

Authors' Response: Health Benefits/Hazards Associated with Companion Animal-Exposure Might be Endpoint-and-Animal Specific

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Dear Editor:

We thank Dr. Richard Gillum for his interest in our study [1] and critical viewpoints [2]. It's true that both Dr. Gillum's and ours used the data collected from roughly the same cohort, i.e. the participants of the National Health and Nutritional Examination Survey, 1988–1994. The two studies, however, are fundamentally different as Dr. Gillum summarized in his letter. It might be inappropriate to assess the consistency of the conclusions from studies with different study populations using different endpoints. As Dr. Gillum correctly pointed out that study population in ours were the “persons under 50 (vs. 40) at baseline and those with chronic medical conditions were excluded (vs. included); the sample was followed 6 years longer; endpoints were restricted to deaths from cardiovascular disease including stroke (vs. all causes)” [2]. It is in particular relevant that Dr. Gillum's study used all cause deaths [3] and ours instead examined deaths from cardiovascular events [1].

Companion animals include various species, from mammals to reptiles. The impact of living with companion animals might be not “all-or-nothing” or “black-and-

white”, not only in terms of the types of animals but also the endpoints selected. The health benefits may be overshadowed by health drawbacks for selected animals with selected health endpoints. The heterogeneity of exposures (types of animal) and outcomes (causes of death, in this case) may explain a substantial part of the inconsistency of the literature, certainly, including the discrepancy between Dr. Gillum's and ours. A beneficial association between pet ownership and cardiovascular disease was observed from numerous studies, including ours. Potential health hazards from keeping a pet were also reported from others, with a majority using cancer, in particular, leukemia and lung cancer [4], as the endpoint. With that said, we believe it is not surprising to find no or a weak relationship between having a pet and all-cause mortality in Dr. Gillum's study [3] since the hazardous and beneficial effects on different health outcomes may be counter acting each other.

We agree with Dr. Gillum that “we need to wait for better studies before making any firm conclusions about pets and survival among their owners” [2], and we are short of an overall assessment of the associations of companion animals with human health, in particular, among general population. For these reasons, we believe that our study [1], in nature, was exploratory, as such, we tried to minimize the type II error and did not adjust for multiple comparisons, which in turn may end with an increased type I error as Dr. Gillum was concerned. We had no intention to “emphasize findings that likely were due to chance (i.e. not statistically significant) and a single finding (women living with cats and stroke) [2]”. As a matter of fact, in addition to the “single finding (women living with cats and stroke)”, all the estimates for women were below the null value regardless of the cardiovascular endpoints (last

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column of table 2) [1], showing a consistency behind the single finding we discussed extensively.

We also take the liberty to have an opinion different from Dr. Gillum's regarding randomized trials. Before our study, there has been a substantial body of studies, unfortunately with most conducted among patients, showing decreased blood pressure and increased physical activity, improved lipid profiles and autonomic tone, normalized sympathetic responses to stress, and better survivability after coronary events among populations with various cardiovascular risks [5]. As early as 2008, National Institute of Health hosted a series of meetings to bring together leading experts in the field of human-animal interactions to discuss the study findings and the ways to improve ongoing research. The American Heart Association also designed the evidence on cardiovascular benefits of pet ownership among populations with cardiovascular risks as Class II B, which indicates that companion animals may be considered as a part of cardiovascular preventive measures. More critically, as public health practitioners, we always put public health importance ahead of the schematized causal hierarchy. Currently, more than half of American families are having companion animals living in their homes; and this number are continuously climbing. A weak relationship, most likely unable to be detected statistically by a study if misclassification occurs substantially, can be translated into a vast amount of health impact, beneficial or hazardous, to the population as a whole; hence, it is not only warranted but also urgent to have randomized trials for firm conclusions.

Compliance with Ethical Standards

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Ethical approval None human participants were involved.

Informed consent None.

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