

## ACDP Survey on Use of Animals in Teaching Physiology

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At the behest of the Office of Technology Assessment (OTA), George A. Hedge, President of the Association of Chairmen of Departments of Physiology (ACDP), was asked to gather information on the use of animals in laboratory teaching for a forthcoming publication prepared for Congress of "Alternatives to Animal Use in Research, Testing and Education." The report issued in the fall of 1985 will serve as the benchmark for all future surveys on animal usage. The ACDP survey was completed in six weeks and a return of 65% on such short notice indicates how seriously this issue is viewed by physiologists.

The OTA has adopted the definition of "alternatives" to include any method "that *replaces* the use of laboratory animals altogether, *reduces* the number of animals required, or *refines* existing procedures or techniques so as to minimize the level of stress endured by the animals." If we consider the three R's in terms of teaching physiology, the ACDP survey shows that they are already being practiced. Over the past decade, 6 schools have dropped labs completely and 52 report a 63% reduction in the number of animals used (question 25). The reasons for the drop are multiple (see questions 26 and 27) and obviously have nothing to do with pressure by the animal welfare community. Another factor, not listed, is the ultimate obsolescence of polygraphs, transducers, etc., with equipment in most schools 10 or more years old and with little likelihood that administrators will view this as a top priority for replacement.

For various reasons, in some schools laboratories are no longer in vogue, but 84% of respondents still have them and of these 89% have laboratories using animals and 59/74 have dog laboratories. It is noteworthy that for 18 schools the number of dogs used in teaching physiology amounted to < % of the number disposed of by local pounds (question 19). Space does not permit printing of the anecdotal comments, but they range from a minority view that animal laboratories are unnecessary and can be replaced by computer models to a majority emphasizing that they are irreplaceable for the student's learning experience. There are unfortunately no objective criteria available to validate either viewpoint.

I thank Darlene Limback for carrying out the computer analysis of the data.

1. Number of copies of survey mailed to ACDP members: 135

2. Number returned: 88 (65%)

Breakdown of primary affiliation:

U.S. Medical Schools	76
U.S. Osteopathic Medical Schools	2
U.S. Veterinary Schools	3
U.S. Dental Schools	2
U.S. Other (Univ.)	4
Foreign Medical Schools	4
Canadian - 3	
Other - 1	

3. Number of full time faculty in responding departments:

MEAN	12.6	RANGE	3-28
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4. How many students are taught in the following disciplines each year by your department:

	Number of Departments	Mean Number of Students	Range
Graduate	81	22.4	1-200
Medical	79	131.1	24-300
Veterinary	6	72.5	4-120
Osteopathic	4	118.3	58-215
Dental	23	88.3	25-150
Pharmacy	13	78.4	2-125
Allied Health	36	79.2	9-285
Nursing	34	100.6	2-282
Undergraduate	22	181.2	2-800
Other	14	44.7	7-120

5. How many schools have organized laboratories: 74/88 (84%)

6. How many schools have required laboratories: 61/74

What percentage of students participate: 96.4 = ± .85\*  
 \* = SEM throughout

7. How many school have optional laboratories: 17/74

What percentage of students participate: 73.3 ± 7.2

8. What percentage of the student's final grade is based on laboratory performance: (66 replies)

RANGE 0-22%

9. What percentage of the student's laboratory grade is based on the following:

	Range	Number of Schools
Practical examinations;		
laboratory performance	22-100%	7
Oral examinations:		
laboratory performance	10-100%	4
Written examinations	5-100%	31
Written reports	10-100%	13
Oral reports	10-45%	3
Other	10-100%	5

10. How many schools have labs using animals: 66/74 (89%)

11. How many departments have dog labs: 59/74 (80%)

12. How many student laboratory sessions involve the following experimental subjects:

	Number of Schools	Sessions Per School		
		Median	Average	Range
Students	59	3	3.9 ± .3	1-13
Frogs	37	1	2.1 ± .4	1-14
Turtles	14	1	1.4 ± .2	1-3
Dogs	57	2	3.1 ± .5	1-18
Cats	6	1	2.3 ± 1.3	1-9
Rabbits	12	1	1.8 ± .7	1-10
Rats	25	1	2.0 ± .5	1-10
Other mammals	5	1	1.2 ± .2	1-2
Invertebrates	5	1	1.0	1
In vitro	10	1	1.9 ± .5	1-6

