F_Leroy-tweets original Meat cancer-plan 3_2_2021

I applaud the #EUCancerPlan BUT beware: putting #meat 🥩 (a nourishing, evolutionary food) in the same box as 🚬 to solve a contemporary health challenge, would be basing policy on assumptions rather than robust data. #FollowTheScience, yes, but not just part of it!

THREAD👇

1/Granted, some studies have pointed to ASSOCIATIONS of HIGH intake of red & processed meats with (slightly!) increased colorectal cancer incidence. Also, @WHO/IARC is often mentioned in support (usually hyperbolically so). But, let's have a closer look at all this!

## Bacon, burgers and sausages are a cancer risk, say world health chiefs: Processed meats added to list of substances most likely to cause disease alongside cigarettes and asbestos

- Fresh red meat is also due to join WHO 'encyclopaedia of carcinogens'
- Rulings will send shock waves through farming and fast food industries
- Could lead to new dietary guidelines and warning labels on bacon packs
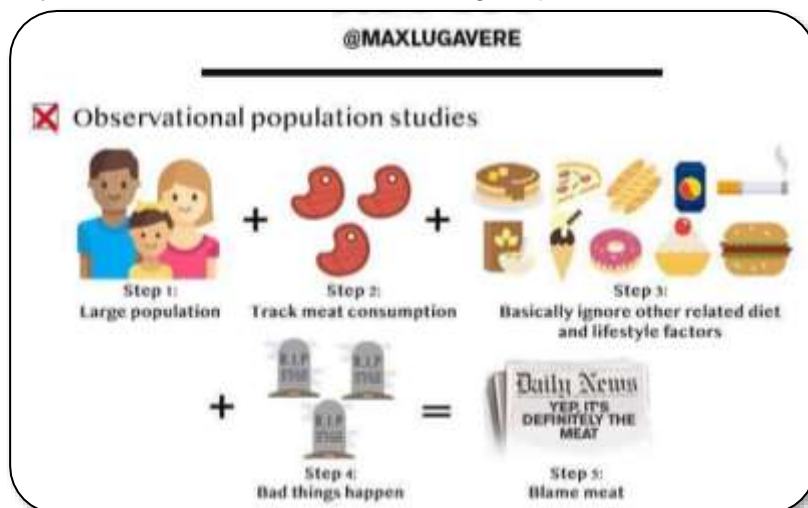- Mounting concern that meat fuels disease that kills 150,000 a year in UK

2/First, meat being "associated" with cancer is very different from stating that meat CAUSES cancer. Unwarranted use of causal language is widespread in nutritional sciences, posing a systemic problem & undermining credibility.
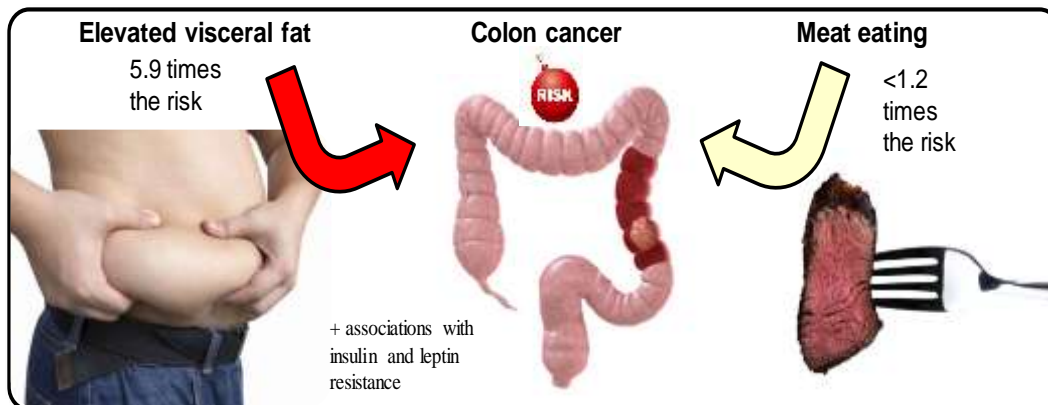https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3280017/

3/That's because observational data are CONFOUNDED (even after statistical adjustment). Healthy user bias, eg. is a major problem. Healthy middle classes are TOLD to eat less red meat (due to historical rather than rational reasons, cf link). So, they obey.
https://iastatedigitalpress.com/mmb/article/id/9456/

4/ What's captured here is sociology, not physiology. Health-focussed Westerners eat less red meat; those who don't adhere to dietary advice tend to have unhealthier lifestyles. That tells us very little about meat AS SUCH being responsible for disease.



