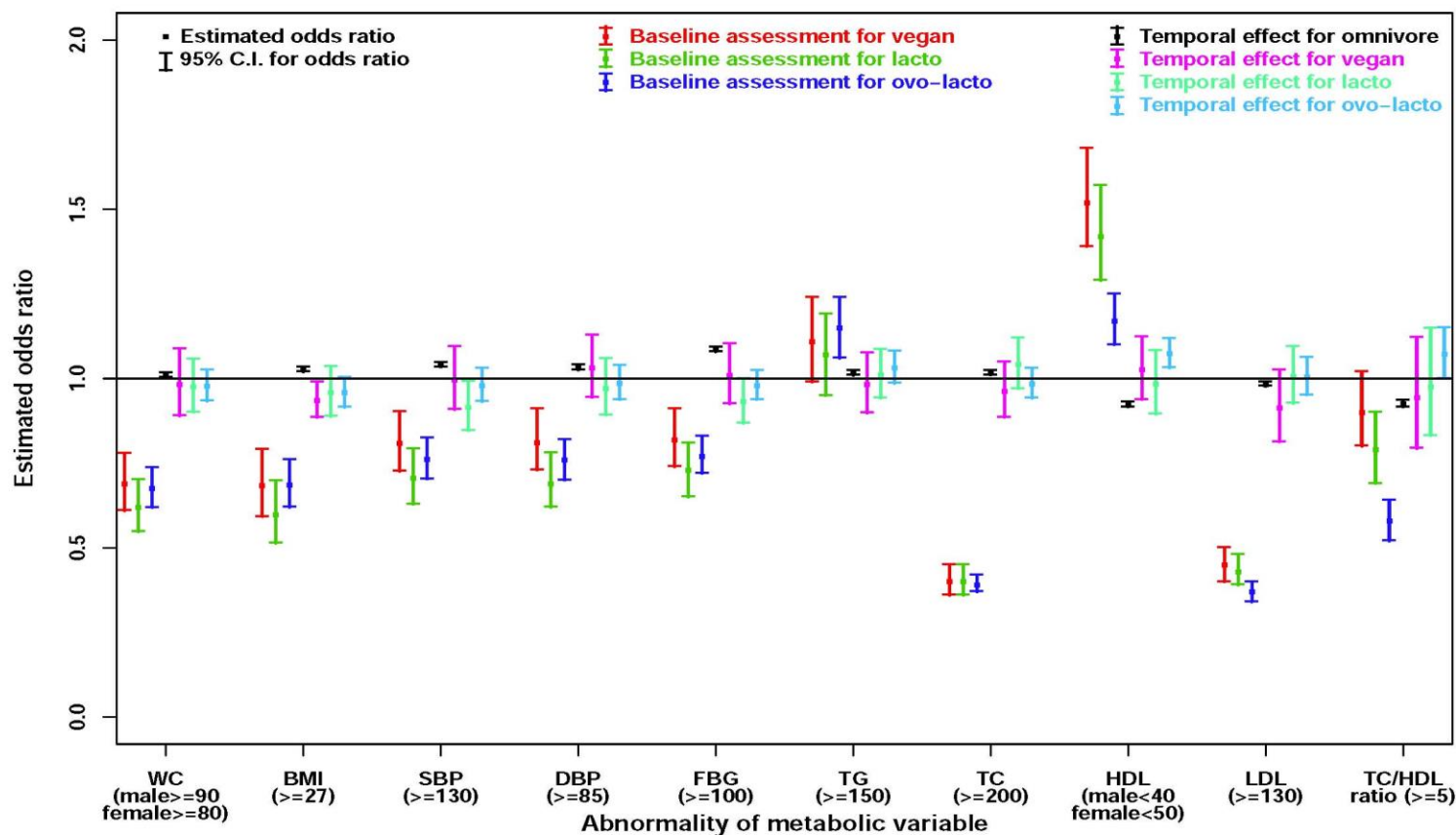
The patterns of TG, LDL, HDL, TC, and TC/HDL ratios over age by dietary type