13. Which subspecialty areas have dog laboratories:

	Number of Schools
General Physiology	1
Electrophysiology	1
Neurophysiology	2
Cardiovascular Physiology	48
Respiratory Physiology	16
Renal Physiology	16
Gastro-intestinal Physiology	2
Endocrinology	1

14. How many departments have cat laboratories: 6

15. Is it feasible to replace dogs or cats used in labs with another species:

	Number of Schools
Yes	8
No	50

16. Chart animal usage in your school:

*Demonstrations*

Species	Numbers of Animals				Number of Schools
	Used		Euthanized		
	Total	Range	Total	Range	
Dogs	153	1-30	136	0-20	30
Cats	3	1-2	3	1-2	2
Rabbits	14	1-6	14	1-6	4
Rats	300	2-270	30	0-12	5
Other	39	1-10	39	1-10	6

*Laboratories:*

Species	Numbers of Animals				Number of Schools
	Used		Euthanized		
	Total	Range	Total	Range	
Dogs	2917	5-240	2917	5-240	54
Cats	83	6-45	75	0-45	4
Rabbits	189	1-60	189	1-60	14
Rats	2002	8-400	1811	0-400	24
Mice	305	25-250	275	0-250	3
Guinea Pig	8	2-6	8	2-6	2
Hamsters	30	30	30	30	1
Other	3198	4-675	2695	4-675	30

(Species: turtle, frog, toad, fish, cow, goat)

17. For schools with dog laboratories, what is the source of animals:

Source	Number of Schools
Pound	14
Licensed Dealers	38
Pound and Licensed Dealers	7

18. How many dogs are used by your department per year:

Number of Dogs Used	Number of Schools
0	28
1-10	8
11-20	10
21-30	9
31-40	8
41-50	5
51-60	4
61-70	4
71-100	3
101-200	6
> 200	2
Average Number Dogs Used Per Year:	52.9 ± 6.4
Range:	2-256

19. If figures are available, how many dogs were euthanized last year by local pound (18 respondents):

	Total Dogs Used By School	Dogs Disposed of By Pound
MEAN	61.8 ± 14.6	11,139 ± 2,625
RANGE	2-256	200-35,000
Dogs Used in Laboratories Compared To Dogs Disposed of by Pounds = 0.55%		

20. How many departments reuse animals in more than one lab: 6

Species	Number of Schools
Rat	4
Rabbit	6
Cat	2
Dog	3

21. What method of euthanasia is used at the end of lab: (60 Replies)

	Number of Schools
Anesthetic overdose	45
Potassium chloride injection	21
Pneumothorax	5
Fibrillation by electrical shock	3
Magnesium sulfate injection	1
Decapitation (small rodents)	3
Pithing (frogs, toads, turtles)	5

22. In laboratory exercises using animals, how many students work in a group:

Number of Students Per Group	Number of Schools
3	3
3-4	2
4	25
4-5	12
5	8
6	7
6-7	1
8	2
10	1
16	1
Average Number of Students Per Groups:	4.95
Range:	3-16

23. Which alternatives to live animals models are being used in your school:

	Number of Schools
<i>Replacements</i>	
Computer simulation	28
In vitro techniques	10
Mannequins	5
Physical/chemical models	8
Videotapes and audio/visual aids	56
Invertebrate species	6
Greater reliance on students as subjects	32
<i>Reductions</i>	
Demonstrations	34
Larger groups of students sharing	16
Using single animals for multiple procedures	10
Greater reliance on students as subjects	23
<i>Refinements</i>	
Noninvasive methods (Imaging, e.g.)	2
Alter protocols to reduce pain	4
Substitute lower species	5
Other	2