@MAXLUGAVERE

❌ Observational population studies

Step 1: Large population + Step 2: Track meat consumption + Step 3: Basically ignore other related diet and lifestyle factors + Step 4: Bad things happen = Step 5: Blame meat

Daily News
YEP, IT'S DEFINITELY THE MEAT

5/At very small relative risks (<<x2), we just CANNOT formulate strong conclusions. Example: someone with elevated visceral fat needs to be worried (6x risk of colon cancer!) For meat, however, risk level is so small (close to x1), that we're out of business.



**Elevated visceral fat**
5.9 times the risk

**Colon cancer**
RISK

**Meat eating**
<1.2 times the risk

+ associations with insulin and leptin resistance

6/Worse: the associations are likely mere artifacts. Why? When we look at studies with better design or move out of a US context (e.g. Asia or worldwide), MORE meat is associated with BETTER health!? Indicative of a cultural construct rather than a paradox.



Controversy on the correlation of red and processed meat consumption with colorectal cancer risk: an Asian perspective

Sun Jin Hur, Cheorun Jo, Yohan Yoon, Jong Youn Jeong & Keun Taik Lee
Received 23 Mar 2018, Accepted 28 Jun 2018, Accepted author version posted online: 12 Jul 2018, Published online: 10 Sep 2018

Among 73 epidemiological studies, approximately 76% were conducted in Western countries, whereas only 15% of studies were conducted in Asia. Furthermore, most studies conducted in Asia showed that processed meat consumption is not related to the onset of cancer.

Processed meat intake and chronic disease morbidity and mortality: An overview of systematic reviews and meta-analyses

Mina Nicole Händel, Isabel Cardoso, Katrine Marie Rasmussen, Jeanett Friis Rohde, Ramune Jacobsen, Sabrina Mai Nielsen, Robin Christensen, Berit Lilienthal Heitmann

Published: October 17, 2019 • https://doi.org/10.1371/journal.pone.0223883

Evidence for associations was more often found when reviews were based on results from case-control than when based on cohort studies, suggesting that the better the study design, the lower the probability of an association. Moreover, the overall certainty in the evidence was very low across all individual outcomes, due to serious risk of bias and imprecision. A systematic quality assessment of each of the primary studies in a review should be performed in future systematic reviews prior to formulating a concrete conclusion of the evidence.

**AMERICAN COLLEGE of CARDIOLOGY**

Guidelines | All Types ▾

Clinical Topics    Latest In Cardiology    Education and Meetings    Tools and Pra

PURE: Healthy Diet Including Dairy and Meats May Be Good For Hearts Worldwide

Aug 28, 2018

**PURE STUDY**
- >218,000 participants
- 50 countries, five continents

Associations vanish or invert (!) when taken out of a US context or when the design of the study improves (cohort vs. case-control studies)

"our results show that dairy products and meat are **beneficial** for heart health and longevity. This differs from current dietary advice."

**Salim Yusuf**, DPhil, FACC, senior author

7/To be fair, researchers are usually more nuanced than policy makers. As stated in this highly cited study on meat & mortality, data 'should be interpreted with caution due to the high heterogeneity observed [&] the possibility of residual confounding'
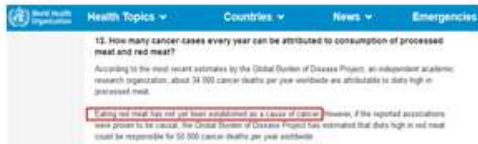https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/association-between-total-processed-red-and-white-meat-consumption-and-allcause-cvd-and-ihd-mortality-a-metaanalysis-of-cohort-studies/35CB32B716F2FBAF6119070029193544

8/Even the WHO/IARC panel looking into the colorectal cancer link declared that 'other explanations for the observations (chance, bias or confounding) could not be ruled out' while 'consumption of red meat has not been established as a cause of cancer'
https://www.who.int/news-room/q-a-detail/cancer-carcinogenicity-of-the-consumption-of-red-

What does **World Health Organization** really say?

"Eating meat has not yet been established as a *cause* of cancer"

**Limited evidence**

"means that a positive association has been observed between exposure to the agent and cancer but that other explanations for the observations (technically termed chance, bias, or confounding) could not be ruled out."