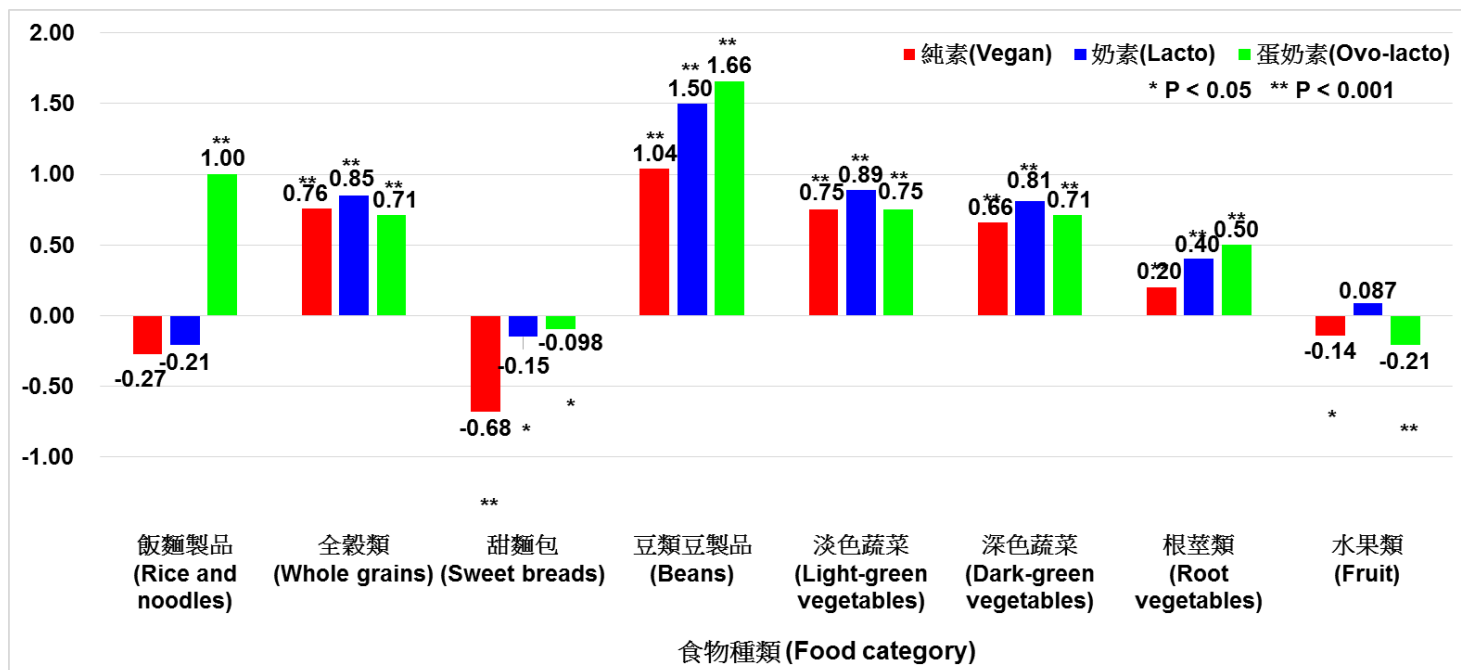
Comparison of baseline characteristics in vegetarians and matched non-vegetarians



