

Effect of pet ownership
on immune functioning in children

&

Nature of the relationship between
children and pets

Report prepared by
June McNicholas, B.Sc., Ph.D.

Department of Psychology
University of Warwick
Coventry
CV4 7AL

6th March 2002

Supported by Novartis Animal Health

PART 1. EFFECT OF PET OWNERSHIP ON IMMUNE FUNCTIONING IN CHILDREN

Aims of the Survey

Are the children of pet owning families more or less healthy than children from non-pet owning families? The purpose of this study was to examine any discernible differences in immunoglobulin A (IgA) between children in pet-owning households and children without pets. IgA was chosen since this is available from saliva samples and is the immunoglobulin present in mucous/mucal barriers. 'Health' was also measured in behavioural terms through percentage attendance at school.

Method

138 children aged 4 years to 11 years were recruited to the study from a Warwickshire primary school. The 19 children who comprised the reception class were subsequently excluded from the data analysis when it was found that this class exhibited much higher absentee rates and much lower pet ownership rates than the rest of the school. To have retained these children in the data analysis could have skewed the data set toward a bias toward an association between non-ownership and poor health.

Of the remaining 119 children, 28 did not own pets, 91 did own pets. Non-pet-ownership was not, as far as we could be aware from the children's answers, due to the existence of allergies to animals in the families.

Results

Pet ownership was significantly associated with better school attendance rates ($F(1,118)=5.547, p=0.002$)

This was apparent across **all** classes (i.e. classes 1-6) but was especially noticeable in the lower school (classes 1-3, age groups 5 -8)

Translating this into actual school sessions (half days – i.e morning and afternoon attendances as recorded on class registers) over a school year, the differences are as follows

Class 1 - pet owners had 15 half days more attendance than non owners

Class 2 – pet owners had 7 half days more attendance than non owners

Class 3 - pet owners had 18 half days more attendance than non owners

Class 4 - pet owners had 4 half days more attendance than non owners

Class 5 - pet owners had 7 half days more attendance than non owners

Class 6 - pet owners had 3 half days more attendance than non owners

There was no significant difference between girls and boys either in pet ownership or in attendance rates.

IgA scores levels did not differ significantly between pet owners and non-owners but it was noticeable, even in the raw data, that the levels in non-pet-owners were spread over a wider range. Pet-owning children have a range of 43.7 - 1051.2, with a median of 450. In contrast, the 'spread' is greater in non-pet-owning children; ranging from as low as 29 to as high as 1493.3, with a median of 375.2.

Each age group has a set of 'normal' ranges of IgA as reported in the medical press. Our data suggest that the levels from samples from non-pet-owning children are much more variable at both ends of the spectrum - below and above normality.

To investigate whether this deviation from normal levels is statistically significant, the absolute difference was calculated between each child's level and the lower, upper and mid-points of the

normal range for their age group. This enabled differences from normality to be calculated for the children with age changes built into the analysis.

The test used on this data is a Levene's Test for Equality of Variances.

Results show that pet-owning children's levels of IgA were significantly less variable from normal range:

at lowest point of normal range $F=4.465, p=0.037$

at mid point in normal range $F= 4.916, p=0.028$

at highest point of normal range $F= 5.490, p=0.021$

There was no evidence from analysis that pet type was a significant factor, although there was a trend for cat owners to have least variable IgA levels and slightly higher attendance rates.

There was also no evidence that kissing a pet, cuddling it and doing a lot to help look after it significantly affected IgA levels. However, there was a noticeable (though not significant) trend towards the more physical involvement (especially cuddles) being associated with lower variation in IgA from normal range.

On the topic of hand washing, it was a little difficult to know whether children were answering normatively or not (i.e. giving what they thought would be the most acceptable 'correct' answer.) However, 30% of the children admitted never or only very rarely washing their hands after handling or feeding their pet. Lowest variability from normal IgA levels were found amongst children who handled their pet a lot but who tended to say they washed their hands most frequently.

Just another interesting feature of the study on what pets children would like to own: non-pet-owning children all wanted a pet and the majority did not aspire to anything big or unusual. In fact most non-pet-owning children just wanted a hamster or a rabbit. Children who had a rabbit/hamster/guinea pig frequently said they were not allowed a dog or cat, suggesting that in these families pet ownership was seen as something that parents let children 'go through' with fairly short lived, containable/caged pets. These children wanted a cat or a dog. The children who had lots of pets, cats and/or dogs all wanted something much more exotic if given free choice – wolves, wallabies, parrots. In some ways they used this as a 'favourite animal' answer in contrast to the others who still had aspirations for pet keeping.

PART II. NATURE OF THE RELATIONSHIP BETWEEN CHILDREN AND PETS

Aims of the Survey

The purpose of this survey was to examine the activities in which children and pets engage together, and whether these could raise issues of potential zoonoses.