9/Observational data yielding associations between meat intake and disease thus need to be CAREFULLY inspected. At best, this creates a HYPOTHESIS that needs to be validated in intervention studies. But such studies fail to indicate harm!



Am J Clin Nutr. 2017 Jan;105(1):57-69. doi: 10.3945/ajcn.116.142521. Epub 2016 Nov 23.

Total red meat intake of ≥0.5 servings/d does not negatively influence cardiovascular disease risk factors: a systemically searched meta-analysis of randomized controlled trials.

O'Connor LE[1], Kim JE[1], Campbell WW[2].

The highest category of red meat consumption (>3 servings of red meat/d) showed **no negative** effects on blood lipid and lipoprotein concentrations and blood pressures and resulted in higher HDL concentrations [...] These results are inconsistent with much of the observational evidence related to red meat consumption and CVD, which prompts the need for future research to reconcile the apparent disconnect between RCT and observation-based conclusions

Increased lean red meat intake does not elevate markers of oxidative stress and inflammation in humans

Hodgson JM[1], Ward NC, Burke V, Beilin LJ, Puddey IB (2007) J Nutr.

No negative effects on risk factors

Red meat, dairy, and insulin sensitivity: a randomized crossover intervention study.
Randomized controlled trial
Turner KM, et al. Am J Clin Nutr. 2015.
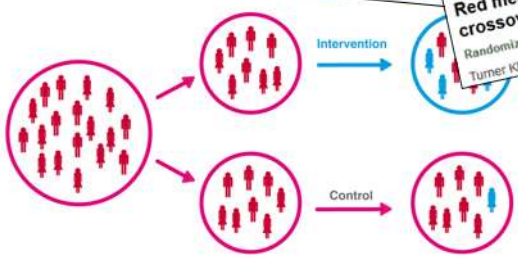
Exp Biol Med (Maywood). 2017 Apr; 242(8): 813-839.
Published online 2017 Feb 16. doi: 10.1177/1535370217693117          PMCID: PMC5407540

Association between red meat consumption and colon cancer: A systematic review of experimental results

Nancy D Turner[1,2] and Shannon K Lloyd[1]

10/It is true of course that such trials are difficult on long term in humans & rely on biomarkers that are imperfect. Alternatively, one can use animal models or cell cultures. Once more: INSUFFICIENT evidence (not to mention the extrapolation concerns)

**Association between red meat consumption and colon cancer: A systematic review of experimental results**

Nancy D Turner[1,2] and Shannon K Lloyd[1]

Forty studies using animal models or cell cultures met specified inclusion criteria, most of which were designed to examine the role of heme iron or heterocyclic amines in relation to colon carcinogenesis. Most studies used levels of meat or meat components well in excess of those found in human diets. Although many of the experiments used semi-purified diets designed to mimic the nutrient loads in current westernized diets, most did not include potential biologically active protective compounds present in whole foods. Because of these limitations in the existing literature, there is currently insufficient evidence to confirm a mechanistic link between the intake of red meat as part of a healthy dietary pattern and colorectal cancer risk.
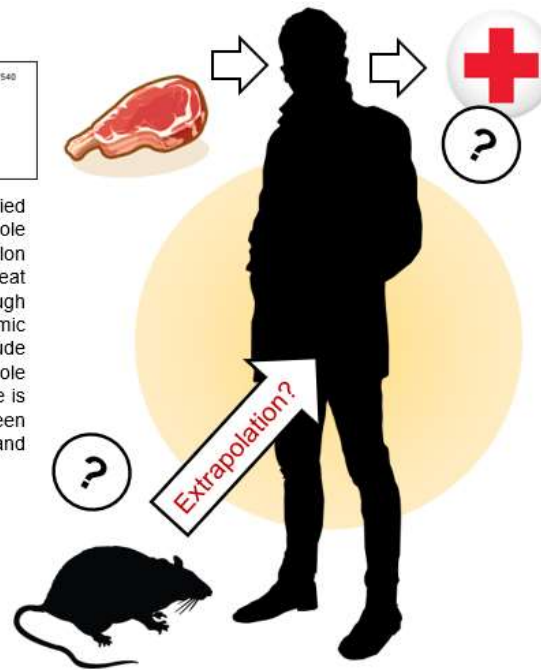


11/Another problem: CHERRY PICKING. Although associated with colorectal cancer, why not mention that meat shows a PROTECTIVE association with melanoma? Or that vegetarians in the UK are WORSE off? Etc.