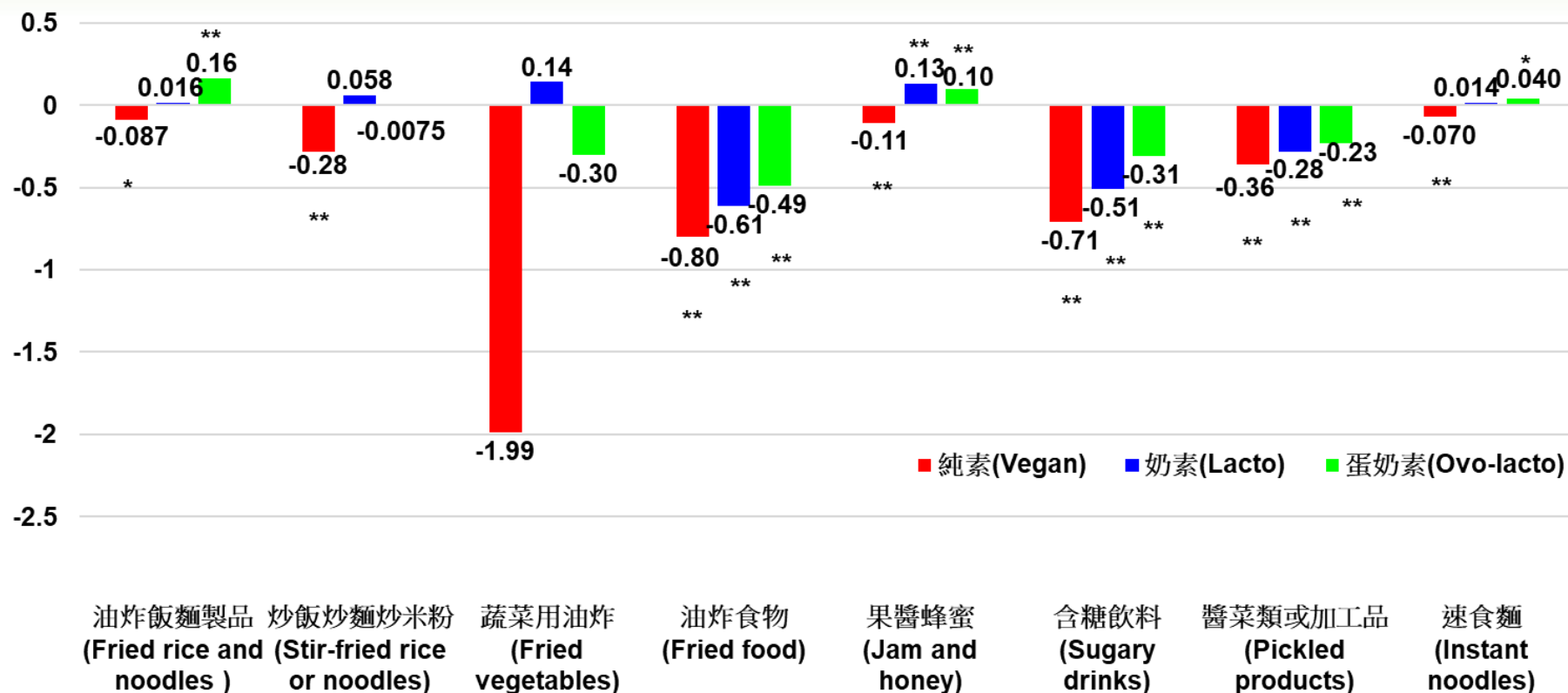
Longitudinal dietary effects on metabolic traits: baseline and temporal effects



Food intake frequency for different types of vegetarians compared to nonvegetarians (I)



Food intake frequency for different types of vegetarians compared to nonvegetarians (II)



份servings/週week



Conclusions

- The better metabolic profile in vegetarians is partially attributable to lower BMI.
