



Platinum Opinion

The Plant-based Prescription: How Dietary Change Can Improve Both Urological and Planetary Health

Alexander P. Cole^{a,*}, Natasha Gupta^b, Stacy Loeb^b

^a Division of Urological Surgery and Center for Surgery and Public Health, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA;

^b Department of Urology and Population Health, New York University Langone Health and Manhattan Veterans Affairs, New York, NY, USA

1. Introduction

The global impact of climate change poses unparalleled challenges. Safeguarding of human health amidst these changes is a priority for all doctors, including members of the urological community.

Climate-related threats to health include vector-borne diseases (eg, malaria, dengue), water-borne infections (eg, cholera and other diarrheal illnesses), respiratory disease, heart disease, and direct temperature-related illnesses (eg, heat stroke and dehydration). With respect to urological health, there is evidence of climate and environmental impacts in many urological conditions [1]. The downstream impact of climate change will also have a dramatic effect on the provision of urological care: pandemics, hurricanes, droughts, and climate migration all can overburden health systems and interrupt prompt health care.

As members of a comparatively small surgical subspecialty, we may feel powerless and removed from the large public health impacts of climate change. Nonetheless, there are some simple strategies to address climate change while simultaneously supporting healthy behaviors for our patients. Reducing or eliminating the consumption of meat is recognized as one such strategy [2]. This may be particularly important in urology, as healthy plant-based diets can reduce most of the urological conditions with the greatest morbidity and mortality, while simultaneously promoting planetary health.

2. Dietary risk factors for urological disease

Diet is the primary contributor to the global burden of disease. Diets that are high in meat and low in fruits and veg-

etables are associated with a higher risk of the top three urological malignancies: prostate cancer [3], bladder cancer [4], and renal cancer [5]. Similarly, meat consumption has been linked to higher risk of common nonmalignant urological conditions, including urinary tract infections, kidney stones, and erectile dysfunction [6–8].

3. How can sustainable diets address environmental health?

Alongside these detrimental health impacts, meat production contributes to destruction of natural ecosystems, habitat conversion, biodiversity loss, depletion of fresh water, pollution, and global warming. For example, livestock production is a significant driver of greenhouse gas emissions, including carbon dioxide (14.5% of global total), methane (50% of global total), and nitrous oxide (60% of total), with the latter two having vastly more global warming potential than carbon dioxide [2]. Transformation of the food system is thus essential in combating climate change.

4. The potential impact of climate on urological health

Human activities and behavioral choices influence natural systems, which in turn feed back to either promote or hinder health. This interplay is seen in several urological diseases. Take the example of urolithiasis: meat-heavy diets are a risk factor for stone disease and a target for dietary modifications in those with recurrent urolithiasis. On a global scale, animal agriculture is a major contributor to greenhouse gases, which in turn lead to more extreme weather

* Corresponding author. Division of Urologic Surgery and Center for Surgery and Public Health, Brigham and Women's Hospital, 45 Francis Street, Boston, MA 02115, USA. Tel. +1 617 5259963; Fax: +1 617 5256348. E-mail address: alexander.p.cole@gmail.com (A.P. Cole).



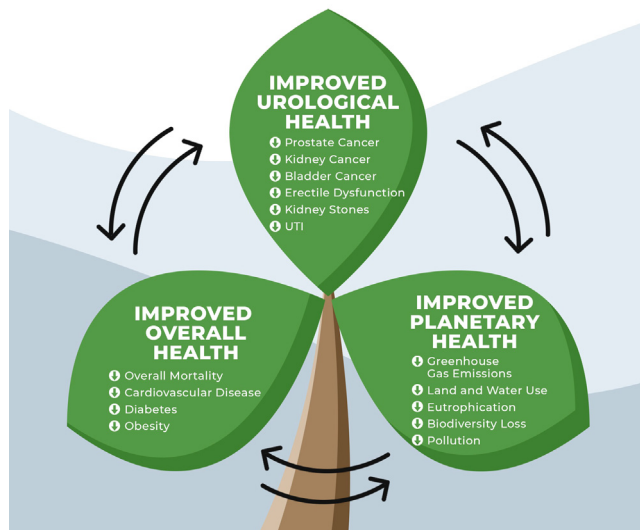


Fig. 1 – Impacts of shifting to a plant-based diet. UTI = urinary tract infection.

and heatwaves. This feeds back to further increase the burden of stone disease [6]. Thus, a reduction in meat intake has the potential to reduce the burden of stone disease at both the individual and societal levels.