## ! Inconvenient facts

- Red and processed meat intake is associated with colorectal cancer but inversely associated with melanoma (Cross et al. 2007; Yen et al. 2018)
- With respect to colorectal cancer most studies were from 1990s, more up to date info from the UK showed no significant association with red meat and only a weak one with processed meats (Bradbury et al. 2020)
- (British) vegetarians are not better off than meat eaters: higher incidence of colorectal cancer (Key et al. 2014); mortality from circulatory diseases and all causes is not significantly different (Key et al. 2009)

Incident malignant cancers and RRs (95% CIs) by diet group among 32,491 meat eaters, 8612 fish eaters, and 20,544 vegetarians and vegans

| Cancer site (ICD-10 codes) and model | Meat eaters | | Fish eaters | | Vegetarians and vegans | |
|---|---|---|---|---|---|---|
| | No. of cancers | RR | No. of cancers | RR (95% CI) | No. of cancers | RR (95% CI) |
| Colorectum (C18–20) | | | | | | |
| Basic | 382 | 1.00 | 43 | 0.66 (0.48, 0.92) | 154 | 1.03 (0.84, 1.26) |
| +BMI | | 1.00 | | 0.67 (0.48, 0.92) | | 1.04 (0.84, 1.28) 0.032 |
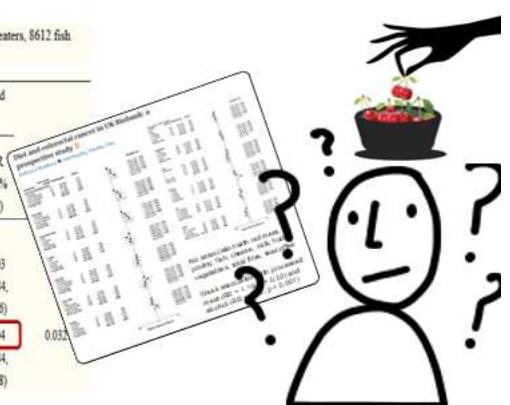
12/Bringing us to the WHO/IARC assignment of red meat to Group 2A ("probably carcinogenic to humans"). Why did they do this and what does it mean?

Source: Cancer Research UK, WHO  *International Agency for Research on Cancer  BBC
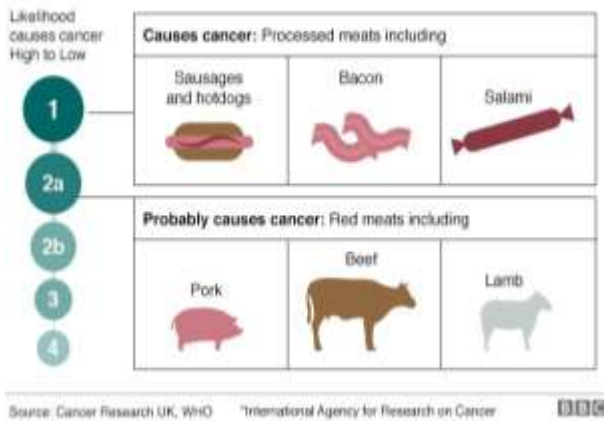
13/It's good to have in mind that this is more controversial than it seems. One of the WHO/IARC's own experts, dr. Klurfeld, has severely criticized this. For an overview of his objections, cf:

https://watermark.silverchair.com/vfy009.pdf?token=AQECAHi208BE49Ooan9kkhW_Ercy7Dm3ZL_9Cf3qfKAc485ysgAAApQwg gKQBgkqhkiG9w0BBwagggKBMIICfQIBADCCAnYGCSqGSIb3DQEHATAeBglghkgBZQMEAS4wEQQMsPC9byK57MWgJy8cA gEQgIICR2xgrM7PTPT91bPYAjPsp6SAN9QfbXkSLtn4aa_RusxpW941rZiPQFLCZ0dOSq1D1a1iI26gy5SbubQFokQBXpN9Zt8D utBsgW8ttrj2mqqpXoji00ozyAntgzjrdNJ6x298Tpe1sdvzEEdPJi2bBJV3Pn9Ncy6dvEdC1edIOjx_QQnDnSvHIixvmRNlhRABEijaP n4RYn5HI8Ini1PdBdT4oqVFCWeWUbzthRws2VMTbzI_3yoXSAuTlUSJMY4S6XDI7t_CQqr7vXXtxOYOESteiVZJ0zzMwhhk75U SSgnkkAWrSOSUs20vH-V3t5ZltUU1zN3647xU8VnUMiyoVOosp-tcFC4g_NK0IVw_V2LRmetPxQlw5B9V0nvrBKDUsi2JbEF0Sa41qQoRbaMfGF2OICvwG5q0vmHy8oaC4N1VLXppc0gmscQd6V RVb7qIJ3mJ1OjF9v9FZ5-UVix-iwDnBRzT8mA87C0rWhrL766AX_SKRhB9J8tP4hdCdJ3vd82KI5HdS0Ck8ELsrtv-SV_UR9xaCahxVnWTAhvO4QRCZflU6X0I_jiQY2JM41IE4ndrI_VkE65suAJn9FwAN06neeQoi3emDgZcJXf0L71HzV0PEbWoEQ 7avgLRYTbr9n4DbnT3WcqK-S-pF-zCB4TIXqlCnve7Wi5vHhKATNsxsEH4ZOrzfbWjc7jpaI-IXw6XujqRwteoF_A05QNJGYFc9gg6SWHep8-Z_wRamL9d5ZER1lUUnmsRBgumMIF8W1PVYj8HRDM

# What is the role of meat in a healthy diet?

David M. Klurfeld

USDA Agricultural Research Service, Beltsville, MD 20705

14/Furthermore, we need to understand that WHO/IARC classifications indicate HAZARDS, not risks. To go from risk to hazard, we need… a risk assessment.



15/Such risk assessment indicates that there is no solid case for concern, especially in the context of a normal diet.

**Red meat and colon cancer: A review of mechanistic evidence for heme in the context of risk assessment methodology.**

Kruger C[1], Zhou Y[2].

In conclusion, the methodologies employed in current studies of heme have not provided sufficient that the mechanisms studied would contribute to an increased risk of promotion of preneoplasia or usual dietary intakes of red meat in the context of a normal diet.

16/ Because, indeed, CONTEXT is everything. Sunlight is a #hazard (more so than red meat, which is at the level of being a hairdresser) & #risk under certain conditions. But it is fair to say that sunlight is mostly beneficial (vitamin D being just one reason)
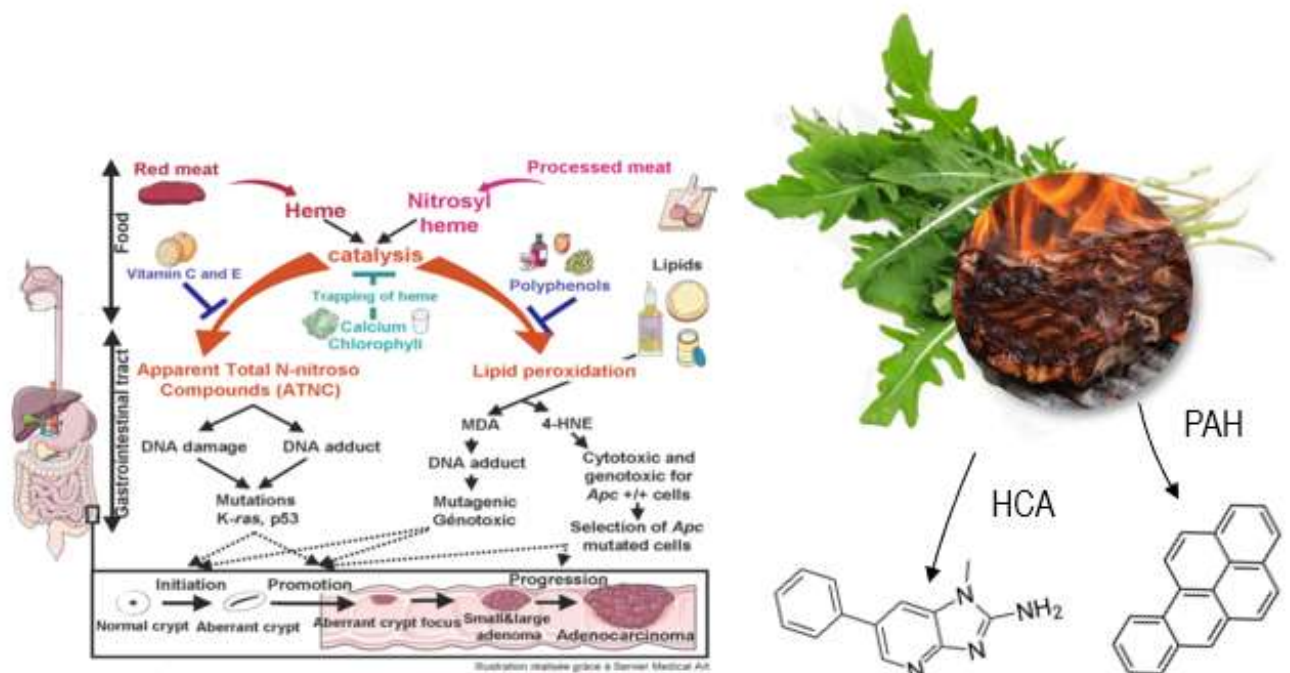