- With proper management of TG and HDL, such as with caution about intake of refined carbohydrates and fructose, a plant-based diet may benefit all aspects of the metabolic profile.

Study on hypertension

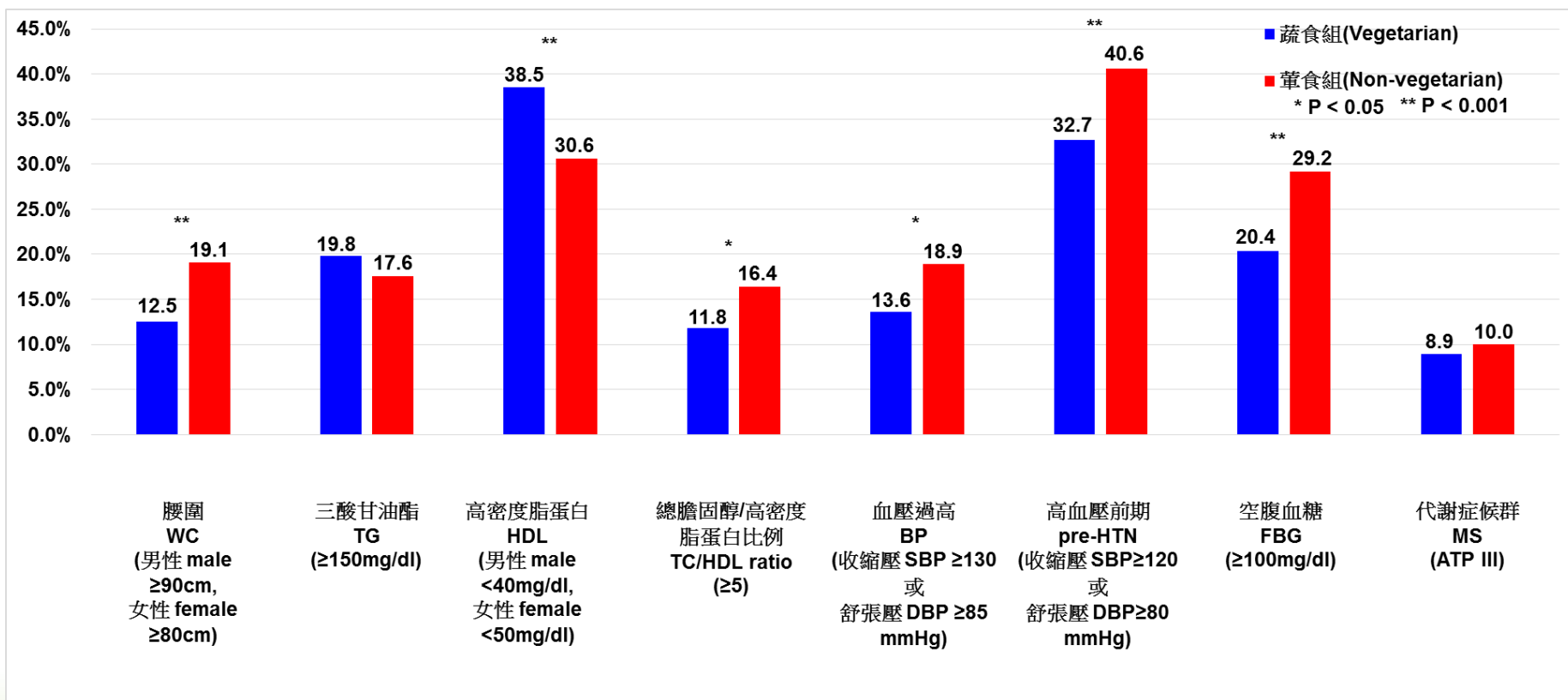
- Further, we investigated the association between a plant-based diet and the incidence of hypertension.
- Examined whether such an association was mediated through metabolic traits.