Surveys were circulated via *Dogs Today* and *Cats Today* magazines, and via Blue Cross Centres and responses were received from 176 families. The surveys required an adult member of the

family to nominate one child and one pet from their family and to answer questions regarding the activities and interactions that occurred between child and pet.

Sample

In total the 176 survey families had between them 338 children, 94 cats, 129 dogs, 22 fish, 30 small rodents (mice, rats, gerbils, hamsters etc), 35 rabbits, 18 guinea pigs, 7 reptiles, 17 indoor-caged birds, 1 pony and 6 groups of assorted poultry.

The nominated children were 78 boys and 88 girls aged from under three years old to over 14 years old. There was near even distribution between girls and boys across age groups.

Nominated children and pet by age and pet type were as follows.

Child age	Dog	Cat	Rabbit	Hamster	Bird
>3 years	12	4	1		
3-5 years	21	10	2		
6-10 years	43	18	2	1	
11-14 years	35	9	1		1
14+ years	4	9	1		1

Mean age of children in the survey was 8.7 years

Areas where the pet is allowed in the house.

- Only 33% were permitted only on floors
- 66% were free to go into the kitchen
- 44% permitted in the living rooms and/or on furniture
- 48% in the child's bedroom
- 47% in other bedrooms

When asked about when the child looked for the company of the pet, the answers were as follows.

- 40% went to their pet if they felt bored
- 32% went to their pet if they felt scared (most dogs)
- 53% had their pet with them when watching TV/videos
- 37% had their pet with them when they were reading/doing homework
- 28% looked for their pet when they had had an argument with the family
- 40% looked to their pet if they were upset
- 85% went to their pet as a playmate
- 34% went to their pet if they were tired
- 33% went to their pet if they felt poorly

Pet care

- 92% of all children took part in pet care routines.
- These included:
 - 55% in grooming
 - 29% in cleaning up faeces, cages, litter trays etc
 - 68% in feeding
 - 57% in exercise

As would be expected, cleaning and exercise duties were more prevalent in older (10+ years) children.

Handling

- Less than 4% of children do not handle their pet in some way
- Of the remainder:
 - 98% cuddle their pet

80% kiss their pet
96% stroke their pet

Under tens tended to kiss their pets a bit more than other age groups, but these percentages were similar across all age groups and, maybe surprisingly, across boys and girls.

Playing

Nearly all (97%) children reported playing with their pets.

19% played pretend picnic and parties with their pets
21.1% played dressing up with their pet (under 8's but no gender difference)
11% played pushing the pet in a pram (mainly little girls)
18% played 'animal hospitals' with their pet as a patient
38% played/hid their pet in their bed (no age/gender distinction!)

90% of all families say that visiting children also play these games with the animals.

Food sharing

When asked if the children ever shared food with the pet, the answers were as follows

Only 25% of children were reported as never sharing food with their pet (and this may be partly a pet type issue)
28% shared food if they thought they weren't being seen to do so
16% shared food at mealtimes/at table
38% shared snacks, crisps etc when watching TV (implications for hand washing?!)
21% let the pets lick their fingers after eating.

When asked HONESTLY how often they thought their children washed their hands after handling pets, the survey respondents answered

7.6% said every time
18% said most times
36% said probably not as often as he/she should
19.5% said definitely not often
12% said rarely or never

When asked how necessary they saw it for their children to wash their hands after handling pets

10% said it was essential and they saw to it that he/she did so
22.7% saw it as highly desirable, and that they tried to see that the child did so
45% saw a possible risk if hands weren't washed but didn't get obsessive about it
12.5% thought it very unlikely that the pet could transmit anything dangerous to health
3.8% saw hand washing as unnecessary

Worming frequencies

	Cats	Dogs
Monthly	13%	8.7%
Quarterly	37%	61%
Twice yearly	8.7%	10.4%
Yearly	22%	15.7%
Never	10.9%	2.6%

Conclusions

Although the previous IgA study suggests that pet interactions may help immune functioning in children, and therefore may be beneficial to children, it is clear from reported activities between child and pet that there is scope for health problems, in particular the risk of zoonotic infection.

A high percentage of families permit pets in the bedrooms and the most frequently reported 'game' was hiding the pet/playing with the pet in bed. This must clearly indicate a need for flea control routines.

The frequency and occasions when food is shared with pets makes hand washing routines, however desirable, almost impossible to adhere to. For example, many pets are permitted to be fed at (human) mealtimes, and many share snacks whilst the child watches TV – the one for you, now one for me type snacks, like crisps and sweets. In addition, the playing of pretend parties and picnics may also go undetected as a need to ensure hands are washed. This must raise the issue of internal parasite transmission and the need to control roundworm in particular.

Clearly pets and children are great for one another. The survey contains frequent touching and humorous reports of how pets can figure significantly in a child's life. Yet the benefits can only be obtained if pet and child are safe for one another to enjoy.