17/Obviously, one shouldn't consume all-too heavily processed meats, or overly charred steaks, all-too often. Or blame the beef patty for the ultraprocessed bun, sauces, fries, & soda consumed with it.

18/So within an overall HEALTHY DIET, whatever potential cancer risk (if any; hard to tell due to confounding & bias) can reasonably be expected to be irrelevant. In the study below, more meat either parallels higher (veg-) or lower (!!) (veg+) risk.

## Co-consumption of Vegetables and Fruit, Whole Grains, and Fiber Reduces the Cancer Risk of Red and Processed Meat in a Large Prospective Cohort of Adults from Alberta's Tomorrow Project

by Katerina Maximova [1,*], Elham Khodayari Moez [1], Julia Dabravolskaj [1], Alexa R. Ferdinands [1], Irina Dinu [1], Geraldine Lo Siou [2], Ala Al Rajabi [3] and Paul J. Veugelers [1]

**All-Cause Cancers** [b]

| | Vegetables and Fruit (Serving/Day) [d] | | |
|---|---|---|---|
| | <55 years: <4 | <55 years: 4–6 | <55 years: >6 |
| | ≥55 years: <3 | ≥55 years: 3–5 | ≥55 years: >5 |
| Red meat (gram/week) [e] | | | |
| <250 | 1.04 (0.79–1.36) | 1.02 (0.89–1.17) | Ref. |
| 250–500 | 1.17 (0.92–1.47) | 1.01 (0.85–1.21) | 0.88 (0.76–1.02) |
| >500 | 1.31 (1.02–1.69) | 1.01 (0.79–1.29) | 0.78 (0.57–1.05) |

https://www.mdpi.com/2072-6643/12/8/2265

19/Some authors are therefore starting to question the usefulness of IARC-type schemes to begin with. As they lead to scaremongering and loss of benefits (meat = valuable nutrition, etc.)

**Classification schemes for carcinogenicity based on hazard-identification have become outmoded and serve neither science nor society.**

Boobis AR[1], Cohen SM[2], Dellarco VL[3], Doe JE[4], Fenner-Crisp PA[5], Moretto A[6], Pastoor TP[7], Schoeny RS[8], Seed JG[9], Wolf DC[10].

This! → […] Because a risk-based decision framework fully considers hazard in the context of dose, potency, and exposure the unintended downsides of a hazard only approach are avoided, e.g., health scares, unnecessary economic costs, loss of beneficial products, adoption of strategies with greater health costs, and the diversion of public funds into unnecessary research.

20/No wonder that some top-level scientists, eg. Gordon Guyatt (leading expert in the field of evidence-based medicine), have criticized the WHO/IARC after the release of its report for "doing the public a disservice". They'd likely say the same for the #EUCancerPlan.

## Mistaken advice on red meat and cancer

Gordon Guyatt, Distinguished Prof., Dept. of Clinical Epidemiology & Biostatistics, Joint Member, Department of Medicine, McMaster University, Ontario; Benjamin Djulbegovic, Associate Dean, College of Internal Medicine; Professor, Dept. of Oncological Sciences; Distinguished Professor, Clinical and Translational Institute, Director, Evidence-based Medicine Research Group, University of South Florida.