(J Hypertens. 2016 Nov;34(11):2164-71.)

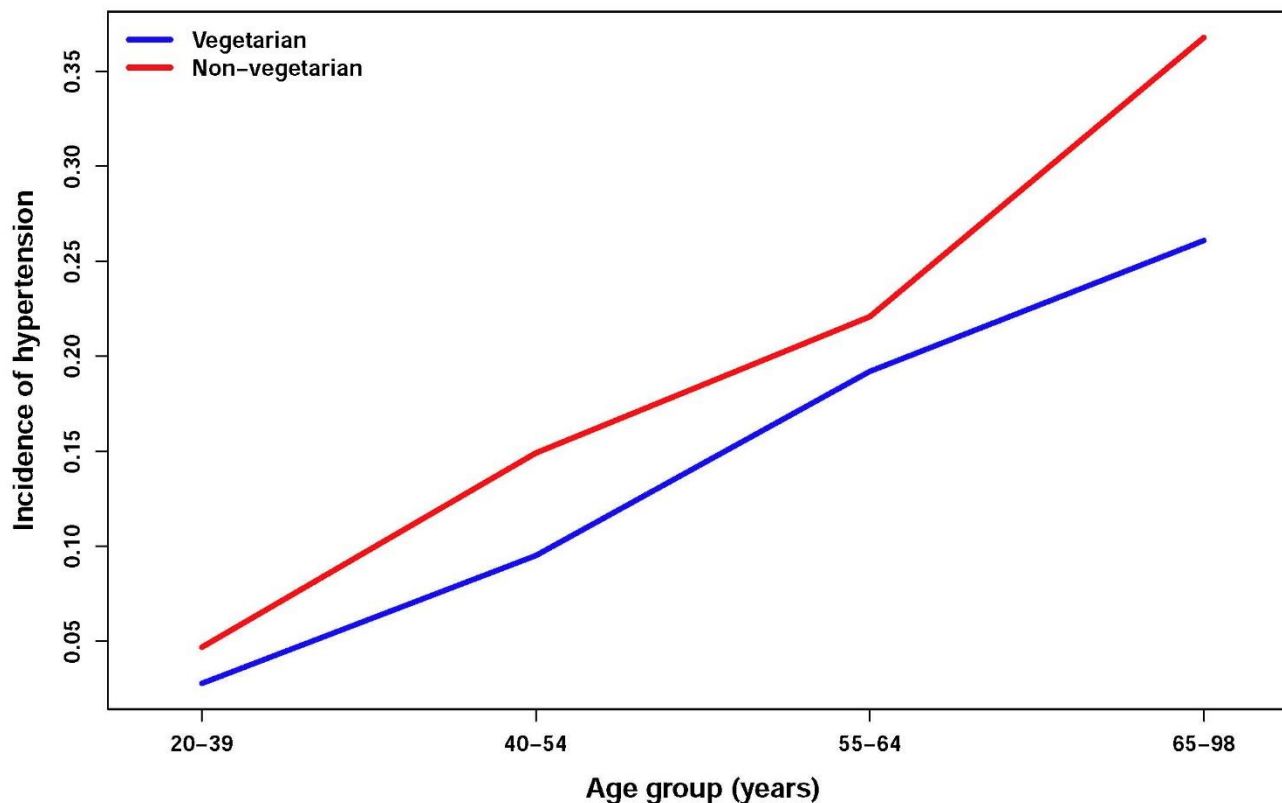
Materials and methods

- 95038 participants including 686 vegetarians with repeated measures and no hypertension at baseline were included in the analysis.
- Each vegetarian was matched with five nonvegetarians by age, sex, and study site. A total of 4109 nonsmokers (3423 nonvegetarians and 686 vegetarians) were analyzed.
- The median of follow-up time was 1.61 years.
- The outcome includes hypertension incidence, as well as SBP and DBP levels.

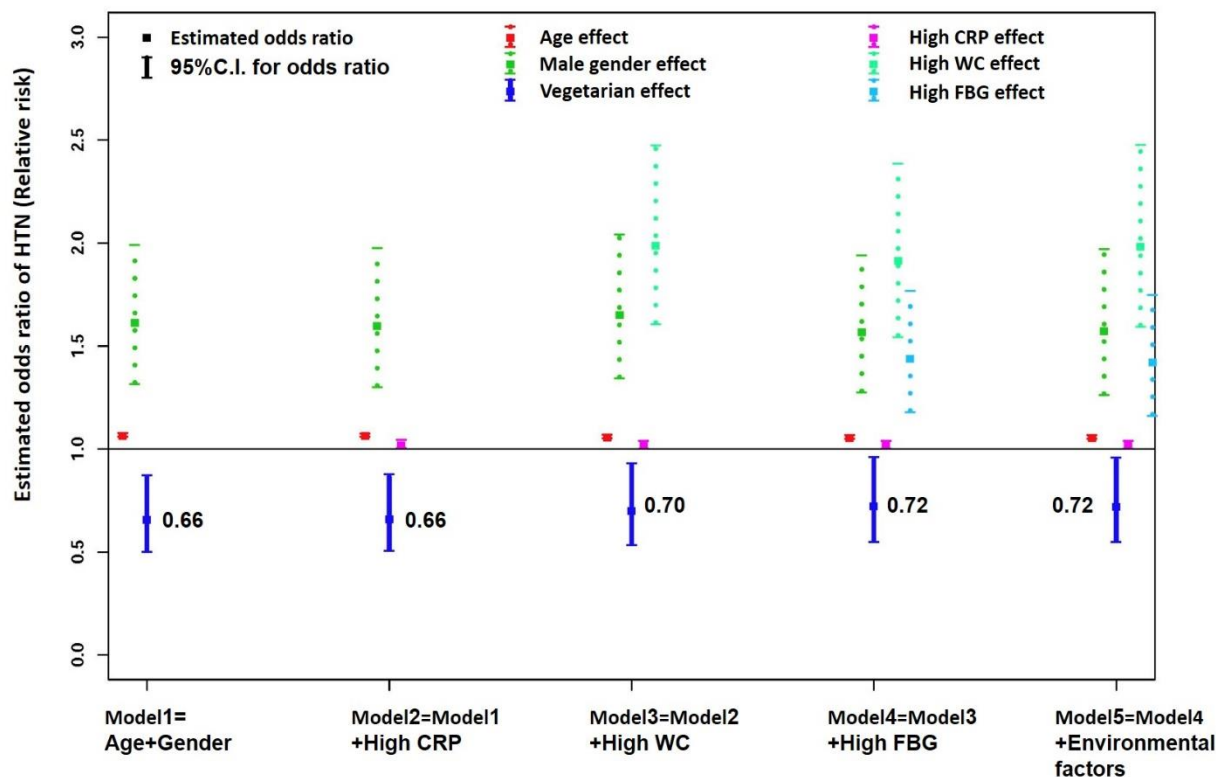
Comparison of percentages of abnormal metabolic traits between vegetarians and matched nonvegetarians



