

Xenotransmission of the socioeconomic gradient in health? A population based study

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The presence of a socioeconomic gradient in health has been documented extensively in humans.^{1,2} Social hierarchy has also been found to be associated with the health of non-human species, as in a study of macaques, in which development of coronary artery occlusion was associated with social hierarchy.³ However, to our knowledge, transmission of the social gradient in health across species has never been reported. We investigated whether the socioeconomic gradient in health could be transmitted from humans to their pets.

Participants, methods, and results

The present research was part of a larger study on depression and suicidal behaviours among adolescents. In this study, cross sectional data were collected annually between 1986 and 1988 from school students in a single, socioeconomically diverse, suburban district in the southeastern United States. Students completed a self administered questionnaire, which included the highest educational level of a parent as a marker of socioeconomic status and the frequency of experiencing the "death of a pet" during the preceding 12 months. We examined the mean frequency of experiencing the death of a pet across socioeconomic strata. To minimise confounding we controlled for race through multivariate analysis of variance.

Altogether, 3419 students completed the survey; the response rate each year was at least 98%. The sample was reduced to 2954 (86.4%) after exclusion of students who did not report parental educational level. Analysis with the *t* test found no significant difference in mean frequency of experiencing death of a pet between students who reported parental education level and those who did not. The sample was equally divided between males and females; students were aged 11-18 years; 16% of students were black; and 67% of students had parents with less than 4 years' university education.

We found an association between socioeconomic status and reported death of a pet ($P=0.02$) (table). The mean frequency of reporting the death of a pet was 25% greater among students whose parents had not finished high school compared with students whose parents had completed at least 4 years of university (0.85 *v* 0.68). Controlling for race did not alter the results.

Comment

These findings may be explained by higher rates of pet ownership among students of lower socioeconomic status; as depression was the focus of the study, students were not asked if they owned a pet. However, in the United States ownership of any pet is positively

Mean frequency of reported death of a pet by socioeconomic status (parental education)

Parental education	Mean frequency*
Less than high school	0.85
High school	0.72
Technical school or <4 years at university	0.71
≥4 years at university	0.68

* $P=0.02$ after white or black race was controlled for.

associated with household income, and this relation exists for dogs, cats, or "small animals"—namely, hamsters, gerbils, etc.⁴ Thus, neither rates of ownership nor type of pet owned seems to explain the transmission of the gradient in health from humans to their pets. Rather, the "mortality" differences in this study are probably an underestimate of the true socioeconomic disparity.

Explanations for the apparent xenotransmission of the health gradient probably include all of the factors that contribute to disparities in health among humans, such as access to health care, nutritional status, environmental exposure, and social support. It is also conceivable that health related behaviours of individual pets are influenced by the social position of their owners, highlighting the profound impact of social position on health related behaviours of both human and non-human species.

Evans succinctly summarises the impact of socioeconomic status on health by stating: "Top people live longer."⁵ As is often the case, such simplifications mask important details; "top people and their pets live longer" may be more accurate.

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2 Smith GD, Carroll D, Rankin S, Rowan D. Socioeconomic differentials in mortality: evidence from Glasgow graveyards. *BMJ* 1992;305:1554-7.

3 Hamm TE, Kaplan JR, Clarkson TB, Bullock BC. Effects of gender and social behavior on the development of coronary artery atherosclerosis in cynomolgous macaques. *Atherosclerosis* 1983;48:221-33.

4 American Pet Products Manufacturers Association. *1996-1997 APPMA national pet owners survey*. Greenwich: APPMA, 1997.

5 Evans RG. Introduction. In: Evans RG, Barer ML, Marmor TR, eds. *Why are some people healthy and others not?* New York: Walter de Gruyter, 1994:3.