Epidemiology is a science that can establish associations […] but seldom cause and effect [The] success story of epidemiological science was its ability to link smoking to cancer, with WHO designating tobacco as a "convincing" carcinogen in 1986 […] Ever since, however, standards for these risks in policy making have been dropping. This week's decisions on meat are based on relative risks of 1.17 to 1.18, a tiny fraction of those for smoking. To keep things in perspective: for colon cancer, which was the focus of the WHO report, the absolute risk of contracting this cancer in one's lifetime is less than 4.5%. An increased relative risk of 1.17 raises the absolute risk to no more than 5.3%. As two of the leaders in evidence based medicine, we were involved in the development an evidence ranking system, called "GRADE," adopted by over 90 groups world-wide, including the WHO. GRADE notes that unless relative risks are greater than 5, epidemiological studies typically provide only low-quality evidence […] In such cases, the evidence is not convincing, and any recommendations would ordinarily be we would make a "weak", or "optional" recommendation, since the benefits do not clear outweigh the potential harms. The WHO has done the public a disservice in abandoning GRADE in its evaluation of the evidence, and greatly overstating confidence in a causal connection between red meat and cancer. Recent decades are littered with policies based on weak relative risks which, when properly tested in clinical trials, had to be reversed […] We see the same story with dietary guidelines: recommendations to restrict dietary cholesterol and limit fat to fight cancer were originally based principally on epidemiological ... that clinical trials failed to confirm […] The reason that weak associations are untrustworthy is that they could very well be ... associated with any number of factors in diet or lifestyle […] Vegetarians tend to be more alert to good health: they smo... ess, exercise more, and have a higher socioeconomic status. By contrast, meat-eaters over the past 30-plus years are pe... nore their doctor's orders and are likely to be engaging in other insalubrious behaviors, all of which alone or in ...ght explain the small relative risks associated with meat-eating. Bias against red meat is another factor, easily ... scientific literature and the popular press […] Small relative risks are therefore just as likely to reflect bias as any ... domized clinical trials provide far more trustworthy evidence regarding cause and effect. It is therefore perplexing that this ... HO document does not even mention the relevant data: two large, multi-year RCTs, both funded by the National Institute of Health [Polyp Prevention Trial and WHI] To say that red or processed meat is equivalent to smoking is profoundly misleading.

21/Last year, Guyatt & others formalized their critique by COMPREHENSIVELY looking at the evidence. Based on sufficiently high standards of evidence, they concluded that advice to reduce red & processed meat is based on weak evidence.
https://www.acpjournals.org/doi/10.7326/M19-1621

22/In the editorial of the journal, Carroll & Doherty argued that those who seek to dispute this [assessment] will be hard pressed to find appropriate evidence with which to build an argument"

## Meat Consumption and Health: Food for Thought

Aaron E. Carroll, MD, MS; Tiffany S. Doherty, PhD

A fifth article this month is a new guideline [...] based on these reviews. It was voted on by 14 members, including 3 community members, from 7 countries and had strict criteria concerning conflicts of interest. The overall recommendations, contrary to almost all others that exist, suggested that adults continue to eat their current levels of red and processed meat, unless they felt inclined to change them themselves. This is sure to be controversial, but it is based on the most comprehensive review of the evidence to date. Because that review is inclusive, those who seek to dispute it will be hard pressed to find appropriate evidence with which to build an argument [...] Moreover, it may be time to stop producing observational research in this area. These meta-analyses include millions of participants. Further research involving much smaller cohorts has limited value. High-quality randomized controlled trials are welcome, but only if they're designed to tell us things we don't already know.

Johnston et al (2019) recommend "to continue rather than reduce consumption of unprocessed red meat or processed meat"

Causal inference assessment based on summary of evidence

**Annals of Internal Medicine**

**Unprocessed Red Meat and Processed Meat Consumption: Dietary Guideline Recommendations From the Nutritional Recommendations (NutriRECS) Consortium**

Bradley C. Johnston, PhD; Dena Zeraatkar, MSc; Mi Ah Han, PhD; Robin W.M. Vernooij, PhD; Claudia Valli, MSc; Regina El Dib, PhD; Catherine Marshall, Patrick J. Stover, PhD; Susan Fairweather-Taitt, PhD; Grzegorz Wójcik, PhD; Faiz Bhatia, PDng; Russell de Souza, ScD; Carlos Brotons, MD, PhD; Joerg J. Meerpohl, MD; Chirag J. Patel, PhD; Benjamin Djulbegovic, MD, PhD; Pablo Alonso-Coello, MD, PhD; Malgorzata M. Bala, MD, PhD; Gordon H. Guyatt, MD

23/What followed was indeed incoherent rebuttal by anti-meat groups arguing that we should accept lower standards of evidence for nutrition, because it can't do better (?!) Plus a vitriolic smear campaign. MUST READ! https://www.tamus.edu/wp-content/uploads/2020/01/JAMA-Article-1.15.20.pdf

## Backlash Over Meat Dietary Recommendations Raises Questions About Corporate Ties to Nutrition Scientists

Rita Rubin, MA

It's almost unheard of for medical journals to get blowback for studies before the data are published. But that's what happened to the *Annals of Internal Medicine* last fall as editors were about to post several studies showing that the evidence linking red meat consumption with cardiovascular disease and cancer is too weak to recommend that adults eat less of it.