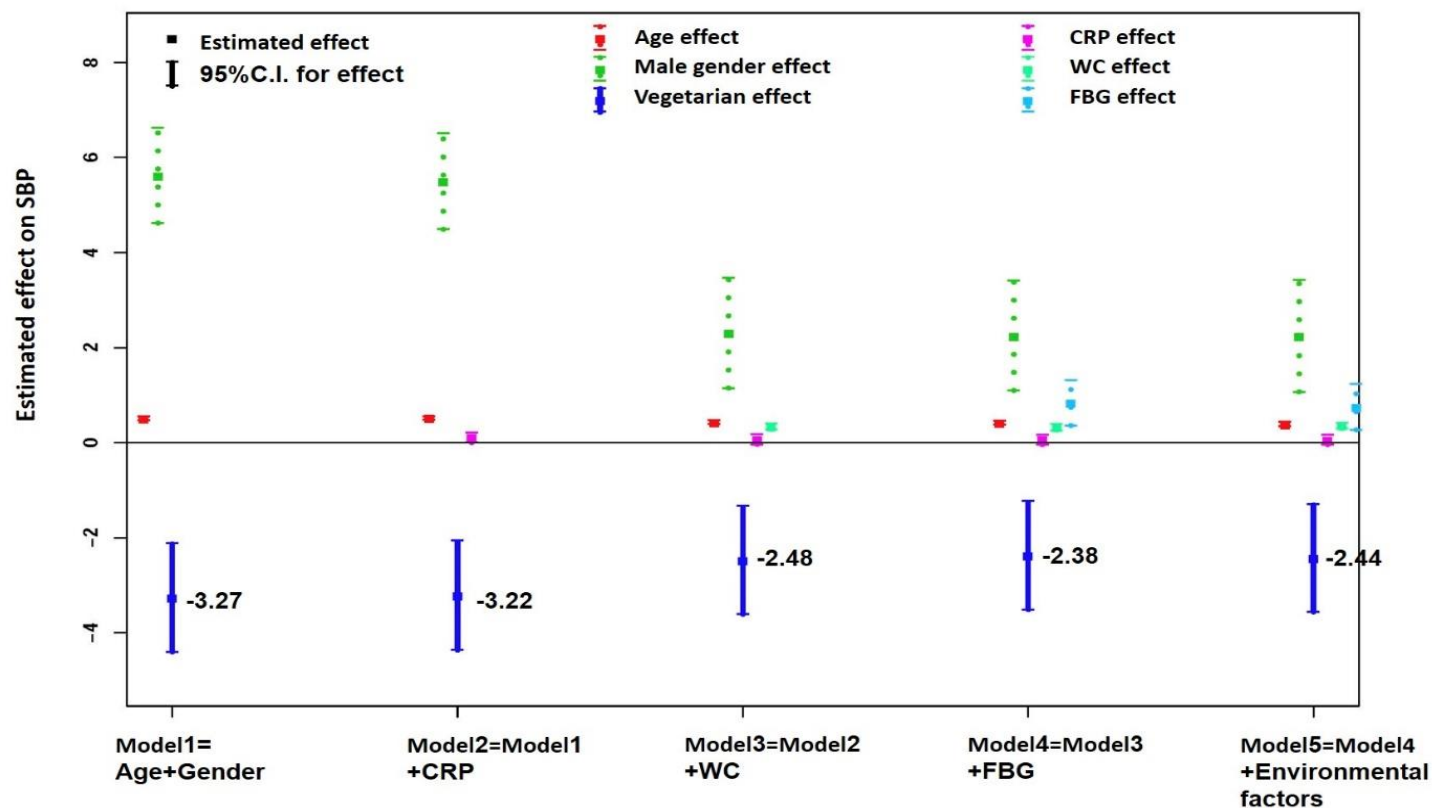
Association between vegetarian diet and hypertension incidence by age group