In prostate cancer, greater intake of meat is linked to carcinogenesis and to a higher risk of chronic diseases that increase biopsy-related and treatment-related toxicity (eg, diabetes). At the societal level, animal agriculture results in changes in biodiversity and reductions in green space, which may increase carcinogenic inflammatory pathways that are associated with a greater likelihood of lethal prostate cancer [9]. Animal agriculture is also a contributor to antibiotic resistance, which exacerbates problems such as sepsis after prostate biopsy. Of the more than 30 000 000 pounds of antibiotics used in the USA, 80% are used in livestock farming and most end up in the soil and water. Lastly, the cancer care spectrum is susceptible to downstream effects of climate disruption such as human migration and extreme weather events.

5. The role for systems-based thinking

Systems-based thinking is critical for understanding and addressing the intersection of human and planetary health. Dietary counseling is already in our purview and is included in the guidelines for many urological conditions, ranging from erectile dysfunction and stone disease to cancer survivorship. It is less well recognized that systems-based thinking may also support planetary health, which in turn will benefit us and our patients. Even comparatively small dietary changes can have a significant impact (Figure 1).

Researchers from the UK estimated that optimizing diets to comply with the World Health Organization recommendations (including reducing red meat consumption by 38% and increasing the intake of nonstarchy vegetables by 56.4%) would lead to a 17% reduction in greenhouse gas emissions [10]. As clinicians and researchers, we hold a crucial responsibility in promoting the health of our patients, fostering behavior change, and advocating for research and policies that advance public health. By actively supporting a shift from meat-heavy diets to sustainable and nutritionally rich plant-based consumption, urologists can significantly contribute to both mitigating the impact of urological disease and supporting the health of our planet.

Conflicts of interest: Alexander P. Cole has received grant funding from Pfizer/ACS. The remaining authors have nothing to disclose.

Acknowledgments: Alexander P. Cole is supported by the American Cancer Society and Pfizer Global Medical Grants and by a Bruce A. Beal and Robert L. Beal surgical fellowship. Natasha Gupta is supported by the National Institutes of Health (NIH) National Center for Advancing Translational Sciences (grant KL2TR001446). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH. Stacy Loeb is supported by the New York State Department of Health, and by Tricia and Michael Berns.

References

- [1] Loughlin KR. Global warming: the implications for urologic disease. *Can J Urol* 2019;26:9806–8.
- [2] Shah UA, Merlo G. Personal and planetary health—the connection with dietary choices. *JAMA* 2023;329:1823–4.
- [3] Gupta N, Patel HD, Taylor J, et al. Systematic review of the impact of a plant-based diet on prostate cancer incidence and outcomes. *Prostate Cancer Prostat Dis* 2022;25:444–52.
- [4] Taylor J, Gupta N, Blanck J, Loeb S. A systematic review of plant-based diets and bladder cancer: a call for further research. *Soc Int Urol J* 2022;3:240–4.
- [5] Daniel CR, Park Y, Chow WH, Graubard BI, Hollenbeck AR, Sinha R. Intake of fiber and fiber-rich plant foods is associated with a lower risk of renal cell carcinoma in a large US cohort. *Am J Clin Nutr* 2013;97:1036–43.
- [6] Brikowski TH, Lotan Y, Pearle MS. Climate-related increase in the prevalence of urolithiasis in the United States. *Proc Natl Acad Sci U S A* 2008;105:9841–6.
- [7] Chen YC, Chang CC, Chiu THT, Lin MN, Lin CL. The risk of urinary tract infection in vegetarians and non-vegetarians: a prospective study. *Sci Rep* 2020;10:906.
- [8] Bauer SR, Breyer BN, Stampfer MJ, Rimm EB, Giovannucci EL, Kenfield SA. Association of diet with erectile dysfunction among men in the Health Professionals Follow-up Study. *JAMA Netw Open* 2020;3:e2021701.
- [9] Iyer HS, James P, Valeri L, et al. The association between neighborhood greenness and incidence of lethal prostate cancer: A prospective cohort study. *Environ Epidemiol* 2020;4:e091.
- [10] Milner J, Green R, Dangour AD, et al. Health effects of adopting low greenhouse gas emission diets in the UK. *BMJ Open* 2015;5:e007364.