Annals Editor-in-Chief Christine Laine, MD, MPH, saw her inbox flooded with roughly 2000 emails—most bore the same message, apparently generated by a bot—in a half hour. Laine's inbox had to be shut down, she said. Not only was the volume unprecedented in her decade at the helm of the respected journal, the tone of the emails was particularly caustic.

"We've published a lot on firearm injury prevention," Laine said. "The response from the NRA (National Rifle Association) was less vitriolic than the response from the True Health Initiative."

24/Rather than ideological a "priori", let's return to common sense: "for a modern disease to be related to an old-fashioned food is one of the most ludicrous things I ever heard in my life".

Let's focus on ultraprocessed junk instead?
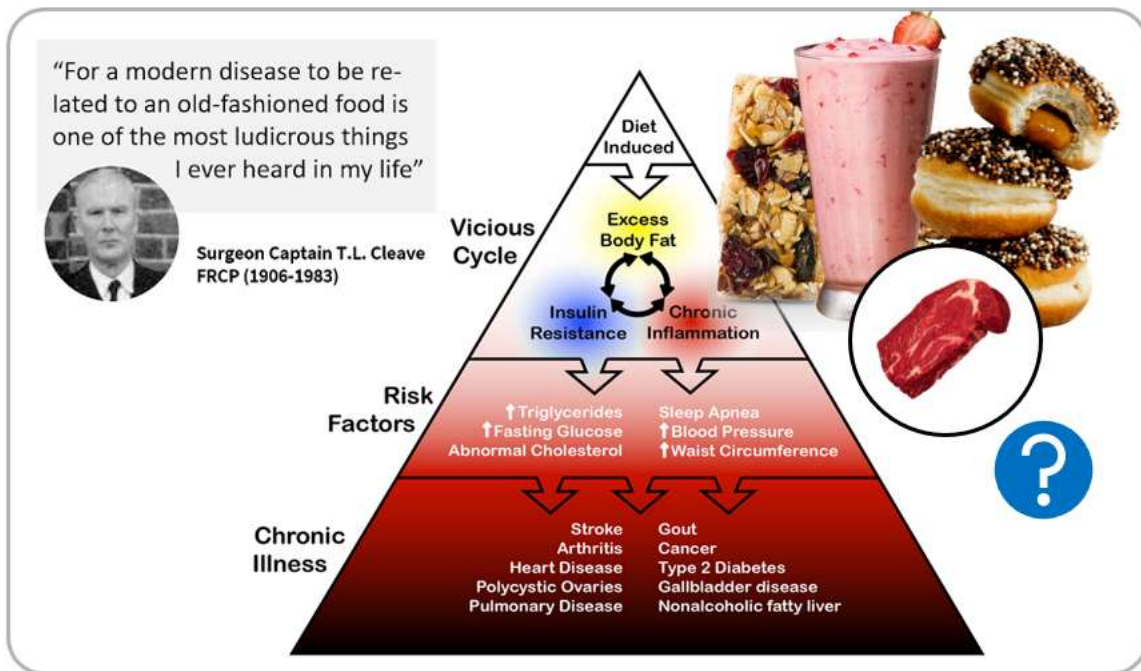
25/I leave it with the following statement: "we argue that claims about the health dangers of red meat are not only improbable in the light of our evolutionary history, they are far from being supported by robust scientific evidence"
https://www.tandfonline.com/doi/full/10.1080/10408398.2019.1657063

26/...and our @aleph2020 website (brought by a consortium of 35+ scientists). I invite you to visit the Health section where we not only argue that there's no good reason to avoid meat, but also that it may lead to the loss of valuable nutrition: https://aleph-2020.blogspot.com/p/introduction.html

27/Meat, indeed, is an evolutionary food. It made us human. We're *adapted* to it. It would be highly improbable that it harms us to such an extent that we would have to include its restriction in a #EUCancerPlan. https://aleph-2020.blogspot.com/2020/04/the-role-of-asfs-in-historical-diets.html

- - - - -