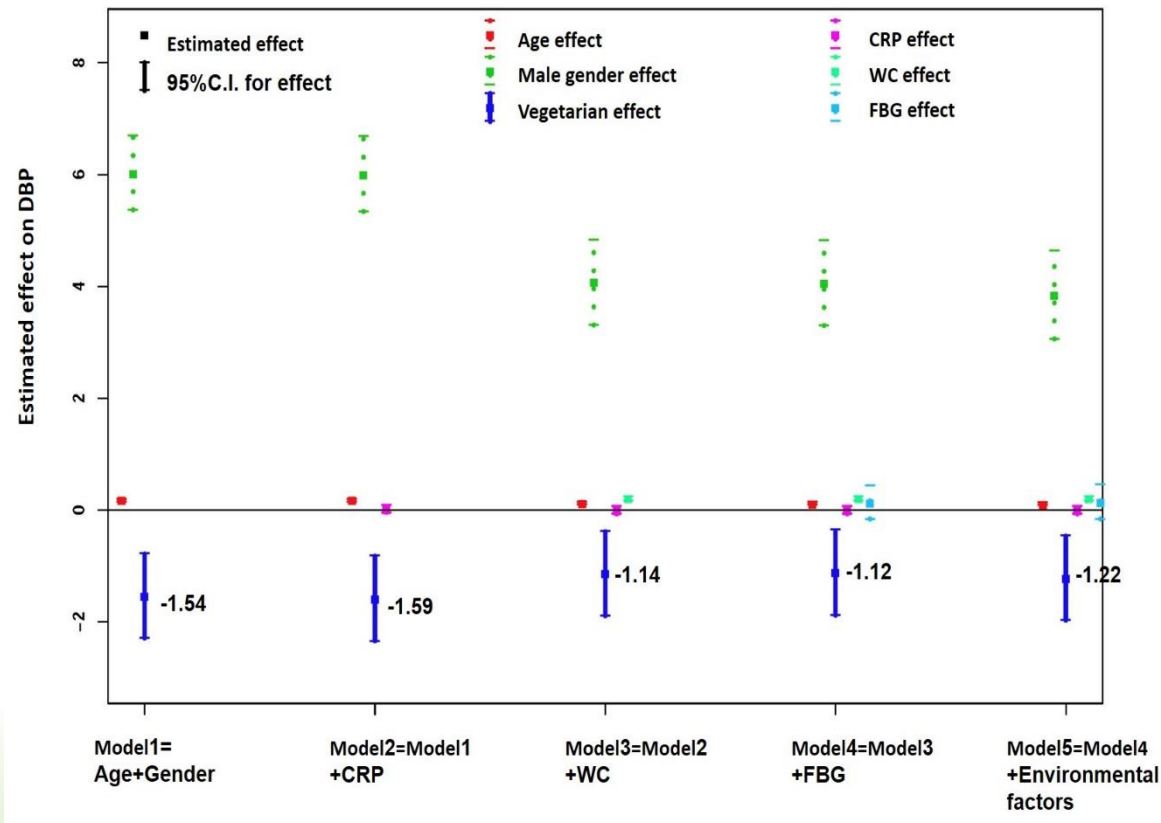
Association between vegetarian diet and hypertension incidence by different models



Association between vegetarian diet and systolic blood pressure by different models, according to baseline metabolic profile



Association between vegetarian diet and diastolic blood pressure by different models, according to baseline metabolic profile



Population-attributable fraction of a vegetarian diet for hypertension incidence

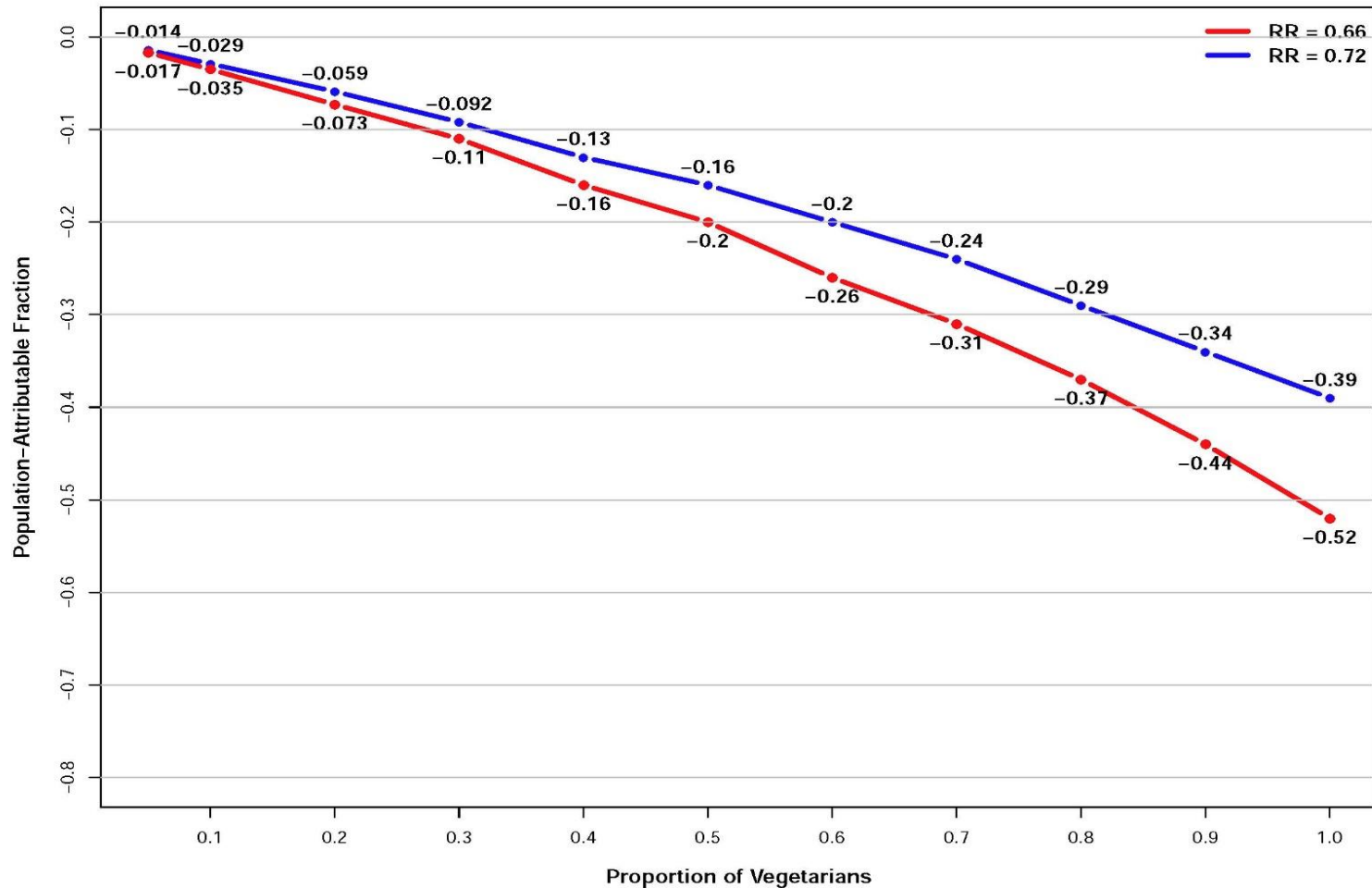


Figure 2

Red line: adjusted for age and sex

Blue line: adjusted for age and sex and other factors

Conclusions

- After adjustment for age and sex, and compared to matched nonvegetarians, vegetarians had a 34% lower risk of developing hypertension (odds ratio: 0.66, 95% confidence interval: 0.50-0.87) and a lower follow-up systolic blood pressure SBP: 3.3mmHg, $P < 0.001$; DBP: 1.5mmHg, $P < 0.001$).

Position of the academy of nutrition and dietetics: vegetarian diets

Acad Nutr Diet. 2016; 116:1970-1980

“It is the position of the Academy of Nutrition and Dietetics that appropriately planned vegetarian, **including vegan**, diets are healthful, nutritionally adequate, and may provide health benefits in the prevention and treatment of certain diseases ...

美國營養學會（Academy of Nutrition and Dietetics）亦於2016年再度表達立場：「適當規劃的素食，包括純素，不但能夠達到營養足夠，且有助預防與治療某些疾病；並適合所有生命期，包括懷孕、哺乳、嬰幼兒、青少年、老年人與運動員。植物性飲食比動物性飲食更有助於環境永續，因消耗較少天然資源，且能大量減少對環境的破壞。」



Position of the academy of nutrition and dietetics: vegetarian diets

Acad Nutr Diet. 2016; 116:1970-1980

... These diets are appropriate for all stages of the life cycle, including pregnancy, lactation, infancy, childhood, adolescence, older adulthood, and for athletes. Plant-based diets are more environmentally sustainable than diets rich in animal products because they use fewer natural resources and are associated with much less environmental damage.”

美國營養學會（Academy of Nutrition and Dietetics）亦於2016年再度表達立場：「適當規劃的素食，包括純素，不但能夠達到營養足夠，且有助預防與治療某些疾病；並適合所有生命期，包括懷孕、哺乳、嬰幼兒、青少年、老年人與運動員。植物性飲食比動物性飲食更有助於環境永續，因消耗較少天然資源，且能大量減少對環境的破壞。」



Acknowledgement

Collaborators

國衛院

Dr. 熊昭

Dr. 許志成

Dr. 莊紹源

Dr. 莊淑鈞

Ms. 李君儀

慈濟大學&醫院

Dr. 邱雪婷營養師

美兆健檢中心

曹總裁

Dr. 劉婷婷

參與健檢人員

Consultation

中央研究院&國衛院

Dr. 潘文涵

國衛院

Dr. 張新儀

Dr. 陳麗光



Thank you!



Hi~ My name is “佐助”,
I have been a **vegan** for six years!